Doctorate in Institute of Neuroscience

Intolerance of uncertainty, social anxiety and alcohol use among students in the United Kingdom and Indonesia

Muhamad Salis Yuniardi

110530503

March 2017

Supervisors: Prof. Mark Freeston & Dr. Jacqui Rodgers

This thesis is submitted in partial fulfilment of the degree of Doctorate in Institute of Neuroscience

I declare that this assignment is my own work and I have correctly acknowledged the work of others. This assignment is in accordance with University and School guidance on good academic conduct (and how to avoid plagiarism and other assessment irregularities. University guidance is available at www.ncl.ac.uk/right-cite.

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In memory of Devy Erfasanti. I dedicate this thesis for you and our beloved daughter, Azzahra Melica Marzie Ramadhani.

Overall table of contents

Contribution of Authors

This Ph. D thesis consists of seven manuscripts. Specific for the second manuscript with the title “The unique contribution of intolerance of uncertainty to social anxiety”, Mair Roberts and Hannah Blowfield provided the archival data. I had a principle role in the development of the study idea, definition of study questions, formulation of hypotheses, design and methodology, data management, statistical analyses and interpretation of the findings, and manuscript writing and revisions. For the other six manuscripts, I was responsible for the entire process. My supervisors, Professor Mark H Freeston and Doctor Jacqui Rodgers, provided guidance throughout.

Acknowledgements

I would like to express my gratitude to my supervisors, Professor Mark Freeston and Dr Jacqui Rodgers, for their exceptional mentorship and sincere support throughout my studies. The term “supervisor” does not encapsulate what they have given to me in terms of accomplishing my study and the development of my personal character over the last few years, particularly during a very challenging personal time. It was truly invaluable and I greatly appreciate it.

I would also like to express my sincere appreciation to Dr Alison Tyson-Capper, Dr. Fiona LeBeau, Dr Gabriele Jordan and Dr. Robert Dudley, for their support, suggestions and encouragement. Furthermore my thanks go to all the gate keepers and participants both in the UK and Indonesia for their assistance in data collection. I would also like to acknowledge the contribution of archival data from the following undergraduate students: Mair Roberts and Hannah Blowfield. I would also like to thank to my “supervisor-mates”: Alin, Khulood, Tim and Nicola for their support, encouragement and ideas and furthermore to Michael Henderson for the proof-reading.

I would like to express a sincere thank you to my parents. My prayers are always for you and even though you are not here anymore, your love and guidance are always the light in my life. To my sisters: mbak Yuyun, mbak Ana and Ningrum, for their unwavering support and love.

A very special thank you goes to my beloved wife, Devy Erfasanti, who sincerely loved me, unconditionally accepted me and sincerely supported me with her genuine love. Although you are not with us any more, we will always love you and your love will always be in our hearts. To my beloved daughter, Azzahra Melica Marzie, your eyes, smile and happiness always strengthen me. No words can describe the love your mum and I have for you. I dedicated this thesis to both of you.

Overall abstract

This thesis principally aimed to investigate the precise role of IU in the development and maintenance of social anxiety and the relationship between IU, social anxiety and alcohol use. Furthermore, most of the findings of this thesis are original.

A development and factor analyses of the Newcastle Substance Use Questionnaire (NSUQ), four independent cross-sectional studies and an experimental study were conducted. Non-clinical samples were recruited and entire studies were conducted online.

The UK student sample study (university students; N = 349), the Indonesian study (N = 540) and also the replication of the UK student sample study (N = 200) reported that IU, FNE and AS each consistently made significant additive and unique contributions to the variance in social anxiety. The UK mixed sample study (N = 112) reported that both IU and FNE each made significant contributions, whilst shame did not. All the UK studies reported that IU contribution was the second greatest; whereas from the Indonesian study, the contribution of IU was the smallest. Each reported that the contribution of FNE was the greatest.

Both the UK mixed sample and the UK student sample studies found that the effect of IU on social anxiety was significant only when FNE was intermediate to high. As FNE increased, the effect of IU in predicting social anxiety became stronger. The reversed analysis in the UK mixed sample study found that the effect of FNE on social anxiety was significant only when IU was intermediate to high, whereas in the UK student sample study it was significant at all levels of IU. Both studies reported that the effect of FNE on social anxiety became stronger as IU increased. The UK student sample study also reported that the effect of IU on social anxiety was significant at all levels of AS and it was augmented as the increasing of AS levels, whereas the effect of AS on social anxiety was significant only when IU was intermediate to high and it was augmented as the increasing the levels of IU.

Moreover, the UK and Indonesian studies reported that FNE, IU and AS each consistently contributed to the variance in worry and depression symptoms. The UK study also found that the effects of IU on worry were significant at all levels of FNE or only when AS was low to high. The increase in FNE or AS decreased the impact of IU on worry. The reversed analyses found that the effects of either FNE or AS on worry were significant only when IU was low to high. Their effects became negative as IU increased.

Furthermore, the experimental study (university students from the UK; N = 164) found that situational IU caused social anxiety and safety behaviours in the social interaction situation, although not in the social performance situation. It also provided evidence of

temporal precedence concerning the IU predisposition on safety behaviours in social interaction situation. It also provides evidence that the FNE predisposition influenced social anxiety and safety behaviours, in both situations. Unexpectedly, situational FNE was not effectively manipulated to cause social anxiety and safety behaviours.

The factor analyses (participants of the UK student sample study; N = 285) reported that the three-factor solution of the alcohol section of the NSUQ was superior to other solutions and also interpretable. Social factor accounted for the most variance, followed by cognitive factor and lastly, sexual factor. Improving social interaction attained the highest rate and drinking alcohol with friends is the most frequent context.

The UK student sample study and the replication also investigated the relationship between IU, social anxiety, social motives and alcohol use with friends. Both studies reported that the direct effects of IU, FNE and AS on drinking alcohol with friends were not significant. Moreover, the indirect effects of these cognitive vulnerabilities through social anxiety were significant and negative. Only the indirect effect of FNE through social motives was significant and positive. However, the indirect effect of IU through social anxiety and social motives serially was significant and positive, whereas the indirect effect of FNE was not significant.

Overall, this thesis establishes the important role of IU, in conjunction with FNE and ASI, in predicting social anxiety; but also provides an initial evidence that IU may in fact have a causal role in social anxiety. Moreover, IU is a transdiagnostic factor which may underlie comorbidity across social anxiety and GAD. Lastly, this thesis reported that socially anxious students may be less inclined to participate in social activities and eventually less likely to take part in social drinking. However, they may be motivated by social reason to use alcohol as a social lubricant.

Institute of Neuroscience

Chapter 1. General Background

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March 2017

Supervisors: Prof. Mark Freeston & Dr. Jacqui Rodgers

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Contents

Chapter 1. General Background

1. Introduction

Social anxiety is one of emotional disorders (anxiety disorders and mood disorders) and the third largest mental disorder worldwide, following substance use and depression. Various approaches have been proposed to clearly understand the aetiology and maintenance of social anxiety, but the cognitive approach has been considered as the most influential approach (Brendan & Bradley, 1998; Butler, 1985; Emmelkamp, 1982; Morrison & Heimberg, 2013; Ouimet, Gawronski & Dozois, 2009; Rapee & Heimberg, 1997; Riskind, 1997; Stopa & Clark, 1993) in part because it has implications fro treatment through CBT approaches seeking to modify cognition.

Meanwhile, trait variables, such as perfectionism (Newby et al., 2017), neuroticism (Hong, 2013; McEvoy & Mahoney, 2012; Newby et al., 2017) and conscientiousness (Hong, 2013) also significantly linked to social anxiety. Interestingly, first, their relationship is probably mediated by cognitive variables. It has been reported that the relationship between either neuroticism (i.e. Hong, 2013; McEvoy & Mahoney, 2012) or conscientiousness (Hong, 2013) and social anxiety was mediated by cognitive variables. This indicates that trait variables not in the same order with cognitive variables. Secondly, trait variables has been indicated being influenced by genes and thus, it is heritable (i.e. Bartels, van de Aa, van Beijsterveldt, Middeldorp, & Boomsma, 2011; Gillespie, Evans, Wright, & Martin., 2004; Hansell et al., 2012; Lamb et al., 2010; Rettew et al., 2006). On the other hand, cognitive variables are postulated to be the result of learning process and thus, they are considerably more treatable.

Considering cognitive vulnerability factors, recently, there have been an increasing number of studies providing evidence of a consistently moderate correlational relationship between social anxiety and intolerance of uncertainty (IU) (e.g. Boelen & Reijntjes, 2009; Boelen, Vinssen & Tulder, 2010; Brown & Gainey, 2013; Carleton, Collimore & Asmundson, 2010; McEvoy & Mahoney, 2011 & 2012; Norr et al., 2013). In addition, none of these studies compared the relative contribution of IU to the contributions of fear of negative evaluation (FNE) and anxiety sensitivity (AS) and investigated any possible interactions between IU and these other factors. Moreover, three studies have provided an indication that a reduction in IU is associated with a reduction in social anxiety (Boswell, Hollands, Farchione

& Barlow; 2013; Hewitt, Egan & Rees, 2009; Mahoney & McEvoy, 2012). However, none of these studies have provided evidence of the temporal precedence of IU over social anxiety.

Interestingly, an increasing number of studies have reported that IU may be a transdiagnostic factor across anxiety disorders and depression (e.g. Boelen & Reijntes, 2009; Carleton et al., 2012; Fetzner, Horswill, Boelen & Carleton, 2013; Frank et al., 2012; Yook, Kim, Suh & Lee, 2010). Given these results, it is considered relevant for future studies to investigate the possible relationships between IU and various different psychological disorders (Boelen & Reijntjes, 2009; Carleton, 2012), including alcohol use.

In addition to this, numerous studies have investigated the relationship between social anxiety and alcohol use among adolescents or students with mixed results. For instance, Buckner and Turner (2009), Nelson et al. (2000), and Zimmerman et al. (2003) reported that social anxiety positively correlated with alcohol use. Conversely, Frojd, Ranta, Kaltiala-Heino and Marttunen (2011), Ham, Zamboanga, Olthuis, Casner and Bui (2010), and Johnson, Wendel and Hamilton (1998) reported that highly anxious students drank less frequently because they preferred to avoid social interactions. These equivocal results indicate that further studies are required.

Given a possible link between IU and social anxiety, in addition to the equivocal relationship between social anxiety and alcohol use, it is proposed that there may also be a correlation between IU and alcohol use. While several studies have examined either IU and social anxiety or social anxiety and alcohol use, to the best of our knowledge, no study has examined all three variables simultaneously. This thesis will attempt to connect them all together in a way that we hope will lead to a better understanding than is currently available.

The studies of this thesis will be conducted in and involve higher educational institutions in both the United Kingdom and Indonesia. Firstly, let we define several terms used in this thesis and subsequently summarise the evidence for the relationships among these main variables.

2. Social Anxiety

2.1. Definition and prevalence

Social anxiety is characterised by an irrationally excessive fear of being criticised or embarrassed in either social interaction or performance situations, which could interfere with the social and occupational functions of individuals whom suffer from it (American Psychiatric Association, 2013). Social anxiety is comprised of two sub-types: interaction

anxiety (fear when engaging in conversation) and performance anxiety (fear when undergoing a specific task in front of the public) based on two types of social situations, primarily, social interaction and social performance (Mattick & Clarke, 1998; Whiting et al., 2014). People can be diagnosed with a social anxiety disorder if they experience one or both types (American Psychiatric Association, 2013).

The prevalence rate of social anxiety within the community is approximately 3%-13% (American Psychiatric Association, 2013; Beek, 1995; Grant, Stewart, O'Connor, Blackwell & Conrod., 2007; Kessler, Chiu, Demler & Walters, 2005; Magee, Eaton, Wittchen, McGonagle & Kessler, 1996; Stein & Stein, 2008; Xu et al., 2012). For instance, based on a study among adult households in the USA, it was reported the 12-month and lifetime prevalence of social anxiety in the community were 6.8% and 12.1%, respectively (Kessler et al., 2005). Specifically among students, a study conducted in France estimated the 12-month prevalence of social anxiety at 3.2% (Verger, Guagliardo, Gilbert, Rouillon & Masfety, 2012). A higher prevalence was reported in Turkey, specifically 9.6% (Izgiç, Akyüz, Dogan, & Kugu, 2014). Finally, a study in Brazil estimated the prevalence of social anxiety at 11.6% (Baptista et al., 2012). It is possible that the different diagnostic tools used in these studies could also in part account for the different rates reported.

There are no official data from Indonesia, although three studies have reported a range of prevalence among students varying from 9% to 22% (Kraaimaat, van Dam-Baggen, Veeninga & Sadarjoen, 2012; Suryaningrum, 2006; Vriends, Pfaltz, Novianti & Hadiyono, 2013). Several issues related to methodology are noted from these studies and, consequently, their conclusions in connection with the prevalence of social anxiety should be treated with great caution. For instance, Suryaningrum (2006) utilised a brief questionnaire, which was developed based on social phobia criteria mentioned in the DSM-IV, but without any examination of its internal reliability. In addition, participants were diagnosed and classified based on the tertile-split (high vs. moderate vs. low) of the scale's total scores. Moreover, Kraaimaat et al. (2012) utilised the Inventory of Interpersonal Situations, but this scale does not measure the somatic symptoms of social anxiety whereas several studies have reported that Asians are rather more prone to somatic symptoms related to anxiety rather (e.g. Chen, Chen & Chung, 2002; Hinton, Park, Hsia, Hofmann & Pollack, 2009; Kirmayer, 2002). Vriends et al. (2013) classified participants' level of social anxiety based on the DSM-IV social phobia checklist, although they did not provide any further information regarding how they came to their conclusions. In addition, participants in these three studies were recruited from only one city. Consequently, it is unwise to generalise such the results to represent overall social anxiety in Indonesia, which is a multicultural country.

Even in the absence of robust prevalence data, given the total population of Indonesia was approximately 250 million people in 2015 (Badan Pusat Statistik, 2015), so if we take the lowest prevalence rate for social anxiety (3%) reported by the American Psychiatric Association (2013), we can estimate that more than 7 million Indonesian people may be affected by social anxiety.

2.2. Models explaining social anxiety

Two well-known cognitive models attempt to explain the aetiological process of social anxiety. The first is the Cognitive Model of Social Phobia proposed by Clark and Wells (1995). Here, when individuals encounter a social situation or simply anticipate it, they will make assumptions about it. If they perceive social danger, such as a negative evaluation by others, they will shift their attention from the external environment (social situation) to a detailed monitoring of their internal condition. This excessive self-focus may lead to the construction of a negative self-impression and increase fear of negative evaluation. Eventually, social anxiety is triggered. Subsequently, the individuals concerned will employ a range of safety behaviours in order to reduce the risk of negative evaluation as well as their anxiety. However, these safety behaviours prevent them from eliciting confirmation of their beliefs. More importantly, the safety behaviours may lead to a greater degree of negative self-appraisal as a result of their incapability to face social situations and consequently, this leads to greater distress and increasing social anxiety. A vicious circle is initiated.

The second model is the Cognitive Behavioural Model of Social Phobia proposed by Rapee and Heimberg (1997) which was later further developed by Heimberg, Brozovich and Rapee (2010). As opposed to the previous model, this model underlines the discrepancy between mental representations about the self (internal) and the environment (external). Similarly to the previous model, the process starts when individuals encounter a social situation or simply anticipate it. However, they not only make mental representations (assumptions) about the external environment, but also about their internal condition. These two mental representations are developed based on a variety of information sources: long term memory (e.g. prior experience), internal cues (e.g. physical symptoms) and external cues (e.g. other people' feedback). Discrepancies between mental representation about internal condition and the external environment will lead to a highly negative-self appraisal and an excessive fear of negative evaluation. Both cognitive biases enhance social anxiety and reduce the quality of their social interaction and social performance and consequently, they will get negative feedback from others. This negative feedback will be negative input concerning self-

incapability and unpleasant social situations for further mental representation. Again, a vicious circle ensues.

Despite their differences, both models similarly highlight the role of fear of negative evaluation (FNE), a fear of receiving negative judgements from other people (Levinson et al., 2013; Watson & Friend, 1969), as the principal causal factor in social anxiety. A large number of studies have provided strong evidence to support the relationship between FNE and social anxiety (e.g., Carleton, Collimore & Asmundson, 2007; Collins, Westra, Dozois & Stewart, 2005; Stopa, 2001; Weeks et al., 2005; Weeks, Heimberg, Rodebaugh & Norton, 2008). Therefore, FNE is a more well-known reliable predictor of social anxiety in contrast to IU. Interestingly, to our knowledge, no studies have provided evidence supporting the temporal precedence of FNE over social anxiety.

3. Intolerance of Uncertainty

3.1. Definition and sub-dimensions

IU is a cognitive bias where there is an excessive tendency to perceive and interpret that an uncertain situation will lead to a negative outcome and thus, the situation is considered unacceptable and is avoided (Buhr & Dugas, 2002; Carleton, 2012; Carleton, Sharpe & Asmundson, 2007; Dugas, Schwarzt & Francis, 2004). IU is considered to be a dispositional characteristic more than a temporary cognitive bias and therefore, IU can be reasonably stable (Buhr & Dugas, 2009; Carelton, 2012; Koerner & Dugas, 2006 & 2008).

Individuals with high IU believe that they are unable to cope with uncertain situations (Carleton, 2012; Holaway, Heimberg & Coles, 2006) and eventually often fail to provide effective responses in such situations (Andersen & Schwartz in Carleton, 2012; Freeston, Rheaume, Letarte, Dugas & Ladoucer, 1994). Thus, theoretically, they would be liable to choose maladaptive behaviours and cognitive strategies as coping mechanisms when encountering situations they consider to be uncertain or potentially threatening (Behar, DiMarco, Hekler, Mohlman & Staples, 2009).

Dugas et al. (2005) reported that individuals with significant levels of IU were more likely to interpret ambiguous information as more threatening than those with low levels of IU. Furthermore, Carleton (2012) explained that IU consists of three elements of anxiety: (i) a sense of uncontrollabity over an uncertain situation, (ii) a sense of inescapability with regards to handling potentially future negative outcomes; therefore, (iii) tending to perceive uncertain situations as threats "*that are unequivocally certain but are also, as of yet, unrealised"*

(Carleton, 2012; p. 938). At present, IU may lead to anxiety which is a response to a potential threat that may or may not occur. Again, according to Carleton (2012), this is in accordance with cognitive distinction related to social anxiety as suggested by Suarez, Bennett, Goldstein & Barlow (2009; in Carleton 2012), who remark that a "sense of uncontrollability focused on the possibility of future threats, danger or other potentially negative events". Overall, individuals having high IU would be more likely to interpret uncertain social situations may have uncertain outcomes. The same as situations that are threatening in that they cause distress, lead to unhelpful behaviours, etc.

Freeston et al. (1994) measured IU in terms of the endorsement of a range of beliefs: being an uncertain person reflects badly on an individual, uncertainty triggers negative emotional reactions, such as frustration or stress, consequently uncertainty should be avoided, as eventually uncertainty inhibits action. Moreover, Carleton, Norton and Asmundson, (2007) established that IU had two factors which they initially labelled prospective and inhibitory anxiety. The former factor emphasises "fear and anxiety based on future events", whereas the latter factor stresses "uncertainty inhibiting action or experience" (p. 112). McEvoy and Mahoney (2011) replicated these factors, but stated that: "...it may be that prospective IU (P-IU) and inhibitory IU (I-IU) are more appropriate labels for the IUS subscales, to reflect the fact that emotional responses to uncertainty are not specific to anxiety (p. 120)".

However, independently of McEvoy and Mahoney (2011), a systematic review of factor analytic studies on IU (in English) at the time was published by Birrell, Meares, Wilkinson and Freeston (2011). They concluded that among the various factors described in numerous studies, two factors were stable across studies and corresponded to those identified by Carleton, Norton et al. (2007) and McEvoy and Mahoney (2011): "desire for predictability" and "uncertainty paralysis". Birrell et al., (2011) defined desire for predictability as "some active response to an uncertainty in an attempt to make a situation more predictable" (p. 1205), whereas uncertainty paralysis can be described as "being unable to respond in uncertain situations" (p. 1205).

3.2. Intolerance of uncertainty and social anxiety

IU was originally conceived to explain worry, the hallmark of Generalized Anxiety Disorder (GAD) (Carleton, Norton, 2007; Freeston et al., 1994) and numerous studies supported this (e.g., Buhr & Dugas, 2009; Dugas, Marchand & Ladouceur, 2005; Freeston et al., 1994; Zlomke & Jeter, 2014). However, a decade later, IU was determined to be of interest beyond GAD (Carleton, 2012).

GENERAL BACKGROUND

Recently there has been an increase in cross-sectional studies reporting a consistently moderate correlational relationship between IU and social anxiety. As previously explained, social anxiety is characterised by an excessive fear of being criticised or embarrassed in social interaction, or during a social performance. However, this fear of negative evaluation could be stated to be an irrational fear given either being criticised or creating a poor impression is, as of yet, unrealised. Therefore, social anxiety could also be defined as an excessive fear of the ***possibility of*** being criticised or embarrassed in social interaction, or during a social performance. Although fear of the uncertain outcomes in relation to social situations could be implicitly defined as an intolerance to the uncertain outcomes of a social situation, Whiting et al., (2014, p. 261) stated, "Surprisingly, researchers have only recently begun to explore the relation of IU to social anxiety".

Riskind, Tzur, Williams, Mann and Shahar, (2007) first reported that IU correlated significantly with social anxiety. This finding has since been replicated with evidence obtained from various samples: among adolescents (Boelen et al., 2010), undergraduates (Norr et al., 2013; Whiting et al., 2014), community volunteers (Boelen & Reijntjes, 2009; Boelen, Reijntjes & Carleton, 2014; Carleton et al., 2010) and clinical samples (Brown & Gainey, 2013; McEvoy & Mahoney, 2011 & 2012; Michel, Rowa, Young & McCabe, 2016; Sapach, Carleton, Mulvogue, Weeks & Heimberg, 2015).

Half of these previous studies (Boelen et al., 2010; Boelen & Reijntjes, 2009; Brown & Gainey, 2013; McEvoy & Mahoney, 2011; Norr et al., 2013; Riskind et al., 2007) used the Intolerance of Uncertainty Scale-27 (27 items; Freeston et al., 1994). However, the factor structure of IUS-27 has been reported to be unstable across studies investigating its latent structure (Buhr & Dugas, 2002; Carleton, Norton et al., 2007; Freeston et al., 1994; Norton, 2005).

From a study on two independent groups of large samples, recruited in Canada and the US, Carleton, Norton et al. (2007) reported several possible limitations of the IUS-27. First, none of the previously reported one-, four- and five-factor solutions were superior in terms of meeting the criteria for goodness of fit. Second, there was a high number of items loading on multiple factors. Third, Cronbach's alpha was very high. Fourth, there was one factor from one multi-factor solution that had items loaded on different factors in the other model and vice versa. Fifth, there were high correlations between these factors and all other factors in these solutions. Finally, there were two pairs of items with very high inter-correlations. The limitations related to lack of superior fit and multiple loadings indicate that the reported factor solutions were not optimal, while the limitations related to internal consistency and high correlation indicate the presence of redundant items. Carleton, Norton et al. (2007)

recommended the development of a more efficient version that is able to meet the minimum criteria of reliability.

Moreover, Carleton, Norton et al. (2007) also observed that these two factors, one from each model, contained different items and that they could serve as a basis around which to revise the scale, dropping items from the other factors with which they correlated strongly. This resulted in 17 items. Subsequently, they also removed two redundant items (one from each pair) and further narrowed the focus of the scale by dropping three items that the least semantically related to the retained factors.

The remaining 12 items demonstrated the two expected factor structures (Carleton, Norton et al., 2007). These two factors are the prospective anxiety, which is "fear and anxiety based on future events", and the inhibitory anxiety, which is "uncertainty inhibiting action or experience" (Carleton, Norton et al., 2007; p. 112). In addition, the IUS-12 strongly correlated with the total scores of the IUS-27, and showed adequate internal consistency and a similar pattern of convergent and divergent validity to the IUS-27. All of this would indicate that the extra 15 items from the IUS-27 are redundant and thus, IUS-12 is a more efficient, if somewhat narrower, tool (Carleton, Norton et al., 2007). Later, Birrell et al. (2011) reviewed six previous exploratory analyses and four confirmatory factor analyses (CFA) studies of two-factor models. They concluded "two factors with 12 consistent items emerged throughout the exploratory studies and the stability of models containing these two factors was demonstrated in subsequent confirmatory studies" (p. 1198).

Moreover, half of these previous studies used the Social Performance Scale (SPS) and/or the Social Interaction Anxiety Scale (SIAS), either using both scales (McEvoy & Mahoney, 2011 & 2012; Whiting et al., 2014) or only one of them (Norr et al., 2013; Sapach et al., 2015). Both SPS and SIAS were developed by Mattick and Clarke (1998) and they measure fear and avoidance as the main features of social anxiety in two separate aspects (performance and interaction situations) of social anxiety. Later, Carleton et al. (2009) proposed a more efficient tool, the Social Interaction Phobia Scales (SIPS), which unifies both scales. The other scale covering both situational aspects is the Social Phobia Inventory (SPIN) proposed by Connor et al. (2000). This is different from the Social Interaction Phobia Scales (SIPS; Carleton et al., 2009) which is a combination of SPS and SIAS, whereas the SPIN not only measures fear and avoidance, but also physiological discomfort related to both performance and social interactions.

In conjunction with increasing evidence of the cross-sectional or correlational relationship between IU and social anxiety, two studies (Boelen & Reijntjes, 2009 and Whiting et al., 2014) investigated the relative contribution of IU compared to the fear of

negative evaluation (FNE). As a result of comparisons between IU and FNE, it appears that different covariates lead to different outcomes. For instance, FNE was comparable with IU when controlling for neuroticism and six other cognitive variables (anxiety sensitivity, low self-esteem, the three perfectionism subscales and pathological worry), either when entered over neuroticism only (52.8% and 51.6%, respectively) or when entered as the last variable (6.6% and 5.4%, respectively) (Boelen & Reijntjes, 2009). However, Whiting et al. (2014), who independently replicated Boelen and Reinjtes (2009) study, reported that in both types of social anxiety, FNE was a stronger predictor than IU when controlling for perfectionism, worry and obsessive-compulsive symptoms. Concerning interaction anxiety, FNE and IU accounted for 39% and 20% respectively, while in relation to performance anxiety, FNE and IU made up 36% and 28% correspondingly. In addition, different measures and samples may also affect the outcome. Boelen and Reinjtes' utilised IUS-27 and SPIN (Social Phobia Inventory; Connor et al., 2000) and recruited a group of grieving adults, while Whiting et al. utilised IUS-12 and SIAS and recruited undergraduate samples.

Recently, Sapach et al. (2015) also examined the relative contributions of IU, FNE, fear of positive evaluation (FPE) and AS. They entered FNE as the first variable, whereas IU and the other variables were entered collectively in the subsequent step. This means that they highlighted FNE and did not analyse a clear comparison of each contribution. Once they had controlled FNE, all three variables entered made significant individual contributions, although the relative importance of each was not analysed.

Another cognitive factor that has been linked with social anxiety is anxiety sensitivity (AS), a fear of arousal of "bodily sensation" which is believed could lead to harmful consequences and, thus, intensify anxiety (Hazen, Walker & Stein, 1994; Naragon-Gainey, 2010). Although originally proposed by Reiss, Peterson, Gursky and McNally (1986; in Naragon-Gainey, 2010) as a specific vulnerability trait for panic disorder, further studies found AS across anxiety disorders, depression and even in substance use disorders (Naragon-Gainey, 2010). Referring to the definition of AS which is "anxiety over anxiety symptoms" and AS has been found across anxiety disorders, Taylor et al. (2007) suggested that AS may act as an anxiety amplifier.

Regarding the relationship between AS and social anxiety, the evidence has been found from: clinical children (e.g. Alkozei, Cooper & Creswell, 2014), clinical adolescents (e.g. Essau, Sasagawa & Ollendick, 2010), clinical adults (e.g. Hazen et al., 1994; Naragon-Gainey, Rutter & Brown, 2014; Rodriguez, Bruce, Pagano, Spencer & Keller, 2004; Scott, Heimberg & Jack, 2000; Taylor, Koch & McNally, 1992), non-clinical children (Alkozei et al., 2014) and non-clinical adults (e.g. Taylor et al., 1992). Among clinical adults it was

reported that AS had the strongest association with panic disorders in comparison to other anxiety disorders (Rodriguez et al., 2004; Scott et al., 2000; Taylor et al., 1992). Interestingly, Essau et al. (2010) reported that AS was most strongly associated with social anxiety in comparison to all other anxiety disorders among adolescents, whereas Alkozei et al., (2014) reported that socially anxious children had higher levels of AS than anxious children (not specifically social anxiety) and non-anxious children.

Moreover, Moore et al. (2009) conducted three independent experiments (two with university students and one with patients at a clinic for anxiety) where all participants were asked to indicate their anxiety as if they themselves were in the multiple embarrassing scenarios presented. Subsequently, their AS levels were measured. The same pattern of results was found across experiments, where, greater AS predicted higher level of anxiety.

Recently, Nowakowski, Rowa, Anthony and McCabe (2016) conducted a treatment study examining CBT that targeted AS for patients suffering social anxiety and patients with depression. They reported that the changes in AS following the therapy significantly predicted the treatment outcomes of both groups. Further analysis revealed that changes in the AS physical and the AS social sub-scales made significant contributions to the prediction of post-treatment social anxiety, however, only the changes regarding the AS physical sub-scale made a significant contribution to the prediction of post-treatment depression. Although neither study did not demonstrated temporal precedence, they provided support for the notion that, AS may have a causal relationship with social anxiety. Overall, this recent study proposed that AS amplifies the social anxiety caused by FNE and IU.

Not only having significant correlations, these three cognitive risk factors may mediate the relationship between trait variables and social anxiety. McEvoy and Mahoney (2012) reported that IU mediated the relationship between neuroticism and social anxiety. Moreover, Hong (2013) reported that IU, FNE and AS mediated the relationship of neuroticism and conscientiousness to various emotional disorders including social anxiety.

Apart from IU, FNE and AS, there are several other cognitive vulnerability factors that have been reported, which have a significant relationship with social anxiety, such as rumination, low self-esteem and a high level of self-presentation. Rumination, which is a form of excessive self-attention, is a repetitive thought concerning negative emotion. Several studies reported that it predicted depression (Hong, 2013; Liao & Wei, 2013; Noelen-Hoeksema & Davis, 1999; Noelen-Hoeksema & Morrow, 1991) and anxiety disorders (Hong, 2013; Liao & Wei, 2011; Noelen-Hoeksema, 2000; Watkins, 2004), including social anxiety disorder (Hong, 2013). Interestingly, Liao and Wei (2013) also reported that rumination mediated the relationship between IU and both depression and symptoms of anxiety. This is

in accordance with a previous assumption that individuals with high IU may tend to lead to rumination, as a strategy to manage or even to lessen the feelings of uncertainty (Ward, Lyubomirsky & Nolen-Hoeksema, 2003; Watkins & Baracaia, 2001).

Moreover, several studies have also reported that low self-esteem was related to social anxiety (i.e. Iancu, Bodner, Ben-Zion, 2015; Obeid, Buchholz, Boerner, Henderson & Norris, 2013; Yen, Yang, Wu & Cheng, 2013). However, previously it has been suggested that measuring the relationship between self-esteem and social anxiety should be conducted carefully, given that it may be influenced by concerns related to self-presentation. Individuals with high social anxiety will probably be more affected by this concern rather than their self-esteem (Farnham, Greenwald & Banaji, 1999; Johnson, 1999; de Jong, 2002). Self-presentation is a tendency to attempt to present a perfect self-image and refrain from disclosing one's imperfections (Hewitt et al., 2003). It has been established that it has an even stronger relationship with social anxiety than trait perfectionism to social anxiety (Fleet & Hewitt, 2014).

Overall, it is considered important to further investigate to what extent the contribution of IU social anxiety. None of the studies mentioned specifically examined the relative contribution of IU compared to other cognitive risk factors related to social anxiety, particularly FNE and AS. In addition, none of the studies has examined any possible relationship amongst IU, FNE and AS. All those previous studies were cross-sectional studies, and thus, they preclude causal interpretation.

3.3. Intolerance of uncertainty as a transdiagnostic factor

Despite studies examining IU initially being developed to describe GAD, in recent years an increasing number of cross-sectional studies have reported that IU may be a fundamental component across anxiety disorders.

For example, it has been noted that IU was significantly associated with GAD, social anxiety and obsessive compulsive disorder (OCD), although it was not significantly related to depression, after the shared variance among symptoms has been controlled (Boelen & Reijntjes, 2009). Nonetheless, it has been demonstrated that IU correlated not only with worry, and social anxiety, but also with panic disorder (Carleton et al., 2012), depression (Carleton et al., 2012; Yook et al., 2010), post-traumatic stress disorder (PTSD) (Boelen, 2010; Fetzner et al., 2013), health anxiety (Fergus & Vaentiner, 2011) and also eating disorders (Frank et al., 2012).

Recent evidence has revealed that people from a clinical group, who experienced various anxiety disorders scored higher on the IUS-12 than the control group (non-clinical)

(Anderson et al., 2012). This is in line with the results from undergraduate, community and clinical data by Carleton et al., (2012), who reported that the IU scores were significantly and substantially higher in clinical participants, who experienced anxiety disorders or depression, in contrast to non-clinical participants.

It is worth noting that a number of studies employing hierarchical regression have illustrated that, of the two IU factors proposed by Carleton, Norton et al. (2007), the prospective factor may be more strongly related to symptoms associated with GAD and OCD, while the inhibitory factor may be more related to symptoms of social anxiety, panic disorder and depression (e.g. Carleton et al., 2012; Khawaja & McMahon, 2011; Mahoney & McEvoy, 2012; McEvoy & Mahoney, 2011 & 2012; Whiting et al., 2013) and also PTSD (Fetzner et al., 2013). Hence, it has been concluded that it was possible that IU maintains various symptoms of anxiety disorders, depression and PTSD.

Regardless of several criticisms of the self-reporting method, all of these previously mentioned studies strongly suggested IU as a robust transdiagnostic construct; a feature that has been discovered to be associated with various disorders. The non-disorder-specific nature of IU, makes it interesting and indicates that it provides more extensive opportunities for use. IU therefore could be explored in other domains in the context of clinical psychology. For instance, conducting investigations correlating IU to other mental disorders, out of those that have been investigated, and developing a more sophisticated and integrated model of psychopathology including explanation of the process underlying comorbidity across mental disorders. IU could also be used outside a clinical psychology setting, such as in health psychology or even in industrial and organisational psychology.

3.4. Intolerance of uncertainty as a plausible causal factor

Not only has it been established that IU correlates significantly with anxiety disorders and depression, but there is growing evidence indicating that IU may be a causal factor in worry and GAD. The evidence for this comes from three types of studies: a longitudinal naturalistic study, laboratory studies examining a model, and a treatment study on clinical participants which examines temporal precedence.

Firstly, Dugas, Laugesen and Bukowski *(*2012) conducted a 5 year-longitudinal study, following 338 adolescents assessed twice a year. They ascertained that reduction in fear of anxiety and IU predicted reduction in worry. Interestingly, it was discovered that IU plays a greater role than fear of anxiety. To date this is the only longitudinal study examining IU, but a natural longitudinal study such as this is not able to rule out any possible third variable.

Secondly, several laboratory studies have consistently reported that a reduction in IU predict a reduction in GAD, although various drawbacks, such as the manipulation of IU were noticeable in these particular studies. For instance, Ladouceur, Gosselin and Dugas, (2000) allocated 42 students equally into experimental and control groups. They manipulated IU through differential instructions for a gambling game. Participants were allocated into the experimental group were told that the chance of winning was very unlikely, whereas participants were allocated into the control groups were told that the probability of winning was high. The manipulation check revealed that they reliably changed the levels of IU between the groups. Those being allocated to the experimental group reported more worry than those being allocated to the control group. This indicates that increasing IU leads to greater worry. This provides an initial indication that IU may cause worry and perhaps GAD. However, it seems that although the manipulation did not clearly specify the level of uncertainty; it may have manipulated optimism-pessimism, or presumably the expectation of winning. Additionally, the dependent variable may have been measuring worry related to concern about winning the game, rather than worry as the outcome of uncertainty.

In a later study, Buhr and Dugas (2009) examined the impact of fear of anxiety and IU on level of worry by manipulating fear of anxiety. One hundred and thirty-nine participants have previously been asked to complete a series of questionnaires, including IUS, and a series of memory tests. Subsequently, they were asked to attend a psychology lecture and were informed that their memory would be measured again later on. Participants were assigned to two groups: one group received information intended to increase anxiety (a lecture explaining that anxiety is harmful), whereas the other group obtained the opposite information (a lecture explaining that anxiety is normal). The result was as expected in their hypothesis that fear of anxiety and IU predicted level of worry. However, without involving the manipulation of IU, thus, the conclusion in relation to the role of IU in GAD should be considered debatable.

Recently, Reuman, Jacoby, Fabricant, Herring and Abramowitz (2015), conducted a computer-administration task in the classroom. Using the vignette approach which represented 10 situations students frequently faced, they manipulated uncertainty related to the outcome (explicit vs implicit) and threat level (high vs low). Their hypotheses, that higher threat situations within an explicitly uncertain situation would lead to an increasing anxiety level and tendency to perform safety behaviours, were supported. However, first, the variability of baseline levels regarding anxiety was not controlled during randomisation. Variability of the participants' existing characteristics could have explained the results, but this study did not investigate this possibility. Secondly, the specificity of IU manipulation was not measured precisely. This previous study provided a manipulation check question *("How*

uncertain do you feel about this situation"), but the specificity related to whether or not the given uncertain situation actually disturbed participants' feelings was not measured. This question would be significant as an indication that participants were intolerant of the given uncertain situation. Lastly, this previous study did not specifically measure social anxiety, as their outcome variable. Despite these weaknesses, however this study was the first experimental study to provide clear evidence that IU may play a causal role in anxiety.

Most recently, Chapman (2015a) conducted a meta-analysis of eight experimental studies manipulating IU. He reported that there was a medium overall effect (r = 0.34; 95% CI = 0.22 - 0.45) of IU manipulation leading to increases in worry. However, Chapman identified potentially serious flaws in all of the studies, including demand characteristics, low ecological validity and hypothesis guessing. Addressing these issues, Chapman (2015b) conducted an experiment based online in which uncertainty was manipulated to precede worry. Participants were presented with a video consisting of a human actor and were subsequently asked to rate the person in the scenario. Furthermore, a cover story was provided, in order to avoid hypotheses guessing. These strategies enhanced the ecological validity of the experiment, although the randomisation failed. Consequently, there were significantly higher baseline levels of IUS and worry in one group, which may have affected the results. Despite this limitation, this study provided evidence that IU was manipulated and increasing IU led to the elevation of worry.

Third, a stronger evidence comes from an experimental study examining the efficacy of a treatment by Dugas and Ladouceur (2000). Through an experimental-multiple baseline design using four GAD patients, this study determined that a 16-session treatment targeting IU was able to reduce the patients' level of IU, worry and GAD symptoms, both post-treatment and during the 12-week follow up. Moreover, tested with the Box-Jenkins multivariate autoregressive moving average (ARMA) model, it showed that a reduction in IU preceded a reduction in worry. Interestingly, the reverse was not true in three out of four cases. This means that changes in IU were able to precede changes in levels of worry and therefore, IU is a possible causal factor in GAD.

All of these studies have provided initial evidence that IU may serve as a broad predispositional vulnerability factor for the development of worry and anxiety. However, it is too early for definitive conclusions and therefore, further investigation is warranted.

3.5. Intolerance of uncertainty as a possible causal factor in social anxiety

Although stronger evidence has been demonstrated for GAD, relatively little is known concerning causal relationships in social anxiety. To our knowledge, an unequivocal causal

relationship between IU and social anxiety has not yet been established, although three studies have provided some initial indications that a reduction in IU are associated with a reduction in social anxiety.

First, Hewitt et al. (2009) examined the efficacy of 6 sessions of Cognitive Behavioural Therapy (CBT) specifically targeting IU for a patient who had a comorbid diagnosis of several anxiety disorders and depressive symptoms. The results demonstrated that IU and social anxiety were reduced significantly during the intervention and follow up, but not with regards to the panic disorder symptoms.

Likewise, Mahoney and McEvoy (2012) independently replicated these findings. They examined the same protocol among 32 patients diagnosed with social anxiety. They reported that this treatment was able to lead to reductions in IU, social anxiety and depression. Interestingly, the reduction in IU was associated only with the reduction in social anxiety, and not with the reduction in depression.

More recently, based on studies suggesting IU as a transdiagnostic factor, Boswell et al. (2013) examined the efficacy of 18 weeks treatment using a Transdiagnostic Cognitive-Behavioural Therapy. They conducted a Randomized Control Trial (RCT) design among 37 patients diagnosed with heterogeneous anxiety, including social anxiety and depression. The core treatment modules were designed to target the regulation of emotional experience. The patients were randomised into an immediate-treatment group or a delayed-treatment group. First, it was found that this treatment effectively reduced IU and also the severity of anxiety and depression symptoms. Second, IU reduction was significantly associated with the reduction in symptom severity across diagnoses, including social anxiety.

Notwithstanding the absence of temporal precedence supporting a causal relationship between IU and social anxiety in these previous studies, the fact that both IU and social anxiety change is a step towards supporting the idea that IU may conceivably act as a causal factor for social anxiety.

Overall, the focus of this recent study is IU given it is an emerging factor that has recently been proposed as a transdiagnostic factor across anxiety emotional disorders (see Sub-Chapter 3.3. below), including being linked with social anxiety. The contribution of IU is investigated and compared only to FNE and AS, and not with other cognitive vulnerability factors, given FNE has been stamped as the principal feature of social anxiety, while AS has been identified as the amplifier of anxiety across anxiety disorders. Therefore, it is hypothesised that these three cognitive factors may be the primary model of cognitive vulnerabilities related to social anxiety. This is the primary reason for this research studying only these three cognitive risk factors.

This is also in accordance with **the fundamental fears** proposed by Carleton, Thibodeau, Osborne, Taylor and Asmundson (2014). This concept is a refinement of the previous concept proposed by Reis (1991) who suggested that AS, FNE and Injury/Illness Sensitivity (IIS) may be the fundamental fears that essentially contribute to anxiety-related psychopathologies. Furthermore, Carleton et al (2014) added IU and pain-related anxiety. This concept proposed that each construct represents distinct reaction to common situations. FNE is the hallmark of social anxiety, IU for worry, AS for panic disorder, IIS has been studied in the context of specific phobias, and lastly pain-related anxiety is associated with chronic pain. IU and FNE are more associated with mental and social consequences, while AS covers all physical, mental and social concerns. Conversely, both IIS and pain-related anxiety appear to specifically represent physical symptoms-related fears; fear of being injured and fear of chronic pain, respectively. Carleton et al (2014) reported from their factorial analyses that these fear-related cognitive factors are distinctive although the dimensions within constructs may overlap. Therefore, these fear-related cognitive factors could be further explored as either independent or interdependent variables. All in all, fundamental fears is an overarching framework for anxiety disorders that allows variables to be **both** transdiagnostic factors and disorder specific factors across anxiety disorders.

Moreover, Hong & Cheung (2014) conducted a meta-analysis and suggested that IU, FNE and AS are cognitive vulnerabilities associated with anxiety, while ruminative style, pessimistic inferential style and dysfunctional attitudes are more associated with depression. Therefore, this makes a very neat and coherent rationale for IU, FNE and AS in anxiety disorders and social anxiety in particular. Specifically, a very neat and coherent rationale to investigate to what extent IU, which has been associated with worry, contribute to social anxiety.

Trait variables, such as neuroticism and perfectionism, are not the focus of this recent study assuming that the cognitive approach has been considered as the most influential approach (Brendan & Bradley, 1998; Butler, 1985; Emmelkamp, 1982; Morrison & Heimberg, 2013; Ouimet et al., 2009; Rapee & Heimberg, 1997; Riskind, 1997; Stopa & Clark, 1993). Trait variables have also been identified close to inherited characteristics and thus, may be less treatable/modifiable. Neuroticism, perhaps the best established trait variable that is relevant to anxiety, may not be of the same order with IU seeing as the relationship between neuroticism and social anxiety is mediated by cognitive variables (i.e. Hong, 2013; McEvoy & Mahoney, 2012). Although perfectionism has been proposed by some as a cognitive transdiagnostic factor within anxiety models (e.g. Levinson et al., 2015), others

have argued that it is fundamentally a trait variable (e.g. Hong, 2013; Hong & Cheung, 2014; Newby et al., 2017).

Once the proposed model involving IU, FNE and AS has been supported, further investigation expanding the model is possible. This may involve either other cognitive risk factors, for instance rumination, self-esteem and self-presentation or trait variables, such as neuroticism and perfectionism would be interesting.

4. Substance Use

4.1. Definition of substance use

In this thesis, substance use is defined as consumption of any legal or illegal psychoactive substances. This can be applied to a range of substances consisting of 11 classes: alcohol; amphetamines; caffeine; cannabis; cocaine; hallucinogens; inhalants; nicotine; opioids; phencyclidine; and sedatives, hypnotics or anxiolytics (American Psychiatric Association, 2013). Note that this definition of substance use, although consistent with the DSM-IV classes of Substance Use Disorders, encompasses a more extensive range of individuals who engage in the experimental or recreational use at different frequencies through to persistent use with negative impacts on functioning or dependence. When there is significant negative impact of substance use or dependence, the substance use may subsequently be considered a disorder.

4.2. Definition of Substance Use Disorders

According to DSM-V (American Psychiatric Association, 2013), Substance Use Disorders (SUD) are among of the Substance-Related Disorders; along with Substance-Induced Disorders. Substance Use Disorders are defined as any maladaptive pattern of taking or consuming substances accompanied by clinically significant impairment or distress. Furthermore, Substance-Induced Disorders are a reversible substance-specific syndrome development manifested in significant maladaptive behavioural or psychological changes caused by substance ingestion or exposure.

Substance Use Disorders are further divided into two groups; specifically: Substance Abuse Disorders and Substance Dependence Disorders. Substance Abuse Disorders are defined as a repeated pattern of legal or illegal substance use for at least a year, accompanied by one or more of: failure to fulfil social, academic or occupational obligations; recurrent use in situations in which it is physically dangerous to do so; repeated legal problems due to

substance use; or continued use despite recurrent interpersonal problems caused or made worse by substance use. Substance Dependence Disorders are a pattern of using legal or illegal substances for at least a year with three or more of the following negative consequences: tolerance; withdrawal; a substance is taken in larger quantities or for longer periods; persistent unsuccessful efforts to reduce; investment of considerable time in activities required to obtain the substance; reduction or abandoning of social, occupational or recreational activities; or continued use despite knowledge that substance use causes or exacerbates particular physical or psychological problems.

The definitions given clearly distinguish between substance use and Substance Use Disorders. The number of people who may be formally defined as suffering from a Substance Use Disorder will be a subset of those considered to be substance users; a substance user can only be diagnosed with a Substance Use Disorder when the required numbers of criteria for either impact on functioning and/or consequences are met. Throughout the text, *substance use* will be referred to without capitalisation; whereas when the literature specifically refers to disorders, the words will be capitalised *Substance Use Disorders (or Substance Abuse, Substance Dependence).*

4.3. Prevalence of substance use and Substance Use Disorders

In the general population in the US, the prevalence of Alcohol Use Disorder, Alcohol Dependence Disorders and Alcohol Abuse have been estimated to be 8.5%, 3.8% and 4.7%, respectively. Additionally, the prevalence of Drug Use Disorders, Drug Dependence Disorders, and Drug Abuse was 2.5%, 0.9% and 1.6%, respectively (Compton, Dawson, Duffy & Grant, 2010). In contrast, the Adult Psychiatric Morbidity Survey conducted in England, in 2007, approximated the prevalence of hazardous drinking and Alcohol Dependence at 24.2% and 5.9%, correspondingly. Additionally, this survey also estimated the prevalence of Drug Dependence at 3.4%, where Cannabis Dependence was at 2.5%, while Other Drugs Dependence was 0.9% (McManus, Meltzer, Brugha, Bebbington & Jenkins, 2009). Recently, the Crime Survey for England and Wales (CSEW) reported that in 2011/2012, approximately 37.7% of young people (16-24 years) (approximately 2.5 million people) in the United Kingdom had consumed illegal drugs and 19.3% (approximately 1.3 million people) had consumed illicit drugs during the previous year. Additionally, the report took into account that 14.6% of students used prohibited drugs in the previous year, while figures for the unemployed and employed were 19.8% and 8% respectively (Crime Survey for England and Wales, 2012).

Focusing particularly on students in the UK, it has been reported that only 11% of students were not alcohol users, 59% had experience of illicit drugs and 19.8% of students consumed cannabis regularly (Webb, Ashton, Kelly & Kamali, 1996). Furthermore, a survey in the US reported that the lifetime prevalence of any illicit drug and alcohol use among college students were 49.2% and 80.5% respectively, while the 12-month prevalence of any illicit drug use and alcohol use among college students were 36.3% and 77.4% respectively (Johnston, O'Malley, Bachman & Schulenberg, 2012).

Moreover, it is important to note that there are studies that do provide diagnostic data from student samples. For instance, a study in Belgium by Aertgeerts and Buntinx (2002) reported that 10.5% of students met the criteria for Alcohol Abuse Disorder and 3.6% for Alcohol Dependence Disorder. Additionally, a further study in France reported that the estimated 12 month prevalence of Substance Use Disorder was 8.9% (Verger et al., 2010). However, the different definitions and measures used in these studies could in part account for the different prevalence rates.

A similar trend has been reported in Indonesia, although the prevalence was smaller. According to a study conducted by the National Narcotics Agency and the Centre for Health Research at the University of Indonesia, approximately 9.6 million people (5.9% of the total population) had experience of consuming one or more illicit drugs over their life-time. Meanwhile, 2.2% of that number had consumed drugs in the last year (approximately 3.7 million people), increasing from 1.9% in 2008 (Badan Narkotika Nasional, 2012). Furthermore, specifically for students (N = 38663), this national survey also revealed the prevalence of students who had experience of using illicit drugs over their life time was 4.3% (95% CI: 4.1% to 4.5%), while the prevalence of students who had consumed drugs over the last 12 months was 2.9% (95% CI: 2.73% to 3.07%). This national survey stated with 95% confidence that 41 to 45 out of 1000 students in Indonesia had some experience of illicit drugs during 2011-2012 and 27 to 30 out of 1000 students had consumed drugs in the last 12 months (Badan Narkotika Nasional, 2012).

4.4. The effects of substance use and its motivation

Different types of substances obviously will lead to distinguishable effects on brain chemistry and therefore impact on mood, cognition, sensation and behaviour in different ways. Substances have been classified into several principal classes based on the distinguishable effects on neurotransmitters (e.g. Julien, 1997; Parrott, Morinan, Moss & Scholey, 2004). For instance, Hallucinogens such as ecstasy (MDMA) and LSD are well known as recreational drugs. Hallucinogens boost serotonin and therefore induce visual and

auditory hallucinations, which consequently separate hallucinogen users from reality. Moreover, hallucinogen users will also feel extremely pleasant and euphoric. Conversely, it has a different effect to alcohol, an example of a CNS Depressant that works on GABA, the inhibitory neurotransmitter centre. Thus, the breathing rate decreases and psychomotor performance is impaired (slows down), which makes alcohol users feel more relaxed, and less anxious (Julien, 1997; Parrott et al., 2004). A complete summary of substance classes is enclosed in the appendix.

Moreover, it is proposed that individuals take substances because they are motivated in relation to a variety of goals. According to Cox and Klinger (1988) there are four types of motivation that underlie an individual's decision to use a substance, which are constructed from two dimensions: outcome (positive-negative) and source (internal-external). These are crossed, leading to four types: to seek positive moods (positive-internal), e.g. for the reason that it gives a person a feeling of pleasure; reduce negative emotions (internal-negative), e.g. to forget problems; obtain social rewards (positive-external), e.g. to be sociable and to avoid social rejection (negative-external), e.g. therefore, a person will not feel left out.

However, a recent review by Muller and Schumann (2011) proposed a more sophisticated explanation. Concerning the various effects of substances on neurotransmitters, individuals use a substance as an instrument or a tool to achieve a range of personal goals: improving social interaction, facilitating sexual behaviour, developing cognitive performance and counteract fatigue, aid recovery from and coping with psychological stress, self-medication for mental health problems, expanding perception horizons, to become euphoric, improving physical appearance and attractiveness, and assisting with spiritual and religious activities. They proposed a number of examples; CNS depressants, such as alcohol are commonly used to facilitate social interaction due to their ability to reduce anxiety and increase talkativeness. In addition, stimulants for instance amphetamine and MDMA are preferred more by students to enhance their academic performance, while in several cultures and religions; psychedelic drugs are commonly used in meditation and rituals.

Since this model was proposed in 2011, a growing number of studies have investigated it (e.g. Morgan, Noronha, Muetzelfeldt, Fielding & Curra, 2013; Sattler, Sauer, Mehlkop. & Graeff, 2013; Wolff & Brand, 2013; Wolf, Brand, Baumgarten, Loses & Ziegler, 2014). For instance, Morgan, et al. (2013) asked 5791 participants recruited from 40 countries to rate the harms and benefits associated with 15 commonly used drugs or drugs classes. Moreover, Wolff and Brand (2013) reported that overwhelming demands in school predicted neuroenhancement or the use of substances to enhance cognitive function. Neuroenchacement

is a novel term proposed by Wolff and Brand (2013) based on the instrumental motives proposed by Muller and Schuman (2011).

Eventually, given the theoretical frameworks discussed above, it can be proposed that the instrumental motives related to substance use will play a role in decision making, concerning type, degree and setting regarding substance use.

5. Substance Use and Social Anxiety

Several studies have examined the linkage between substance use/Substance Use Disorders and social anxiety among adolescents or students with equivocal results. For instance, Schneier et al., (2010) reported that the lifetime prevalence of co-morbidity between Alcohol Use Disorders and Social Anxiety was 2.4%. Moreover, Essau, Conradt and Petermann (1999) established that 23.5% of those who met the criteria for Social Phobia also had Substance Use Disorders. However, the small number of participants meeting the criteria pertaining to Social Phobia disorder in this study was noted to be a limitation (17 out of 1305, accounting for only 1.6%).

Further studies have concentrated on a specific substance or compared two specific substances. Buckner, Schmidt, Bobadilla and Taylor (2006) revealed a unique relationship between Cannabis Use Disorders (CUD) and social anxiety, although not with Alcohol Use Disorders. However, this research did not distinguish between Dependence Disorders and Abuse Disorders. Interestingly, in a later more comprehensive study among adolescents, Buckner et al., (2008) reported that social anxiety is a significant predictor of Alcohol or Cannabis Dependence Disorder, although did not predict Alcohol or Cannabis Abuse Disorder.

Other studies among adolescents and college students have reported similar results. For instance, social anxiety with co-morbid depression was also a strong predictor of Alcohol Dependence Disorders (Nelson et al., 2000), whereas social anxiety correlated significantly with Alcohol Abuse Disorder and Alcohol Dependence Disorder (Zimmerman et al., 2003), or with Alcohol Use Disorders (Buckner & Turner, 2009).

Only a few studies have examined the role of social anxiety as a plausible causal factor in substance use. Bakken, Landheim and Vaglum (2005) conducted a retrospective study among in-patients and out-patients participating in rehabilitation. Using a retrospective-cross sectional method they determined that 70% of these patients had been diagnosed with Social Anxiety a year or more prior to being diagnosed with either Alcohol or Poly-Substance

Dependent Disorder. Notwithstanding the limitations of a retrospective study, such as recall bias, this study provided an initial indication that social anxiety is possibly a causal factor in relation to substance use.

Stronger evidence comes from a 14-year longitudinal study conducted by Buckner et al. (2008) (N = 1,709; Mean age T1 = 16.6, SD T1 = 1.2). This study ascertained that Social Anxiety diagnosed at T1 was significantly associated with either Alcohol or Cannabis Dependence Disorder although not with Alcohol or Cannabis Abuse at T4. Therefore, they concluded that social anxiety might be a plausible causal risk factor for either Alcohol or Cannabis Dependence Disorder. Interestingly, Buckner et al. (2008) established that only social anxiety and not anxiety disorders or mood disorders predicted later Substance Dependence. The possible explanation proposed was that an individual experiencing GAD characterised predominantly by excessive anxiety easily becomes worried about numerous things, including their health. Consequently, they may tend to avoid substances. However, despite the large number of participants involved and the strong design, there are very few participants in most diagnostic categories. This led to clearly odd ratios and therefore, the prevalence may be difficult to generalise.

Tension Reduction Theory, originally proposed by Cappell and Greeley (1987) is the most commonly discussed concept applied as an explanation for comorbidity between substance use and anxiety disorders, including social anxiety. According to this theory, people use substances to reduce the negative affect. This agrees with the conclusion of Grant et al. (2007) and Merril and Read (2010) who reported that one of the reasons that students use substances is to enable them to cope with anxiety. Therefore, we proposed that socially anxious individuals are more liable to respond to social situations with distress, which interferes with their life and makes them more likely to use substances to relieve their negative affect.

Conversely, Frojd et al. (2011) reported that symptoms of social anxiety did not elevate the incidence of either substance use or alcohol use among adolescents in Finland and they proposed a possible explanation of this result. They proposed that adolescents require social skills, in order to access alcohol or other substances that are illegal in Finland. Additionally, adolescents in their study tended to use alcohol or other substances within social situations with their peers, something that would trigger anxiety in adolescents with social anxiety. This is in line with the result from Moreno et al., (2012) that there were no differences related to fear of anxiety and depressive symptoms between recreational users (groups of alcohol or cannabis users) and non-users. They suggested that students who use substances recreationally were driven more by sensation seeking rather than to manage symptoms of

anxiety or depression. Additional studies conducted by Johnson et al., (1998) and a similar study by Ham et al.(2010) examining the correlation between social anxiety and drinking games, regularly established on college campuses, reported that exceedingly anxious students drank less frequently given that they prefer to avoid social interactions, including drinking games.

However, it is also possible that there is a correlation, although no causal relation since there may be unmeasured variables that lead to both social anxiety and substance use (Zimmerman et al., 2003).

The inconsistent findings concerning the linkage between the use of substances and social anxiety, particularly among students, who typically use substance recreationally, has not yet been precisely explained, indicating a need for further investigation.

Given the somewhat equivocal findings regarding the correlation between social anxiety and substance use and the stronger findings of a relationship between IU and social anxiety, the preceding discussion suggests possible correlations among these three variables. Moreover, as reported above, IU is proposed to be a transdiagnostic feature across anxiety disorders and depression. As Boelen and Reijntjes (2009) and Carleton (2012) argued, it would be relevant for future studies to assess the specificity of IU to different psychological disorders.

To our knowledge, no studies have so far examined the relationship between IU, social anxiety and substance use. Hence, this thesis seeks to further develop the model of social anxiety concerning the role of IU and consequently, it will be the first study to examine the relationship between IU, social anxiety and substance use.

6. Acculturation

Acculturation is the modification of cultural and psychological characteristics within a group or an individual, as a result of contact with people from other cultures (Berry, 2005). Thus, people may identify with their culture of origin or the predominant culture they find themselves in. This is not only the case for immigrants or the children of immigrants; it can also apply to traditional versus modern culture, or sub-cultures within a dominant culture.

The United Kingdom is one of several favoured destination countries for international students. Its long history of education and a number of prominent universities mean that it attracts thousands of international students every year. This applies equally to most universities in the United Kingdom (The Complete University Guide, 2013). For instance, in 2013, Newcastle University had 4,248 international students from over 110 countries

worldwide or approximately 20.56% of its 20,660 students (Public Relation Directorate of Newcastle University, 2013). This means that Newcastle University is a multicultural university with a mixture of various cultures, including a generic British culture, 'Geordie', which is the local culture of Newcastle, the cultures of British students of non-British ethnicity (in UK census terms), students from the European Union, and various cultures brought by international students.

Likewise, Indonesia is also a multi-ethnic society, consisting of approximately 1000 ethnicities/sub-ethnicities, of which 15 ethnic groups have a population of more than 1 million people (Suryadinata, Arifin & Ananta, 2003). Each ethnicity has its own languages, range of dialects, social norms and rules of behaviour that sometimes oppose each other (Cunningham, 2012).

This signifies that both countries, especially in terms of student populations in the larger cities, are melting pots for various cultures. It is argued that acculturation is an inevitable process encountered and experienced by many of the students in the UK and Indonesia indeed. Consequently, it is interesting to explore whether acculturation moderates the relationship between IU, social anxiety and substance use. Finally, the main proposed relationships among the variables examined in this thesis are indicated in the appendixes.

7. The Aims of the Study

Based on the discussion related to the background given above, the principal aim of this thesis is to address the following questions:

1) To what extent and in what way is IU related to social anxiety?
2) To what extent and in what way are IU and social anxiety associated with alcohol use?

However, this thesis also aims to address the following specific questions:

1. To what extent is the relative contribution of IU to social anxiety compared to the contributions of the other risk factors related to social anxiety?
2. To what extent and in what way does IU interact with the other risk factors related to social anxiety in predicting social anxiety?
3. Is the contribution of IU specific to only social anxiety, or is it also established in GAD symptoms (worry) and depression?
4. Is the relationship between IU and social anxiety only correlational, or could it be causal?
5. Does IU have direct and indirect effects on alcohol use?

6. To what extent is the relationship between IU and social anxiety similar to or different between students from the United Kingdom and Indonesia? Does acculturation influence these relationships?

Prior to answering the primary and secondary questions above, this thesis will examine the following preliminary questions:

1. What are the psychometric properties of the Newcastle Substance Use Questionnaire?
2. Are there any differences in terms of motives and contexts related to the use of differential substance classes?
3. What are the psychometric properties of all of the measurements in relation to the Indonesian versions used in this thesis?

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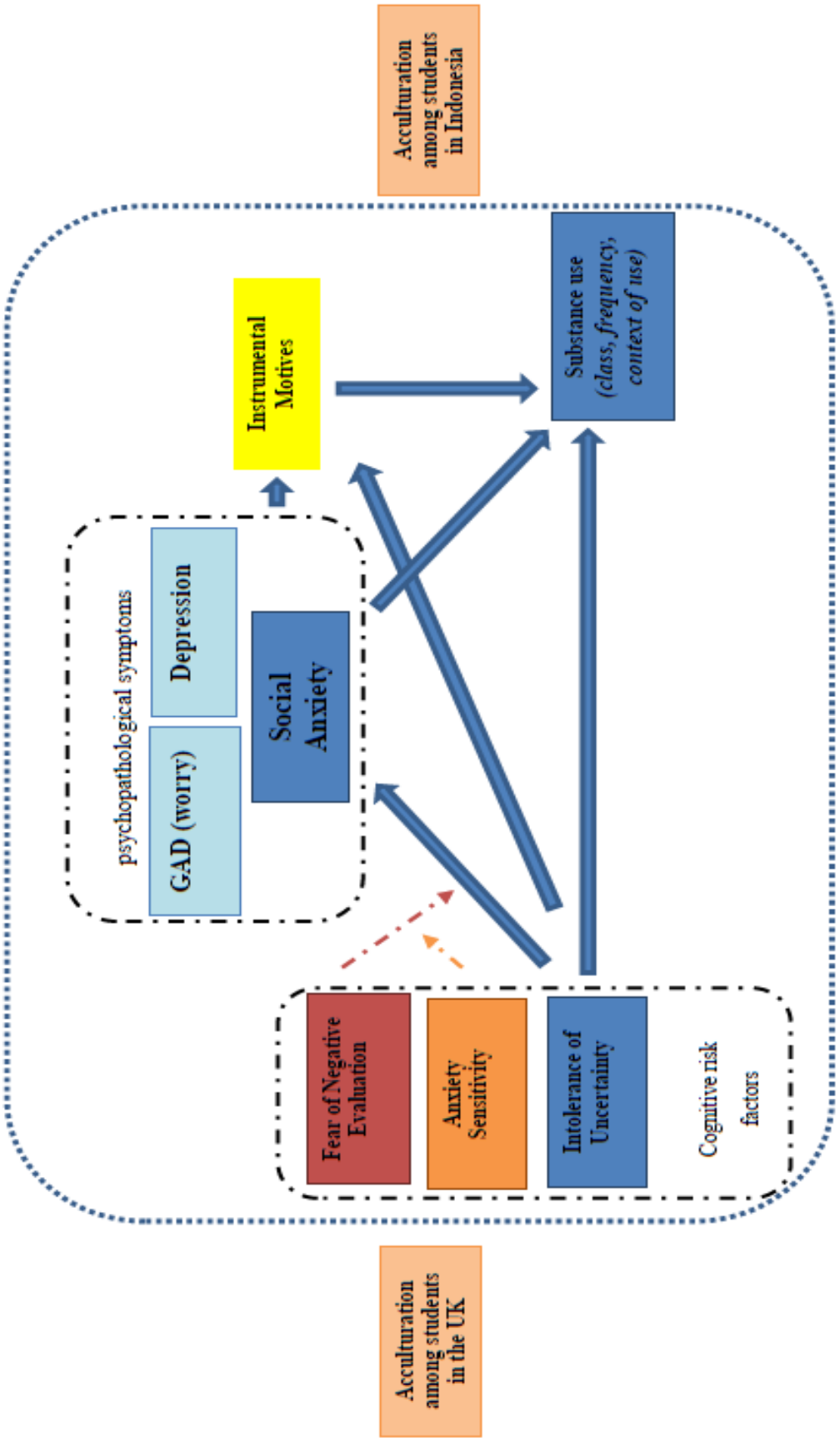
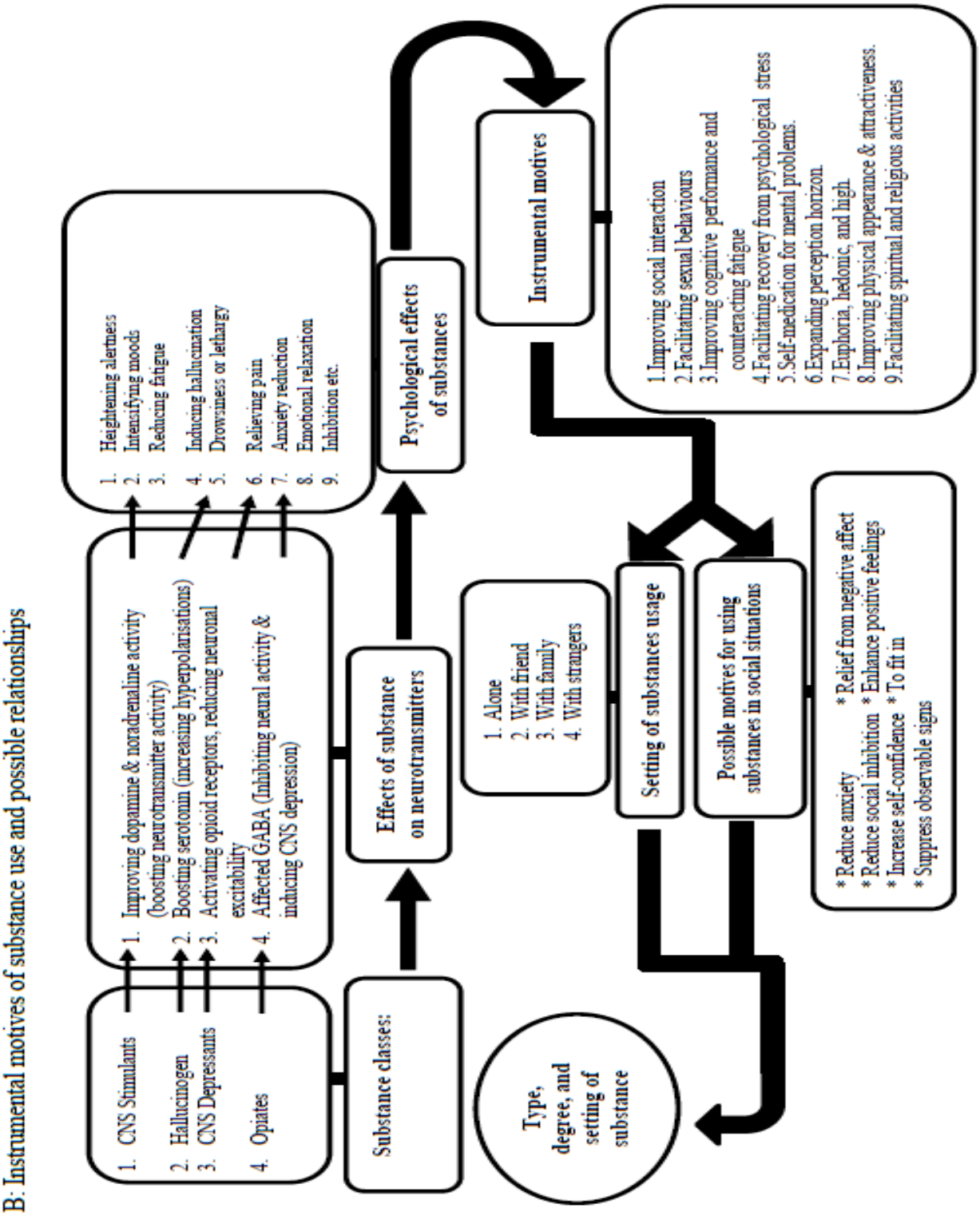
List of appendices

Appendix A: Possible relationship between main variables explored within this thesis



Notes: in blue colour are the primary variables, and in the black colour are the secondary variables

Appendix B: Instrumental motives of substance use and possible relationships



Institute of Neuroscience

Chapter 2. The Unique Contribution of Intolerance of Uncertainty to Social Anxiety

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I declare that this assignment is my own work and I have correctly acknowledged the work of others. This assignment is in accordance with University and School guidance on good academic conduct (and how to avoid plagiarism and other assessment irregularities. University guidance is available at www.ncl.ac.uk/right-cite

Contents

Abstract

Introduction: An increasing number of studies have provided evidence that intolerance of uncertainty (IU) may be a transdiagnostic factor across anxiety disorders, including social anxiety. Consequently, a few recent studies have attempted to compare a relative contribution of IU to fear of negative evaluation (FNE), a well-known predicting factor of social anxiety, with equivocal results. Moreover, shame has also recently been linked to social anxiety. Therefore, this study aimed to examine the relative contributions of IU to social anxiety and the presence of IU's possible interactions with FNE and shame in predicting social anxiety.

Method: Of 112 participants, nearly one half of whom were university students, completed a series of online questionnaires. Hierarchical regression via SPSS version 21.0 to examine the relative contribution of IU and interaction analyses using PROCESS macro for SPSS to investigate any possible interactions were performed.

Results: IU and FNE each consistently predicted social anxiety whilst shame unexpectedly did not. Although the contribution of IU was smaller than FNE, IU consistently provided additive and unique contributions to the variance in social anxiety over and above FNE. An interaction between IU and FNE was detected. IU predicted social anxiety only when FNE was intermediate to high. The relationship between IU and social anxiety was augmented by the increasing levels of FNE. FNE also predicted social anxiety only when IU was intermediate to high. The relationship between FNE and social anxiety was also augmented by the increasing levels of IU.

Conclusion: These findings extend our understanding of the critical role of IU in predicting social anxiety. Although FNE might be a stronger predictor of social anxiety, IU has a consistent predictive correlation to and consistently accounts for a significant proportion of social anxiety. Furthermore, IU and FNE strengthen each other in predicting social.

Chapter 2. The Unique Contribution of Intolerance of Uncertainty to Social Anxiety

1. Background

Social anxiety is a persistent fear of being criticized or embarrassed in social situations (American Psychiatric Association, 2013). The prevalence of social anxiety based on the general population data varies widely from 3% to 13% (American Psychiatric Association, 2013; Grant et al., 2005; Kessler, Chiu, Demler & Walters, 2005; Magee, Eaton, Wittchen, McGonagle & Kessler, 1996; Stein & Stein, 2008; Xu et al., 2012). Similar ranges have been reported among student samples (Baptista et al., 2012; Izgiç, Akyüz, Dogan & Kugu, 2004; Verger, Guagliardo, Gilbert, Rouillon & Masfety, 2010).

Various theorists have argued that there is no single cause for all mental disorders and that they are frequently represented by a cluster of several risk factors (e.g. Fyer & Brown, 2009; Hyman, 2003; Levinson et al., 2013). For social anxiety, various cognitive risk factors have been proposed which possibly contribute to social anxiety. One cognitive risk factor that is currently receiving increased attention is intolerance of uncertainty (IU) which is a cognitive bias to perceive and interpret uncertain situations in a negative way (Buhr & Dugas, 2002; Carleton, 2012; Carleton, Sharpe & Asmundson, 2007; Dugas, Schwarzt & Francis, 2004).

Interestingly, IU was originally conceived to explain worry (Carleton, Sharpe, 2007; Freeston, Rheaume, Letarte, Dugas & Ladoucer, 1994) and numerous studies support this (e.g., Buhr & Dugas, 2009; Dugas, Marchand & Ladouceur, 2005; Zlomke & Jeter, 2013). Recently, several studies have provided increasingly consistent evidence suggesting that IU may be a transdiagnostic factor or a fundamental component across anxiety disorders and depression (Boelen & Reijntjes, 2009; Carleton et al., 2012; Khawaja & Mcmahon, 2011; Mahoney & McEvoy, 2012; McEvoy & Mahoney, 2011 & 2012; Michel, Rowa, Young & McCabe, 2016).

A number of studies among adolescents (Boelen, Vrinssen, & Tulder, 2010), undergraduates (Norr et al., 2013; Riskind, Tzur, Williams, Mann & Shahar, 2007; Whiting et al., 2014), community volunteers (Boelen & Reijntjes, 2009; Carleton, Collimore & Asmundson., 2010) and clinical samples (Brown & Gainey, 2013; McEvoy & Mahoney, 2011 & 2012; Michel et al, 2016; Sapach, Carleton, Mulvogue, Weeks & Heimberg, 2015) have provided evidence of a consistently moderate correlational relationship between IU and social

anxiety. IU has been found to predict social anxiety symptoms after controlling for various other factors, such as anxiety sensitivity (AS) (Boelen & Reijntjes, 2009; Norr et al., 2013), fear of negative evaluation (FNE) (Boelen & Reijntjes, 2009; Carleton et al., 2010; Whiting et al., 2014), neuroticism (Boelen & Reijntjes, 2009; McEvoy & Mahoney, 2011 & 2012), negative affectivity (Boelen et al., 2010; Norr et al., 2013), distress tolerance and discomfort intolerance (Norr et al., 2013).

Several of these previous studies (Boelen et al., 2010; Boelen & Reijntjes, 2009; McEvoy & Mahoney, 2011; Norr et al., 2013) employed the original version of the Intolerance of Uncertainty Scale (IUS-27 items; Freeston, Rheaume, Letarte, Dugas & Ladoucer, 1994). There are several issues corresponding to this original scale. For instance, the factor structure of the IUS-27 has been reported to be unstable across studies investigating its latent structure (Buhr & Dugas, 2002; Carleton, Norton & Asmundson, 2007; Freeston et al., 1994; Norton, 2005) and none of the solutions were superior in terms of meeting criteria for goodness of fit (Birrell, Meares, Wilkinson & Freeston, 2011; Carleton, Norton et al., 2007). A detailed discussion of these issues about the IUS-27 can be found in Chapter 1.

Addressing these issues, Carleton, Norton et al. (2007) proposed the IUS-12, which is a short version of the IUS-27, in which the two factor structures are consistently stable (Carleton, Norton et al., 2007). Those two factors are labelled Prospective Anxiety, "fear and anxiety based on future events", and Inhibitory Anxiety, "uncertainty inhibiting action or experience" (Carleton, Norton et al., 2007; p. 112). Secondly, the IUS-12 performed comparable to the original IUS-27 in terms of its psychometric properties (internal consistency, convergent and divergent validity) and its total scores strongly correlated with the total scores of the IUS-27, suggesting that the extra 15 items from the IUS-27 are redundant (Carleton, Norton et al., 2007). Therefore, the IUS-12 is a more efficient tool, particularly for a study utilising a series of questionnaires.

Moreover, several of these previous studies utilised the Social Performance Scale (SPS) and the Social Interaction Anxiety Scale (SIAS), either together (McEvoy & Mahoney, 2011 & 2012; Whiting et al., 2014) or individually (Norr et al., 2013). These two scales were proposed by Mattick and Clarke (1998) and measure two aspects of social anxiety, social interaction and social performance anxiety, separately. Later, these two scales were combined and condensed to become one scale, which is known as the Social Interaction Phobia Scale (SIPS; Carleton et al., 2009). This new scale demonstrated high correlations with both the original measures; providing support for its validity and utility (Carleton et al., 2009). Although both aspects of social anxiety are distinct, it would be more efficient for a cross-

sectional study, particularly an exploratory study such as this one, to utilise a scale that covers both aspects together.

It should be noted that an increasing number of studies have employed hierarchical regression analyses to investigate the sub-dimensions of IU recommended by Carleton, Norton et al. (2007). It has been found that the prospective factor is moderately more related to symptoms identified with Generalised Anxiety Disorder (GAD) and Obsessive Compulsive Disorder (OCD). On the other hand, the inhibitory factor is partially more related to symptoms of social anxiety, panic disorder and depression (Carleton et al., 2012; Khawaja & Mcmahon, 2011; Mahoney & McEvoy, 2012; McEvoy & Mahoney, 2011 & 2012; Whiting et al., 2013) and moreover, Post-Traumatic Stress Disorder (PTSD; Fetzner, Horswill, Boelen & Carleton, 2013).

With an increasing amount of evidence of the consistently moderate correlational relationship between IU and social anxiety, two studies (Boelen & Reijntjes, 2009; Whiting et al., 2014) have attempted to examine the relative contribution of IU compared to FNE, the fear of receiving negative judgements from other people (Levinson et al., 2013). Boelen and Reijntjes (2009) reported that the contributions were comparable, whereas Whiting et al. (2014) reported that FNE was a stronger predictor of social anxiety than IU. The use of different covariates, measures and samples may account for these inconsistent results.

FNE was proposed over forty years ago to explain social anxiety (Watson & Friend, 1969). A large number of studies has provided strong evidence that FNE is a reliable predictor of social anxiety (e.g., Carleton, Collimore & Asmundson, 2007; Collins, Westra, Dozois & Stewart, 2005; Stopa, 2001; Weeks et al., 2005; Weeks, Heimberg, Rodebaugh & Norton, 2008; Winton, Clark & Edelmann, 1995). FNE has been established as contributing to social anxiety even after controlling for various factors, such as IU (Boelen & Reijntjes, 2009; Carleton et al., 2010; Whiting et al., 2013), neuroticism (Boelen and Reijntjes, 2009), anxiety sensitivity (Boelen & Reijntjes, 2009; Carleton et al., 2010), and more recently social appearance and perfectionism (Levinson et al., 2013). Two well-known cognitive models of social anxiety, the Cognitive Model of Social Phobia (Clark & Wells, 1995) and the Cognitive Behavioural Model of Social Phobia (Heimberg, Brozovich & Rapee, 2010; Rapee & Heimberg, 1997), also consider FNE to be the primary cognitive risk in relation to social anxiety (see Chapter 1). However, none of studies has provided evidence of its causal relationship with social anxiety.

Moreover, given that one of the characteristics of social anxiety is the fear of receiving judgments that may lead to being embarrassed, shame has also recently been associated with social anxiety (Fergus, Valentiner, McGrath & Jencius, 2010; Gilbert, 2000; Hedman, Strom,

Stunkel & Mortberg, 2013). Those reporting social anxiety excessively focus on the self as unable to impress others and consequently, avoid negative judgements from others (Gilbert, 2001). This point meets the fact that human competition for a social position to be positively valued is naturally part of major adaptation to human evolution and thus, disposition to shame or proneness to shame can act as a warning (Matos, Pinto-Gouveia & Gilbert, 2013); as a mental ability to excessively focus on "how others' think about us" (Gilbert, 2003, 2007) and so could be one route to the fear of negative evaluation .

Shame is a painful feeling caused by the consciousness of being scrutinized negatively or rejected socially (Gilbert, 2000; Hedman et al., 2013; Tangney, Miller, Flicker & Barlow, 1996). Shame is characterised by an evaluation of a "bad self" and is thus frequently followed by withdrawal tendencies (Cohen, Wolf, Panter & Insko, 2011; Tangney & Dearing, 2002). For instance, Hedman et al. (2013) reported that person with SAD are more prone to experience shame than people without SAD.

It is noted that these previous studies measuring the relationship between shame and social anxiety have used the Test of Self-conscious Affect (TOSCA). This questionnaire theoretically aims to predict both the emotional and behavioural reactions of respondents, whether guilt or shame, over a series of wrongdoing situations (Tangney, Wagner & Gramzow, 1989). However, several studies have critiqued TOSCA. Firstly, TOSCA-shame does not measure shame as its original definition. Luyten Fontaine and Corveleyn (2002) discovered that TOSCA-shame measures more about negative self-esteem, which is a maladaptive aspect related to shame, rather than shame itself. Secondly, TOSCA does empirically not distinguish between the tendency to feel emotions of guilt and shame (Luyten et al., 2002; Sorolla, Piazza & Espinosa, 2011). They found that TOSCA-shame predicted emotions associated with guilt, shame and self-critique.

Thus, addressing these critiques, Cohen et al. (2011) proposed a new measure, the Guilt and Shame Proneness Scale (GASP), which is believed to be able to distinguish between guilt and shame and between emotional traits (indicated with a pattern of attitudes) and behavioural traits (indicated with a pattern of intentions). They proposed guilt and shame proneness to highlight the liability of experiencing both painful feelings, more than the emotional and behavioural reactions of either guilt or shame. GASP consists of two characteristics of guilt, which includes negative-behaviour evaluations and repair actions and the two characteristics of shame, namely negative self-evaluation and withdrawal action tendencies (Cohen et al., 2011; Ross, Hodges & Salmivalli, 2013). To date, no study has measured the correlation between social anxiety and shame proneness and as operationalised by the GASP. Therefore, from our understanding that shame proneness is the ability to think about how others see us,

this recent study would be the first study examining the potential relationship between shame proneness and social anxiety.

Furthermore, negative affectivity was initially suggested three decades ago as one of the key vulnerability factors in the development of both depression and anxiety disorders (Hall (1977) in Watson & Clark, 1985) and a large number of studies have supported this (e.g. Brown, Chorpita & Barlow, 1998; Clark, Watson & Mineka, 1994; Watson & Clark, 1984; Watson, Clark & Harkness, 1994). Negative affectivity is an unpleasant subjective feeling or emotion that subsumes a variety of negative mood states, including anger, contempt, disgust, guilt, fear and nervousness (Watson, Clark & Tellegen, 1988). Therefore, negative affectivity is presumably a proxy variable within the model of social anxiety. Such a variable has a close relationship with the variable of interest. In addition, it would also be likely to improve the result when intentionally being included in an analytic model. This is different to a confounding variable that may influence the results in undesirable ways and thus, should be controlled.

The principal aim of this study is to examine the relationship between IU and social anxiety. The results obtained are expected to clarify how the model of the occurrence and maintenance of social anxiety can be made more precise.

2. The Aims of the Study

The principal aim of this study is to address the following questions:

1) To what extent is IU related to social anxiety?
2) To what extent is the relative contribution of IU to social anxiety compared to the contributions of FNE and shame?
3) To what extent and in what way does IU interact with FNE and shame in predicting social anxiety?

This study also aims to explore:

1) To what extent are the sub-dimensions of IU related to social anxiety?
2) To what extent does negative affect contribute to the proposed model?

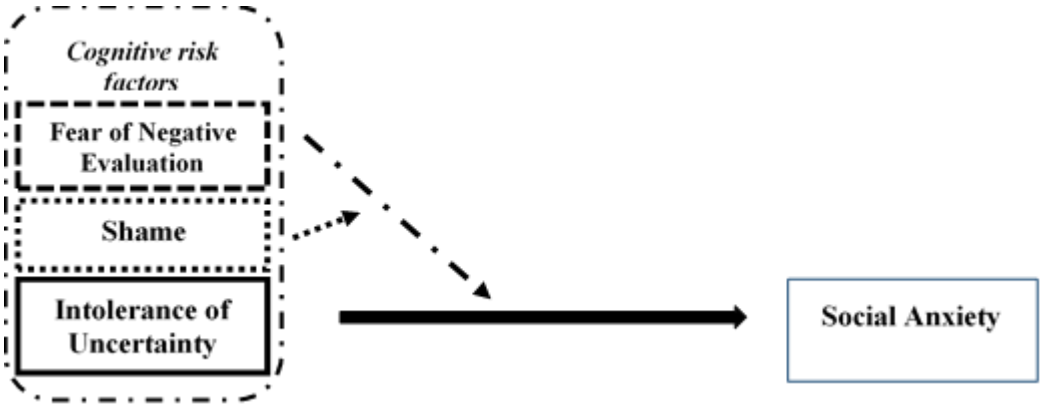

Figure 1. Model being investigated

3. Method

3.1. Participants

Participants were recruited using internet-based advertising; through Facebook and E-mail. They accessed the information page through an internet link. Once they had provided consent, they completed a series of online questionnaires displayed using Qualtrics software. The total number of participants who accessed the information page was 129, although 13 participants did not opt in. Hence, the total number of participants was 116 (Mean age = 34.47; SD = 15.09; 50% were in the 21-23 years old range). The overwhelming majority of participants were Caucasians (97.4%), two third were females (73.3%), and close to one half (46.6%) were university students. Of this number, four participants provided data only on some questionnaires and their data are retained only in internal reliability estimates (Cronbach's α) for those questionnaires. A total of 112 participants provided their complete data and are included in the main analyses. The study was approved by the School of Psychology Human Ethics Committee at Newcastle University.

As the data had been already collected, a sensitivity power analysis for multiple regression was performed using G*Power 3 software ((Faul, Erdfelder, Buchner & Lang, 2009; Faul, Erdfelder, Lang & Buchner, 2007) to estimate the effect size detected from the 112 participants, for power = .80, with α = .05. As a result, this study can detect a near medium effect size (f^2 = .10, R^2 = .09). Therefore, the final sample of 112 participants was judged to be sufficient.

3.2. Measures

3.2.1. Social Interaction Phobia Scales (SIPS)

The SIPS (Carleton et al., 2009) was derived from two scales, specifically the Social Interaction Anxiety Scale (SIAS) and Social Phobia Scale (SPS), developed by Mattick and Clarke (1998). This scale discriminates between people who experience social distress and those who do not. The SIPS consists of 14 items measured on a 5-point Likert scale, ranging from 0 (not at all) to 4 (extremely). Examples of SIPS's items are *"I have difficulty talking with other people"* and *"I can feel conspicuous standing in a queue"*.) The internal consistency of this scale is excellent (α = .96; Carleton et al., 2010).

3.2.2. Brief Fear of Negative Evaluation scale, Straightforward (BFNE-S)

The BFNE-S (Weeks et al., 2005) is a revision of the original BFNE (Leary, 1983). The BFNE-S consists of 8 items that are rated on a 5-point Likert scale ranging from 0 (not at all characteristic of me) to 4 (extremely characteristic of me). Examples of its items are *"I am frequently afraid of other people noticing my shortcomings"* and *"I am afraid that other people will find fault with me".* It has excellent internal consistency and is more reliable across groups of samples than BFNE and BFNE-R (Weeks et al., 2005).

3.2.3. The Intolerance of Uncertainty Scale – Modification (IUS-M)

The IUS-M (Walker, 2008) is an ease of language modification of the Intolerance of Uncertainty Scale-12 (IUS-12) (Carleton, Norton et al., 2007). The items were modified to make it more easily understood by people in general, without changing the meanings. Examples of items from the IUS-12 are "*Unforeseen events upset me greatly"* and *"It frustrates me not having all the information I need"*, were changed in the IUS-M as "*When things happen suddenly, I get very upset"* and *"It bothers me when there are things I don't know".* The IUS-12 itself is a revised 12-item version of the original 27-item version of the IUS (Freeston et al., 1994). The IUS-12 has been reported to have an excellent internal consistency (α = .91 for total score), convergent validity, and discriminant validity, in addition to factor stability (Birrell et al., 2011).

3.2.4. Guilt and Shame Proneness (GASP)

The GASP (Cohen et al, 2011) measures the individual tendency to experience guilt and shame, and for each construct comprises two subscales. The guilt subscales are negative behaviour-evaluation and repair action tendencies following personal misdemeanours, while

the shame subscales are negative self-evaluations and withdrawal action tendencies following publicly exposed transgression. Originally this scale used a 7-point Likert scale, however, in this study it was altered on the recommendation of the lead author to a 5-point scale ranging from 1 (not at all likely) to 5 (extremely likely) in order to decrease the range of participant's response options. Based on the purpose of this study, only shame scores (GASPS) were analysed. An example of a shame items is *"You make a mistake at work and find out a co-worker is blamed for the error. Later, your co-worker confronts you about your mistake. What is the likelihood that you would feel like a coward?"*

3.2.5. Positive and Negative Affect Schedule (PANAS)

The PANAS (Watson et al., 1988) was developed as a 10-mood checklist measuring positive and negative affectivity. Two examples of positive affectivity are "*Inspired*" and "*Active*", whilst two for negative affectivity are "*Upset*" and "*Ashamed*". Each of these items is rated based on participants' experience during the last week on a 5-points scales ranging from 1 (very slightly or not at all) to 5 (very much). The PANAS is valid and reliable with excellent internal reliability for both positive and negative affects with α = .89 and α = .85 respectively (Crawford & Henry (2004). However, for this study, only negative affectivity (PANASN) scores were analysed.

3.3. Analyses

First, the reliability of all scales was verified. Subsequently, Pearson correlations were used reported. Then, a series of hierarchical regression analyses by means of SPSS version 21.0 were performed to examine the contributions of the independent variables. Interaction analyses using the PROCESS macro for SPSS (Hayes, 2012) were used to address any possible interactions and their interpretation. The nature of interactions was depicted through graphical analysis based on the Johnson-Neyman technique. This approach is able to address the major drawback of the pick-a-point approach that tends to be arbitrary in selecting the various values of the moderator used to estimate the conditional effect of X on Y (Hayes, 2013).

4. Results

4.1. Preliminary Data Analyses

Prior to the data analysis, item distributions, skewness and kurtosis were examined. There were no missing data. However, there was one outlier on GASPS, which was winsorized. The scores were normally distributed. The skewness and kurtosis were evident only for SIPS (skewness = 1.61; kurtosis = 1.93). Various transformations were attempted and Log reduced both (skewness = 0.99; kurtosis = 0.09). The winsorized end transformed data were strongly correlated with the original scores ($r = 1.00$, $p < .001$ and $r = .99$, $p < .001$) and, thus, were used in all subsequent analyses.

The descriptive statistics of all measured variables are presented in table 1. The internal consistencies for SIPS, BFNE and IUS total score and P-IU were excellent (α's > .90) and acceptable for I–IU, GASPS and PANASN (α's > .75).

Table 1
Descriptive Statistics

				Male (N = 29)		Female (N = 83)	
	α	*M*	*SD*	*M*	*SD*	*M*	*SD*
SIPS	.95	23.42	10.23	25.48	9.91	22.70	10.29
FNE	.95	18.13	8.11	18.59	7.89	17.98	8.22
IU Total	.92	28.04	9.98	26.96	8.59	28.41	10.44
P – IU	.84	18.13	5.61	17.38	4.92	18.40	5.84
I –IU	.92	9.90	5.01	9.59	4.70	10.01	5.14
GASPS	.76	16.13	3.12	13.07	3.05	17.22	2.26
PANASN	.78	10.52	4.39	10.00	3.32	10.70	4.70

Note. P-IU = Prospective anxiety dimension-IU; I-IU = Inhibitory anxiety dimension-IU; GASPS = Guilty and Shame Proneness – Shame dimension; PANASN = Positive and Negative Affect Schedule – Negative affect dimension.

The questionnaire scores were also examined in relation to gender and age using the Mann-Whitney Test. Apart from the GASPS, none of the scores differed as a function of gender. Regarding the GASP- S, women reported higher scores ($U(112) = 363.00$, $Z = -5.62$, $p < .001$).

Table 2
Zero-order inter-correlations

	Age	SIPS	BFNE	IUS	P-IU	I-IU	GASPS
SIPS	**-.23**						
FNE	-.16	**.66**					
IU Total	-.14	**.57**	**.61**				
P–IU	-.16	**.49**	**.58**	**.95**			
I–IU	-.09	**.58**	**.57**	**.93**	**.76**		
GASPS	**.25**	.12	**.20**	**.20**	**.15**	**.24**	
PANASN	**-.21**	**.42**	**.47**	**.61**	**.61**	**.54**	.18

Note. N = 112, correlation coefficients $r > |.186|$ are significant, $p < .05$. Bold = Significant.

Pearson correlations (two-tailed) were calculated between all of the measured variables. There was a relationship between age and SIPS, GASPS and PANASN scores. Equivocal results related to gender have been found in previous studies on social anxiety (e.g. Barahmand, 2008; Carleton et al, 2010; Whiting et al, 2013), but gender differences regarding shame were found in this study, and age was established to be correlated with several variables including social anxiety. Therefore, age and gender were controlled in all further analyses.

All the measures except for the GASPS correlated with all the others at the moderate to strong levels (r's(110) = .42 - .66; p's < .05). Additionally, GASPS was significantly correlated only with BFNE ($r(110) = .20$, $p = .038$) and IUS ($r(110) = .20$, $p = .033$), and not with SIPS ($r(110) = .12$, $p = .211$). Both P-IU and I-IU were very strongly correlated with the total of IUS scores (r's(110) > .93, p's < .001) and strongly correlated with each other ($r(110) = .76$, $p < .001$). There was no high correlation to indicate multicollinearity ($r < .80$) even though there was a strong correlation between BFNE and SIPS ($r(110) = .66$, $p < .001$).

4.2. Main analyses

4.2.1. Contribution of intolerance of uncertainty

Although the correlation analysis indicated that the correlation between shame and social anxiety was not significant, shame was still entered in the following regression analysis. The underlying reason for this was that the correlation results indicated that shame is significantly associated with other predictors (FNE and IU). This indicates that shame may still be able to interact with other predictors in predicting the outcome. However, given the result of the correlation analysis, examination of the relative contributions of the predictors

focused on FNE and IU only; shame was considered only as a possible extra variable and would be added and entered in step 4 of the analysis, over and above FNE and IU.

Table 3

Regression model of FNE, IU, and shame predicting social anxiety

	Variable	Coefficient statistic			Model step statistic			
		β	*t*	*p*	ΔR^2	ΔF	*df*	*p*
	Covariates							
1	**Age**	**-0.21**	**-2.23**	**.028**	**.064**	**3.71**	**2, 109**	**.028**
	Gender	-0.11	-1.13	.260				
	Sequence 1							
2	**FNE**	**0.67**	**9.79**	**<.001**	**.440**	**95.87**	**1, 108**	**<.001**
3	**IU**	**0.30**	**3.70**	**<.001**	**.056**	**13.60**	**1, 107**	**<.001**
	Sequence 2							
(2)	**IU**	**(0.60)**	**(7.99)**	**(<.001)**	**(.348)**	**(63.81)**	**(1, 108)**	**(<.001)**
(3)	**FNE**	**(0.49)**	**(6.01)**	**(<.001)**	**(.148)**	**(36.10)**	**(1, 107)**	**(<.001)**
	Two-way interactions							
5	**IU x FNE**	**1.31**	**4.40**	**<.001**	**.086**	**8.52**	**3, 103**	**<.001**
	FNE x GASPS	0.47	0.97	.333				
	IU x GASPS	**-1.77**	**-3.13**	**.002**				
	Three-way Interaction							
6	FNE x IU x GASPS	0.29	0.12	.904	.000	0.02	1, 102	.904

Note. Significance level $p < .05$.Figures in parentheses indicate the reverse order, i.e. IUS first, BNFE second.

Gender and age accounted for 6.4% of the variance in SIPS. Age significantly predicted SIPS scores, but gender did not. BFNE accounted for a greater proportion of the variance in any position entered. When entered in the second step, BFNE accounted for 44% of the variance over and above the covariates and IUS contributed an additional 5.6 %. With the order reversed, IUS accounted for 34.8% and BFNE accounted for an additional 14.8%. In line with the results of zero-order correlation analyses, the GASPS did not add a significant explanation (0.8%).

Additionally, the two-way interactions when entered together made a significant additional contribution of 8.6% of the variance; only IU x FNE and IU x shame were significant. Meanwhile, the three-way interaction did not significantly account for variance (0.0%), indicating that the interaction model could not be developed in a three-way interaction

model (Aiken & West, 1991). The final model was significant ($F(9,102) = 21.39$, $p < .001$) and accounted for 65.4% of the variance in SIPS.

4.2.2. Interactions in predicting social anxiety

Referring to the principal aim of this study, which is to examine the precise role of IU in predicting social anxiety, it is considered important to further investigate possible two way-interactions involving IU: IU x FNE and IU x shame. The results obviously would provide a better explanation in terms of interpreting the role of IU in predicting social anxiety

The first series of hierarchical regressions was conducted to examine the specific role of the interaction between IU and FNE. In the first regression, IU was the predictor variable, FNE was the moderator, shame was entered as a covariate, and age and gender were also controlled. Subsequently, the reverse model, where FNE was the predictor and IU was the moderator, was examined. The second series of regressions was performed to examine the specific role of the interaction between IU and shame. Similar regression analyses were repeated.

In this case, interaction analysis utilising the PROCESS model 1 was used due to its ability to undertake the centring and interaction terms automatically. Subsequently, the nature of the relationships are depicted using the John-Neyman technique.

4.2.2.1. Interaction between intolerance of uncertainty and fear of negative evaluation

The interaction between IU and FNE accounted for an additional 5.17% of the variance, $\Delta F(1, 105) = 14.25$, $p < .001$; indicating that the interaction was present and significant. Figure 2 plots the regression coefficient for IU on social anxiety at different values of FNE (solid red line). Conversely, Figure 3 plots the regression coefficient for FNE on social anxiety at different values of IU. The 95% bootstrapped confidence intervals are also plotted (dotted lines). The significance zone, where the low CI exceeds zero, is indicated in orange.

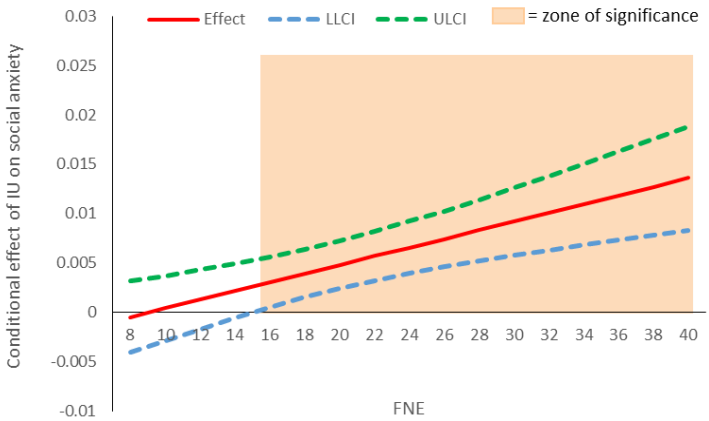

Figure 2. Conditional effect of IU on social anxiety moderated by FNE

THE UNIQUE CONTRIBUTION

As can be seen in Figure 2, the effect of IU on social anxiety was significant only when FNE > 15, indicated by the lower bootstrapped confidence interval which lies above zero; the value of *b* at FNE = 16, *b* = .0030, *t*(1, 105) = 2.34, *p* < .05. By way of the increases in FNE, the relationship between IU and social anxiety becomes stronger.

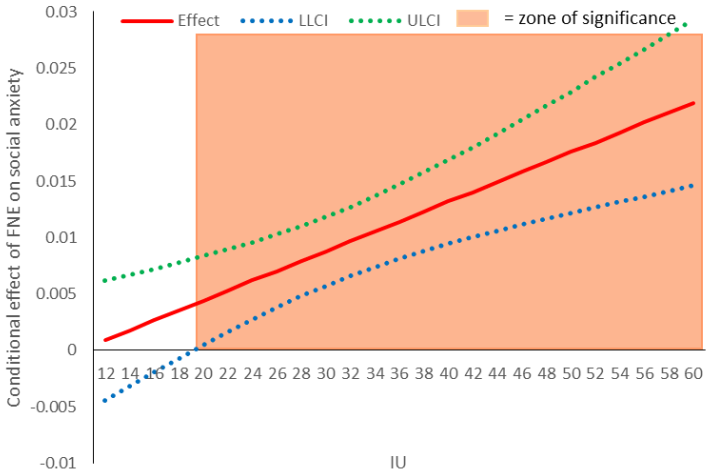

Figure 3. Conditional effect of FNE on social anxiety moderated by IU

As can be seen in Figure 3, the effect of FNE on social anxiety was significant only when IU > 19, indicated by the lower bootstrapped confidence interval which lies above zero; the value of *b* at IU = 20, *b* = .0044, *t* (1, 105) = 2.21, *p* < .05. By way of the increases in IU, the relationship between FNE and social anxiety becomes stronger.

4.2.2.2. Interaction between intolerance of uncertainty and shame

The interaction between IUS and GASPS accounted for an additional contribution of 1.41%, Δ*F* (1, 105) = 3.54, *p* = .063, but this was not statistically significant.

4.3. Exploratory analyses

4.3.1. Intolerance of uncertainty's dimensions predicting social anxiety

To further confirm the relative contribution of each dimension of IU to the variance in social anxiety, hierarchical regressions were performed in two orders. In the first order, I-IU was entered before P-IU, and *vice versa* in the second order.

Table 4

Regression model of FNE, IU, IU's subscales, and shame predicting social anxiety

	Variable	Coefficient statistic			Model step statistic			
		β	*t*	*p*	ΔR^2	Δ*F*	*df*	*p*
1	**Age**	**-0.21**	**-2.23**	**.028**	**.064**	**3.71**	**2, 109**	**.028**
	Gender	-0.11	-1.13	.260				

THE UNIQUE CONTRIBUTION

	Variable	Coefficient statistic			Model step statistic			
		β	*t*	*p*	ΔR^2	ΔF	*df*	*p*
2	**FNE**	**0.67**	**9.79**	**<.001**	**.440**	**95.87**	**1, 108**	**<.001**
3	**I-IU**	**0.35**	**4.54**	**<.001**	**.080**	**20.64**	**1, 107**	**<.001**
(4)		**(0.39)**	**(3.88)**	**(<.001)**	**(.059)**	**(15.02)**	**(1, 106)**	**(<.001)**
4	P-IU	-0.07	-0.65	.518	.002	0.42	1, 106	.518
(3)		**(0.19)**	**(2.29)**	**(.024)**	**(.023)**	**(5.25)**	**(1, 107)**	**(.024)**
5	GASPS	0.08	0.93	.356	.003	0.86	1, 105	.356

Note. BFNE = Brief Fear of Negative Evaluation-Straightforward items; I-IU = inhibitory factor; P-IU = prospective factor; significance level $p < .05$

I-IU accounted for additional explanation of the variance in SIPS, either when entered as the third step over and above the covariates and BFNE (8%) or in the fourth step over and above the covariates, BFNE, and P-IU, (5.9%). Conversely, P-IU significantly contributed to the model only when entered in the third step after controlling for the covariates and over BFNE, accounting for 2.3%, but not when entered in the fourth step, only accounting for 0.2%. Shame did not add a significant contribution explaining the variance, only accounting for 0.3%.

4.3.2. The role of negative affectivity in the model

Subsequently, it is interesting to examine the role of negative affectivity as a possible proxy variable. Therefore, whether or not negative affectivity can also provide an additional contribution to the model was investigated. In addition, whether the contributions of IU and FNE in predicting social anxiety are changed by the presence of negative affectivity was also examined. A series of hierarchical regression analyses were performed. In the first analysis PANASN was entered in the last step, while in the second analysis it was entered in the second step.

Table 5

Regression Model of BFNE, IUS, GASPS and PANASN Predicting SIPS

	Variable	Coefficient statistic			Model step statistic			
		β	*t*	*p*	ΔR^2	ΔF	*df*	*p*
1	**Age**	**-0.21**	**-2.23**	**.028**	**.064**	**3.71**	**2, 109**	**.028**
	Gender	-0.11	-1.13	.260				
2	**FNE**	**0.67**	**9.79**	**<.001**	**.440**	**95.87**	**1, 108**	**<.001**
(3)		**(0.60)**	**(7.87)**	**(<.001)**	**(.275)**	**(61.99)**	**(1, 107)**	**(<.001)**
3	**IU**	**0.30**	**3.69**	**<.001**	**.056**	**13.60**	**1, 107**	**<.001**

	Variable	Coefficient statistic			Model step statistic			
		β	*t*	*p*	ΔR^2	ΔF	*df*	*p*
(4)		**(0.27)**	**(2.96)**	**(.004)**	**(.036)**	**(8.75)**	**(1, 106)**	**(.004)**
4	GASPS	0.12	1.38	.172	.008	1.89	1, 106	.172
(5)		(0.11)	(1.32)	(.189)	(.007)	(1.75)	(1, 105)	(.189)
5	IUS x FNE	1.31	4.40	<.001	.086	8.52	3, 103	<.001
(6)		(1.36)	(4.55)	(<.001)	(.091)	(9.12)	(3, 102)	(<.001)
	FNE x	0.47	0.97	.333				
	GASPS	(0.51)	(1.06)	(.290)				
	IU x	-1.77	-3.14	.002				
	GASPS	(-1.87)	(-3.30)	(.001)				
6	FNE x IU	0.29	0.12	.904	.000	0.02	1, 102	.904
	x GASPS							
(7)		(0.25)	(0.10)	(.918)	(.000)	(0.01)	(1, 101)	(.918)
7	**PANASN**	0.11	1.40	.164	.007	1.97	1, 101	.164
(2)		**(0.45)**	**(5.20)**	**(<.001)**	**(.187)**	**(27.01)**	**(1, 108)**	**(<.001)**

Note. Significance level $p < .05$.

When entered last, the PANASN did not significantly provide an additional explanation ($\Delta R^2 = .007$, $\Delta F(1, 101) = 1.97$, $p = .164$) in predicting SIPS over and above the 65.4% explained by BFNE, IUS, GASPS and their interactions after controlling for age and gender. However, PANASN did account for some variance in SIPS (18.7%) when entered prior to BFNE, IUS and the GASPS. The unique contributions of BFNE, IUS, and GASPS to SIPS remain, although they were somewhat reduced to 31.8% from 56.9%.

5. Discussion

This current study has two principal purposes. The first aim is to examine the relative contribution of IU in predicting social anxiety, particularly relative to the presence of FNE and shame; and secondly, to examine the presence of IU's possible interactions with FNE and shame in predicting social anxiety. Several specific results from this study give supporting evidence to the findings of earlier studies in the same area, while several others are novel findings.

Firstly, this study provides additional evidence that IU consistently makes additive and unique contributions to variance in social anxiety. In conjunction with IU, FNE also contributes to variance in social anxiety. Nonetheless FNE noticeably accounted for a greater

proportion of the variance, inferring that it is a reasonably stronger predictor of social anxiety; yet IU clearly contributed significant additive and unique contributions. Surprisingly, the hypothesis that shame would independently make a contribution as do IU and FNE, was not supported.

The evidence that IU and FNE consistently predict social anxiety and the contribution of FNE to the variance in social anxiety was greater than the contribution of IU supports Whiting et al. (2013) that those two cognitive vulnerability factors maintain both sub-types of social anxiety and that FNE contributed more variance. Their study used SPS and SIAS in order to measure two types of social anxiety separately, and they recruited an undergraduate sample only. This was different from this current study, which employed SIPS that is the result of a unification of both SPS and SIAS. In addition, the current study recruited a mixed sample of community members and students.

Moreover, the consistency of IU in predicting social anxiety provides further evidence and presumably complements the Cognitive Model of Social Phobia (Clark & Wells, 1995) and the Cognitive Behavioural Model of Social Phobia (Heimberg et al., 2010; Rapee & Heimberg, 1997), which emphasised the importance of FNE in maintaining social anxiety. This study provides strong evidence that IU has a consistent predictive correlation with social anxiety.

Although several recent studies have linked shame to social anxiety with a positive relationship (Fergus et al., 2010; Gilbert, 2000; Hedman et al., 2013), shame did not predict social anxiety in the present study. This non-significant result may possibly relate to the two contrasting faces of shame. According to Roos et al., (2013), shame is related to both avoidance and anger. Apart from an intention to avoid social situations as the result of a negative feeling of being embarrassed, shame is also characterised by blaming others for the cause of their devastating feelings, thus leading to have the intention to perform more counterproductive actions (Tangney, Wagner & Gramzow, 1992). Supporting this suggestion, Harris and Darby (2009) reported that one-third of GP patients stopped seeing their doctors due to their shame-provoking experiences, while another third of patients reported that shame motivated them to improve their health. However, the study by Harris and Darby was a retrospective cross-sectional study and thus, may have been influenced by memory bias and obviously cannot prove any causality.

Moreover, this is not in agreement with previous studies, perhaps also owing to problems with the scales. TOSCA-shame (Tangney et al., 1989), which was employed in previous studies, measures different aspects in comparison to what is measured by the GASPShame scale used in this study. TOSCA-shame measures negative self-esteem, not

shame itself (Luyten et al., 2002). A large number of studies have reported a strong correlation between low or negative self-esteem and social anxiety (e.g. Harman, Hansen, Cochran & Lindsey, 2005; Jong, 2005; Kocovski & Endler, 2000). Therefore, it is reasonable that these previous studies, which utilised TOSCA-shame, found a correlation between "shame" (actually negative self-esteem) and social anxiety. To our knowledge, this is the first study to utilise GASPShame to investigate the relationship between shame and social anxiety and thus, it deserves further study.

Secondly, the contribution of the two-way interactions among IU, FNE and shame in predicting social anxiety was significant. However, this study does not provide evidence to support the existence of the three-way interaction between IU, FNE and shame in predicting social anxiety. Not only was this study not able to detect a small effect size, but the effect size of the three-way interaction itself was trivial ($f^2 = .02$, $R^2 = .02$).

The most interesting original finding is that there was an interaction between IU and FNE in predicting social anxiety. IU had a significant relationship with social anxiety only when the level of FNE was intermediate to high. Their relationship was augmented by the increasing level of FNE. Conversely, FNE also had a significant relationship with social anxiety only when the level of IU was intermediate to high. The effect of FNE on social anxiety was augmented by the increasing level of IU. This could be interpreted by assuming that both cognitive vulnerability factors strengthened each other.

The explanation proposed is that individuals who have FNE would excessively fear that they would receive negative judgments and consequently, they would feel anxious socially. When these individuals also have IU, they would be more likely to perceive that social situations were full of threats, particularly the possibility of obtaining negative judgments, and so would be more negatively uncertain. Consequently, they would be more liable to feel anxious socially and thus, to avoid social situations.

However, the assumptions regarding the cognitive process herein obviously cannot be concluded from regression analysis, which can only demonstrate the presence of interaction. Moreover, only a longitudinal study or an experimental design would be able to provide temporal precedence and so evidence of causality.

Although an extensive number of previous studies have ascertained that FNE is a consistent predictor of social anxiety (e.g., Carleton et al., 2007; Collins et al., 2005; Stopa, 2001; Weeks et al., 2005 & 2008; Winton et al., 1995), to our understanding, this is the first study that provides evidence regarding the interaction between IU and FNE. Therefore, this novel finding is significant and, thus, obviously deserves further study.

Moreover, further hierarchical regression analyses revealed that only I-IU had a robust predictive correlation with social anxiety even after controlling for the covariates, FNE and P-IU. Conversely, the contribution of P-IU was accounted for by FNE and I-IU after controlling for the covariates.

These results are in agreement with the majority of previous studies that reported that only I-IU had a significant relationship with social anxiety, and neither P-IU (Carleton et al., 2010; Mahoney and McEvoy, 2012; McEvoy & Mahoney, 2011 & 2012) Therefore, McEvoy and Mahoney (2011) suggested that given that theoretically anxiety disorders were classified into phobic anxiety (social anxiety and panic disorder/agoraphobia) and non-phobic anxiety (generalised anxiety disorders and obsessive-compulsive disorder), the first classification might correlate more strongly with a tendency to be inhibited in response to uncertainty, while the second classification is strongly associated with anxiety in response to anticipation of uncertainty. Whiting et al (2013) partly agreed and stated that I-IU had a significant predictive correlation linked with both types of social anxiety (interaction and performance), although P-IU noticeably predicted performance anxiety and not interaction anxiety. However, Sapach et al (2015) reported a dissimilar result in a clinical sample where P-IU consistently accounted for social anxiety variance, and not I-IU. As previous studies used a community sample, Sapach et al (2015) assumed that the difference in sample had been taken into account. Thus, the precise pattern of the relationship between both IU dimensions and social anxiety remains unclear.

Despite the equivocal results corresponding to the comparison between the contribution of P-IU and the contribution of I-IU to social anxiety, the zero correlation analysis reveals that both P-IU and I-IU were very strongly correlated with the total IUS score (r's(110) $\geq$ .93, p's < .001) and strongly correlated with each other (r(110) = .76, p < .001). This indicates that IU can be measured as a unidimensional construct and both dimensions interdependently represent the process (approach and avoidance) that occurs when individuals are intolerant of uncertain situations.

This finding accords with the conclusion of Hale et al., (2016) who compared the fit of the two-factor solutions of the IUS-12 proposed by Carleton, Norton et al. (2007). They found that the general IU factor had a high reliability and accounted for nearly 50% of the total variance and 80% of the shared variance in IUS-12 scores, indicating that the total scores truly reflect the general factor. In addition, firstly, there were only a few items, which were strongly loaded on the two sub-scale factors. Secondly, both sub-scale factors accounted for relatively small proportions of both the total and shared variance. Finally, both sub-scale

factors demonstrated poor reliability when the effect of the other factors were controlled. Therefore, they recommended the use of the IUS-12 as a unidimensional scale.

Moreover, although negative affectivity could account for some of the outcome when entered after the covariates, it could not account when entered as the last variable. In addition, the contributions of FNE and IU to the variance in social anxiety were still significant when negative affectivity was entered after the covariates.

This indicates that the presence of negative affectivity as a proxy variable did not add a significant contribution to the model. Not only that, but the relationship between negative affectivity and social anxiety can also be almost entirely accounted for by FNE and IU. This is further evidence that the effects of FNE and IU were not simply explained by being related to negative affectivity. This finding partly supports those of Norr et al. (2013), who established that there was a significant correlational relationship in IU with social anxiety, even after controlling for the negative affectivity and trait anxiety.

The current study bolsters previous findings and provides further evidence to the growing body of literature examining the role of cognitive-risk factors in relation to social anxiety. However, several limitations must be noted, particularly in relation to the demographics of the sample, where age and gender were not evenly distributed in this study. We are aware that this will not only lead to generalisation problems, but may also potentially have influenced the findings. Also, this study recruited a non-clinical sample from among graduate students and the general population. Consequently, the results are not necessarily generalizable to those diagnosed with social anxiety. Finally, this study was a cross-sectional study and therefore, could not provide cause and effect explanations.

Notwithstanding these several limitations, this study provides novel evidence that IU has a unique role in predicting social anxiety. IU has a consistent predictive correlation with social anxiety, although its contribution to social anxiety smaller than that of FNE. IU and FNE also interact and strengthen each other in predicting social anxiety. Hence, it is critical for further study to confirm to what extent the interaction between IU and FNE can predict social anxiety. Given that attention to the roles of the dimensions of IU and particularly shame in predicting social anxiety are considerably limited in the current growing body of literature, a close attention to this issues in future studies is required.

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Institute of Neuroscience

Chapter 3. Development of the Newcastle Substance Use Questionnaire (NSUQ), factor analyses and comparison of alcohol and cannabis motives

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Contents

Abstract

Introduction: Considerable efforts have been made over a long period of time to understand the variability in substance use and the causal factors underlying it. Several measures have been developed as part of these efforts with limitations: specific type and/or narrow aspect. Addressing those limitations, a novel measure named the Newcastle Substance Use Questionnaire (NSUQ) was proposed. Therefore, it aimed to investigate the latent factor structure of motives, and to compare motives and the context of alcohol and cannabis use.

Method: Participants were recruited from five universities in the UK. Two hundred and eighty five participants completed the NSUQ-Alcohol section and 62 participants answered the NSUQ-Cannabis section. Exploratory factor analysis (EFA) was performed through FACTOR version 9.2. Comparison of motives was conducted using General Linear Model-Repeated Measure through SPSS version 21.0.

Results: The NSUQ-Alcohol motives sub-section consisted of 14 items. The three-factor model emerged: social, perspective taking, and sexual motives. Meanwhile, the NSUQ-Cannabis motives sub-section comprised of 16 items divided into three factors: perspective taking, social and physical motives. Improving social interaction got the highest rate on alcohol use, whereas improving cognitive performance was the highest rate on cannabis use. Additionally, the using with friends is the most frequent context for both substances.

Conclusion: both the NSUQ Alcohol and the NSUQ cannabis motives sections had an acceptable fit and were interpretable. There are differences and similarities regarding motives and contexts of alcohol and cannabis use. Social and cognitive motives may reflect the main motives of both substances, however, alcohol is more a ‘social lubricant’, while cannabis is a booster of perspective taking.

Chapter 3. Development of the Newcastle Substance Use Questionnaire (NSUQ), factor analyses and comparison of alcohol and cannabis motives

1. Background

Nowadays, substance use, particularly among young people or students, is one of the major issues being encountered by countless countries worldwide. Numerous studies have provided evidence of the detrimental effects of substance use, either related to health problems (e.g. Brook, Stimmel, Zhang & Brook, 2008; Rehm et al., 2009; Rey, Sawyer, Raphael, Patton & Lynskey, 2002), social problems (e.g. Merline, O'Malley, Schulenberg, Bachman & Johnston, 2004), academic problems (e.g. Brook et al., 2008; Ginzler, Garrett, Baer & Peterson, 2007), juvenile delinquency problems (e.g. Mason, Hitchings, McMahon & Spoth, 2007; Mason, Hitchings & Spoth, 2007), sexual problems and pregnancy among adolescents (e.g. Poulin & Graham, 2001; Yen, 2004), or even economic costs (e.g. Rehm et al., 2009).

Specific to student samples, several studies reported a range of negative effects in relation to substance use: low academic achievement (e.g. Bell, Weschler & Johnston, 1997; Buckner, Ecker & Cohen, 2010; Engs, Diebold & Hanson, 1996), unplanned sex (e.g. Koss, Gidycz & Wisniewski, 1987; Strote, Lee & Weschler, 2002; Wechsler et al., 2002), troubles with law enforcement agencies (e.g. Hingson, Heeran, Winter & Henry, 2005; Pezza & Bellotti, 1995), or physical illnesess (e.g. Presley, Meilman & Cashin, 1996). Conversely, specific to academic achievement and alcohol use several other studies reported no relationship (e.g. Aertgeerts & Buntinx, 2002; Thombs et al., 2009).

Alcohol and cannabis are probably the most commonly consumed substances, particularly amongst youths. For instance, based on the results of the Crime Survey for England and Wales (2012), the overwhelming majority (roughly 90 %) of young adults, from 16 to 24, reported alcohol use within the past year. In addition, approximately 16 % reported cannabis use in the past year; therefore, it was the most popular of the illicit drugs consumed by youths in the UK.

Various authors propose that individuals take substances for a variety of motives and a variety of goals. In this context, motives are defined as what underlies the decision to use a substance or not. According to Cox and Klinger (1988), there are four types of motives that underlie the decision to use a substance. These four types are constructed from two dimensions: outcome (positive-negative) and source (internal-external). Crossing these leads to four types: (i) the positive-internal quadrant represents seeking positive moods, e.g. as it

gives you a pleasant feeling; (ii) the negative-internal quadrant represents reducing negative emotions, e.g. to forget about your problems; (iii) the positive-external quadrant represents obtaining social rewards, e.g. to be sociable; and (iv) the negative-external quadrant represents avoiding social rejection, e.g. so you won't feel left out.

In contrast, a recent review by Muller and Schumann (2011) proposed a more sophisticated account. Given the differing effects of substances on neurotransmitters, individuals may use substances as an instrument or a tool to achieve their personal goals. These goals may include improving social interaction; facilitating sexual behaviours; improving cognitive performance and counteracting fatigue; facilitating recovery from and coping with psychological stress; self-medication for mental health problems; expanding perceptual horizons; becoming euphoric; improving the physical appearance and attractiveness; and facilitating spiritual and religious activities. They gave examples. On the one hand, CNS depressants such as alcohol are commonly used to facilitate social interaction due to their ability to reduce anxiety and increase talkativeness. On the other hand, stimulants, for instance amphetamine and MDMA are preferred more by students to enhance their academic performance. Finally, psychedelic substances are frequently used as a part of meditation and rituals in some cultures and religions.

Considerable efforts have been made over a long period of time to understand the variability in substance use and the causal factors underlying it. Notwithstanding the increasing volume of research examining prevalence, related problems, in addition to the costs and efficacy of prevention and treatment programmes, studies that seek to understand the causes of substance use are still required.

Several measures have been developed as part of these efforts. Many examine specific type of substances and thus lack flexibility in their use while others endeavour to overcome this limitation and cover a broad range of substance types, although may be limited in the aspects measured. For instance, the Drinking Motive Measure (Cooper, 1994; Cooper, Russell, Skinner & Windle, 1992) and/or the Marijuana Motive Measure (Simons, Correia, Carey & Borsari, 1998) are two extensively used measures. Both measures examine only a single aspect of a single substance: the motives underlying either alcohol or cannabis use. The UEL Drug History Questionnaire (Parrott, Sisk & Turner, 2000) has covered the use of various recreational drugs but measures only their frequency of use. Other relevant aspects could include patterns of using the substance. Thus, a comprehensive questionnaire is required. The current study proposed a novel measure named as the Newcastle Substance Use Questionnaire (NSUQ). It was developed in order to gain a sufficiently detailed understanding on the subject of substance use across a range of substances.

The NSUQ consists of three sections, specifically, the class and frequency of substances used, the patterns of using substances, while the last section is the motives underlying substance use. We will now consider each in turn.

(1) The class and frequency of substances used

The first section covers the type of substance used and the frequency of use of seven classes of psychoactive substances, summarised from Julien (1997) and Parrott, Morinan, Moss and Scholey (2004), and a section covering any other substance that may be consumed as identified by the participant. These classes are: (i) Tobacco, (ii) Alcohol, (iii) Central Nervous System Stimulants (Ecstasy, Amphetamine, Methamphetamine, Cocaine, and Cathinone), (iv) Cannabis, (v) Hallucinogen (LSD, Mescaline, Phencyclidine, and Mushrooms), (vi) Opiates, (vii) Central Nervous System Depressants (Benzodiazepine, Barbiturates) and (viii) Other Substances. According to Julien (1997) and Parrott et al. (2004), each substance has a unique psychopharmacological impact.

It is important to note that this questionnaire explored the class of substances used, and not the specific type or exact name of the substances. For example, cocaine is the second most popular substance in the UK but only the eighth most popular in Indonesia, while methyl-amphetamine is number seven in the UK, but the most popular in Indonesia (UK data from the Crime Survey for England and Wales, 2012; Indonesian data from Badan Narkotika Nasional, 2012). Both are classified in the same class, typically, CNS stimulants. Therefore, both are placed in the same section and the class and common or street names are also provided (sub-scale C: Ecstasy (MDMA/'e'), Amphetamine (Speed/Phet/Billy), Methamphetamine (Ice, Meth, Crank, Shabu), Cocaine (Coke/Charlie/Crack/Snow/Percy), Cathinones (Khat)) in the NSUQ. Hence, this questionnaire is flexible enough to be used in all countries no matter which types of substance are most popular.

The instrumental drug use framework proposed by Muller and Schumann (2011) is based on the assumption that instrumental motives also help determine the frequency of use. For example, individuals who use substances to feel euphoric or to improve social interactions, perhaps, will conceivably use substances occasionally and only in social events. Therefore, their frequency of substance use may be less frequent than individuals who use substances for self-medication or coping with psychological stress, which could be on a daily basis. Based on this assumption, frequency of substance use is also measured in this questionnaire.

(2) Patterns in using the substance (solitary or social)

Several studies examined the pattern of alcohol use, for example, solitary or socially drinking. For instance, Mohr et al. (2001) stated that participants preferred to drink more in

social contexts on days with positive interpersonal experiences, whereas they engaged in more solitary drinking on days with negative interpersonal experiences. Tomlinson and Brown (2012) established that adolescents with depressive symptoms more frequently drink alone, while adolescents with social anxiety reported less frequent drinking when they were at a party where alcohol was present.

Given the theoretical framework of instrumental drug use by Muller and Schumann (2011), we proposed that instrumental motives may further be associated with a pattern of substance use. For instance, individuals possibly use alcohol in social situations when they perceive it is able to enhance social interaction, while they may use opioids alone to self-medicate in response to mental health problems. Therefore, the pattern of substance use is also explored in this questionnaire, specifically, solitarily (alone) and in different social contexts (with friends, family, or strangers).

(3) Motives

The Motives section is based on Muller and Schumann (2011) who developed nine motives to assess the extent to which people are motivated to consume substances based on the customer's perception of the impact of those substances upon mental and physical states. There are 17 items, referring to the nine instrumental motives underlying substance use. Eight instrumental motives are each represented by two items, which are worded to capture the breadth of the motive. For instance, the improvement of social interaction motive is represented by *"I use it because it helps me to feel more confident"* and *"I use it because it helps me to be less anxious around people".* The final motive, improving physical attractiveness, is represented by a single item. These nine motives and the items representing them are at appendix. All the items were rated on a 5-point scale (1 = not at all like me, 2 = not much like me, 3 = somewhat like me, 4 = quite a lot like me, 5 = just like me).

As this questionnaire covers three aspects that are considered the most important in terms of research regarding substance use, namely, class and frequency of use, context of use and motive, the NSUQ is arguably both comprehensive and flexible. Further, it explores the class of substance use instead of a specific name of a substance based on shared psychotropic characteristics. Therefore, it is proposed that it can be used for various purposes across different characteristic of samples such as education, clinical-non clinical and even cultural backgrounds. It is important to note that the NSUQ is not designed to measure the negative impacts of substance use for Substance Abuse Disorders or the principal features of Substance Dependence Disorders and therefore could not be used for diagnostic purposes or to distinguish between abuse and dependence.

2. Aims of the Study

The NSUQ is a new measure. Although it is based on the recent notion of multiple instrumental motives underlying substance use, we are not aware of any empirical studies regarding this framework. Consequently, there are no clear predictions as to the likely factor structure underlying the NSUQ-Motives sections for alcohol and cannabis. Alcohol and cannabis were selected to be analysed and compared given that one represents a legal and the other represents an illegal substance. Moreover, according to surveys in both the UK (the Crime Survey for England and Wales, 2012) and Indonesia (Badan Narkotika Nasional, 2012), they are the most popular substances consumed, particularly by students, and thus, interesting to be analysed. Although some studies have compared motives behind the use of alcohol and cannabis (e.g. Comeau, Stewart & Loba, 2001; Newcomb, Chou, Bentler & Huba, 1988; Simons, Correia & Carey, 2005; Simons, Gaher, Correia, Hansen & Christopher, 2005), none have yet examined these using the instrumental motive framework.

Therefore, this current study aims to investigate the latent factor structure of motives for both substances and to compare motives across the two substances using questions based on a novel motivational framework. In addition, this study also compared the context of alcohol and cannabis use.

3. Methods

3.1. Participants

The following factor analyses were part of a larger study exploring the relationship between cognitive risk factors, social anxiety and substance use (Chapter 4). All the participants were recruited using web-based advertising disseminated by gatekeepers, who were either Heads of Schools or Presidents of student societies, from five universities in the North and North East of the UK. All the participants completed a series of online self-report questionnaires. The detail recruitment process is explained in Chapter 4 (see Chapter 4, p. 122).

Thus, 291 participants reported consuming alcohol in the past year and 285 of them completed the alcohol section of the NSUQ. Furthermore, there were 63 participants reported that they used cannabis in the last 12 months and 62 of them completely answered the cannabis section of the NSUQ. All of those who reported using cannabis also reported drinking alcohol in that same year. The study was approved by the Ethics Committee of the Faculty of Medical Sciences at Newcastle University.

3.2. Data analysis

In accordance with the aims, exploratory factor analysis (EFA) is more appropriate (Fabrigar, Wegener, MacCallum & Strahan, 1999; Floyd & Widaman, 1995; Ford, MacCallum & Tait, 1986; Henson & Roberts, 2006). The exploratory factor analyses were conducted using FACTOR version 9.2 which is not only a user-friendly program, but also includes several recent developments in factor analytic approaches (Lorenzo-Seva & Ferrando, 2006). Additionally, the comparisons of motives and contexts of use across alcohol and cannabis were conducted using ANOVA through SPSS version 21.0.

4. The Development of the NSUQ

The development of the NSUQ was based on a deductive approach. It began with relevant literature review, specifically reviewing the theoretical framework of instrumental drug use proposed by Muller and Schumann (2011) and any literature explaining the differential or distinctive effects of substances on neurotransmitters, in addition to on psychological matters (e.g. Julien, 1997; Parrott, Morinan, Moss & Scholey, 2004). This relevant literature review was conducted to fully understand the phenomenon to be investigated, which was the instrumental motives of drug use.

Subsequently, the theoretical definition of each instrumental motive was used as the guidance for item generation. Four items were created representing each motive and thus, there were 36 items in total. The content validity of the items was analysed by means of a series of in-depth discussions involving the author and both supervisors (Prof Mark H. Freeston and Dr Jacqui Rodgers). Any items that did not completely capture the breadth of the motives were revised.

Lastly, given this NSUQ would cover eight classes of psychoactive substances (including any other that may be consumed as identified by the participant) and each section consists of frequency, pattern of use, and motives; therefore, it could end up having an excessive number of items. A pragmatic decision was taken to reduce the number of items representing instrumental motives was taken in accordance with the efficiency principle. Two items that have the most adequate content were retained for each motive. The exception was only related to the improving physical attractiveness motive which is represented by a single item, due to its exclusive definition (control weight to improve physical attractiveness).

5. Results

5.1. Exploratory Factor Analyses

5.1.1. The NSUQ-Alcohol Motives section

Factor analysis of the NSUQ-Alcohol Motives items was conducted on a sample of 285 participants who reported alcohol use within the past year. Initial inspection of the distribution of each item showed that six items had means between 2 and 4 and of those, four items were negatively kurtotic (< -1.0). The remaining 11 items had means < 2.0 and of those, nine items were positively skewed (> 1.0), while eight of these were positively kurtotic (> 1.0). According to Muthén & Kaplan (1985 & 1992), skewness affects statistical estimations and subsequently model fitting. Therefore, the Pearson correlation was not suitable in this situation; the polychoric correlation matrix was recommended instead. Different to the Pearson correlation which is based on an assumption of an underlying normal distribution, the polychoric correlation assumes an underlying continuous distribution.

In addition, the coefficient of multivariate asymmetry skewness was not significant ($p = 1.00$), however the coefficient of multivariate asymmetry kurtosis was highly significant ($p < .001$). Based on multivariate normality analysis proposed by Mardia (1970), this data was categorised as kurtotic. Violation to multivariate normality could also support utilising the polychoric correlation (Baglin, 2014).

There was only one high inter-correlation ($r = .85$) between item 1, "*I drink alcohol because it helps me feel more confident*", and item 7, *"I drink alcohol because it helps me be less anxious around people"*. This is unsurprising because both items are designed to measure the same motive, specifically, improving social interactions. Three items, namely, item 14 (*I drink alcohol because it helps me control my weight*), item 15 (*I drink alcohol because it is part of a ritual in my culture/religion*), and item 17 (*I drink alcohol because it helps me feel more spiritual*) had low ($r < .20$) or no significant correlations with many other items ($r = .00$). Item 14 had low or no significant correlations with nine other items, item 15 had low or no significant correlations with 15 other items, whereas item 17 had low or no significant correlations with 13 other items. Most inter-correlations for all other items were in the range of weak to moderate level while the remaining few were > .50. The determinant of the matrix was 0.00025 (> .00001), indicating that generally multicollinearity was not present (Field, 2009).

Table 1
Matrix of association (polychoric correlation)

Item	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1																
2	.18															
3	.46	.20														
4	.39	.48	.40													
5	.10	.24	.12	.18												
6	.16	.45	.18	.43	.35											
7	.81	.15	.48	.44	.12	.17										
8	.31	.29	.38	.32	.21	.30	.32									
9	.11	.14	.10	.16	.15	.23	.15	.30								
10	.38	.18	.29	.28	.19	.31	.28	.31	.21							
11	.13	.50	.16	.37	.33	.48	.19	.31	.27	.34						
12	.16	.17	.14	.21	.23	.29	.22	.21	.67	.20	.33					
13	.45	.11	.31	.28	.12	.17	.35	.30	.15	.49	.11	.20				
14	.08	.40	.08	.18	.21	.20	.13	.23	.29	.03	.19	.50	.08			
15	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.04		
16	.22	.24	.29	.22	.21	.21	.25	.67	.17	.27	.23	.17	.22	.19	.00	
17	.06	.13	.00	.22	.07	.07	.04	.12	.12	.13	.16	.12	.07	.64	.02	.08

Three items: items 14, 15 and 17, were dropped for both conceptual and empirical reasons. In terms of the conceptual reason, item 14 was dropped as alcohol is not frequently used to control weight, indeed it may lead to an increase in weight due to the amount of calories consumed (for instance: an average pint of 5% strength beer has 170 kilo calories) (National Health Services, 2014). Items 15 and 17 were eliminated given that substances commonly used as part of a religious ritual or spiritual activities are forms of cannabis or hallucinogens, whereas alcohol usually is not (Julien, 1997; Muller & Schumann, 2011; Parrott et al., 2004). In terms of the empirical reason, these three items were highly positively skewed (> 1.90) and kurtotic (> 3.00) given that very few people endorsed these motives.

As a result of dropping these items, the participant to item ratio was greater than 20:1, indicating that the sample size was adequate. Despite eliminating those items with the most extreme skew and kurtosis, the distributions of six items still remained skewed (> 1.00), whilst two items demonstrated high kurtotis (> 3.00). Therefore, use of the polychoric correlation matrix was still indicated.

The determinant of the matrix of the remaining 14 items was 0.00057 (> .00001), indicating multicollinearity was not present. The Kaiser-Meyer-Olkin (KMO) test was .88 (good) and the Bartlett's statistic was 2082 (df = 91; p < .001). A KMO statistic > .80 and a significant Bartlett's test indicated that the matrix was suitable for factor extraction (Beavers et al., 2013). Therefore, the remaining 14 items were retained for all subsequent analyses.

The next step was deciding the number of factors to retain. Various criteria were proposed to help decide how many factors to retain and each does not necessarily lead to the same decision. Therefore, relying on multiple criteria and examining multiple solutions offered until finding the most interpretable solutions is considered as the best strategy (Fabrigar et al., 1999; Ford et al., 1986; Henson & Roberts, 2006).

This study used three of perhaps the best known criteria to decide on the number of factors retained: Kaiser's criterion, the scree plot and parallel analysis (PA). This study used PA based on Minimum Rank Factor Analysis (PA-MRFA), which is the default method within FACTORS, rather than methods of PA currently applied within most publications (e.g. Horns's PA and PA based on principal axes factor analysis (PA-PAFA)). This PA-MRFA is based on the comparison between the proportions of the explained common variance (ECV) from the observed data with the EVC from randomly generated data that shares the same distribution (Timmerman & Lorenzo-Seva, 2011). In addition, it has been empirically demonstrated to be more powerful than the other two methods (Timmerman & Lorenzo-Seva, 2011).

According to Kaiser's criterion (Kaiser, 1960), all components with eigenvalues < 1.00 should be excluded; therefore, in this case three factors were suggested to be retained (see Table 2). The scree plot indicated that two factors situated before the line started at 'the elbow' afterward and became flat after the third factor (see Figure 1). However, parallel analyses (PA-MRFA) advised one solution.

Table 2

Initial eigenvalues and proportions of common variance of the 14 item-NSUQ-Alcohol

Factor	Eigenvalue	Proportion of common variance	Cumulative proportion of variance
1	6.70	.48	.48
2	1.51	.11	.59
3	1.08	.08	.66
4	.91	.06	
5	.76	.05	
6	.63	.04	

Factor	Eigenvalue	Proportion of common variance	Cumulative proportion of variance
7	.46	.03	
8	.43	.03	
9	.39	.03	
10	.31	.02	
11	.29	.02	
12	.27	.02	
13	.16	.01	
14	.10	.01	

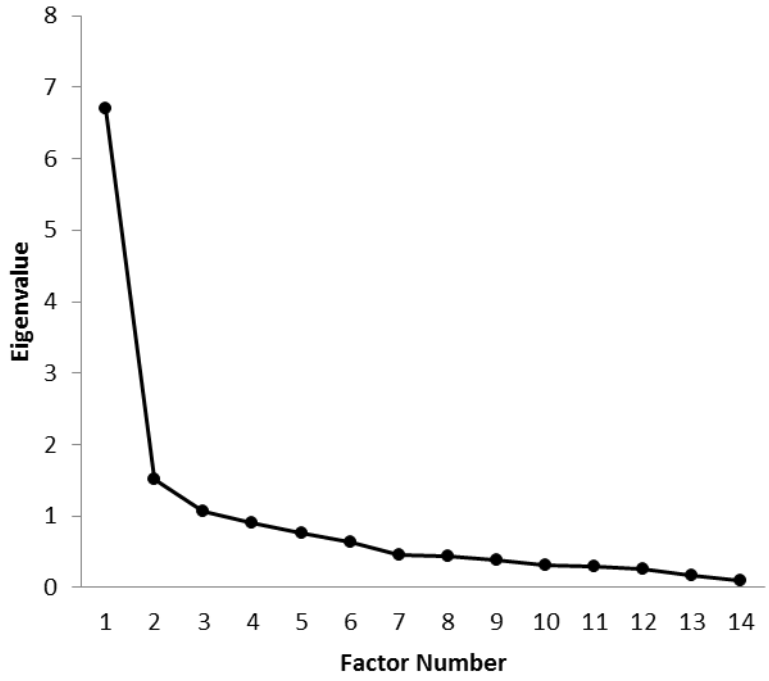

Figure 1 Scree plot of the 14 items-NSUQ-Alcohol Motives

Given this discrepancy, factors were extracted on all three possible models, fitting the common factor model to the data, followed by rotation and finding a solution with the simplest structure. Given the data was kurtotic and so not normally distributed, Unweighted Least Squares (ULS) approach was used for extraction. ULS is considered more robust if the assumption of multivariate normality is severely violated (Osborne, 2014). Several authors argue that most factor extraction methods cannot compute the percentage of common variance explained, including ULS (Lorenzo-Seva, 2013; Lorenzo-Seva & Ferrando, 2006; Shapiro & ten Berge, 2002; Ten Berge & Kiers, 1991). They argue that only Minimum Rank Factor Analysis (MRFA), which is under multivariate normality assumption, enables the proportion

of variance explained by each factor to be computed. Therefore, in following these recommendations the variance explained will be reported, but not as a percentage of the total.

Indices of fit can also be used to guide decisions concerning the adequacy of a solution. Since each of the fit indices has different strengths and weaknesses, this study relied on double criteria: the Goodness-of-Fit Index (GFI) and The Root Mean Square of Residuals (RMSR). According to Cole (1987), GFI > .9 indicates a well-fitting model and RMSR < .10 is arguably considered sufficient.

Direct oblimin rotation was used to achieve factor simplicity. It allows correlations amongst factors and, thus, is more suitable for social sciences as constructs in the real world are rarely uncorrelated (Osborne, 2014). In this case, correlations between different motivational factors would not be unreasonable. There is no single rule of thumb regarding a minimum magnitude of variable loading that is considered significant and meaningful. Authors have variously proposed, > .50 (Norusis, 1985), > .40 (Ford et al., 1986), or > .30 (Floyd & Widaman, 1995). Given the exploratory nature of this study, this analysis considered items with loadings greater than .30 and emphasised particularly items having larger loadings (> .50) in interpretation and naming factors.

As can be seen in Table 3, the three-factor model emerged with better goodness-of-fit statistics compared with the two other models. The three-factor model demonstrated an excellent fit (Goodness of Fit Index = .99) and it's residual (Root Mean Square of Residual/RMSR = 5.01%) was smaller than other models.

For all three possible models, there were no "hyperplane" item, that is, no items that did not load on any factor ($\leq$ .30). For the one-factor model, all items were loaded strongly (> .50) to the single available factor. There were no high communality items (> .60). For the two-factor model, 10 items loaded robustly on their corresponding factors. However, four items loaded on double factors and only three items had high communalities. For the three-factor model, ten items were robustly loaded on their corresponding factor. Only three items showed multiple loadings, while there were seven items with high communality (> .60). The three-factor model was superior in loadings and in terms of the number of items with high communalities. Inspection of the items indicated that the three-factor model is interpretable.

Therefore, the three-factor model was retained because of superior fit indices, simpler structure and high communalities. The detailed comparisons are presented in Table 3, while factor loadings and the communalities are presented in Table 4 below.

Table 3
Features of three suggested solutions of the 14 items-NSUQ-Alcohol

	GFI	RMSR (%)	Loadings			High Communalities
			High	Multi	Hyperplane	
One factor	.96	10.25%	14	-	-	-
Two factors	.98	6.86%	10	4	-	3
Three factors	.99	5.01%	10	3	-	7

Table 4
Factor loadings (≥ .30), explained variance and reliability of rotated factors for the NSUQ-Alcohol Motives-14 item version.

No	Items	One-factor		Two-factor			Three-factor			
		I	Com	I	II	Com	I	II	III	Com
1	I drink alcohol because it helps me feel more confident	**.70**	.49	**.96**	-.08	.84	**.95**	-.06	-.02	.83
7	I drink alcohol because it helps me be less anxious around people	**.71**	.50	**.87**	.00	.75	**.86**	-.03	.04	.74
3	I drink alcohol because it makes me feel relaxed	**.67**	.44	**.61**	.16	.52	**.62**	.18	-.02	.52
13	I drink alcohol because it makes me high/drunk/stoned	**.63**	.40	**.56**	.18	.46	**.58**	.05	.14	.46
10	I drink alcohol because it helps me feel euphoric	**.69**	.47	.38	**.39**	.47	**.41**	.27	.15	.46
2	I drink alcohol because it helps me think more clearly	**.64**	.41	.02	**.68**	.48	.00	**.83**	-.10	.61
11	I drink alcohol because it gives me mental boost	**.68**	.46	-.10	**.85**	.63	-.08	**.75**	.15	.64
6	I drink alcohol	**.68**	.46	-.03	**.78**	.58	-.02	**.74**	.09	.61

No	Items	One-factor		Two-factor			Three-factor			
		I	Com	I	II	Com	I	II	III	Com
	because it makes me feel creative or inspired									
4	I drink alcohol because it helps me look at things differently	**.73**	.54	.36	**.47**	.53	.36	**.54**	-.07	.58
5	I drink alcohol because it helps me reduce tiredness	**.55**	.31	.00	**.60**	.36	.03	**.48**	.15	.35
8	I drink alcohol because it helps me when I feel low or down	**.74**	.55	.34	**.49**	.53	.36	**.37**	.14	.53
16	I drink alcohol because it helps me feel less upset	**.65**	.42	.29	**.43**	.41	.31	**.35**	.10	.41
9	I drink alcohol because it increases my sexual desire	**.58**	.33	.02	**.61**	.39	.00	-.02	**.89**	.77
12	I drink alcohol because it increases my sexual stamina	**.61**	.38	.04	**.64**	.43	.03	.05	**.81**	.73
Explained variance		6.15		3.22	4.16		3.28	3.13	1.85	
Reliability (Cronbach α)		.92		.92	.89		.91	.86	.86	

Note: bold = loading to the corresponding factor; Com. = communality

Following recommendations by Rummel (1970), three criteria should be considered when naming factors: (i) *communication to others.* The name should be able to *"capsulize the substantive nature of the factors and enable others to grasp its meaning"* (p. 474), (ii) *mnemonic* or how easy the label would be recalled, and (iii) *future use* or the expediency of

any future use. The recommended approach to meet all those criteria is selecting a label that best describes the substance of the highest loading items.

For the three-factor model, factor 1 consisted of five items. The two largest loading items clearly described alcohol as a "social lubricant"; which may possibly contribute to emotionally positive social outcomes such as being more confident and less anxious. Alcohol was perceived as helping people to get along well with others. The three remaining items, specifically, being relaxed, high and euphoric, represented emotionally positive outcomes frequently associated with social situation as well. Thus, "social-motives" was considered as the most appropriate label for factor 1. The social factor accounted for the most variance (3.28).

Factor 2 consisted of seven items. Three strongly loading items represented improved perspective taking motives. An item, *"I drink alcohol because it gives me mental boost",* represented mental recovery. A further item, "*I drink alcohol because it helps me reduce tiredness*", represented recovering from fatigue. It could be perceived as either mental and/or physical tiredness. The two remaining items had weak loadings and depicted emotional coping. Based on the majority of strongly loading items, this factor was named "perspective taking motives". The perspective taking factor accounted for (3.13) almost as much variance as the social factor.

Factor 3 comprised only two items: *"I drink alcohol because it increases my sexual desire"* and *"I drink alcohol because it increases my sexual stamina".* Both items clearly represented a thought that alcohol is believed to facilitate sexual activities. Therefore, this factor named "sexual-motives". This factor contributed considerably less variance (1.85) than the other two factors.

Social motives correlated with the perspective taking motives and the sexual motives, r = .42 and r = .53, respectively. The perspective taking motives also correlated with the sexual motives, r = .55.

5.1.2. The NSUQ-Cannabis Motives section

Sixty two participants were involved in this part and all reported that they had consumed cannabis in the last 12 months. Two participants each did not provide information on one item. Therefore, for the purpose of this specific study, their missing data were replaced with random values obtained from www.random.org that were proportional to the distribution across the range of the questionnaire's score (1 – 5).

Of the original 17 items, 10 of the items were positively skewed (> 1.0), seven items were positively kurtotic and one item was negatively kurtotic. Consequently, referring to a

recommendation from Muthén & Kaplan (1985 & 1992), the polychoric correlation matrix was more appropriate. In addition, nearly half of the correlations fell into the .3 to .5 range (moderate), only two correlations were considered strong (> .5), whereas the rest of the correlations were weak (< .3).

Table 5
Matrix of association (polychoric correlation)

Item	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1																
2	.34															
3	.26	.19														
4	.28	.45	.39													
5	.31	.32	.08	.27												
6	.36	.45	.26	.55	.34											
7	.36	.20	.22	.26	.25	.31										
8	.41	.38	.29	.39	.34	.41	.33									
9	.29	.31	.08	.20	.28	.28	.16	.23								
10	.33	.30	.27	.41	.31	.39	.29	.34	.20							
11	.36	.48	.20	.43	.39	.46	.21	.41	.29	.32						
12	.34	.32	.14	.27	.36	.32	.24	.28	.35	.27	.33					
13	.24	.21	.34	.40	.06	.31	.14	.29	-.05	.37	.27	.11				
14	.27	.27	-.04	.17	.27	.22	.19	.13	.26	.10	.31	.31	.03			
15	.14	.13	-.06	.15	.16	.13	.09	.05	.14	.10	.10	.12	.04	.19		
16	.35	.39	.31	.44	.32	.41	.36	.55	.24	.31	.36	.32	.31	.19	.10	
17	.25	.30	.16	.42	.27	.43	.19	.31	.29	.24	.36	.31	.24	.24	.13	.32

The determinant of the matrix was 0.00002 (> .00001), the Kaiser-Meyer-Olkin (KMO) test was .82 (good) and the Bartlett's statistic was now 595.6 (df = 136; p = 0.000010). Hence, all three indicators indicated that the matrix was suitable.

Though some item distributions were quite strongly positively skewed (> 2.0), all the items conceptually portrayed what people might perceive in relation to the possible impact of cannabis on their mental or physical states. For instance, in contrast to alcohol, people may use cannabis to control weight (e.g. Cochrane, Malcom & Brewerton, 1998) or part of religion (BBC, 2014; McFadden, 2014). Hence, in contrast to alcohol where three items (item 14: *control weight*; item 15: *part of ritual/religion*; item 15: help to feel more spiritual) were

dropped on conceptual and empirical grounds, all 17 items were retained for entire further analyses.

The participant to item ratio was 3.65:1 which violates some of the common rules of thumb about participant numbers (e.g. Gorsuch, 1983; Norusis, 1985) and/or participant to item ratios (e.g. Floyd & Widaman, 1995; Streiner, 1994; Suhr, 2006). The rule of thumb regarding sample size for factor analysis could be summed up as "the more, the better". However, several authors argue these rules of thumb actually lack support both theoretically and empirically and thus, do not provide an accurate guide (Guadacnoli & Velicer, 1988; Henson & Roberts, 2006; Hogarty, Hines, Kromrey, Ferron & Mumford, 2005; MacCallum & Tucker, 1991; MacCallum, Widaman, Zhang & Hong, 1999; Osborne & Costello, 2004; Reise, Waller & Comrey, 2000; Zhao, 2009). Guadacnoli and Velicer (1988) argued that sample size is not the only single determinant of the factor solution stability, and so carefully selecting variables that strongly load to corresponding factors is recommended more than simply increasing the sample size. Furthermore, MacCallum and Tucker (1991) and MacCallum et al. (1999) demonstrated that deriving definitive a priori decisions regarding a minimum sample size appropriate in all situations is impossible. They concluded that factors can be defined well if all variables have high communalities (> .6) and each factors has at least three strongly loading items, even with relatively small sample sizes.

Each method of selecting the number of extracted factors indicated a different number of factors. The eigenvalue table (see Table 4) displayed three factors with eigenvalues > 1.00, the scree plot indicated either two or three factors (see Figure 2), however parallel analysis pointed to one factor.

Table 6
Initial eigenvalues and proportions of common variance of the 17 items-NSUQ-Cannabis Motives

Factor	Eigenvalue	Proportion of common variance	Cumulative proportion of variance
1	5.52	.33	.33
2	1.60	.10	.42
3	1.03	.06	.48
4	.96	.05	
5	.80	.05	
6	.79	.05	
7	.77	.05	
8	.74	.04	

Factor	Eigenvalue	Proportion of common variance	Cumulative proportion of variance
9	.68	.04	
10	.65	.04	
11	.61	.04	
12	.58	.03	
13	.51	.03	
14	.48	.03	
15	.46	.03	
16	.41	.02	
17	.39	.02	

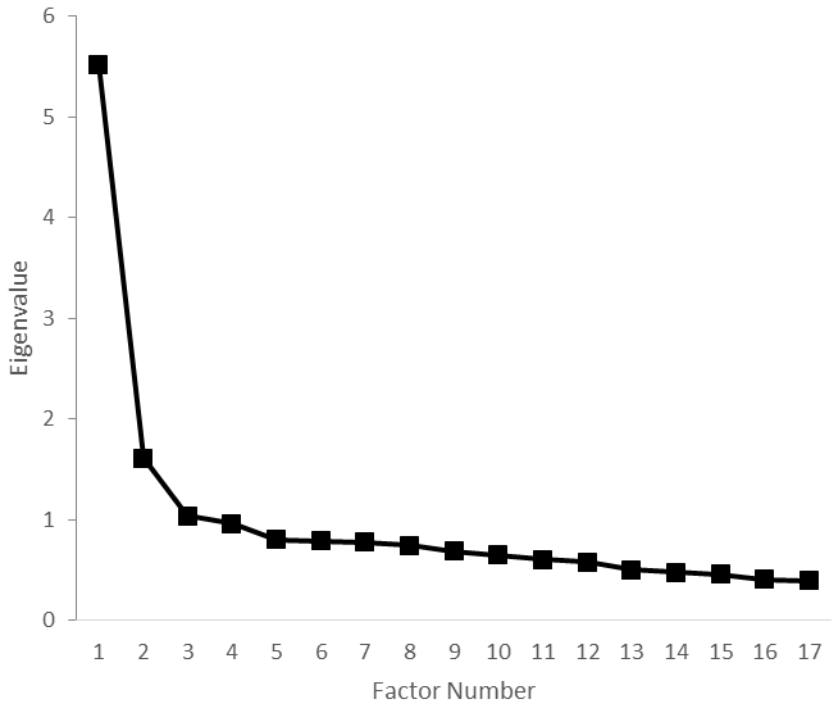

Figure 2 Scree plot of the 17 items-NSUQ-Cannabis Motives

Since each of methods proposed different solutions, extraction was performed upon all three factor solutions suggested. Given the coefficient of multivariate asymmetry kurtosis was significant ($p < .001$), Unweighted Least Squares (ULS) extraction was used. Direct oblimin rotation was once again used as it allows inter-correlations amongst factors.

Table 7
Features of three suggested solutions of the 17 item-NSUQ-Cannabis

	GFI	RMSR (%)	Loadings			High Communalities
			High	Multi	Hyperplane	
One factor	.97	6.48%	16	-		1
Two factors	.99	3.79%	7	1	2	-
Three factors	.99	2.91%	7	2	1	1

Table 7 shows that the three-factor model demonstrated better statistical features than other models. It had excellent goodness of fit (GFI = .99) and smaller proportion of residual (Root Mean Square of Residual/RMSR= 2.87).

Item 15 did not load sufficiently (≤ .30) on any factor across the proposed models, perhaps due to its weak correlations (< .20) with all other items. According to Floyd and Widaman (1995, p. 288) *"If an item does not correlate at least moderately (e.g., r = .20 or greater) with other items for the construct, then the item will likely perform poorly in a factor analysis."*

Once again, for the one-factor model, all 16 items loaded strongly (> .50) on the factor, but no items had high communalities (> .60). For the two-factor model, seven items had robust loadings with regards to their corresponding factors. One item had multiple loadings (> .30). There were two 'hyperplane' items. No item had a high communality. For the three-factor model, seven items loaded strongly to the corresponding factors (> .50). Two items each loaded on two factors, while one item had high communality.

Thus, the three-factor model demonstrated stronger loadings. Communalities for all models were low with only one item meeting the .60 criterion for the three factor solutions. Even at a less stringent criterion of .40, the three-factor solution was still relatively poor with seven items showing moderate communalities but better when compared to five for the two-factor model and six for the one-factor solution. In addition, the three-factor model was interpretable and was retained.

Table 8
Factor loadings (≥ .30), explained variance and reliability of rotated factors for the NSUQ-Cannabis Motives-17 item version.

No	Items	One-factor		Two-factor			Three-factor			
		I	Com	I	II	Com	I	II	III	Com
4	I use cannabis because it helps me look at things	**.67**	.45	**.59**	.21	.51	**.82**	-.04	-.07	.62

No	Items	One-factor		Two-factor			Three-factor			
		I	Com	I	II	Com	I	II	III	Com
	differently									
6	I use cannabis because it makes me feel creative or inspired	**.70**	.48	**.43**	.38	.48	**.59**	.13	.10	.51
17	I use cannabis because it helps me feel more spiritual	**.54**	.29	.22	**.40**	.29	**.53**	-.01	.20	.33
11	I use cannabis because it gives me mental boost	**.65**	.42	.26	**.47**	.43	**.48**	.14	.23	.44
2	I use cannabis because it helps me think more clearly	**.62**	.62	.24	**.47**	.39	**.46**	.13	.22	.40
13	I use cannabis because it makes me high/drunk/stoned	**.41**	.17	**.70**	-.17	.39	**.46**	.15	-.36	.39
8	I use cannabis because it helps me when I feel low or down	**.64**	.40	**.46**	.29	.42	.06	**.66**	-.05	.48
1	I use cannabis because it helps me feel more confident	**.58**	.34	.25	**.42**	.34	-.05	**.64**	.12	.41
7	I use cannabis because it helps me be less anxious around people	**.45**	.20	.25	.27	.20	-.11	**.59**	.02	.27

No	Items	One-factor		Two-factor			Three-factor			
		I	Com	I	II	Com	I	II	III	Com
16	I use cannabis because it helps me feel less upset	**.64**	.41	**.45**	.30	.42	.16	**.55**	-.03	.45
3	I use cannabis because it makes me feel relaxed	**.38**	.15	**.61**	-.13	.31	.18	**.38**	-.35	.33
10	I use cannabis because it helps me feel euphoric	**.54**	.30	**.45**	.19	.32	.29	**.33**	-.06	.32
14	I use cannabis because it helps me control my weight	**.36**	.13	-.19	**.60**	.29	.17	.06	**.46**	.29
9	I use cannabis because it increases my sexual desire	**.42**	.17	-.12	**.60**	.30	.12	.19	**.42**	.30
12	I use cannabis because it increases my sexual stamina	**.52**	.27	.02	**.57**	.34	.12	.32	**.34**	.34
5	I use cannabis because it helps me reduce tiredness	**.52**	.27	.02	**.58**	.34	.12	.32	**.34**	.34
15	I use cannabis because it is part of a ritual in my culture/religion	.20	.04	.08	.30	.07	.17	-.04	.24	.08
Explained variance		4.86		2.71	3.13		2.63	2.50	1.19	
Reliability (Cronb. α)		.88		.78	.79		.80	.76	.62	

Note: bold = loading to the corresponding factor; Com. = communality

It was decided to delete the hyperplane item (item 15) which refers explicitly to ritual (in contrast to the other religious instrumental motive item, item 17, which refers more broadly to spirituality) and to examine the three-factor model on the remaining 16 items. The overall fit was considered good and slightly better than the previous three-factor model, with GFI = .099, RMSR = 2.87%.

Rotation for the remaining 16 items demonstrated eight items loaded strongly to the corresponding factors (> .50), one item more than previous rotation. There were two items loaded to two factors as before, but there were no 'hyperplane' items. One item had high communality (> .60) with eight out of 16 (vs. 7/17) meeting a moderate communality criterion. The 16-item solution was chosen for interpretation given its slight superiority. The loadings and the communality were displayed in Table 9. The 16-item solution was chosen for interpretation given its slight superiority.

Table 9

Factor loadings (≥ .30), explained variance and reliability of rotated factors for the NSUQ-Cannabis 16 items.

No	Items	Three-factor			
		I	II	III	Com.
4	I use cannabis because it helps me look at things differently	**.80**	-.03	-.11	.61
6	I use cannabis because it makes me feel creative or inspired	**.61**	.12	.07	.51
17	I use cannabis because it helps me feel more spiritual	**.55**	-.02	.18	.33
11	I use cannabis because it gives me mental boost	**.53**	.11	.22	.45
2	I use cannabis because it helps me think more clearly	**.50**	.11	.21	.41
13	I use cannabis because it makes me high/drunk/stoned	**.42**	.16	-.40	.41
1	I use cannabis because it helps me feel more confident	-.05	**.66**	.10	.42
7	I use cannabis because it helps me be less anxious around people	-.13	**.62**	.00	.28
8	I use cannabis because it helps me when I feel low or down	.09	**.62**	-.06	.47
16	I use cannabis because it helps me feel less upset	.18	**.53**	-.04	.45

No	Items	Three-factor			
		I	II	III	Com.
3	I use cannabis because it makes me feel relaxed	.17	**.36**	-.34	.31
10	I use cannabis because it helps me feel euphoric	.27	**.34**	-.09	.32
14	I use cannabis because it helps me control my weight	.19	.08	**.43**	.27
9	I use cannabis because it increases my sexual desire	.16	.17	**.42**	.31
12	I use cannabis because it increases my sexual stamina	.15	.32	**.33**	.35
5	I use cannabis because it helps me reduce tiredness	.15	.32	**.32**	.34
Explained variance		2.72	2.47	1.05	
Reliability (Cronbach α)		.81	.76	.60	

Note: bold = loading to the corresponding factor; Com. = communality

Factor 1 consisted of six items and was named "perspective taking motives". The two items had strong loadings representing the perception that cannabis might facilitate improvement of their perspective taking; making them look at things differently and be more creative. The next two items represented people's thoughts that cannabis makes them more spiritual and provides a mental boost. These were followed by another item that represented perspective taking motives *"I use cannabis because it helps me think more clearly".* The last remaining item represented a perception that cannabis can make users high. This factor explained the largest variance (2.72).

Factor 2 comprised six items, signified "social motives". No item strongly loaded to this factor (> .80) and arguably, the four highest loading items loaded equally (.53 - .66). The two highest loading items represented the idea that that consuming cannabis might facilitate some positive emotion outcomes, particularly making people more confident and less anxious particularly within social situations. Two other items represented that cannabis is consumed as self-medication for emotional problems: helping a person when they feel low and making less upset. Two remaining items with weaker loadings (< .50) represented cannabis facilitating recovery from mental stress and to feel euphoric. The amount of the variance explained by the emotional factor (2.47) was slightly lower than the perspective taking factor.

Factor 3 represented "physical motives" and comprised four items. The highest loading item represented cannabis consumed to improve physical appearance. Of the remaining items, two items portrayed cannabis facilitating sexual desire and stamina, whereas one item

depicted counteracting fatigue. The physical factor explained the smallest amount of variance (1.05).

The perspective taking factor and the physical factor were strongly correlated (r = .73), while the relationship between the social factor and both the perspective taking and the physical factors were weak, r = .18 and r = .09, respectively.

5.2. Comparison of motives and contexts

5.2.1. Motives

Although 63 participants reported using alcohol and cannabis during the last 12 months, only 58 participants provided complete data on both the NSUQ-Alcohol Motives and the NSUQ-Cannabis Motives sections. All 58 participants were included in this analysis, comparing the motives underlying alcohol and cannabis use. ANOVA was performed with two levels of substance (alcohol and cannabis), and 17 levels of instrumental motives.

Mauchley's test of Sphericity was significant for both the motives, $\chi 2$ (135) = 383.89, and the substance X motive interaction, $\chi 2$ (135) = 272.32, indicating that the assumption of sphericity had been violated (the variances of the differences between levels of the motive levels are not equal). Both had estimates of sphericity = .06. According to Girden (1992; cited in Field, 2009), if the sphericity estimate is <.75, the Greenhouse-Geisser correction is recommended.

The results revealed that there were significant main effects concerning type of substances, $F(1, 57) = 9.44$, $p = .003$, $\eta_p^2 = .14$, type of motive across substances, $F(9.24, 526.68) = 68.85$, $p < .001$, $\eta_p^2 = .55$, and the substance X motive interaction, $F(10.09, 575.34) = 25.53$, $p < .001$, $\eta_p^2 = .31$.

The results can be seen in Figure 3 and show that there are several broad similarities between the substance with some motives being high for both substances, for instance item 11 (being euphoric) and item 13 (being high), and other motives being low for both substances, for example item 2 (think clearly) and item 5 (reducing tiredness). However, for some pairs, there were apparent differences.

Overall, collapsed across all motives, the grand mean rating was 2.08 (*not much like me*), slightly higher ratings for alcohol (M = 2.21, SD = 0.08) and lower ratings for cannabis (M = 1.94, SD = 0.09). Nevertheless, the means for four of the alcohol motives were 3 or above (i.e. *somewhat like me* or higher): item 1 (increasing confidence), item 7 (less anxious), item 13 (being high) and item 3 (getting relaxed) and two for cannabis, specifically item 13 (being high) and item 3 (getting relaxed).

The interaction was examined by using deviation contrasts that help to identify where the differences lie. Within this approach, the each mean is compared in turn to the average of mean of each substance. As can be seen in Table 10, the deviation contrasts were significant for 10 items, but not for the other seven items.

Taking the pair of items for each motive in turn, we can see from Table 10 and Figure 3 that for item 9 (increasing sexual desire) and item 12 (increasing sexual stamina), for both alcohol and cannabis, the patterns were similar across substances. Both items were lower than their respective means and neither deviation contrasts were significant ($F(1, 57) = 3.81$, $p = .056$, $\eta_p^2 = .06$ and $F(1, 57) = 1.17$, $p = .284$, $\eta_p^2 = .02$, respectively), indicating that use of both substances for sexual motives is low and there is no difference between alcohol and cannabis.

In contrast, the means for items 1 for alcohol (increasing confidence) and 7 (less anxious), both referring to social situations, were much higher than the alcohol mean, while in cannabis, the mean for item 1 was lower than cannabis mean and for item 7 was slightly higher than cannabis means. Their deviation contrasts were significant ($F(1, 57) = 205.41$, $p < .001$, $\eta_p^2 = .78$ and $F(1, 57) = 72.64$, $p < .001$, $\eta_p^2 = .56$, respectively). Thus, the pattern for social motive differs across the two substances

Table 10

Pairwise comparisons of motives

Group of motives	Motives	Alcohol			Cannabis			Differences in deviations
		M	*SD*	Dev.	*M*	*SD*	Dev.	
Improving social interaction	1. confident	3.59	0.14	1.38	1.52	0.11	-0.43	**1.80**
	7. less anxious	3.60	0.17	1.39	2.00	0.16	0.06	**1.34**
Euphoria	10. euphoric	2.93	0.18	0.72	2.33	0.16	0.38	**0.34**
	13. high	3.59	0.18	1.38	3.71	0.16	1.76	**-0.39**
Mental recovery	3. relaxed	3.45	0.14	1.24	3.78	0.15	1.83	**-0.59**
	11. mental boost	1.69	0.12	-0.52	1.52	0.11	-0.43	-0.09
Self-medication for mental problems	8. down	2.40	0.18	0.19	2.03	0.17	0.09	0.10
	16. upset	2.16	0.17	-0.05	1.91	0.16	-0.03	-0.02
Expanding	4. look	2.29	0.16	0.08	2.59	0.19	0.64	**-0.56**

Group of motives	Motives	Alcohol			Cannabis			Differences in deviations
		M	*SD*	Dev.	*M*	*SD*	Dev.	
perception horizon	differently 6. inspired	1.67	0.13	-0.54	2.16	0.18	0.21	**-0.75**
Improving cognitive performance	2. think clearly	1.41	0.10	-0.80	1.72	0.14	-0.22	**-0.58**
	5. tiredness	1.62	0.14	-0.59	1.28	0.09	-0.67	0.08
Facilitating sexual behaviour	9. sexual desire	1.84	0.14	-0.36	1.33	0.12	-0.62	0.25
	12. sexual stamina	1.53	0.10	-0.67	1.52	0.11	-0.43	0.11
Facilitating spiritual & religious activities	15. ritual	1.57	0.15	-0.64	2.00	0.16	0.06	0.10
	17. spiritual	1.16	0.05	-1.05	2.33	0.16	0.38	**-0.85**
Improving physical attractiveness	14. weight	1.05	0.03	-1.16	3.71	0.16	1.76	**-0.28**

Note: bold indicating that the differences are significant; deviation = mean of each motive – the average means of each substance; differences in deviation = deviation of alcohol – deviation of cannabis

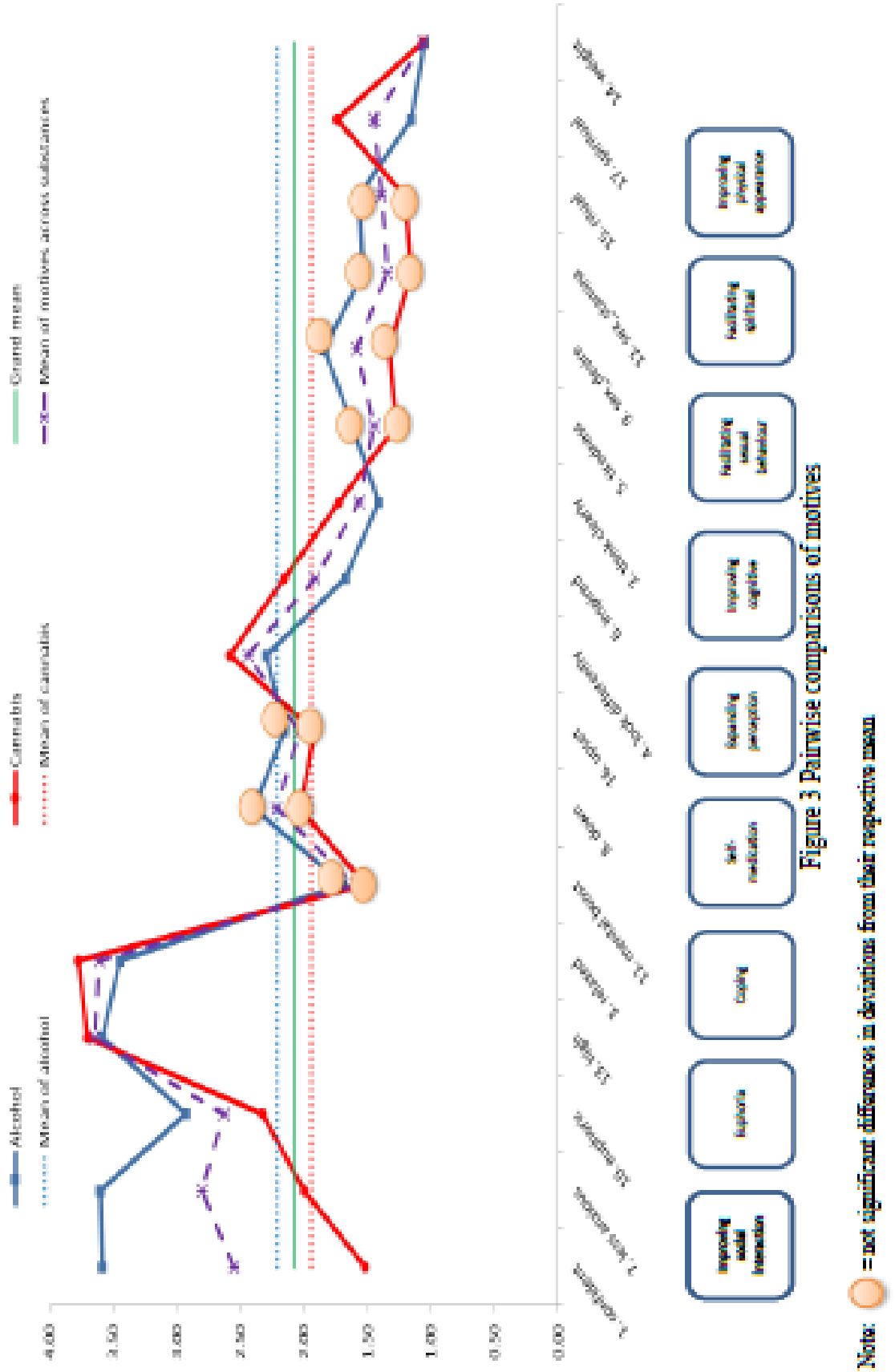

Figure 3 Pairwise comparisons of motives

5.2.2. Contexts

The sixty participants who provided complete data in the NSUQ-Cannabis Motives were included in this analysis. The analysis was similar to the previous using ANOVA. In this section, two levels of substances (alcohol and cannabis) and four levels of contexts of substance use (alone, with friends, with family and with strangers) were involved.

Mauchley's test of Sphericity for the contexts was not significant, indicating the assumption of spherecity was not violated, $\chi 2$ (5) = 4.74. In contrast, the sphericity test for the substances X contexts interaction was significant, indicating the assumption of sphericity was violated, $\chi 2$ (5) = 14.56. Thus, following the recommendation from Girden (1992; cited in Field, 2009), Greenhouse-Geisser correction is used.

The main effect in relation to the types of substances was significant, $F(1, 59) = 161.94$, $p < .001$, $\eta_p^2 = .74$. The second main effect, type of contexts across substances, was also significant, $F(2.83, 167.18) = 82.22$, $p < .001$, $\eta_p^2 = .58$, as was the substances X contexts interaction, $F(2.58, 152.04) = 26.77$, $p < .001$, $\eta_p^2 = .31$.

As can be seen in Table 11 and Figure 4, the family context differed between substances while the other three contexts were similar. Consuming with friends was high for both substances, while drinking alcohol alone and with strangers were low for both substances. The grand mean rating was 2.44 (not much like me), the ratings for alcohol ($M = 3.25$, $SD = 0.12$) emerged higher relative to the cannabis ($M = 1.64$, $SD = 0.07$). Unsurprisingly, the mean for drinking alcohol with friends was 4.85 or nearly just like me.

The deviation contrast revealed that the differences were significant for all contexts across substances. Thus, the patterns for all contexts differ across the two substances. For instance, drinking alcohol with friends in addition to consuming cannabis with friends was higher than their mean. The deviation contrast was significant ($F(1, 59) = 26.20$, $p < .001$, $\eta_p^2 = .31$). It indicated that students were preferable use either alcohol or cannabis with friends, although the pattern still differed. As another example, the mean for drinking alcohol with family was higher than the alcohol mean, but consuming cannabis with family was lower than the cannabis mean. Its deviation contrast was significant ($F(1, 59) = 41.97$, $p < .001$, $\eta_p^2 = .42$). It indicated that the pattern of consuming within the family context across both substances was different.

Table 11

Pairwise comparison of contexts

Context	Alcohol			Cannabis			Differences in deviation
	Mean	*SD*	Deviation	Mean	*SD*	Deviation	
Alone	2.30	1.53	-0.95	1.35	0.88	-0.29	**-0.66**
Friends	4.85	1.22	1.61	2.70	1.11	1.06	**0.54**
Family	3.55	1.47	0.31	1.12	0.32	-0.52	**0.82**
Strangers	2.28	1.46	-0.97	1.38	0.67	-0.26	**-0.71**

Note: bold indicating significant

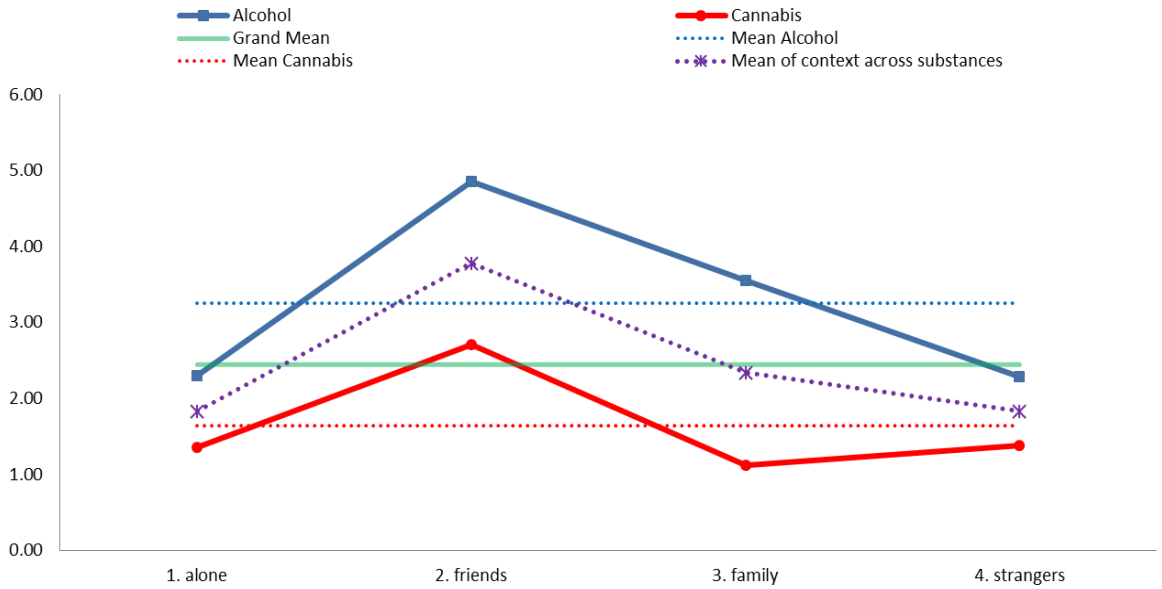

Figure 3 Pairwise comparison of contexts

6. Discussion

This study primarily aimed to examine the latent structure underlying the motives section of a new measure, the NSUQ, for alcohol and cannabis. In addition, this study explored the similarities and differences in the instrumental motives between alcohol and cannabis. An exploratory analysis comparing the contexts of alcohol and cannabis use was also conducted. The data were collected from students, a group who generally consume substances recreationally.

Alcohol and cannabis were selected to be analysed and compared given that both are probably the most commonly consumed substances by youths in the UK (the Crime Survey for England and Wales, 2012). Approximately 90 % of youth reported alcohol use within the past year and approximately 16 % reported cannabis use in the past year. Similar proportions were reported by students in the current study. Amongst 367 university students who provided data for the NSUQ and were predominantly (79.08 %) aged from 18 to 24 years old, nine out of ten participants (95.10 %) reported alcohol use in the last 12 months. Approximately one in five (20.26 %) reported cannabis use in the last year and moreover, similar to the national statistics, it was the most frequently consumed illicit drug.

6.1. Exploratory factor analyses

For both the NSUQ-Alcohol Motives and the NSUQ-Cannabis Motives, the exploratory analyses established a three-factor model. Both of the three-factor models were superior than the models with fewer factors, demonstrated better goodness-of-fit criteria, had higher loadings and were interpretable.

With regards to the NSUQ-Alcohol Motives, the model consisted of 14 items loading on three factors. Factor 1 comprised five items and was specified as the social factor, factor 2 consisted of seven items and was named the perspective taking factor, while factor 3, which included only two items was assigned as sexual factor. The social factor explained the largest amount variance, followed by the perspective taking factor, and finally, the sexual factor. In addition, all the factors were moderately correlated.

The NSUQ-Cannabis Motives consisted of 16 items after item 15 did not load to any corresponding factors and was subsequently dropped. The NSUQ-Cannabis Motives comprised three factors. Factor 1 consisted of six items and was named the perspective taking factor. Factor 2 consisted of six items and was specified as the social factor, whereas factor 3 was named the physical factor and consisted of four items. Surprisingly, the perspective taking factor explained the most variance, followed by the social factor, with the physical factor being the smallest. The perspective taking factor was strongly correlated to the physical factor, while the social factor, unexpectedly, had a weak correlation with the other two factors.

These three-factor models for both substances reflected potential latent variables underlying the questionnaire items. However, we assumed that these factors, particularly the social and perspective taking motives, may also reflect the main motives underlying

recreational alcohol and cannabis use amongst student samples. In terms of social factors, many studies have suggested the importance of social reasons for both alcohol and cannabis use amongst students (e.g. Kong & Bergman, 2010; Lee, Neighbors & Woods, 2007; Read, Wood, Kahler, Maddock & Palfai, 2003). A small number of studies have reported expanded cognitive performance as one of the motives behind alcohol and/or cannabis use among students (Chabrol, Duconge, Casas, Roura & Carey, 2005; Simons et al., 1998 & 2005; Simons, Gaher et al., 2005).

Noticeably one factor was different. The third factor within the NSUQ-Alcohol Motives section was the sexual factor consisting of only two items while in the cannabis section, the third factor was a broader four-item physical factor. Items 9 and 12 (representing sexual motives) and item 5 (reducing tiredness), item 14 (controlling weight) made up the physical factor. However, Item 14 had been dropped in the NSUQ-Alcohol Motives section as empirically very few participants endorsed these motives. In addition, alcohol is not frequently used to control weight, given it may lead to an increase in weight instead (National Health Services, 2014). Indeed, it was not endorsed very frequently for alcohol. This case is different with cannabis. People may perceive cannabis as an instrument to control weight (e.g. Cochrane et al., 1998). Thus, item 14 for the NSUQ-Cannabis Motive section was retained to explore this possibility, and as a result, a number of people endorsed this motive.

Although the first two factors were labelled social and perspective taking in both cases, the exact items differed; therefore, it is not simply a case of difference in order of appearance. For instance, two items representing alcohol as self-medication for mental problems loaded to the perspective taking factor with weak loadings, while two items representing similar motives for cannabis loaded to the social factor with high loading. Therefore, any substantive interpretation of the factors needs to go beyond the label.

Further, in both cases, the variance accounted for by the first and second factors does not differ greatly. For alcohol, the social factor provided the largest contribution, closely followed by the perspective taking factor. However, in relation to cannabis the pattern was opposite. It may possibly be related and explained by the result of the motive comparison in relation to both alcohol and cannabis (see 5.2).

Moreover, one may question why an emotional coping motive was not one of the more robust factors within the current study. Nevertheless, this question has probably been answered by several studies (Ham, Zamboanga, Olthuis, Casner & Bui, 2010; Norman, Conner & Stride, 2012; Read et al., 2003) that reported that coping with emotional problems

may not be the primary motive for substance use among students, who often use substances recreationally. Instead, they are initially driven more by social reasons to use substances. However, as substance use increases and turns to substance use-related problems, such as abuse or dependence, then coping with negative emotions motive may emerge.

6.2. Comparison of motives and contexts

At pair item level, the most important finding from the comparison was that a number of motives demonstrated dissimilar patterns of endorsement for alcohol and cannabis, whereas several others showed similar patterns. The improving social interaction and the expanding perception horizon and the improving cognitive performance motives were three examples of differences (see Table 10). The means of improving social interaction motives for alcohol were high, whereas for cannabis they were low. Conversely, the means of expanding perception horizon and improving cognitive performance motives for alcohol were lower than for cannabis. The deviation contrasts were also significant, indicating significant dissimilarities in the patterns of both motives in relation to alcohol and cannabis.

These results may illustrate the differences in students' perceptions towards both types of substances. Presumably alcohol is seen more as a 'social lubricant', while cannabis is perceived more as a booster of cognitive performance. This assumption appears to be in accordance with (Simons, Correia et al., 2005), who ascertained that social motives were more strongly related to alcohol use, while cognitive enhancement was more strongly related to cannabis use.

Conversely, two examples of similarities were sexual and spiritual motives; both were infrequently endorsed. Thus, it appears that students were not really driven by either sexual or spiritual motives to use either alcohol or cannabis. The deviation contrasts were not significant. The most recognised theory, the motivational model, developed by Cox and Klinger (1988) did not propose a sexual role and spiritual motives, whereas the more recent theory, instrumental motives (Muller & Schumann, 2011) did. This current study provided evidence that some students endorsed these motives, although the rate was not high.

This current study also revealed the differences in contexts between alcohol and cannabis among students. For instance, among those who consume both, the mean response of drinking alcohol with friends was "just like me", while consuming cannabis with friends was "somewhat like me". Despite these differences, there were also similarities. For instance, using with friends was the most favoured context for both alcohol and cannabis. Again, it

supports the suggestion that students who use substance recreationally, regardless of the underlying motives, are more likely to consume the substances during a social occasion.

6.3. Limitations

This study has a number of limitations. First, several items may have had an ambiguous meaning that could affect the results and thus, it is suggested that they should be reworded. For instance item 15, "*I use alcohol because it is part of a ritual in my culture/religion*". Though alcohol could probably be considered to be a part of the culture, particularly in Western countries or in sub-cultures, such as amongst football fans or the Cine Cedar Society, (a student group at Newcastle University), it is unlikely to be considered part of a religion. Similarly, although there may be sub-cultures that are in part defined by cannabis use, it is probably only a religious ritual for Rastafarians (BBC, 2014; McFadden, 2014). Mixing culture and religion could be perceived by respondents to be puzzling. A further item, number 5, "*I use cannabis because it helps me reduce tiredness*", was initially developed to examine mental fatigue. However, respondents could perceive it as meaning either mentally or physically tired.

Second, the first limitation may be related to the NSUQ item generation process. The item generation of NSUQ used the deductive approach to operationalize a specific top-down theoretical model. The content validity of NSUQ was developed via a series of comprehensive discussions involving the author and both supervisors, who are experts in understanding the construct, development of a measure, and factorial analyses. However, according to Hinkin, Tracey and Enz (1997), the best approach with respect to exploring an unfamiliar phenomenon where little theory may exist is the inductive approach. It can be argued that although the phenomenon is relatively unfamiliar, but a theory does exist. The instrumental drug use proposed by Muller and Schumann (2011) can be classified as a novel model. To the extent that the model is valid, the deductive approach is defendable, but more extensive feedback may have been helpful. The factor analyses are clearly interpretable but their stability is unknown, which is a potential limitation.

However, only a few studies have examined this novel model empirically (i.e. Morgan, Noronha, Muetzelfeldt, Fielding & Curra, 2013; Sattler, Sauer, Mehlkop & Graeff, 2013; Wolff & Brand, 2013; Wolf, Brand, Baumgarten, Loses & Ziegler, 2014) and the model has not been validated with substance users. From this standpoint, a more inductive approach could be indicated. Therefore, first, drafting items and/or discussing the content validity of

items by way of focus group discussions involving first substance users and then experts on issues around motives for substance use may have increased confidence in the content validity. More extensive piloting of the measure and prior exploratory factor analyses (EFA) probably have allowed a replicated factor structure for the main study and pre-empted questions about the content validity of NSUQ.

Worth to be noted that the NSUQ was used twice within this thesis, in the correlational studies in the UK (see Chapter 4) and in Indonesia (see Chapter 5). These two samples gave an opportunity to look at construct validity through replicating factor analyses, but Indonesian sample let it down as insufficient substance users recruited. Moreover, the NSUQ Alcohol sub-section was utilized again in the replication study in the UK (see Chapter 6). It gave a possibility to look at factor structure of alcohol section of NSUQ which it addressed factor stability, even if not content validity.

Third, the small number of participants included in the factor analysis of the NSUQ-Cannabis Motives and the comparison analyses is a significant limitation (less than a quarter of the initial sample). Though several experts state that the number of participants in a factor analysis is less important than some other considerations (Floyd & Widaman, 1995; Guadacnoli & Velicer, 1988; Henson & Roberts, 2006; MacCallum & Tucker, 1991; MacCallum et al., 1999; Reise et al., 2000), in terms of stability of factor solutions, we believe that "more is still better". However, it is important to note that the proportion of participants reporting cannabis use in the current study (20.26%) was slightly higher than the result established in the national survey (16%, Crime Survey for England and Wales, 2012). Given that the entire sample was 397, in order to increase the sample for those who consume cannabis to N = 170 (10:1 ratio) or N = 340 (20:1 ratio), 834 or 1678 participants would need to be recruited respectively, which is two to four times the current sample.

Fourth, in spite of the practicalities of much larger samples, MacCallum and Tucker (1991) and MacCallum et al. (1999) state that a relatively small sample size does not really matter, as long as factors can be well defined; indicated by the high communalities and strongly loadings of most items. Despite strong theoretical underpinnings and a structure that was broadly interpretable, the factor analysis for the NSUQ-Cannabis Motives section did not meet these two criteria; therefore, the factor structure must be treated with caution.

Fifth, comparison analyses were conducted on a pair level. Consequently, this study did not examine the role of single item as a possible distinctive motive. However, the analysis that has been actually done within this study is a more sophisticated version of t-test which

would only say whether they are different. What this study has taken into account is how different they are **relative** to the overall pattern of difference. This is what an interaction means.

However, in fact, although both items of each pair represent a given instrumental motive, these two items may be interpreted as two distinct motives. For instance, the two items representing increasing social interaction may be interpreted differently. The first item (*I use it because it helps me to feel more confident*) is the booster of social confidence, while the second one (*I use it because it helps me to be less anxious around people*) is interpreted as an instrument to reduce anxiety. Therefore, further analyses on an individual item level would potentially offer a more interesting picture concerning the comparison motives between alcohol and cannabis use.

As a final limitation, it should be noted that the current study is the first study to explore a measure based on the original instrumental motives framework proposed by Muller & Schumann (2011). Any exploratory factor analysis should be considered as an exploratory technique only and must be followed-up with confirmatory studies across multiple samples (Osborne, 2014). Consequently, improvements to the NSUQ, confirmations of the latent structure of the NSUQ-Motives, comparisons of any similarities and differences between this common set of instrumental motives for alcohol and cannabis, and moreover the contexts as well, deserve further investigation. However, whether this is feasible beyond the motives behind alcohol use will require careful thought. Unless there is a way to target communities of recreational drug users more directly, extremely large general samples, for instance the student sample discussed here would be required, given the low base rates of substance use other than alcohol and cannabis.

6.4. Conclusion

In conclusion, this study used the NSUQ designed to be comprehensive, theory driven, flexible and able to be used in various samples with various substances. In terms of construct validity, there is initial evidence in relation to the NSUQ-Alcohol Motives and, to a lesser extent, the NSUQ-Cannabis Motives that have an acceptable fit and are interpretable. In addition, the study also revealed that the questionnaire can be used to compare instrumental motives and contexts of substance use by finding both differences and similarities in motives and contexts between alcohol and cannabis. The measure demonstrates promise, particularly

for research investigating the motives and context associated with specific substances use. It could potentially be used in clinical settings for investigating the type of beliefs that people with substance use difficulties may hold about various substances. Further research is initially required to slightly revise some items, then address the other limitations of the current study, and finally to extend the findings to other substances and other samples where a greater range of motives may be present.

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Appendix: Blue print of the NSUQ

My reason using (type of substance)

Does not apply	Applies a little bit	Somewhat applies	Much applies	Entirely my main reason to use it
0	*1*	*2*	*3*	*4*

	Instrumental Motives	**Items**
1.	Improved social interaction	I use it because it helps me to feel more confident
2.		I use it because it helps me to be less anxious around people
3.	Euphoria, hedonia, and high.	I use it because it helps me to feel euphoric
4.		I use it because it helps me to be high/drunk/stoned
5.	Facilitated recovery	I use it because it makes me to feel relaxed
6.	and coping with psychological stress	I use it because it helps me to give mental boost
7.	Self-medication for mental problems.	I use it because it helps me when I feel low or down
8.		I use it because it helps me to fell less up set
9.	Sensory curiosity – Expanded perception horizon.	I use it because it helps me to look at things differently
10.		I use it because it makes me feel creative or inspired
11.	Improved cognitive performance and counteracting fatigue.	I use it because it helps me to think more clearly
12.		I use it because it helps me to reduce tiredness
13.	Facilitated sexual behaviour.	I use it because it increases my sexual desire
14.		I use it because it helps me to increase my sexual stamina
15.	Facilitating spiritual and religious activities.	I use it because it is part of a ritual in my culture/religion
16.		I use it because it helps me to feel more spiritual
17.	Improved physical appearance and attractiveness.	I use it because it helps me to control my weight

Institute of Neuroscience

Chapter 4. Understanding Intolerance of Uncertainty, Social Anxiety and Alcohol Use among Students in the United Kingdom

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I declare that this assignment is my own work and I have correctly acknowledged the work of others. This assignment is in accordance with University and School guidance on good academic conduct (and how to avoid plagiarism and other assessment irregularities. University guidance is available at www.ncl.ac.uk/right-cite

Contents

Abstract

Introduction: This study aims to address: To what extent is intolerance of uncertainty (IU) correlated with social anxiety? And to what extent and in what ways are IU and social anxiety correlated with alcohol use?

Method: Three hundred and nine participants completed the online questionnaires. The contributions of IU, fear of negative evaluation (FNE) and anxiety sensitivity (AS) were investigated using a series of hierarchical regression, while their interactions and mediation relationships were investigated using interaction analyses and the bootstrapping approach, correspondingly.

Results: IU, FNE and AS each consistently made additive and unique contributions to the variance in social anxiety. IU accounted for the second greatest proportion of the variance, subsequent to FNE. The relationship between IU and social anxiety was significant either when the levels of FNE was moderate to high or at all levels of AS. It was augmented by the increasing levels of FNE or AS. Conversely, the relationship between FNE and social anxiety was significant at all levels of IU, while the relationship between AS and social anxiety was significant only when IU was high. Both of these relationships were strengthened as a result of increased levels of IU.

IU, FNE and AS each had independent negative indirect effects through social anxiety on drinking alcohol with friends. However, the indirect effects of FNE and AS through instrumental motives were significant and positive, while the indirect effect of IU was not significant. However, the inclusion of instrumental motives for alcohol use in the serial mediational chain reversed the direction of the indirect effect for IU and AS but not for FNE.

Conclusion: This current study highlighted the role of IU, suggesting that although FNE is probably the main vulnerability factor for social anxiety, IU is an important factor. In addition, IU enhances the effect of FNE and AS in predicting social anxiety, and vice versa. Finally, although a socially anxious person may generally prefer to avoid alcohol use, when positive expectancies are present they are arguably more motivated to consume alcohol. IU is the factor underlying it.

Chapter 4. Understanding Intolerance of Uncertainty, Social Anxiety and Alcohol Use among Students in the United Kingdom

1. Background

1.1. Intolerance of uncertainty and social anxiety

1.1.1. Relationship between intolerance of uncertainty and social anxiety

Intolerance of uncertainty (IU), or a tendency to perceive and interpret uncertain situations in a negative way and which should be avoided, was originally conceived to explain worry, the hallmark of Generalized Anxiety Disorder (GAD) (Carleton, Norton, 2007; Freeston et al., 1994) and numerous studies supported this (e.g., Buhr & Dugas, 2009; Dugas, Marchand & Ladouceur, 2005; Freeston et al., 1994; Zlomke & Jeter, 2014). However, a decade later, IU was determined to be of interest beyond GAD (Carleton, 2012).

In recent years, an increasing amount of studies have provided evidence of a consistently moderate correlational relationship between and social anxiety. The evidence is from various samples: among adolescents (Boelen, Vrinssen & Tulder, 2010), undergraduates (Norr et al., 2013; Riskind, Tzur, Williams, Mann & Shahar, 2007; Whiting et al., 2014), mixed students and community (Chapter 2), community volunteers (Boelen & Reijntjes, 2009; Boelen, Reijntjes & Carleton, 2014; Carleton, Collimore & Asmundson, 2010) and clinical samples (Brown & Gainey, 2013; McEvoy & Mahoney, 2011&2012; Michel, Rowa, Young & McCabe, 2016; Sapach, Carleton, Mulvogue, Weeks & Heimberg, 2015).

More than half of these previous studies (Boelen et al., 2010; Boelen & Reijntjes, 2009; Brown & Gainey, 2013; McEvoy & Mahoney, 2011; Norr et al., 2013; Riskind et al., 2007) used the original version of the Intolerance of Uncertainty Scale (27 items; Freeston et al., 1994). However, the factor structure of the IUS-27 has been reported unstable across several studies (Buhr & Dugas, 2002; Carleton, Norton et al., 2007; Freeston et al., 1994; Norton, 2005) and none of solutions were superior in terms of meeting with the criteria for goodness of fit (Carleton, Norton et al., 2007). Addressing these issues, Carleton, Norton et al. (2007) proposed the IUS-12 which is a short version of the IUS-27. It consistently demonstrated two factor structures: the prospective anxiety, “fear and anxiety based on future events”, and the inhibitory anxiety, “uncertainty inhibiting action or experience” (Carleton, Norton et al., 2007; p. 112). In addition, the IUS-12 demonstrated a comparable psychometric properties (internal consistency, convergent and divergent validity) to the IUS-27 and the total score of the IUS-12 strongly correlated to the total score of the IUS-27. This then indicated that the

extra 15 items from the IUS-27 are redundant and thus, IUS-12 is a more efficient tool (Carleton, Norton et al., 2007).

Half of these previous studies (McEvoy & Mahoney, 2011 & 2012; Norr et al., 2013; Sapach, Carleton, Mulvogue, Weeks & Heimberg, 2015; Whiting et al., 2014) used the Social Performance Scale (SPS) and/or the Social Interaction Anxiety Scale (SIAS). Developed by Mattick and Clarke (1998), these two scales measure two separate situational aspects (performance and interaction situations) of social anxiety. This study will utilise the Social Phobia Inventory (SPIN) proposed by Connor et al. (2000). It measures fear, avoidance and physiological discomfort related to both performance and social interactions. The detailed explanation about the reasons underlying this study's utilisation of IUS-12 and SPIN can be read in Chapter 1.

An increasing number of studies using hierarchical regression reported that each sub-factor of IUS-12 is independently more related to different psychopathological symptoms (Carleton et al., 2012; Fetzner, Horswill, Boelen & Carleton, 2013; Khawaja & Mcmahon, 2011; Mahoney & McEvoy, 2012; McEvoy & Mahoney, 2011 & 2012; Whiting et al., 2013). It suggests that the global construct of IU may be a transdiagnostic factor that maintains various symptoms of anxiety disorders and depression, whereas the lower-order dimensions of IU may indicate specificity for particular anxiety disorders and depression.

However, more recently we have explored the two-factor structure of IUS-12 (Chapter 2) and found that both P-IU and I-IU were very strongly correlated with the total IUS score (r's(110) $\geq$ .93, p's < .001) and strongly correlated with each other (r(110) = .76, p < .001). This finding concurs with Hale et al., (2016) who compared the fit of the two-factor solutions of the IUS-12, proposed by Carleton, Norton et al. (2007) and found that the general IU factor had a high reliability and accounted for nearly 50% of the total variance and 80% of the shared variance in IUS-12 scores, indicating that the total scores truly reflect the general factor. Therefore, they recommended to use IUS-12 as a unidimensional scale.

According to Carleton et al. (2014), IU is one of five **fundamental fears**, "constructs posited as individual differences that contribute substantially to anxiety related psychopathologies" (pp. 94). The others are AS, FNE, Injury/Illness Sensitivity and pain-related anxiety. Each construct represents a specific psychopathology, but the dimensions within constructs may overlap. Therefore, it allows investigation of these constructs to be **both** disorder specifics factors and transdiagnostic factors. IU itself has been established as a representative of worry but it may be also a transdiagnostic factors across anxiety disorders, including social anxiety. Therefore, it is considered important to investigate to what extent IU may contribute significantly to social anxiety.

1.1.2. Other factors related to social anxiety

In contrast to the recent findings on IU, fear of negative evaluation (FNE) or a fear of receiving negative judgements from other people (Levinson et al., 2013; Watson & Friend, 1969) is a more well-known reliable predictor of social anxiety. A large number of studies have provided strong evidence to support this (e.g., Carleton, Collimore & Asmundson, 2007; Collins, Westra, Dozois & Stewart, 2005; Stopa, 2001; Weeks et al., 2005; Weeks, Heimberg, Rodebaugh & Norton, 2008). Two well-known cognitive models of social anxiety, the Cognitive Model of Social Phobia (Clark & Wells, 1995) and the Cognitive Behavioural Model of Social Phobia (Heimberg, Brozovich & Rapee, 2010; Rapee & Heimberg, 1997), also highlights the critical role of FNE as the primary cognitive risk in relation to social anxiety (see Chapter 1). Interestingly, there does not appear to be any study that provides evidence of a causal relationship between FNE and social anxiety.

Boelen and Reijntjes, (2009) and Whiting et al., (2014) have compared the relative contributions of IU and FNE. Their studies demonstrated slightly different outcomes. Boelen and Reijntjes (2009) reported that the contributions of IU and FNE were comparable when controlling neuroticism, whereas Whiting et al. (2014) reported that the contribution of FNE was greater than the contribution of IU when controlling perfectionism. Boelen and Reinjtes' used the IUS-27 and SPIN (Social Phobia Inventory; Connor et al., 2000) and recruited a group of grieving adults, while Whiting et al. used the IUS-12 and SIAS, examining social interaction anxiety only, and recruited undergraduate samples. The different measures and samples and the fact they used different covariates are factors that may have affected the outcome.

Another cognitive factor that has been linked with social anxiety is anxiety sensitivity (AS), a fear of arousal of "bodily sensation" which is believed could lead to harmful consequences and, thus, intensify anxiety (Hazen, Walker & Stein, 1994; Naragon-Gainey, 2010). Evidence for the relationship between AS and social anxiety comes from: clinical children (e.g. Alkozei, Cooper & Creswell, 2014), clinical adolescents (e.g. Essau, Sasagawa & Ollendick, 2010), clinical adults (e.g. Hazen et al., 1994; Naragon-Gainey, Rutter & Brown, 2014; Rodriguez, Bruce, Pagano, Spencer & Keller, 2004; Scott, Heimberg & Jack, 2000; Taylor, Koch & McNally, 1992), non-clinical children (Alkozei et al., 2014) and non-clinical adults (e.g. Panayiotou, Karekla & Panayiotou, 2015; Taylor et al., 1992).

Although originally proposed by Reiss, Peterson, Gursky and McNally (1986) as a specific vulnerability trait for panic disorder, further studies have found AS across anxiety disorders, depression and even substance use disorders (Naragon-Gainey, 2010). Among

clinical adults it has been reported that AS had the strongest association with panic disorder in comparison with other anxiety disorders (Rodriguez et al., 2004; Scott et al., 2000; Taylor et al., 1992). Interestingly, Essau et al. (2010) reported that AS was most strongly associated with social anxiety in comparison with all other anxiety disorders among adolescents, whereas Alkozei et al., (2014) found that a group of socially anxious children reported a higher level of AS than a group of anxious children without social anxiety and a group of non-anxious children.

Referring to the definition of AS, which is "anxiety over anxiety symptoms" (Reiss et al., 1986) and AS has been found across anxiety disorders, Taylor et al. (2007) suggested that AS may act as an anxiety amplifier. Furthermore, Moore et al. (2009) supported this suggestion. They conducted three independent experiments (two with university students and one with patients at a clinic for anxiety), where participants were asked to indicate their anxiety, as if they themselves were in the multiple embarrassing scenarios presented. Previously, their AS levels had been measured. Consequently, Moore et al. (2009) determined from across their three experiments, that greater AS predicted higher level of anxiety.

From this point of view, particularly **the fundamental fears** (Carleton, et al., 2014), it is proposed that FNE probably is the defining variable regarding social anxiety, IU is the emerging factor of social anxiety, while AS is the amplifier of social anxiety caused by FNE and IU. Therefore, it is also considered important to provide evidence that FNE's contribution to social anxiety would be the largest, followed by the contribution of IU and finally, would be the contribution made by AS.

To our knowledge, no study to date compares the contribution of IU to the variance in social anxiety, relative to the contributions of FNE and AS. Although, Sapach et al. (2015) examined the relative contributions of IU, FNE, fear of positive evaluation (FPE) and AS, they entered FNE as the first variable, and IU and the other variables were entered simultaneously in the subsequent step. Once they had controlled FNE, all three other variables entered together provided significant individual contributions, but the relative importance of each was not analysed. It means that they highlighted the role of FNE and did not analyse a clear comparison of each contribution. In a previous study (Chapter 2), we have compared the relative contribution of IU to FNE and found that the contribution of IU in the variance in social anxiety was smaller than the contribution of FNE. This previous study examined IU, FNE and shame, whereas this present study will be the first study to provide novel evidence in relation to the relative contribution of IU, FNE and AS and their interactions in predicting social anxiety. In addition, none of the previous studies have investigated possible interactions among IU, FNE and AS concerning social anxiety.

1.1.3. Intolerance of uncertainty as a transdiagnostic factor

Moreover, IU has recently been reported as a transdiagnostic factor across anxiety disorders and depression. For instance, Boelen & Reijntjes (2009) reported a significant correlation between IU and symptoms of Generalized Anxiety Disorder (GAD), social anxiety and obsessive-compulsive disorder (OCD), after the shared variance among symptoms had been controlled. However, they reported that IU was not significantly correlated with depression. Surprisingly, Carleton et al., (2012) reported that IU also correlated with depression symptoms in addition to its significant correlation with worry, social anxiety and panic disorders. In line with Khawaja and Mcmahon (2011), Mahoney and McEvoy (2012), McEvoy and Mahoney (2011& 2012), and Whiting et al., (2013) reported a significant relationship between IU and worry, OCD, social anxiety, panic disorders and depression symptoms. Boelen et al. (2010) and Fetzner et al. (2013) also reported IU's robust correlation with the symptoms of Post-Traumatic Stress Disorder (PTSD).

Despite the limitations of the self-report methods used, these studies support IU as an emergent transdiagnostic construct; a factor that explains the development and maintenance of numerous disorders and thus may explain the occurrence of comorbidity. Since the publication of the DSM III-R, comorbidity between and among anxiety disorders and depression is the most notable (Watson & Clark, 1998). For instance, Brawman et al. (1993) and Massion, Warshaw and Keller (1993) reported that the comorbidity between GAD and other anxiety of mood disorder diagnosis was more than 80%, while Brown, Campbell, Lehman, Grisham and Mancill (2001) reported the prevalence of the life-time and the current comorbidity between anxiety and mood disorders were 81% and 57%, respectively. Within the DSM-5 classification, comorbidity across anxiety disorders and depression also appears to remain frequent (Katz, Stein & Sareen, 2013).

Comorbidity has a strong association with more severe condition of patients (Kendall, Kortlander, Chansky & Brady, 1992; Kessler, McGonagle, Zhao, Nelson & Hughes, 1994; Kessler, Chiu, Demler & Walters, 2005), and a severity is a negative prognostic indicator (Kessler et al., 2005). Therefore, Katz et al. (2013) suggested that the presence of comorbidity may affect the efficacy of a treatment and thus, comorbidity requires a more comprehensive assessment and treatment. Supporting this suggestion. Deckersbach et al. (2014) reported that patients who were suffering from depression with additional anxiety disorders (single or multiple) required more intense and extra treatment compared to patients with depression as single diagnosis.

Given that comorbidity has important clinical implications and that transdiagnostic processes may account in part for the presence of comorbidity, further investigation of possible transdiagnostic factors is required. It would be useful for research to go beyond that, which has already been investigated, and examine disorders such as substance use and dependence. This is in accordance with a suggestion from Boelen and Reijntjes (2009) and Carleton (2012) for future studies to assess the possible relationships of IU with different psychological disorders.

1.2. Social anxiety and alcohol use

Nowadays, alcohol use, particularly among students, is one of the major issues being encountered by countries across the world and a concern priority of the World Health Organisation (World Health Organisation, 2014). Concerning the UK, the Health Survey for England reported in 2006 that the proportion of men and women who had drunk alcohol in the past year were 89% and 84%, respectively. In addition, 72% of men and 58% of women had drunk in the past week and 72% of them, comparably men and women exceeded the recommended amounts. Surprisingly, the most likely to drink over the limit was the group of 16-24 years old (Fuller, 2008). A household survey in 2007 (Fuller, Jotangia & Farrell, 2009) reported that 33.2% of men and 15.7% of women were categorised as alcohol misusers and 8.7% of men and 3.3% of women were diagnosed as suffering Alcohol Dependence. In line with the national survey in 2006, the group of younger people (16-24 years old) had a high risk of experiencing either alcohol misuse or Alcohol Dependence (Fuller et al., 2009). A more recent national survey (Fat & Fuller, 2012) established that there has been an approximately 2% reduction for both those who reported alcohol use in the last year and in the last few weeks. Among those who reported drinking in the past week, 56% of men and 52% of women drank above the UK government safety guidelines and, again, younger people (16-24 years old) stood out as the most likely age group to consume alcohol over the recommended level (Fat & Fuller, 2012).

In accordance with those reports, several other studies reported a high proportion of students in the UK admitted to having engaged in binge drinking at least occasionally, accounting for a range between 64% and 75% (Cooke, Sniehotta & Sch¨uz, 2007; Elliott & Ainsworth, 2012; Jamison & Myers, 2008; Norman, 2011; Norman, Armitage & Quigley, 2007). A study reported that the prevalence of those drinking in excess of the recommended limits in the UK was higher among university students than among non-student peers (Gill, 2002).

A global survey in 2010 by the WHO placed the UK as the 13th highest for heavy drinking out of 196 countries worldwide. They also noted that the prevalence of Alcohol

Dependence in the UK was 5.9% (8.7% of men and 3.2% of women) in 2010, higher than the average (4%) of the WHO European region (World Health Organisation, 2014). This figure is similar to the results of the national household survey in 2007 officially conducted by the NHS (Fuller, 2008), indicating that the level of Alcohol Dependence in the UK may remain steady.

In general, these reports reveal that the UK was not only one of the countries to have one of the highest rates of alcohol abuse, but also to have a high rate of heavy drinking among young people. It may be related with the fact that alcohol is generally recognised as an integral part of British culture (Craig & Mindell, 2012).

Various authors reported that the detrimental effects of excessive alcohol use vary from causing numerous physical and mental health problems, to social and economic burden, at an individual and societal level, and even at national level (e.g. Cherpitel et al., 2009; Department for Transport, 2010; Richardson & Budd, 2006; Standerwick, Davies, Tucker & Sheron, 2007; Theobald, Johansson, Byren & Engfeldt, 2001; White, Altman & Nanchahl, 2002).

Specific to student samples, studies mostly from the US reported a range of negative effects concerning alcohol use. For instance, large studies by Wechsler et al. (2002) and Weschler, Lee, Kuo and Lee (2000) report that students who frequently participated in binge drinking were more likely to have missed classes, fallen behind in school work, become involved in unplanned sex, argued with friends, damaged property, or have gotten into trouble on campus or with the police. Hingson, Heeren, Winter and Henry (2005) reported thousands of unintentional student injuries, deaths and cases of violent acts related to alcohol use by students. Cox, Zhang, Johnson and Bender (2007) reported a relationship between alcohol use and low academic achievement. Ginzler, Garret, Baer and Peterson (2007) also reported a range of negative consequences of alcohol use among students: not completing homework, missing school, fighting with friends or family, bullying, and experiencing a change in personality and even withdrawal from social-life. Interestingly, specific to academic matters, some studies reported a non-significant relationship with alcohol use and achievement in their study (e.g. Aertgeerts & Buntinx, 2002; Thombs et al., 2009).

In spite of increasing studies examining various issues related to alcohol use, the fact remains that the number of alcohol consumers among students remains considerably high. Therefore, studies are still required, particularly those which endeavour to understand the precise causes of alcohol use among students.

Social anxiety has been proposed as a potential cause of alcohol use. However, studies examining the linkage between social anxiety and alcohol use among adolescents or students

report equivocal results. For instance, social anxiety correlated significantly with Alcohol Abuse Disorders (Buckner & Turner, 2009; Zimmerman et al., 2003) or Alcohol Dependence Disorder (Nelson et al., 2000; Zimmerman et al., 2003). Stronger evidence came from a 14-year longitudinal study by Buckner et al. (2008) (N = 1,709; Mean age T1 = 16.6, SD T1 = 1.2). This study establishes that social anxiety diagnosed at T1 was significantly associated with either Alcohol or Cannabis Dependence Disorder, although neither Alcohol nor Cannabis abuse at T4.

In line with this support, a common explanation for the comorbidity between alcohol use and anxiety disorders, including social anxiety, is the Tension Reduction Theory, originally proposed by Cappell and Greeley (1987). According to this theory, people drink alcohol to reduce negative affect. Supporting this theory, several studies reported that coping with negative emotions, either anxiety or depressive symptoms, is one of the key motivators reported by students who drink alcohol (e.g. Grant, Stewart, O'Connor, Blackwell & Conrod, 2007; Merril & Read, 2010). The motivation examined by most of these previous studies was based on the conventional motives that underlie the decision to use a substance proposed by Cox and Klinger (1988).

Conversely, other studies reported that symptoms of social anxiety did not elevate with alcohol use and that highly anxious students drank less frequently because they preferred to avoid social interactions (Frojd, Ranta, Kaltiala-Heino & Marttunen, 2011; Ham, Zamboanga, Olthuis, Casner & Bui, 2010; Johnson, Wendel & Hamilton, 1998). This concurs with the results from Moreno et al. (2012), which revealed that there were no differences in the fear of anxiety (one of the symptoms of social anxiety) and depressive symptoms between recreational users and non-users. The authors suggest that students who drink alcohol recreationally were driven more by sensation seeking rather than to cope with symptoms of anxiety or depression.

Addressing these equivocal results, Buckner, Schmidt and Eggleston (2006) had added alcohol motives proposed by Cox and Klinger (1988) as a mediator in their model. They reported that social anxiety had significant relationship with alcohol use mediated by social motives of alcohol use. However this result only explained the nature of how socially anxious individuals may be at greater risk of using alcohol, and did not explain why others may be protected from alcohol use. Consequently, their rather simple model has not fully explained the equivocal results of any previous studies investigating the relationship between social anxiety and alcohol use. This may also indicate that the simple model might not be sufficient to explain the relationship between social anxiety and alcohol use. Developing a more sophisticated model by means of identifying additional factors and precisely explaining that

the pathway regarding the relationship between social anxiety and alcohol use is required; the pathways through which at least some socially anxious individuals develop problematic alcohol use.

A more complex model is therefore proposed, wherein IU is the predictor variable, alcohol use as the outcome variable, whilst social anxiety symptoms and instrumental motives as serial mediators. To our knowledge, none of the studies examines this model.

Distinguishable from previous studies, the current study will examine the instrumental motive framework proposed by Muller and Schuman (2011). It is proposed that instrumental motives drive people to consume alcohol in order to achieve their personal goals, which they believe are influenced by the impact of the alcohol. Within this framework, these goals may include improving social interaction; facilitating sexual behaviours; improving cognitive performance and counteracting fatigue; facilitating recovery from and coping with psychological stress; self-medication for mental health problems; expanding perceptual horizons; becoming euphoric; improving physical appearance and attractiveness; and facilitating spiritual and religious activities.

Since this detailed framework was proposed in 2011, a growing number of studies have investigated it (Morgan, Noronha, Muetzelfeldt, Fielding & Curra, 2013; Sattler, Sauer, Mehlkop. & Graeff, 2013; Wolff & Brand, 2013; Wolf, Brand, Baumgarten, Loses & Ziegler, 2014). For instance, Morgan, et al. (2013) asked 5791 participants recruited from 40 countries to rate the harms and benefits associated with 15 commonly used drugs or drugs classes. The answers available under the 'benefits' criteria for the recreational drugs were inspired by several models, including the instrumental motives proposed by Muller & Schuman (2011).

Moreover, Wolff and Brand (2013) reported that overwhelming demands in school, such as for high academic achievement, predicted neuroenhancement or the use of substance to enhance cognitive function. Neuroenhancement is a novel term proposed by Wolff and Brand (2013) based on the instrumental motives proposed by Muller and Schuman (2011). To our knowledge, no study has specifically used the framework to construct a scale and subsequently used to predict alcohol use.

1.3. The role of acculturation

This study took place in and involved higher educational institutions in the United Kingdom. The United Kingdom is one of several favoured destination countries for international students. Its long history in education and a number of prominent universities attract thousands of international students every year. This applies equally in most universities in the United Kingdom (The Complete University Guide, 2013).

For instance, in 2013, 26.99% of the 23,864 students at Newcastle University are international students from over 110 countries worldwide (Public Relation Directorate of Newcastle University, 2014). This indicates that Newcastle University is a multicultural university where there is a mixture of various cultures, including a generic British culture, 'Geordie' as the local culture of Newcastle, the cultures of British students of non-British ethnicity (in UK census terms), students from the EU, and various cultures brought by international students. It is argued that acculturation may be an important process encountered and experienced by many of the students in Newcastle University who come either from home countries (UK and European Union) or from overseas.

Within samples of mixed ethnicity or culture, such as students recruited from universities, it would be relevant to consider acculturation. Acculturation is defined as a modification of culture and psychological aspects within a group or an individual, as a result of contact with people from other cultures (Berry, 2005). Thus, people may identify to various extents with their culture of origin or with the predominant culture they find themselves in. This is not only the case for immigrants or children or immigrants; it can also apply to traditional vs. modern culture, or sub-cultures within a dominant culture.

There are also a number of subcultures that may be relevant, especially discussing acculturation within the university context. For instance, in the USA, every student fraternity or sorority and also student clubs generally have their own specific culture and values ruling interaction between members (Grossbard et al., 2009; Turrisi, Mallet, Mastroleo & Larimer. 2006). One of these is related to binge drinking that was established more among members of student fraternities and student clubs than among non-members. As indicated by Turrisi et al. (2006) and Grossbard et al. (2009), members, particularly new members, felt social pressure, to adjust to its binge drinking culture or they would be isolated from club activities.

Within the UK context, while the fraternity/sorority is not the social unit, most universities have numerous clubs and associations that cater for a wide range of interests. For example, part of Newcastle University Students' Union has some clubs explicitly offering drinking-related activities, including clubbing and night-life. A number of these clubs specifically focus on drinking, including the Real Ale and Cider Appreciation Club, Cocktail Societies and the Twenty Minutes Club (Newcastle University Students' Union, 2013). The amount of binge drinking at Newcastle University is relatively high as indicated by Green and Impey (2009), who reported that 75% of Newcastle University students binge drink every week, while numerous studies in the UK also reported that approximately 60 – 70% of their student participants had engaged in regular binge drinking (Gardner, Bruijn & Lally, 2012;

Norman & Conner, 2006; Norman, Conner & Stridge, 2012; Szmigin et al., 2008). Therefore, it appears that drinking may be a part of student life.

Taking everything into account, referring to a possible link between IU and social anxiety as well as between social anxiety and alcohol use, it is proposed then that there may also be a link between IU and alcohol use. While several studies have explored some of these, to the best of our knowledge, no study has examined all of them simultaneously. This study would be able to connect them all together in a way that we hope will lead to a better understanding than is currently available.

2. The aims of the study

This study's principal aim is addressing these questions:

1. To what extent is IU correlated with social anxiety among students?
2. To what extent and in what ways are IU, social anxiety and instrumental motives of alcohol use correlated with alcohol use among students?

This study also aims to address these specific questions:

1. To what extent is the specificity of IU in its relationship with social anxiety relative to the existence of other cognitive risk factors (FNE and AS)?
2. To what extent is the specificity of social anxiety in its relationship with IU relative to other psychopathological symptoms (GAD and depression)?
3. To what extent is the relationship between IU and alcohol use specific to social anxiety, or is it also found in GAD and depression)?

This study also aims to address the following exploratory questions:

1. Which instrumental motives play a significant role in influencing the relationship between IU, social anxiety and alcohol use?
2. Does acculturation mediate the relationships between IU, social anxiety and alcohol use?

The principal relationships among the variables examined are indicated in the following generic figure, which is subsequently broken down in each analysis below:

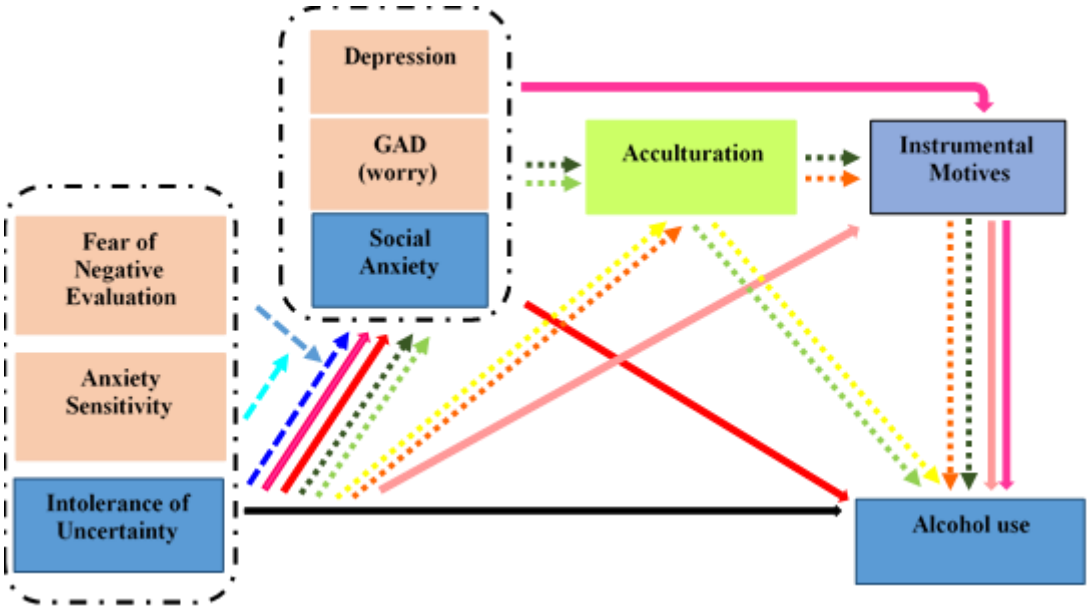


Figure 1. Possible relationship between variables explored within this study

Note:

Intolerance of uncertainty (IU); Fear of negative evaluation (FNE); Anxiety sensitivity (AS); IU x FNE = Interaction between FNE; Alcohol use (AU); Instrumental motives (INMOT); Acculturation = VIA

the primary variables

the secondary variables

the exploratory variables

IU predicts social anxiety

IU x FNE in predicting social anxiety

IU x FNE x AS in predicting social anxiety

IU→AU (Direct effect)

IU→SA→AU (Indirect effect)

IU→INMOTT→AU (Indirect effect)

IU→SA→INMOT→AU (Indirect effect)

IU→VIA→AU (Indirect effect)

IU→SA→VIA→AU (Indirect effect)

IU→VIA→INMOT→AU (Indirect effect)

IU→SA→VIA→INMOT→AU (Indirect effect)

3. Methods

3.1. Design

This is an initial study examining the relationship between IU, social anxiety and alcohol use. Therefore, this study used questionnaires that sought to: a) ensure that the constructs measured are well defined b) measured adequately c) allows good descriptions of the phenomena of interest, and c) subsequently examines the initial relationships between the key variables within the normal population.

3.2. Recruitment Strategy

This study used an online recruitment strategy based on both suitability and feasibility considerations to recruit a range of target participants.

Participants were invited through advertisement and email. A brief advert through the general university news link, e-newspapers, and social media was used to advertise the study. For those being invited via e-mail, the email contained information pertaining to the study sent on behalf of the main researcher by gatekeepers either from an academic unit or from an association/organisation. Potential participants who were interested to know more about the study were guided to a website link that contained detailed information about the study. If they wished to participate, they clicked on an additional link that led them to the consent web page. Once they had consented, they followed a link to the actual questionnaires. The consent information entered was held in a separate file from the data that had been collected from the questionnaire. This study used individual opt-in consent for all participants.

3.3. Participants

Participants were recruited from five universities (Newcastle University, Northumbria University, Durham University, York University, and Leeds University) across the North and North East of the UK via an online advert disseminated by gatekeepers, who were heads of departments or presidents of student unions. The inclusion criteria were university students, aged 18 years old or above.

Non-clinical samples (analogue samples) were of interest here for several reasons: First, university students report higher prevalence rates of substance use and constitute a high risk group for substance use. Second, a study of this type requires a range of experiences on all key variables. It is understood that substance use as defined in this study covers a wide range of individuals. Those who engage in experimental or recreational use of different frequencies

through to persistent use with negative impacts on functioning or dependence, to a point that it would be considered a disorder. Therefore, by way of the college student sample, expectedly this research will be able to recruit non-substance users, recreational substance users, and probably some on the threshold of the clinical range Substance Use Disorders. Third, the large non-clinical samples allow multivariate testing of models, where the relationships between several factors can be examined. Therefore, larger samples are inevitably required where it is difficult to achieve with clinical samples. Moreover, as an initial study, the analogue approach could be fruitful.

All participants were asked to provide consent for their data to be used for research purposes. The participants were subsequently asked to complete a standard battery of questionnaires. Furthermore, participants did not receive any payment or a course credit. The study received a favourable ethical opinion from the Research Ethics Committee of the Faculty of Medical Sciences of Newcastle University.

Four hundred and forty-seven students accessed the questionnaires, 439 participants agreed to participate and provided information, but only 349 participants completed the entire questionnaires and were included in the analyses. The number of female participants (67.91%) was double the number of male participants (32.09%). Approximately 67% were between the ages of 18 to 24, while 20.63% were between 25 and 34 years old, 9.46% were in the range of 35-44 years old, and the remaining participants, accounting for approximately 3%, were 45 years old or above. The distribution across subgroups related to age was unevenly represented. Consequently, age was re-classified into three groups: groups of 18-24 year olds, 25-34 year olds and 35 or above. More than half the participants (55.87%) were students studying bachelor degrees, while the number of participants at master's level was the same for participants pursuing a doctoral degree, approximately 20%, whereas those pursuing professional qualifications accounted for approximately 3%. Regarding religion, almost half of the participants (47.56%) reported no religion, 31.52% described themselves as Christians, while 16 % were Muslim. A smaller number, were Buddhist, Hindu or embracing other religions (1.5% each), only 0.57% were Jewish. With respect to the ethnic composition of the sample, 69.64% self-identified as Caucasians, 20.63%% were Asians, followed by Mixed, Africans, and other ethnicities, which accounted for 6.02%, 2.29% and 1.43%, respectively.

The large majority, 83.09% of the respondents (95% CI: $\pm$ 3.93) reported having experience of alcohol use, and three quarters (79.37%; 95% CI: $\pm$ 4.25) had done so in the last 12 months. Regarding illicit drugs, 39.54% (95% CI: $\pm$ 5.13) had some experience with one or more illicit drugs in their life-time and a quarter (25.79%; 95% CI: $\pm$ 4.59) had done so in the last 12 months. However, the rate of substance use for each illicit drug group was

generally small with the exception of cannabis; 29.51% (95% CI: ± 4.79) reported smoking cannabis at least once and 17.77% (95% CI: ± 4.01) had consumed cannabis in the last twelve months. Given the power analysis and required sample size (reported below), only those who reported alcohol use and completed the instrumental motives for alcohol use section of the NSUQ were retained in the main analyses. Demographic profiles, along with the proportion of alcohol use related demographic profiles are presented in the appendix.

3.4. Measures

3.4.1. The Intolerance of Uncertainty Scale-12 (IUS-12)

The IUS-12 (Carleton et al. (2007) is a revised 12-item version of the original 27-item version (Freeston et al., 1994) and is rated on a 5-point Likert scale ranging from 1 (not at all characteristic of me) to 5 (extremely characteristic of me). Examples of its items are *"It frustrates me not having all the information I need"* and *"When it's time to act, uncertainty paralyses me"*. The IUS-12 has demonstrated internal consistency ($\alpha = .91$ for total score), convergent validity, discriminant validity, as well as stability of the factor structure. It consists of two factors, namely: Desire for Predictability and Uncertainty Paralysis (Birrell et al., 2011; Carleton, Norton et al., 2007). It has been chosen because this study aims to measure IU as a trait rather than as intolerance of uncertainty when facing specific situations related to specific anxiety disorders (Mahoney & McEvoy, 2012).

3.4.2. Brief Fear of Negative Evaluations scale, Straightforward items (BFNE-S)

The BFNE-S (Weeks et al., 2005) consists of 8 items and is a short version of BFNE (Leary, 1983). Its items are rated on a 5-point Likert scale ranging from 0 (not at all characteristic of me) to 4 (extremely characteristic of me). Examples of its items are *"I am frequently afraid of other people noticing my shortcomings"* and *"I am afraid that other people will find fault with me"*. It has an excellent internal consistency and was more reliable across sample groups than BFNE and BFNE-R (Weeks et al., 2005).

3.4.3. Anxiety Sensitivity Index-3 (ASI-3)

The ASI-3 (Taylor et al., 2007) assesses the tendency to experience three types of fear of anxiety symptoms, specifically: physical, cognitive and social concerns. It comprises 18 self-report items that are on a 5-point Likert scale ranging from 0 (very little) to 4 (very much). Examples of its items are *"It is important for me not to appear nervous"* and *"It scares me when my heart beats rapidly"*. The scale has demonstrated excellent internal consistency among non-clinical samples (Osman et al., 2010; Taylor et al., 2007).

3.4.4. The Social Phobia Inventory (SPIN)

The SPIN (Connor et al., 2000) consists of 17 items, rated on a 5-point Likert scale ranging from 0 (not at all) to 4 (extremely). Examples of its items are *"Being criticized scares me a lot"* and *"Heart palpitations bother me when I am around people".* It comprises of three dimensions: fear and avoidance, which are the main features of social anxiety, and physiological discomfort related social anxiety. Furthermore, the SPIN has demonstrated evidence of good validity and reliability in several studies (Boelen & Reijntjes, 2009).

3.4.5. The Penn State Worry Questionnaire (PSWQ)

The PSWQ (Meyer, Miller, Metzger & Borkovec, 1990) measures the tendency to worry excessively. Worry represents the fundamental component of Generalised Anxiety Disorder (Meyer et al., 1990) that will be measured, in order to examine the specificity of correlation between social anxiety and alcohol use. PSWQ consists of 16 items and uses a five-point Likert scale ranging from 1 (not at all typical of me) to 5 (very typical of me). Examples of its items are *"My worries overwhelm me"* and *"I do not tend to worry about things".* It had adequate psychometric properties in non-clinical samples (Meyer et al., 1990) and in clinical anxiety disorder samples (Brown, Antony & Barlow, 1992).

3.4.6. The Rasch-Derived CES-D Short Form (CES-D)

The CES-D (Cole, Rabin, Smith & Kaufman, 2004) measures clusters of depression symptoms (i.e., cognitive, behavioural, affective, somatic). It is a short version of the Centre for Epidemiologic Studies-Depression scale (CES-D) (Radloff, 1977) which includes 20 items and has been extensively used among non-clinical samples. The Rasch-Derived CES-D short form consists of 10 items rated on a 4-point Likert scale ranging from 0 (rarely or none of the time: less than 1 day) to 3 (all of the time: 5-7 days). Examples of its items are *"I felt hopeful about the future"* and *"I felt lonely"*. It has excellent psychometric properties and discriminant ability and is suitable across samples (Cole et al., 2004).

3.4.7. The Newcastle Substance Use Questionnaire (NSUQ)

The NSUQ (Chapter 3) originally measures eight types of substances. Only the alcohol section is analysed here. It consists of three sections. First, the frequency section comprises two items, alcohol use during one's life-time and in the past year, rated on a 5-point scale (1 = never, 2 = less than once a month, 3 = 2-3 times a month, 4 =2-3 times a month, 5 = once a week, 6 = 2-3 times a week, 7 = daily). For instance: *"during your life-time, how often have you drunk alcohol?"*

Second, the pattern section explores two possible contexts where alcohol is consumed: solitarily (alone) and in different social contexts (with friends, family or strangers). Four items in this section were rated on a 7-point scale, similar to the first section. For instance: *"during the last 12 months, how often do you drink alcohol when you are alone?".* Given drinking with friends is probably more common among university students, only drinking alcohol with friends was analysed depicting a social drinking context.

Finally, the motive section explores possible instrumental motives for alcohol use; based on Muller and Schumann (2011). All the items in this motive section were rated on a 5-point scale (1 = not at all like me, 2 = not much like me, 3 = somewhat like me, 4 = quite a lot like me, 5 = just like me). For instance: *"I drink alcohol because it helps me feel more confident"*.

3.4.8. Vancouver Index of Acculturation (VIA)

The VIA (Ryder, Alden & Paulhus, 2000) measures acculturation as a bi-dimensional construct by way of the degree of identification with both heritage and mainstream cultures. It can be used to classify distinctive acculturation strategies: *marginalisation*, where people relinquish both heritage and mainstream culture, and *separation*, where people endorse old traditions but have no intergroup relationships. The opposite is *assimilation* endorsing new traditions and relinquishing the heritage, whereas the last is *integration*, which involves adherence to both (Ryder et al., 2000). VIA consists of 20 items on a 9-point Likert scale ranging from 1 (disagree) to 9 (agree). Examples of its items are *"I often participate in my heritage cultural traditions"* and *"I would be willing to marry a British person".* It has been used extensively and for various ethnicities (Huynh, Howell & Martinez, 2009). Although groups can be formed by crossing the dimensions, the two scales can also be used independently.

3.5. Analyses

3.5.1. Power Analysis

In order to estimate the number of subjects that were sufficient to detect the estimate effect size, a priori power analysis was performed using G*Power (Faul, Erdfelder, Buchner & Lang, 2009; Faul, Erdfelder, Lang & Buchner, 2007). A detailed explanation is provided in the appendix. From the a priori power analysis performed, it was concluded that 300 participants was a reasonable target sample size to detect the estimated effect size at power of .80 and $\alpha = .05$.

3.5.2. Preliminary analyses

Cronbach's α was used to measure and describe the internal consistency of all measures used in this study. Prior to data analyses, data screening was conducted to identify and manage any missing data. Subsequently, univariate outliers were identified through analysis of the scale total score through the plots of the distributions, examination of skewness, and kurtosis statistics. Outliers were handled by either deletion or winsorizing, and skewed distributions may be transformed. Multivariate outliers were identified through analysis of the Mahalanobis Distance.

Means and standard deviations of each measured variable were reported to describe the sample. Subsequently, inter-correlations were investigated.

3.5.3. Main analyses (testing the hypotheses)

The contributions of the main predictors of the main DVs were investigated using a series of hierarchical regression by means of SPSS version 21.0.

Any possible interactions and their interpretation were investigated using interaction analyses through PROCESS macro for SPSS (Hayes, 2012). The nature of the relationship within interaction models was depicted through a graphical analysis based on the Johnson-Neyman Technique. This approach is able to address a major drawback of the pick-a-point approach, which tends to be arbitrary in selecting the various values of the moderator used to estimate the conditional effect of X on Y (Hayes, 2013).

Further, mediation was examined using the bootstrapping approach utilising PROCESS macro for SPPS (Hayes, 2012). It infers the existence of the mediation "by quantifying the effects of interest and then testing hypotheses about or constructing interval estimates for their size" (Hayes, 2009; p. 5). It creates pseudo data sets from a large number of random samples from its original data set, in order to estimate the confidence interval (CI). It obtains bias-corrected 95% confidence intervals. CI that does not encompass zero is considered significant. Here, analyses were conducted using 10000 bootstrap samples.

Estimation of the effects (or paths) through bootstrapping has replaced the causal steps approach proposed Baron and Kenny (1986) which was traditionally used in past studies, for several reasons. First, bootstrapping has been reported to be statistically more powerful in testing mediation effects than other traditional approaches (Hayes, 2009; MacKinnon, Lockwood, Hoffman, West & Sheets, 2002); Second, it does not impose the assumption of normality regarding the sampling distribution of the test statistic (Hayes, 2009; Preacher & Hayes, 2008; Preacher, Rucker & Hayes, 2007). Given the distribution of the sample means approaches normality by means of the increasing of sample size, the normality of sampling

distribution could be biased. Consequently, the sampling distribution of the test statistic, particularly in a large sample, tend to be normal regardless of the actual shape of the data and is likely to produce a significant result, even if the SD is small (Field, 2009; Ghasemi & Zahediasl, 2012; Mordkoff, 2000); Third, it enables researchers to use smaller samples than would be necessary using other methods (Preacher et al., 2007). Fourth, it is able to estimate all the effects of the dependent variables and their confidence intervals, regardless of the complexity of the moderation-mediation models without requiring any significance tests (Hayes, 2009; Hayes, 2012, Preacher & Hayes, 2008). Finally, Hayes (2009) critiques the underlying logic of the causal steps approach and argues that "if *X*'s effect on *Y* is carried in part indirectly through intervening variable *M,* the causal steps approach is least likely of the many methods available to actually detect the effect" (Hayes, 2009; p. 4).

The two effects of IVs on DVs within mediational models were estimated: (i) the direct effect is the effect of the predictor variable on the outcome variable while any other variables that might be related to the outcome variable were controlled, (ii) the indirect effect is the effect of the predictor variable on the outcome variable through other variable(s), i.e. mediator variable(s).

4. Results

4.1. Preliminary Analyses

4.1.1. Identification of missing data

Initial inspection revealed some missing data (2.6% for VIA-heritage and 2% for VIA mainstream) within the questionnaires. By way of totalling, all scores were rescaled as if all items were present using the formula: total items x mean of existing items. This method used information provided by participants if there was sufficient quantity (> 30% of the items). Consequently, participants completing less than 1/3 of items would be left as missing data.

This method is considered to be the best method for handling missing data relative to other methods: using a sample mean which produces a biased estimation; a random value in a range which assumes knowing nothing about the missing data, or a random value that is proportional to the sample, and, thus, is additive, while the replacement is likely to be similar to those present.

4.1.2. Normality test

Prior to the data analysis, the distribution of the data was examined. Univariate outliers were discovered on ASI, CESD, both VIA dimensions and alcohol motives and thus, they were winsorized. Referring to Field (2009) the winsorizing was performed through changing the outlier scores with a value just above the last non-outliers and "if the score you're changing is very unrepresentative and biases your statistical model anyway then changing the score is the lesser of two evils!" (p.153). The number of values winsorized within this study varied from 1.1% to 2.9%. All winsorized variables had near perfect relationships with their original variables (r's = 1.00, p's < .001), indicating that the results of analyses utilising the winsorized variables should not be greatly different compared to the original variables.

Table 1
Normality test

	Outliers	Skew.	Kurt.	Treatment	New Skew.	New Kurt.	*r*
IUS		0.23	-0.68				
BFNE		-0.01	-1.25	Original score			
ASI	2.9%	0.99	0.46	Winsorized	0.84	-0.11	1.00
SPIN		0.50	-0.61				
CESD	1.4%	0.53	-0.44	Winsorized	0.52	-0.49	1.00
PSWQ		-0.13	-1.00				
VIAM	1.5%	-0.40	0.28	Winsorized	-0.28	-0.20	1.00
VIAH	1.5%	-0.88	1.92	Winsorized	-0.39	-0.29	1.00
AU life		-0.17	-1.28	Original score[3]			
AU alone		1.99	3.61	Trans.-ReInv.	0.78	-1.14	.91
AU friends		0.01	-1.33	Original score[3]			
INMOT	1.1%	0.81	-0.18	Winsorized	0.78	-0.29	1.00
SOCMOT		0.38	-1.02	Original score[3]			
COGMOT		1.26	0.78	Tran.-Log	0.76	-0.76	.98
SEXMOT		2.01	3.82	Tran.-ReInv.	1.21	-0.22	.98

Note: IUS = The Intolerance of Uncertainty Scales-12, P-IU = Prospective-IU; I-IU = Inhibitory-IU, BFNE =The Brief Fear of Negative Evaluation-Straightforward Items, ASI = The Anxiety Sensitivity Index-3, SPIN = The Social Phobia Inventory, CESD = The Rasch-Derived CES-D short form, PSWQ = The Penn State Worry Questionnaire, VIAM = VIA-Mainstream sub-scale, VIAH = Vancouver Index of Acculturation-Heritage sub-scale , AU life = alcohol use during life-time, AU alone = drinking alcohol alone, AU friends = drinking alcohol alone, IN-MOT = instrumental motives of alcohol use, SOC-MOT = social motives of alcohol use, COG-MOT = cognitive motives of alcohol use, SEX-MOT = sexual motives of alcohol use.

IUS, SPIN and PSWQ scores were generally normally distributed. BFNE, alcohol use during life-time, drinking alcohol with friends and social motives were slightly negatively

kurtotic (kurtosis < -1.0), the cognitive motive was slightly positively kurtotic (kurtosis > 1.0); drinking alcohol alone and sexual motives were slightly positive skewed (> 1.0) and highly positively kurtotic (> 3.0). Various transformations were attempted; however, all the strategies reduced kurtosis but increased skewness. Therefore, the original total scores were used for subsequent analyses in most cases. For drinking alcohol alone and the sexual motive, the inverse led to reduced skewness and kurtosis. In order to keep the 'smaller scores stay smaller and vice versa' principle, similar to the original data, the inverse scores were reflected. Regarding the cognitive motive of alcohol use, the transformation-log reduced both skewness and kurtosis, accounting for .76 and -.76 respectively. Most transformations had nearly perfect relationships with their original scores (r's > .98, p's < .001), except for drinking alcohol alone that had a strong relationship with its original score (r = .90, p < .001).

4.1.3. Descriptive statistics

The internal consistencies of most measures were considered excellent (α's > .90) and acceptable for CES-D (α = .87), both VIA Heritage and VIA Mainstream (α =.87 and .85, respectively), cognitive motives (α =.86) and sexual motives (α =.76).

The scores of the all variables were analysed as a function of gender and age. T-tests indicated that female participants reported significantly higher scores on all variables except on VIA Heritage, drinking during life-time, drinking alcohol alone, drinking alcohol with friends and sexual motives, in which the differences were not significant (p's > .05).

ANOVA was conducted to compare responses as a function of age differences. SPSS General Linear Model Univariate was used with Type III Sum of Squares, which is suitable for both balanced and imbalanced models. Post hoc tests were conducted with the Games-Howell procedure, which Field (2009) argues offers the best performance when variances may be unequal. The results revealed significant differences; the younger group reported significantly higher scores on all measured variables except for the VIA Heritage and drinking alone scores, where the differences were not significant (p's > .05). Given most of the scores varied as a function of age and gender, further analyses will control age and gender.

Table 1
Descriptive statistics regarding to demographic profiles

		Total		Gender							Age								
				Male (N = 112)		Female (N = 237)					18-24 (N = 227)		25-34 (N = 71)		35-above (N = 43)				
	α	*M*	*SD*	*M*	*SD*	*M*	*SD*	*d*	*f*	*P*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*d*	*f*	*p*
IUS	.91	33.23	10.18	30.44	8.75	34.55	10.56	.424	.212	<.001	34.43	10.15	30.57	8.74	30.34	11.05	.385	.192	.003
BFNE	.96	24.76	9.85	21.27	9.17	26.41	9.75	.543	.272	<.001	26.78	9.29	20.28	9.29	20.37	9.82	.694	.347	<.001
ASI	.93	39.15	15.49	36.52	14.34	40.08	15.16	.515	.257	.038	40.96	15.38	34.94	13.23	34.57	13.32	.409	.204	.001
SPIN	.94	41.81	15.40	36.62	13.44	44.26	15.67	.523	.261	<.001	44.26	15.46	36.35	13.41	35.79	13.30	.534	.267	<.001
CESD	.87	20.69	6.49	19.34	5.63	21.32	6.75	.318	.159	.008	21.47	6.48	18.63	5.45	19.30	7.33	.445	.222	.002
PSWQ	.95	53.86	15.54	46.34	14.22	57.42	14.88	.761	.380	<.001	56.36	15.11	47.94	14.33	48.07	15.58	.561	.280	<.001
VIAH	.87	54.23	9.01	54.40	8.68	54.40	8.33	.000	.000	.999	54.63	8.40	53.80	8.81	54.19	8.19	.097	.048	.761
VIAM	.85	52.06	8.76	50.40	9.05	52.91	8.31	.289	.144	.012	54.61	7.62	47.70	8.56	46.05	7.95	.880	.440	<.001
AU life	-	3.72	1.80	3.61	2.04	3.77	1.68	.086	.043	.425	4.09	1.61	3.14	1.82	2.73	2.12	.556	.278	<.001
AU alone	-	1.71	1.22	1.86	1.37	1.65	1.14	.167	.083	.161	1.73	1.21	1.76	1.28	1.52	1.15	-.025	-.012	.532
AU friends	-	3.44	1.81	3.28	2.06	3.51	1.68	.122	.061	.260	3.91	1.65	2.81	1.76	1.93	1.55	.672	.336	<.001
INMOT	.92	25.79	11.38	23.89	12.01	26.67	10.98	.241	.120	.029	28.28	11.08	22.42	11.68	18.05	6.74	.550	.275	<.001
SOCMOT	.91	12.02	6.11	11.06	6.49	12.47	5.88	.228	.114	.044	13.61	5.81	9.89	6.13	7.11	3.43	.666	.333	<.001
COGMOT	.86	11.03	5.16	10.24	5.42	11.41	4.99	.225	.112	.049	11.80	5.23	9.93	5.20	8.77	3.57	.374	.187	<.001
SEXMOT	.76	2.73	1.38	2.59	1.25	2.79	1.44	.148	.074	.199	2.86	1.49	2.60	1.24	2.16	.65	.198	.099	.001

Note: Bold = significant

4.1.4. Zero-order Correlations

First, Pearson correlations (two-tailed) were examined.

Table 2
Zero-Order Inter-correlations between study variables

	age	IUS	P-IU	I-IU	BFNE	ASI	SPIN	CES-D	PSWQ	VIA-Her
IUS	**-.17**									
P-IU	**-.17**	**.94**								
I-IU	**-.14**	**.92**	**.73**							
BFNE	**-.29**	**.66**	**.59**	**.64**						
ASI	**-.19**	**.61**	**.56**	**.57**	**.58**					
SPIN	**-.24**	**.70**	**.60**	**.70**	**.79**	**.60**				
CESD	**-.17**	**.61**	**.51**	**.64**	**.65**	**.61**	**.66**			
PSWQ	**-.23**	**.70**	**.66**	**.64**	**.71**	**.57**	**.63**	**.65**		
VIAH	-.03	-.10	-.07	**-.12**	**-.11**	-.10	**-.15**	**-.17**	**-.12**	
VIAM	**-.40**	-.02	-.02	-.02	.10	-.01	.01	-.03	.08	**.43**

Note: Correlation coefficients r < [.10] are significant, p < .05; Bold = significant

IUS, BFNE, ASI, SPIN, PSWQ and CESD were inter-correlated in the moderate to strong range (*r*'s(347) = .58 - .79, *p*'s < .001). VIA-Heritage was correlated with BFNE (*r*(347) = -.11, *p* = .035), SPIN (*r*(347) = -.15, *p* = .004), CESD (*r*(347) = -.17, *p* = .001), and PSWQ (*r*(347) = -.13, *p* = .022), but not with IUS and ASI. In contrast, VIA-Mainstream did not correlate with any other measures except for VIA-Heritage (*r*(347) = .43, *p* < .001). As expected, both P-IU and I-IU were very strongly correlated with the total IUS score (*r*'s(347) > .91, *p*'s < .001) and strongly correlated with each other (*r*(347) = .73, *p* < .001). Additionally, there were no high correlations, which would indicate multicollinearity (*r* <.80).

Table 3
Zero-Order correlations between study variables

	Age	AU life	AU alone	AU friends	INMOT	SOCMOT	COGMOT	SEXMOT
IUS		-.04	.03	-.03	**.21**	**.18**	**.21**	**.14**
BFNE		**.16**	.06	**.16**	**.41**	**.40**	**.35**	**.27**
ASI		.03	.08	.06	**.27**	**.21**	**.28**	**.28**
SPIN		-.02	.04	.01	**.30**	**.27**	**.28**	**.20**
CES-D		.10	**.16**	.07	**.35**	**.28**	**.38**	**.24**
PSWQ		**.19**	.08	**.16**	**.32**	**.30**	**.29**	**.23**

	Age	AU life	AU alone	AU friends	INMOT	SOCMOT	COGMOT	SEXMOT
VIA-Main		**.24**	.01	**.26**	**.18**	**.24**	.08	.08
VIA-Her		**-.17**	**-.17**	**-.14**	**-.15**	**-.18**	-.10	-.07
AU life	**-.29**							
AU alone	-.04	**.44**						
AU friends	**-.40**	**.83**	**.48**					
INMOT	**-.33**	**.59**	**.41**	**.64**				
SOCMOT	**-.39**	**.63**	**.38**	**.69**	**.93**			
COGMOT	**-.22**	**.46**	**.41**	**.50**	**.92**	**.74**		
SEXMOT	**-.17**	**.33**	**.22**	**.36**	**.67**	**.52**	**.60**	

Note: Correlation coefficients r < -.11 are significant, p < .05

Among the cognitive variables, only FNE a significant relationship with alcohol drinking during life-time ($r(347) = .16$, $p = .004$) and with friends ($r(347) = .16$, $p = .002$), however not when alone. IU and AS did not correlate with drinking alcohol during life-time (*p'*s = ns) or across contexts (*p'*s = ns).

For the symptoms of the disorders, worry correlated with alcohol drinking during life-time ($r(347) = .19$, $p < .001$) and with friends ($r(347) = .16$, $p = .003$). CESD correlated with drinking alone ($r(347) = .16$; $p = .003$). Social anxiety did not correlate with drinking during life-time or drinking across contexts (*p'*s = ns).

All the cognitive variables and symptoms of the disorders correlated positively with the total instrumental motive score and the three separate factors (*p*'s < .01); meaning that greater cognitive venerability and symptoms were associated with an intense motivation to consume alcohol.

The VIA-Mainstream was correlated positively with alcohol use during life-time and with friends and also with the total and social motives scores. This indicates that identifying with British mainstream culture was associated with more frequent to join social drinking and greater positive social expectancies of alcohol use. Conversely, the VIA-Heritage was correlated in the opposite direction, including drinking alcohol alone. It indicates that those who identified with their heritage culture expressed less motivation to drink for social reasons and less inclined to drink alcohol.

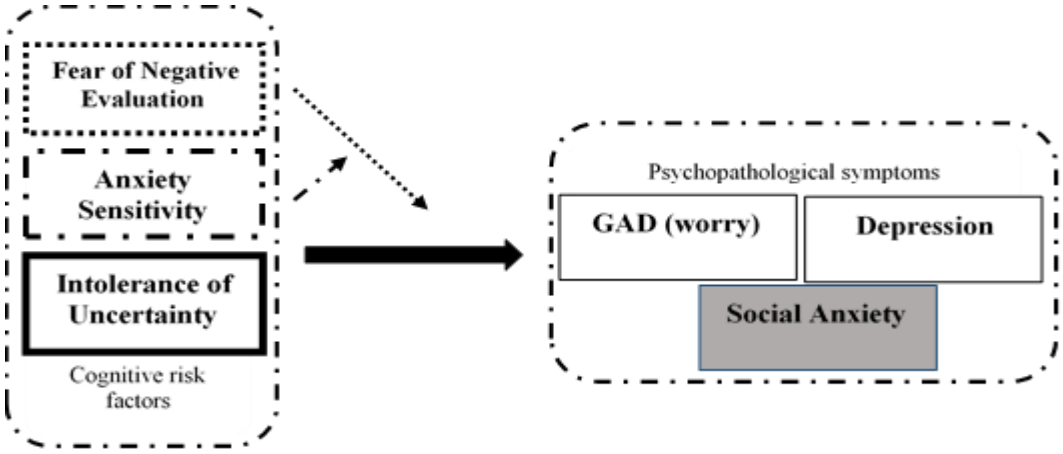
Only two correlations were in the moderate range, specifically between BFNE and motives and between BFNE and social motives to drink alcohol. All other significant correlations involving these variables were weak. Most measures correlated weakly with

cognitive motives, although neither with both VIA dimensions. BFNE, AS, SPIN, CESD and PSWQ also correlated weakly with sexual motives, neither with IU and, again, both VIA dimensions.

In contrast to the generally weak or non-significant correlations with the cognitive and symptom variables, drinking alcohol during the life-time correlated strongly with drinking alcohol with friends during the last 12 months ($r(347) = .83$, $p < .001$). Further, alcohol use during the life-time and in both contexts moderately to strongly correlated with instrumental motives and all sub-instrumental motives (r's(347) = .33 - .63, p's < .001). Nevertheless, there was a weak significant correlation between drinking alcohol alone and sexual motives (r (347) = .22, $p < .001$).

4.2. Main analyses

The first series of analyses investigated the relative contributions of IU on social anxiety compared to FNE and AS and also any possible IU interactions between them. The second series of analyses investigated a possible role of IU as a transdiagnostic factor, by examining the unique contribution of IU to the variance in GAD and depression symptoms. The model investigated is depicted in the following figure:



Note: Solid line = the effect examined; Dot lines = the moderation effect

Figure 2. Interactions among risk factors

4.2.1. Intolerance of uncertainty predicting social anxiety

4.2.1.1. Relative contribution of intolerance of uncertainty on social anxiety

To examine the relative contribution of the three vulnerabilities to the variance in social anxiety, three hierarchical regression analyses were performed. In all cases, age and gender

were entered first as covariates. In the first regression (see sequence 1 in Table 5), FNE was entered in the second step after the covariates as the first cognitive vulnerability factor/fundamental fear, followed by IU and subsequently AS. In the second regression (Sequence 2), IU was entered in the second step, followed by AS, with FNE in the fourth step. In the third regression (sequence 3) AS was entered in the second step followed by FNE and subsequently IU in the fourth step. By rotating the order of entry, these analyses examine the relative strength of contribution of variables when entered first and last (where the contribution of the other variables has been partialled out).

The first analysis tests the conventional model with FNE entered first as the most important predictor of SA before examining the additive contributions of IU and AS. The second analysis tests for the potential dominance of FNE; if it is the most important (as conventional models propose) it should still account for the largest amount of variance when entered last. The final analysis is the most stringent test of the potential contribution of IU whereby FNE and ASI as the better established predictors of SAD are partialled out before examining the potential unique contribution of IU.

Following examination of the additive contribution of the individual variables, any interactive contributions were examined. First, the three two-way interactions were entered together in the fifth step, and then three-way interaction was entered in the last step. Once again, age and gender were entered first as covariates. The contributions of each variable in each step were displayed and compared in Table 5 below.

Table 4

Regression Model of FNE, IU and AS predicting social anxiety symptoms

	Variable	Coefficient statistic			Model step statistic			
		β	*t*	*p*	ΔR^2	ΔF	*df*	*P*
1	Age	**-0.21**	**-4.05**	**<.001**	**.097**	**18.51**	**2, 346**	**<.001**
	Gender	**0.20**	**3.83**	**<.001**				
	Sequence 1							
2	FNE	**0.77**	**21.79**	**<.001**	**.523**	**474.65**	**1, 345**	**<.001**
3	IU	**0.31**	**7.63**	**<.001**	**.055**	**58.30**	**4.344**	**<.001**
4	AS	**0.14**	**3.41**	**.0001**	**.011**	**11.64**	**1.343**	**.001**
	Sequence 2							
2	IU	**0.66**	**17.01**	**<.001**	**.412**	**289.24**	**1, 345**	**<.001**
3	AS	**0.27**	**5.97**	**<.001**	**.046**	**35.61**	**4, 344**	**.001**
4	FNE	**0.52**	**11.95**	**<.001**	**.131**	**142.70**	**1, 343**	**<.001**

	Variable	Coefficient statistic			Model step statistic			
		β	*t*	*p*	ΔR^2	ΔF	*df*	*P*
				Sequence 3				
2	AS	**0.56**	**13.26**	**<.001**	**.305**	**175.76**	**1, 345**	**<.001**
3	FNE	**0.64**	**15.80**	**<.001**	**.252**	**249.69**	**4, 344**	**<.001**
4	IU	**0.26**	**5.94**	**<.001**	**.032**	**35.23**	**1, 343**	**<.001**
				Two-way interactions				
5	IU x FNE	0.14	0.64	.523	.007	2.43	3, 340	.065
	FNE x AS	0.15	0.65	.514				
	IU x AS	0.22	0.87	.386				
				Three-way interaction				
6	IU x FNE x AS	0.98	1.21	.229	.001	1.45	1, 339	.229

IU, FNE and AS each consistently made additive and unique contributions to the variance in social anxiety. FNE accounted for the greatest proportion of the variance, followed by IU and AS; in the second step (52.3% Vs 41.2% Vs 30.5%; correspondingly) and even in the fourth step (13.1% Vs 3.2% Vs 1.1%; correspondingly). This result supported FNE, as being hypothesised, is possibly the defining variable of social anxiety indicated by the proportion of its contribution, which is significantly larger compared to the contributions of IU and AS. However, IU and AS consistently predicted social anxiety even after controlling FNE, with IU contributing as strongly or more strongly than AS in all three positions.

Neither the two-way interactions entered together (0.7%) nor the three-way interaction (0.1%) made additional contributions to the variance in social anxiety. Though these analyses were powered to detect a small to medium effect size (f^2 = .03, R^2 = 3%) with α = .05 and power = .80, the proportions contributed by the three-way or two-way interactions were trivial. The final model was significant (F(9,339) = 86.02, p < .001) and accounted for 69.2% of the variance in relation to social anxiety.

4.2.1.2. Interactions in predicting social anxiety

Though the result above indicates that neither the three-way nor the three two-way interactions collectively were significant, it was considered important to investigate the two-way interactions between IU and either FNE or AS for two principal reasons. First, it is in accordance with the primary aim of this study, which is investigating the precise role of IU in predicting social anxiety. The results obviously would provide a better explanation in terms of

interpreting the role of IU in predicting social anxiety. Second, previous analyses upon an archival data set conducted by the author (Chapter 2) established an interaction between IU and FNE in predicting social anxiety.

Consequently, a series of regressions examined the interactions involving IU with each of the other two factors, namely, IU x FNE and IU x AS. The first series of regressions was to examine the specific role of the FNE x IU interaction, IU was the predictor variable, FNE was the moderator, AS was entered as the covariate; age and gender were also controlled. Subsequently, the reverse model, where FNE was the predictor and IU was the moderator, was examined. The second series of regression was to examine the specific role of the interaction between IU and AS. The identical analyses were repeated with FNE entered as covariate. Interaction analyses using PROCESS model 1 were performed. Subsequently, the Johnson-Newman technique was utilised, with the aim of depicting the nature of any significant interactions.

4.2.1.2.1. Interaction between intolerance of uncertainty and fear of negative evaluation in predicting social anxiety

The interaction between IU and FNE accounted for a significant contribution, $\Delta R^2 =$ 0.44%, ΔF (1, 342) = 4.86, p = .028, indicating that the effect of the interaction was significant. Figure 3 plots the regression coefficient for IU on social anxiety at different values of FNE (solid red line). The 95% bootstrapped confidence intervals are also plotted (dotted lines). The significant zone, where the low CI exceeds zero, is indicated in blue.

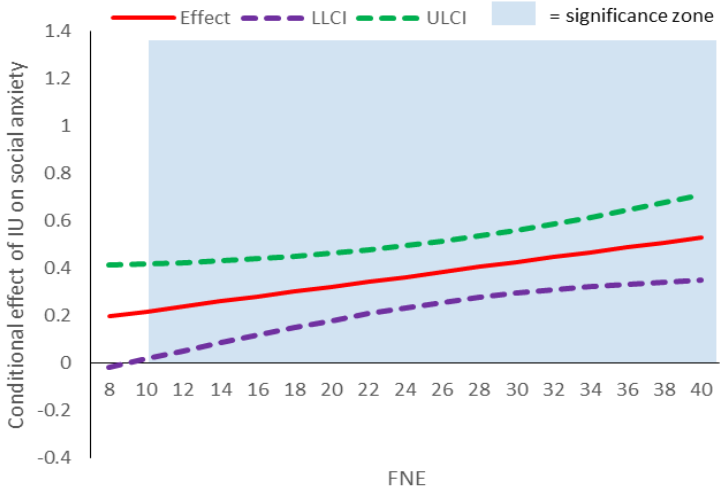


Figure 3. Conditional effect of IU on social anxiety moderated by FNE

As can be seen in Figure 3, the effect of IU on social anxiety was significant only when FNE > 9, indicated by the lower bootstrapped confidence interval lying above zero, the value

of *b* at FNE = 10, *b* = .2077, *t*(1, 342) = 1.97, *p* < .05. As FNE increases, the relationship between IU and social anxiety becomes stronger.

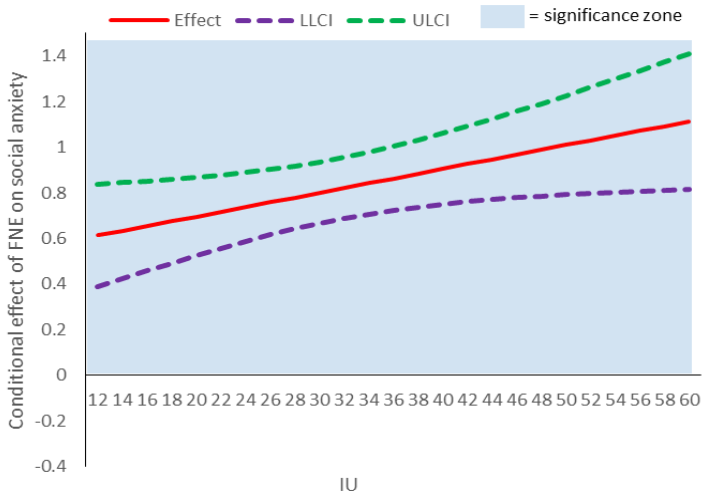


Figure 4. Conditional effect of FNE on social anxiety moderated by IU

As can be seen in Figure 4, the effect of FNE on social anxiety was significant at all level of IU, indicated by the all bootstrapped confidence interval lying above zero. As IU increases, the relationship between FNE and social anxiety becomes stronger.

4.2.1.2.2. Interaction between intolerance of uncertainty and anxiety sensitivity in predicting social anxiety

The regression was repeated with AS by way of the moderator and FNE as the covariate. The interaction between IU and AS accounted for ΔR^2 = 0.57%, ΔF (1, 342) = 6.27, *p* = .013, which signifies that the interaction between IU and AS in predicting social anxiety was significant.

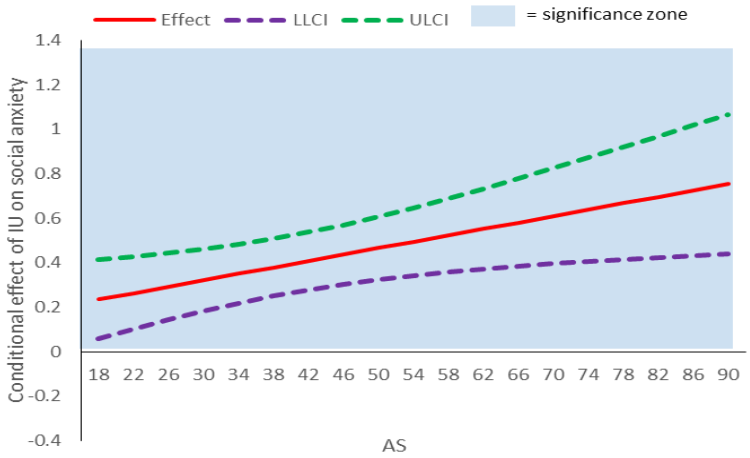


Figure 5. Conditional effect of IU on social anxiety moderated by AS

As can be seen in Figure 5, the effect of IU on social anxiety was significant at all levels of AS; by way of the AS increases, the relationship between IU and social anxiety becomes stronger.

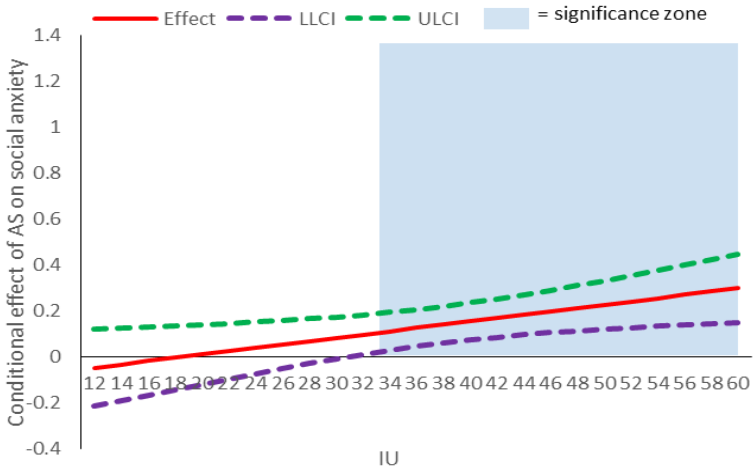


Figure 6. Conditional effect of AS on social anxiety moderated by IU

As can be seen in Figure 6, the effect of AS on social anxiety was significant only when IU > 31, indicated by the lower bootstrapped confidence interval lying above zero, the value of *b* at IU = 32, *b* = .0978, *t* (1, 342) = 2.25, *p* < .05. As IU increases, the relationship between AS and social anxiety becomes stronger.

4.2.2. Intolerance of uncertainty predicting worry

4.2.2.1. Relative contribution of intolerance of uncertainty on worry

In order to examine the specificity of the relationship of IU (and the other cognitive vulnerabilities) to social anxiety, the analyses were repeated with worry as the outcome variable. Three similar hierarchical regression were performed.

Table 5
Regression Model of FNE, IU, and AS predicting worry

Step	Variable	Coefficient statistic			Model step statistic			
		β	*t*	*p*	ΔR^2	ΔF	*df*	*p*
1	Age	**-0.18**	**-3.59**	**<.001**	**.143**	**28.86**	**2, 346**	**<.001**
	Gender	**0.30**	**6.03**	**<.001**				
				Sequence 1				
2	FNE	**0.67**	**16.86**	**<.001**	**.387**	**284.18**	**1, 345**	**<.001**
3	IU	**.41**	**9.32**	**<.001**	**.095**	**.284**	**1, 344**	**<.001**
4	AS	**0.13**	**3.04**	**.003**	**.010**	**9.24**	**1, 343**	**.003**

Step	Variable	Coefficient statistic			Model step statistic			
		β	*t*	*p*	ΔR^2	ΔF	*df*	*p*
				Sequence 2				
2	IU	**0.65**	**17.44**	**<.001**	**.402**	**304.12**	**1, 345**	**<.001**
3	AS	**0.22**	**4.99**	**<.001**	**.031**	**24.95**	**1, 344**	**<.001**
4	FNE	**0.36**	**7.63**	**<.001**	**.062**	**58.21**	**1, 343**	**<.001**
				Sequence 3				
2	AS	**0.53**	**12.46**	**<.001**	**.266**	**157.23**	**1, 345**	**<.001**
3	FNE	**0.52**	**11.48**	**<.001**	**.164**	**131.73**	**1, 344**	**<.001**
4	IUS	**0.35**	**7.60**	**<.001**	**.059**	**55.67**	**1, 343**	**<.001**
				Two-way interactions				
5	IU x FNE	-0.31	-1.29	.197	**.015**	**4.91**	**3, 340**	**.002**
	FNE x AS	-0.03	-0.13	.901				
	IU x AS	-0.41	-1.55	.121				
				Three-way interaction				
6	IU x FNE x AS	0.90	1.05	.296	.001	1.10	1, 339	.296

As can be seen in Table 6, similar to the analyses predicting social anxiety, IU, FNE and AS each consistently made additive and unique contributions to the variance in worry. However, herein, IU contributed the greatest the variance in worry, followed by FNE and subsequently AS, both of which were entered in the second step (40.2% Vs 38.7% Vs 26.6%, respectively) and even in the fourth step (6.2% Vs 5.9% Vs 1%, respectively).

However, for worry, the two-way interactions when entered together, made a significant contribution to the model (1.5%); none of the individual interactions were meaningful. The three-way did not make a significant additional contribution (0.1%). The final model was significant ($F(9,339) = 70.24$, $p < .001$) and accounted for 65.1% of the variance in worry.

4.2.2.2. Interactions in predicting worry

Similar to the model predicting social anxiety, the key two-way interactions involving IU to predict worry would be investigated.

4.2.2.2.1. Interaction between intolerance of uncertainty and fear of negative evaluation in predicting worry

The interaction between IU and FNE explained significant variance in worry, ΔR^2 = 1.14%, $\Delta F(1, 342) = 11.06$, $p = .001$. It indicates that the effect of the interaction was significant.

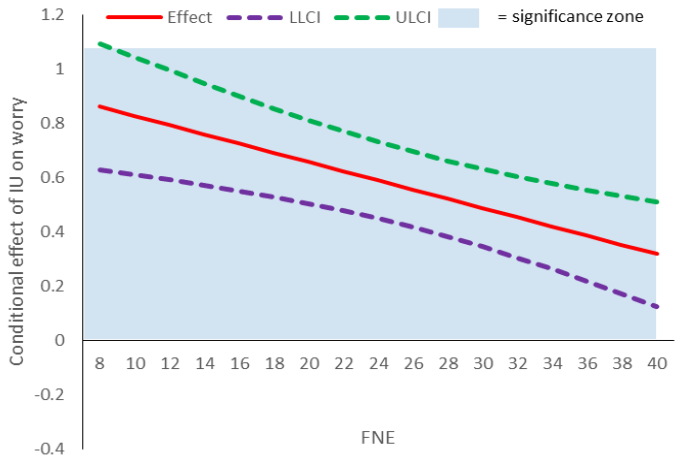


Figure 7. Conditional effect of IU on worry moderated by FNE

Figure 7 shows that the effect of IU on worry was significant at all level of FNE. By way of FNE increases, the effect of IU on worry becomes negative.

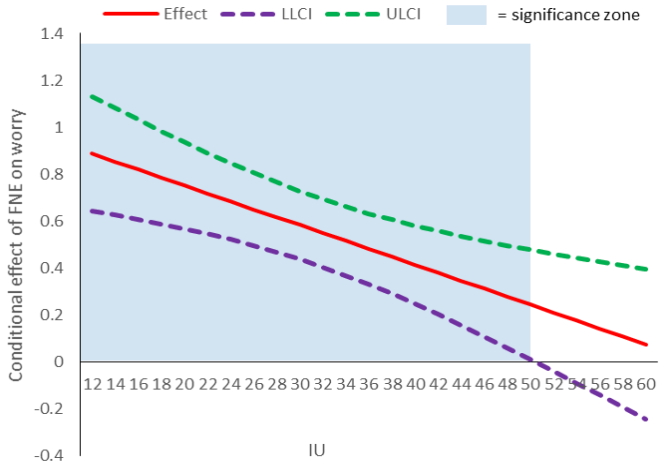


Figure 8. Conditional effect of FNE on worry moderated by IU

As can be seen in Figure 8, the effect of FNE on worry was significant only when IU < 51, indicated by the lower bootstrapped confidence interval lying above zero, the value of *b* at IU = 50, $b = .2434$, $t(1, 342) = 2.04$, $p < .05$. As IU increases, the relationship between FNE and social anxiety becomes negative.

4.2.2.2.2. Interaction between intolerance of uncertainty and anxiety sensitivity in predicting worry

The interaction between IU and AS also accounted for a significant contribution, ΔR^2 = 1.33%, ΔF (1, 342) = 12.92, $p < .001$.

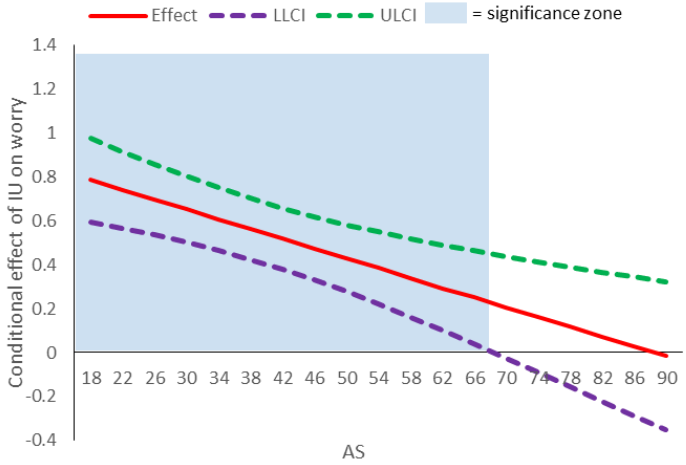


Figure 9. Conditional effect of IU on worry moderated by AS

As can be seen in Figure 9, the effect of IU on worry was significant only when AS < 68, indicated by the lower bootstrapped confidence interval lying above zero, the value of *b* at AS = 67, *b* = .2246, *t*(1, 342) = 1.97, $p < .05$. By way of the AS increases, the relationship between IU and worry becomes negative.

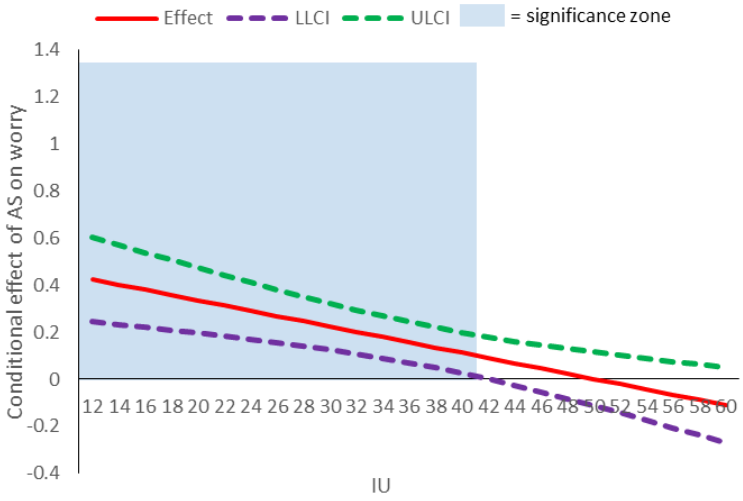


Figure 10. Conditional effect of AS on worry moderated by IU

As can be seen in Figure 10, the effect of AS on worry was significant only when IU < 43, indicated by the lower bootstrapped confidence interval lying above zero, the value of *b* at IU = 42, *b* = .0901, *t*(1, 342) = 1.97, $p < .05$. By way of the IU increases, the relationship between AS and worry becomes negative.

4.2.3. Intolerance of uncertainty predicting depression

4.2.3.1. Relative contribution of intolerance of uncertainty on depression

Alike to analyses on worry, the similar analyses on depression were conducted in order to examine the specificity of the relationship of IU (and the other cognitive vulnerabilities) to social anxiety. Three similar hierarchical regression were performed.

Table 6

Regression Model of FNE, IU, and AS predicting depression symptoms

step	Variable	Coefficient statistic			Model step statistic			
		β	*t*	*P*	ΔR^2	ΔF	*df*	*P*
1	**Age**	**-0.15**	**-2.77**	**.005**	**.042**	**7.50**	**2, 346**	**.001**
	Gender	**0.12**	**2.23**	**.022**				
				Sequence 1				
2	**FNE**	**0.66**	**15.06**	**<.001**	**.380**	**226.86**	**1, 345**	**<.001**
3	**IU**	**0.33**	**6.29**	**<.001**	**.060**	**39.50**	**1, 344**	**<.001**
4	**AS**	**0.29**	**5.85**	**<.001**	**.047**	**34.20**	**1, 343**	**<.001**
				Sequence 2				
2	**IU**	**0.60**	**13.70**	**<.001**	**.338**	**187.62**	**1, 345**	**<.001**
3	**AS**	**0.38**	**7.60**	**<.001**	**.089**	**57.70**	**1, 344**	**<.001**
4	**FNE**	**0.38**	**7.60**	**<.001**	**.060**	**43.65**	**1, 343**	**<.001**
				Sequence 3				
2	**AS**	**0.60**	**13.81**	**<.001**	**.341**	**190.59**	**1, 345**	**<.001**
3	**FNE**	**0.45**	**9.31**	**<.001**	**.124**	**86.75**	**1, 344**	**<.001**
4	**IU**	**0.21**	**3.95**	**<.001**	**.021**	**15.56**	**1, 343**	**<.001**
				Two-way interactions				
5	IU x FNE	**0.77**	**2.80**	**.005**	**.015**	**3.63**	**3, 340**	**.013**
	FNE x AS	0.13	0.47	.648				
	IU x AS	**-0.84**	**-2.77**	**.006**				
				Three-way interaction				
6	IU x FNE x AS	0.82	0.83	.407	.001	0.69	1, 339	.407

Similar to the results obtained for worry, IU, FNE and AS each consistently made additive and unique contributions to the variance in depression symptoms. FNE contributed the greatest proportion to the variance, followed by AS and IU, which were both entered in

the second step (38% Vs 33.8% Vs 34.1%, respectively) and even in the fourth step (6% Vs 4.7% Vs 2.1%, respectively).

Partly similar to the results obtained for worry as well, the two-way interactions when entered together made an additional interactive contribution to the model (1.5%); IU x FNE and AS x FNE were significant. Meanwhile, the three-way interaction did not make a significant additional contribution (0.1%). The final model was significant ($F(9,339) = 44.92$, $p < .001$) and accounted for 54.4% of the variance in depression.

4.2.3.1.1. 4.2.3.2. Interactions in predicting depression

The interaction between IU and FNE did not explain a significant variance in depression symptoms, $\Delta R^2 = 0.25\%$, ΔF (1, 342) = 1.85, $p = .175$. Likewise, the interaction between IU and AS also did not account for a significant contribution, $\Delta R^2 = 0.26\%$, ΔF (1, 342) = 1.91, $p = .168$. Therefore, neither FNE nor AS moderated the effect of IU on depression.

4.2.4. Intolerance of uncertainty, social anxiety and alcohol use

The unique paths of the relationships between IU on alcohol use was investigated. The two effects of IU on alcohol use were estimated: (i) the direct effect, the effect of IU on alcohol use while social anxiety and instrumental motives of alcohol use were controlled, (ii) the indirect effect, the effect of IU on alcohol use through social anxiety only, instrumental motives only and lastly, both social anxiety and instrumental motives serially.

The roles of FNE and AS were also investigated in order to examine the specificity of IU; while the investigations of the roles of worry and depression were in order to examine the specificity of social anxiety. PROCESS model 6 that accounts for two or more serial mediators was used. The significance of the effects are indicated by their coefficient bootstrap confidence interval lying above zero. The model examined can be seen in the following figure.

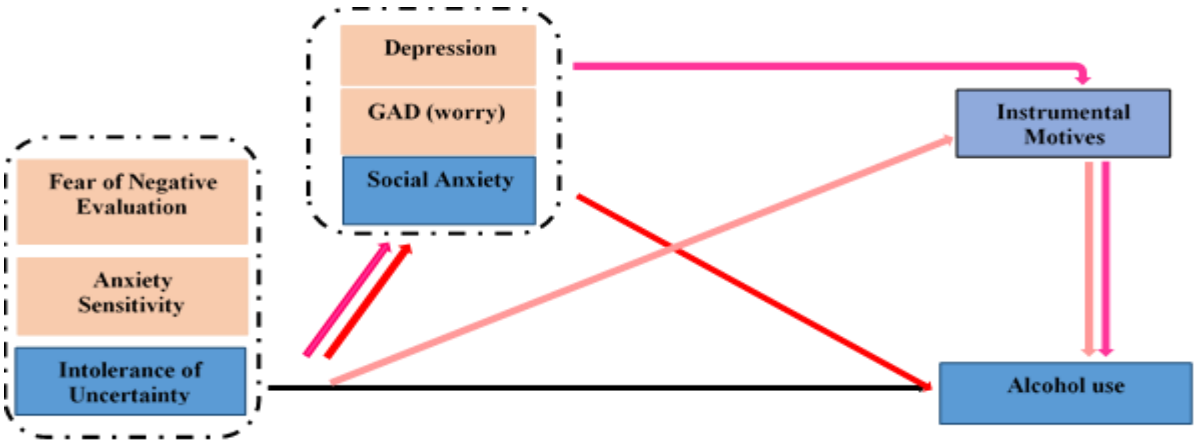
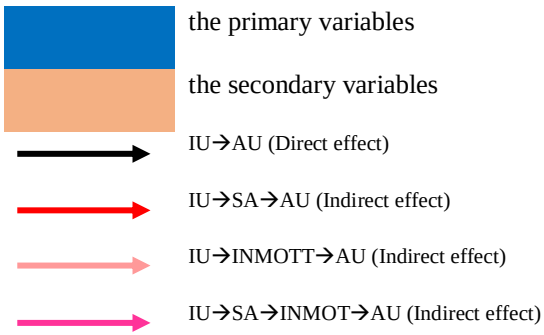


Figure 11. Direct and indirect effects of IU on alcohol use



4.2.4.1. The direct and indirect effects of intolerance of uncertainty on alcohol use mediated by social anxiety

The direct and the indirect effects of IU on alcohol use were examined. IU was the predictor, frequency of alcohol use was the outcome variable, while social anxiety and instrumental motives of alcohol use were the mediators, age and gender were covariates.

Table 8 below shows the direct and indirect effects of IU through social anxiety and instrumental motives on alcohol use across time and contexts.

Table 7

The direct and indirect effects of IU on alcohol use mediated by social anxiety

Models	Effect	Se	LLCI	ULCI
Direct effect				
IU [SA–INMOT]→AU life	-.0090	.0102	-.0291	.0111
IU [SA–INMOT]→AU alone	-.0022	.0020	-.0062	.0018
IU [SA–INMOT]→AU friends	-.0127	.0094	-.0312	.0059
Indirect effect				
IU→SA [INMOT]→AU life	**-.0238**	**.0079**	**-.0390**	**-.0086**
IU→SA **[INMOT]**→AU alone	.0001	.0013	-.0025	.0027
IU→SA [INMOT]→AU friends	**-.0223**	**.0066**	**-.0356**	**-.0099**
IU→ **INMOT [SA]**→AU life	.0012	.0075	-.0129	.0157
IU→ **INMOT [SA]**→AU alone	.0002	.0009	-.0017	.0020
IU→ **INMOT [SA]**→AU friends	.0012	.0076	-.0134	.0164
IU→SA→INMOT→AU life	**.0154**	**.0052**	**.0060**	**.0263**
IU→SA→INMOT→AU alone	**.0020**	**.0007**	**.0007**	**.0035**
IU→SA→INMOT→AU friends	**.0158**	**.0053**	**.0058**	**.0268**

Note: SA = social anxiety; M = instrumental motives of alcohol use; AC = alcohol use; inside parentheses = variable(s) being controlled

None of *the direct effects* were *significant*, so IU alone was not related to alcohol consumption. Regarding the indirect effects, first, the indirect effects of IU *through social anxiety* as the single mediator on alcohol consumption for lifetime and with friends were *significant* and *negative*, but not when alone, indicating that *increasing* IU and social anxiety were associated with *decreasing* alcohol use during lifetime and with friends. Second, *none* of the indirect effects of IU on the alcohol variables *through instrumental motives only* were *significant*. Interestingly, third, the indirect effects of IU on alcohol consumption across time and contexts were *positive and significant* when *instrumental motives* for alcohol consumption were added as *the second mediator*, indicating that *increasing* IU was now significantly associated with *increasing* alcohol consumption through the expansion of the path.

4.2.4.2. The direct and indirect effects of fear of negative valuation on alcohol use mediated by social anxiety

An identical analyses were repeated, however FNE was the predictor variable here. Table 9 shows the direct and indirect effects of FNE on alcohol use across time and contexts. This was investigated in order to explore the specificity of the paths of IU and alcohol use.

Table 8

The direct and indirect effects of FNE on alcohol use mediated by social anxiety

Models	Effect	SE	LLCI	ULCI
Direct effect				
FNE [SA–INMOT]→AU life	**.0277**	**.0129**	**.0023**	**.0530**
FNE **[SA–INMOT]**→AU alone	-.0040	.0026	-.0091	.0010
FNE **[SA–INMOT]**→AU friends	.0119	.0120	-.0116	.0355
Indirect effect				
FNE→SA [INMOT]→AU life	**-.0490**	**.0100**	**-.0690**	**-.0292**
FNE→SA **[INMOT]**→AU alone	.0011	.0019	-.0025	.0048
FNE→SA [INMOT]→AU friends	**-.0405**	**.0089**	**-.0580**	**-.0230**
FNE→INMOT [SA]→AU life	**.0427**	**.0084**	**.0275**	**.0608**
FNE→ INMOT [SA]→AU alone	**.0060**	**.0013**	**.0036**	**.0088**
FNE→ INMOT [SA]→AU friends	**.0452**	**.0091**	**.0281**	**.0645**
FNE→SA→INMOT→AU life	-.0063	.0065	-.0194	.0061
FNE→SA→INMOT→AU alone	-.0009	.0009	-.0028	.0008
FNE→SA→INMOT→AU friends	-.0067	.0069	-.0205	.0068

Only *the direct effect* of FNE on alcohol use during life time that was *positive and significant,* indicating that *increasing* FNE was directly associated with *increasing* alcohol use during lifetime. Regarding the indirect effects, first, *similar* to the result on IU, the effects of FNE mediated *by social anxiety* on alcohol use during life-time and drinking alcohol with friends were *significant* and *negative,* indicating that *increasing* FNE and social anxiety were associated with *lower* alcohol use over lifetime . Secondly, interestingly, the indirect effects of FNE on alcohol use across time and contexts changed to be significant and positive when *instrumental motive*s were entered as *a single mediator*, indicating that *increasing* FNE and instrumental motives were associated with *increasing* alcohol use lifetime now. This was *entirely different* to IU. Third, *entirely different* to IU as well, *none* of the indirect effects remained *significant* when mediated serially by *both social anxiety and instrumental motives*.

4.2.4.3. The direct and indirect effects of anxiety sensitivity on alcohol use mediated by social anxiety

Likewise the rationale for the investigation on FNE, the direct and indirect effects of AS on alcohol use across time and contexts were investigated in order to explore the specificity of the paths of IU and alcohol use. An identical analyses were repeated where AS was entered as the predictor variable.

Table 9

The direct and indirect effects of AS on social anxiety mediated by social anxiety

Models	Effect	Se	LLCI	ULCI
Direct effect				
AS [SA–INMOT]→→AU life	-.0035	.0063	-.0159	.0096
AS [SA–INMOT]→→AU alone	.0002	.0012	-.0023	.0026
AS [SA–INMOT]→→**AU friends**	**-.0027**	**.0058**	**-.0142**	**-.0088**
Indirect effect				
AS→SA [INMOT]→AU life	**-.0151**	**.0036**	**-.0226**	**-.0084**
AS→SA **[INMOT]**→AU alone	-.0006	.0007	-.0020	.0007
AS→SA [INMOT]→AU friends	**-.0154**	**.0034**	**-.0226**	**-.0090**
AS→INMOT [SA]→AU life	**.0097**	**.0051**	**.0002**	**.0201**
AS→INMOT [SA]→AU alone	**.0012**	**.0007**	**.0001**	**.0027**
AS→INMOT [SA]→AU friends	**.0100**	**.0052**	**.0006**	**.0209**
AS→SA→INMOT→AU life	**.0060**	**.0024**	**.0013**	**.0110**
AS→SA→INMOT→AU alone	**.0008**	**.0003**	**.0002**	**.0014**
AS→SA→INMOT→AU friends	**.0062**	**.0025**	**.0016**	**.0113**

Only the *direct effect* of AS on drinking alcohol with friends was *significant and negative*; indicating that *increasing* AS directly was directly associated with *decreasing* alcohol use over lifetime. Regarding the indirect effects, first, *similar* to IU and FNE, the indirect effect of AS mediated by *social anxiety* on alcohol use during life-time and drinking alcohol with friends were *significant and negative,* not on drinking alcohol alone; indicating increasing AS and social anxiety were associated with decreasing social drinking. Secondly, *entirely similar* to FNE, the indirect effects of AS *through instrumental motives* on alcohol use across time and contexts were *significant* and *positive*, indicating that *increasing* AS and instrumental motives were associated with *increasing* alcohol use. Third, *entirely similar to IU,* the indirect effects of AS on alcohol use when mediated serially by *both mediators* remained *significant* and *positive*.

In order to obtain a comprehensive picture of the relationship between IU, social anxiety and alcohol use and also the specificity of IU, those results were summarised. The results are presented in the following table:

Table 10

The direct and indirect effects of IU, FNE and AS in predicting alcohol use mediated by social anxiety

	Direct effect	Indirect effect		
	X [SA-INMOT] **→ Y**	**X → SA** [INMOT] **→ Y**	**X → INMOT** [SA] **→ Y**	**X → SA → INMOT → Y**
IU - AU life	NS	-	NS	+
IU - AU alone	NS	NS	NS	+
IU - AU friends	NS	-	NS	+
FNE - AU life	+	-	+	NS
FNE - alone	NS	NS	+	NS
FNE - AU friends	NS	-	+	NS
AS - AU life	NS	-	+	+
AS - AU alone	NS	NS	+	+
AS - AU friends	NS	-	+	+

Note: X = predictor variable, Y = outcome variable, SA = social anxiety, NS = non-significant, (-) = significant and negative, (+) = significant and positive

Only FNE had a significant and positive direct effect on alcohol use during life-time. First, each cognitive risk factor had significant and negative indirect effects on alcohol use during a life time and alcohol use with friends mediated by *social anxiety*, suggesting that

increasing these cognitive vulnerabilities and social anxiety led to decreasing alcohol use during life time and drinking alcohol with friends. Secondly, *only IU* had *non-significant* indirect effects *through instrumental motives* on alcohol use across time and contexts, while the indirect effects *of FNE* and *AS* were *significant* and *positive*. Third, surprisingly, the indirect effects of IU and AS turned out to be *significant* and *positive* when mediated serially by *social anxiety* and *instrumental motives* of alcohol use. Meanwhile, the indirect effect of FNE on social anxiety mediated serially by *social anxiety* and *instrumental motives* of alcohol use was *not significant*.

Standing out from this summary is that only individuals reporting either high IU or high AS and social anxiety, although they basically are not liable to join social activities, may consume alcohol during social occasion due to they are driven by instrumental motives. Nevertheless, this is not observed for individuals reporting high FNE and social anxiety.

4.2.5. The specificity of social anxiety in the relationship between intolerance of uncertainty and alcohol use

The specificity of social anxieties role within the model was further investigated. The roles of worry and depression symptoms in mediating the relationship between IU and alcohol use were explored. IU was entered as the predictor variable; alcohol use was the outcome variables; while worry or depression symptoms and also instrumental motives were the mediators in a serial sequence. Age and gender were covariates for the entire subsequent analyses. The bootstrapping approach utilising PROCESS model 6 was performed.

The first analyses were the direct and indirect effects of IU on alcohol use across time and contexts mediated by worry, followed by depression.

Table 11
The direct and indirect effects of IU on alcohol use mediated by worry (GAD)

Models	Effect	se	LLCI	ULCI
Direct effect				
IU [WOR-INMOT]→AU life	**-.0592**	**.0103**	**-.0795**	**-.0390**
IU **[WOR-INMOT]**→AU alone	-.0028	.0020	-.0068	.0013
IU [WOR-INMOT]→AU friends	**-.0474**	**.0097**	**-.0663**	**-.0284**
Indirect effect				
IU→WOR [INMOT]→AU life	**.0281**	**.0071**	**.0141**	**.0420**
IU→WOR **[INMOT]**→AU alone	.0006	.0014	-.0021	.0035
IU→WOR [INMOT]→AU friends	**.0135**	**.0066**	**.0009**	**.0268**
IU→INMOT [WOR]→AU life	-.0038	.0071	-.0174	.0102

Models	Effect	se	LLCI	ULCI
IU→ NMOT [WOR]→AU alone	-.0005	.0010	-.0025	.0014
IU→INMOT [WOR]→AU friends	-.0041	.0075	-.0189	.0106
IU→WOR→INMOT→AU life	**.0187**	**.0048**	**.0101**	**.0288**
IU→WOR→INMOT→AU alone	**.0026**	**.0007**	**.0014**	**.0042**
IU→WOR→INMOT→AU friends	**.0200**	**.0051**	**.0111**	**.0312**

Note: WOR = worry (GAD)

Dissimilar to the results from social anxiety, the direct effects of IU, when worry and instrumental motives were controlled, on alcohol use during life-time and drinking alcohol with friends were *significant* and *negative*. This indicates that increasing IU directly lead to low alcohol use during life-time and drinking alcohol with friends.

Regarding the indirect effects, first, the indirect effects of IU on alcohol use during life-time and drinking alcohol with friends through *worry* were *significant* and *positive*. These findings are *entirely opposite* to the indirect effects through social anxiety. Secondly, *identical* to the results from social anxiety, *none* of the indirect effects of IU *through instrumental motives* on alcohol use across time and contexts were significant. Third, interestingly, when *instrumental motives* of alcohol use was entered as *the second mediator*, all the indirect effects of IU on alcohol use across time and contexts were *significant* and *positive*. These were *entirely similar* to the results from social anxiety.

Table 12

The direct and indirect effects of IU on alcohol use mediated by depression

Models	Effect	se	LLCI	ULCI
Direct effect				
IU [DEP-INMOT]→AU life	**-.0295**	**.0095**	**-.0483**	**-.0108**
IU [DEP-INMOT]→AU alone	**-.0037**	**.0018**	**-.0074**	**-.0001**
IU [DEP-INMOT]→AU friends	**-.0230**	**.0087**	**-.0402**	**-.0058**
Indirect effect				
IU→DEP [INMOT]→AU life	-.0028	.0063	-.0150	.0099
IU→DEP [INMOT]→AU alone	.0017	.0012	-.0008	.0042
IU→DEP [INMOT]→AU friends	**-.0121**	**.0055**	**-.0228**	**-.0013**
IU→INMOT [DEP]→AU life	-.0044	.0069	-.0173	.0095
IU→INMOT [DEP]→AU alone	-.0006	.0009	-.0023	.0012
IU→INMOT [DEP]→AU friends	-.0047	.0075	-.0190	.0104
IU→DEP→INMOT→AU life	**.0205**	**.0047**	**.0121**	**.0306**

Models	Effect	se	LLCI	ULCI
IU→DEP→INMOT→AU alone	**.0026**	**.0007**	**.0014**	**.0041**
IU→DEP→INMOT→AU friends	**.0219**	**.0050**	**.0128**	**.0326**

Note: DEP = depression

Contrasting to the results from social anxiety but partly similar to worry, all the direct effects of IU, when depression and instrumental motives were controlled, on alcohol use were significant and negative. Regarding the indirect effects, first, only the indirect effect of IU *through depression* on drinking alcohol with friend was *significant* and *negative*. This is *similar* to the results on social anxiety. Secondly, *mirroring* the results on social anxiety and worry, none of the indirect effects of IU *through instrumental motives* on alcohol use across time and contexts were *not significant*. Third, similar to the results from *both social anxiety and worry*, the indirect effect of IU turned out to be *significant* and *positive* when *instrumental motives* were added as the second mediator.

The summary of the pathways of IU's effect on alcohol use across psychopathological symptoms were presented in the following table:

Table 13
Similarities and differences in the relationship between IU and alcohol consumption for social anxiety, GAD (worry) and depression

	Direct effect	Indirect effect		
	X [SA/WOR/DEP -INMOT] → **Y**	**X → SA/WOR/DEP** [INMOT] → **Y**	**X → INMOT** [SA/WOR/DEP] → **Y**	**X → SA/WOR/DEP → INMOT → Y**
IU – SA - AU life	NS	-	NS	+
IU – SA - AU alone	NS	NS	NS	+
IU – SA - AU friends	NS	-	NS	+
IU – WOR - AU life	-	+	NS	+
IU – WOR - AU alone	NS	NS	NS	+
IU – WOR - AU friends	-	+	NS	+
IU – DEP - AU life	-	NS	NS	+
IU – DEP - AU alone	-	NS	NS	+
IU – DEP - AU friends	-	-	NS	+

The direction of the direct effects of IU on alcohol consumption varied across psychopathological symptoms when controlling for the mediators. For social anxiety only, the direct effects of IU on alcohol consumption were not significant, whereas most of the direct effects of IU on worry and depression symptoms were significant and negative.

First, the indirect effects of IU on alcohol consumption were *significant* and *positive only through worry*, for both during life-time and with friends. In contrast, the indirect effects of IU through either social anxiety or depression on drinking alcohol with friends were *significant* and *negative*. Dissimilar to drinking alcohol with friends, the indirect effects of IU on drinking alcohol alone were not significant for any of the mediating psychopathological symptoms. Secondly, *none* of the indirect effects of IU on alcohol consumption across time and context through the instrumental motives were *significant*, regardless of the psychopathological symptoms controlled. Third, for all of the psychopathological symptoms mediating the path, the indirect effects of IU on alcohol consumption across time and context were *significant* and *positive* when *the instrumental motives of alcohol consumption* were added *as the second* mediator.

Standing out from this summary is that individuals reporting IU and either social anxiety or depression symptoms, although they basically are not liable to join social activities, may consume alcohol during social occasion due to they are driven by instrumental motives. Conversely, individuals reporting IU and worry may have less anxious around people and thus, may consume alcohol with or without the presence of instrumental motives.

4.3. Exploratory analyses

4.3.1. The role of sub-instrumental motives of alcohol use

Further, it is crucial to explore which sub-instrumental motives play a more significant role within the proposed models specifically predicting an alcohol use-related context. Referring to the results in Chapter 3, most students frequently consume alcohol with friends and rarely drink alcohol alone. Moreover, these next analyses will examine each sub-instrumental motives and alcohol use with friends.

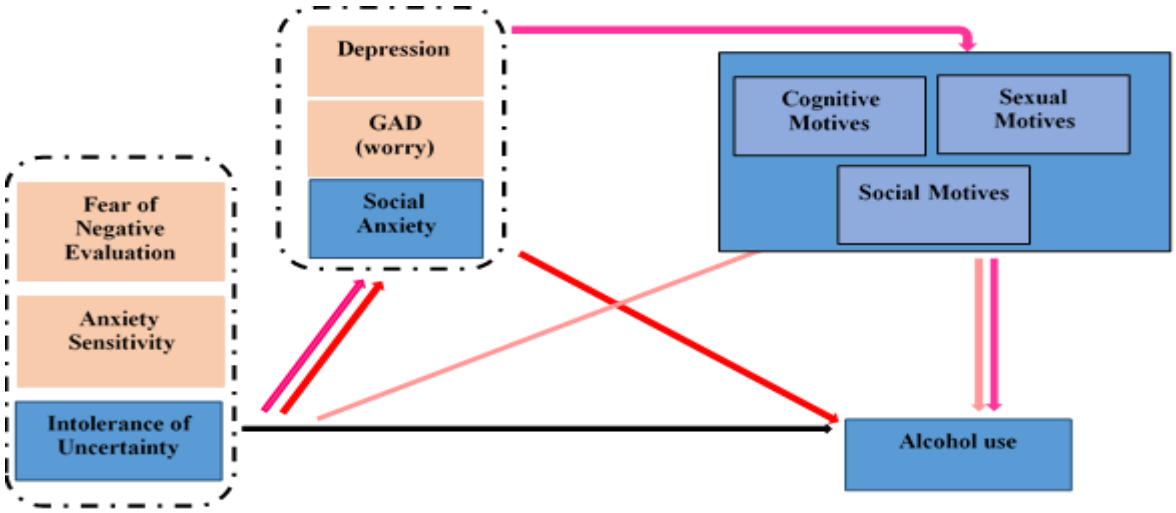


Figure 12. Indirect effect of IU on alcohol use through social anxiety and sub-instrumental motives

As can be seen from Figure 12, IU was entered as the predictor variable, social anxiety and sub-instrumental motives were the first and the second mediators respectively, while alcohol consumption in specific contexts, namely alone and with friends, was the outcome variable. Age and gender were covariates. Subsequently, an identical analysis was repeated for FNE and AS. The bootstrapping approach using PROCESS model 6 was performed to examine the models. The results are displayed in the following tables.

Table 14

The indirect effects of IU on drinking alcohol with friends through social anxiety and sub-instrumental motives serially

Models	Effect	Se	LLCI	ULCI
Direct effect				
IU→[SA-SOCMOT] AU friends	-.0102	.0090	-.0279	.0076
IU→[SA-COGMOT] AU friends	-.0163	.0103	-.0366	.0040
IU→[SA-SEXMOT] AU friends	-.0121	.0113	-.0342	.0101
Indirect effect				
IU→SA [SOCMOT]→AU friends	**-.0218**	**.0064**	**-.0345**	**-.0095**
IU→SA [COGMOT]→AU friends	**-.0176**	**.0069**	**-.0315**	**-.0042**
IU→SA [SEXMOT]→AU friends	-.0110	.0073	-.0258	.0033
IU→ SOCMOT [SA]→AU friends	-.0013	.0083	-.0177	.0151
IU→COGMOT [SA]→AU friends	.0049	.0064	-.0078	.0177
IU→SEXMOT [SA]→AU friends	-.0006	.0043	-.0077	.0091
IU→SA→ SOCMOT→AU friends	**.0153**	**.0055**	**.0052**	**.0266**
IU→SA→COGMOT→AU friends	**.0111**	**.0047**	**.0027**	**.0210**
IU→SA→SEXMOT→AU friends	.0045	.0033	-.0017	.0113

As can be seen in Table 15, *none* of the direct effects of IU on social drinking were *significant*. The indirect effects of IU *through social anxiety* were *significant* and *negative*, indicating the critical role of social anxiety to influence increasing IU leads to less alcohol consumption with friends. None of the direct effects of IU on drinking alcohol alone by way of *each-sub dimension* as a *single mediator* were significant. Interestingly, when either *social motives* or *cognitive motives* were entered as the second mediator following *social anxiety*, the indirect effects of IU on drinking alcohol alone were now *significant* and *positive*. This did not occur for the sexual motives. The indirect effects of IU on drinking alcohol with friends involving sexual motives were not significant, irrespective of the models examined.

Table 15

The indirect effects of FNE on drinking alcohol with friends through social anxiety and sub-instrumental motives serially

Models	Effect	Se	LLCI	ULCI
Direct effect				
FNE→[SA-SOCMOT] AU friends	.0059	.0115	-.0168	.0285
FNE→[SA-COGMOT] AU friends	**.0273**	**.0128**	**.0021**	**.0525**
FNE→[SA-SEXMOT] AU friends	**.0377**	**.0139**	**.0104**	**.0651**
Indirect effect				
FNE→SA [SOCMOT]→AU friends	**-.0353**	**.0085**	**-.0522**	**-.0189**
FNE→SA [COGMOT]→AU friends	**-.0454**	**.0093**	**-.0642**	**-.0275**
FNE→SA [SEXMOT]→AU friends	**-.0414**	**.0099**	**-.0609**	**-.0222**
FNE→ SOCMOT [SA]→AU friends	**.0512**	**.0099**	**.0322**	**.0716**
FNE→COGMOT [SA]→AU friends	**.0298**	**.0079**	**.0159**	**.0471**
FNE→SEXMOT [SA]→AU friends	**.0194**	**.0059**	**.0094**	**.0325**
FNE→SA→ SOCMOT→AU friends	-.0120	.0071	-.0267	.0017
FNE→SA→COGMOT→AU friends	-.0018	.0057	-.0132	.0093
FNE→SA→SEXMOT→AU friends	-.0059	.0044	-.0154	.0024

In *contrast* to IU, *the direct effects* of FNE on drinking alcohol with friends were *significant* and *positive* when social anxiety and either *cognitive motives* or *sexual motives* were controlled. This reveals that the absence of social anxiety and these two motives influence encourage greater FNE leading to increased social drinking. Interestingly, the direct effect of FNE when social anxiety and social motives were controlled was not significant.

Slightly different to IU, first, all the indirect effects of FNE through social anxiety on drinking alcohol with friends were *significant* and *negative*, irrespective sub-dimensions of

instrumental motives that were controlled. This signifies the critical role of social anxiety in influencing higher levels of FNE leading to decreasing social drinking. Secondly, *contrasting* to IU, the indirect effects of FNE on drinking alcohol with friends *through each sub-dimensions* of instrumental motives were *significant* and *positive*. This indicates that the absence of social anxiety change the direction of the effects of FNE. However, the presence of *both mediators* determined the indirect effects of FNE on social drinking became *not significant*.

Table 16
The indirect effects of AS on drinking alcohol with friends through social anxiety and sub-instrumental motives serially

Models	Effect	Se	LLCI	ULCI
Direct effect				
AS→[SA-SOCMOT] AU friends	.0028	.0056	-.0081	.0137
AS→[SA-COGMOT] AU friends	-.0021	.0064	-.0146	.0105
AS→[SA-SEXMOT] AU friends	-.0019	.0070	-.0157	.0119
Indirect effect				
AS→SA [SOCMOT]→AU friends	**-.0163**	**.0035**	**-.0235**	**-.0100**
AS→SA [COGMOT]→AU friends	**-.0138**	**.0037**	**-.0216**	**-.0071**
AS→SA [SEXMOT]→AU friends	**-.0089**	**.0039**	**-.0170**	**-.0018**
AS→ SOCMOT [SA]→AU friends	.0045	.0052	-.0053	.0153
AS→COGMOT [SA]→AU friends	**.0094**	**.0043**	**.0016**	**.0186**
AS→SEXMOT [SA]→AU friends	**-.0092**	**.0032**	**.0034**	**.0163**
AS→SA→ SOCMOT→AU friends	**.0071**	**.0027**	**.0020**	**.0126**
AS→SA→COGMOT→AU friends	**.0046**	**.0022**	**.0004**	**.0091**
AS→SA→SEXMOT→AU friends	-.0003	.0016	-.0035	.0028

Identical to IU, *the direct effects* of AS on social drinking were *not significant*. First, entire indirect effects of AS through *social anxiety* only were *significant* and *negative*. This is slightly similar to IU but identical to FNE. Second, partly similar to FNE, the indirect effects of AS through either *cognitive motives* or *sexual motives* were *significant* and *positive*, whereas the indirect effect of AS through social motives was not significant. This indicates that individuals reporting high AS but not social anxiety may join social drinking for cognitive or sexual motives, but not for social motives. Third, *similar* to IU, the indirect effects of AS were *significant* and *positive* only when either *social motives* or *cognitive motives* were *added* as *the second mediator* following social anxiety. Integrating with the

previous findings on points one and two, this indicates that individuals reporting IU and social anxiety may consume alcohol when driven by social motives. The summary is presented in the following table.

Table 17

The direct and indirect effects of IU, FNE and AS in predicting alcohol use with friends mediated by social anxiety and each sub-instrumental motives

	Direct effect	Indirect effect		
	X [SA-MOTIVES] → **Y**	**X → SA** [MOTIVES] → **Y**	**X →** **MOTIVES** [SA] → **Y**	**X → SA →** **MOTIVES →** **Y**
IU-SOCMOT-AU friends	NS	-	NS	+
FNE-SOCMOT-AU friends	NS	-	+	NS
AS-SOCMOT-AU friends	NS	-	NS	+
IU-COGMOT-AU friends	NS	-	NS	+
FNE-COGMOT-AU friends	+	-	+	+
AS-COGMOT-AU friends	NS	-	+	+
IU-SEXMOT-AU friends	NS	NS	NS	NS
FNE-SEXMOT-AU friends	+	-	+	NS
AS-SEXMOT-AU friends	NS	-	+	NS

Most direct effects of these cognitive risk factors were *not significant*, except the direct effects of FNE when either cognitive motives or sexual motives were controlled. First, when *social motives* were involved, the direction of the indirect effects of IU and AS, that were *initially significant* and *negative* when through *social anxiety only*, now turned out to be *significant* and *positive*. This is not observed for FNE. Secondly, when *cognitive motives* were involved, the indirect effect of all these cognitive vulnerabilities, that were *initially significant* and *negative* when through *social anxiety only*, now turned out to be *significant* and *positive*.

This indicates the importance of improving cognitive performance motives for social anxious people including those reporting high FNE. Third, when *sexual motives* were involved, the indirect effect of most of these cognitive vulnerabilities (except IU), that were *initially significant* and *negative* when through *social anxiety only*, now turned out to be *not significant*.

4.3.2. The role of acculturation

These analyses investigated whether acculturation mediated the relationship between IU and alcohol consumption. Therefore, acculturation was added as the second mediator in the proposed model. Building on the results of the analyses immediately above, where social anxiety played a role only for drinking with friends, these further analyses would only examine the relationship between IU and drinking alcohol with friends mediated serially by social anxiety, acculturation and social motives for alcohol consumption.

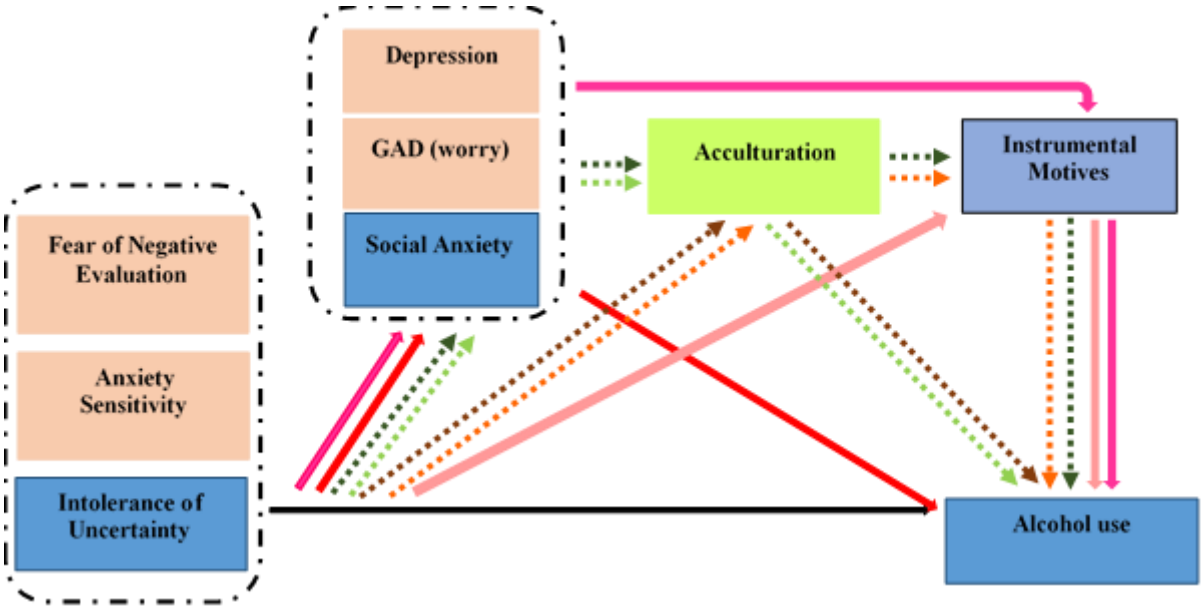


Figure 13. The effects of IU on alcohol use mediated by acculturation

The first series investigated the role of identification with one's heritage cultures (VIAH) and the second withe the mainstream culture (VIAM). In this case the mainstream cultures is British. Age and gender were covariates. Once again, the bootstrapping approach utilising PROCESS model 6 was performed.

Table 18

The direct and indirect effects of IU on drinking alcohol with friends mediated serially by social anxiety, acculturation and social motives of alcohol use

Models	Effect	se	LLCI	ULCI
Direct Effect				

Models	Effect	se	LLCI	ULCI
IU→[SA-VIAH-SOCMOT] AU friends	-.0141	.0096	-.0329	.0047
IU→[SA-VIAM-SOCMOT] AU friends	-.0140	.0096	-.0329	.0049
Indirect Effect				
IU→SA [VIAH+SOCMOT]→ AU friends	**-.0239**	**.0069**	**-.0380**	**-.0109**
IU→SA [VIAM+SOCMOT]→ AU friends	**-.0215**	**.0068**	**-.0353**	**-.0089**
IU→VIAH [SA+SOCMOT]→AU friends	-.0001	.0015	-.0032	.0031
IU→VIAM [SA+SOCMOT]→AU friends	-.0006	.0010	-.0041	.0005
IU→ SOCMOT [SA+VIAH]→AU friends	.0017	.0074	-.0124	.0160
IU→ SOCMOT [SA+VIAM]→AU friends	.0016	.0076	-.0134	.0167
IU→SA→VIAH [SOCMOT]→AU friends	**.0019**	**.0013**	**.0001**	**.0055**
IU→SA→VIAM [SOCMOT]→AU friends	-.0005	.0007	-.0028	.0003
IU→SA→SOCMOT [VIAH]→AU friends	**.0144**	**.0052**	**.0045**	**.0248**
IU→SA→SOCMOT [VIAM]→AU friends	**.0169**	**.0055**	**.0069**	**.0285**
IU→VIAH→SOCMOT [SA]→AU friends	-.0001	.0013	-.0030	.0024
IU→VIAM→SOCMOT [SA]→AU friends	-.0005	.0009	-.0033	.0004
IU→SA→VIAH→SOCMOT→AU friends	**.0016**	**.0011**	**.0001**	**.0048**
IU→SA→VIAM→SOCMOT→AU friends	-.0004	.0006	-.0024	.0003

Neither of the direct effects of IU on drinking alcohol with friends were significant. First, regardless of which acculturation sub-dimensions was controlled, the indirect effects of IU *through social anxiety* on drinking alcohol with friends were *significant* and *negative*. Secondly, regardless of which acculturation sub-dimensions was controlled, the indirect effects of IU on drinking alcohol with friends were *significant* and *positive* when *social motives* were added as the second mediator following *social anxiety*. Interestingly, when identification with one's *heritage* (but not mainstream) cultures was entered as second mediator after SA (whether with or without instrumental motives in the model), the indirect effect of IU on drinking alcohol with friends was *significant* and *positive*. This indicate that increasing IU, social anxiety and identification with one's heritage were associated with drinking alcohol with friends.

5. Discussion

Several studies have examined the relationship between social anxiety and alcohol consumption, particularly among students, with equivocal results. Conversely, a growing number of studies have reported a consistent moderate correlational relationship between IU and social anxiety. Therefore, the primary purpose of the current study was to investigate the potential relationship between IU, social anxiety and alcohol consumption. It was hypothesised that there will be direct and indirect relationships between IU, social anxiety and alcohol consumption.

Prior to examining these main research objectives, this study first examined the contribution of IU in predicting social anxiety relative to the contributions of FNE and AS. This study also investigated any possible interactions of these cognitive risk factors in predicting social anxiety. Overall, as will be discussed in the next sections, the data was mostly consistent with the proposed hypotheses.

5.1. The contribution of intolerance of uncertainty on social anxiety

This study found that IU consistently and independently made additive and unique contributions to the variance in social anxiety over and above FNE and AS. It supports the findings from a growing body of literatures examining the relationship between IU and social anxiety (Boelen et al., 2009 & 2010; Brown & Gainey, 2013; Carleton et al., 2010; McEvoy & Mahoney, 2011& 2012; Michel et al., 2016; Norr et al., 2013; Sapach et al., 2015; Whiting et al., 2014; Chapter 2).

This study largely replicated previous studies, although the measures used differed. In contrast to Boelen et al., (2010), Boelen and Reijntjes (2009), Brown and Gainey (2013), Norr et al. (2013) and McEvoy and Mahoney (2011) who used the original version of IUS (Freeston et al., 1994), this study utilised IUS-12 which has a stable two-factor structure and is arguably more efficient (Birrell et al., 2011; Carleton, Norton et al., 2007). Unlike McEvoy and Mahoney (2011 & 2012), Norr et al. (2013) and Whiting et al. (2014) who utilised either the combination of or one of Social Performance Scale and Social Interaction Anxiety Scale (Mattick & Clarke, 1998), two scales that measure two aspects of social anxiety separately, this study used SPIN that covers both aspects together. Therefore, to the extent that the exact constructs differ between measures, this study provides a degree of extension by replicating across measures.

As predicted, IU accounted for a smaller proportion of the variance than FNE. However, the contribution of IU was slightly greater than the contribution of AS. This finding is

partially in line with previous studies reporting that IU and FNE predict social anxiety although FNE noticeably accounted for a greater proportion of the variance (Whitting et al., 2014; Chapter 2). Moreover, although several studies have reported that AS correlates with social anxiety (e.g. Carleton et al, 2010; Panayiotou et al., 2015), this current study is the first study showing AS makes additive and unique contributions to the variance in social anxiety over and above FNE and IU.

Recently, Sapach et al. (2015) examined a similar model to this study; however, they also involved fear of positive evaluation (FPE), laterally with IU, FNE and AS. However, Sapach et al. did not perform a series of hierarchical regression comparing each contribution when the variables were rotated and entered into the first (after covariates) and last steps. Consequently, a clear comparison of each contribution was not achieved. Therefore, this study is the first study to clearly compare the contributions IU, FNE and AS.

Furthermore, the hypothesis that there would be a three-way interaction among IU, FNE and AS in predicting social anxiety was not supported. With regard to this result, it is worth noting that although the present study was powered to detect a small to medium effect size, the contribution of the three-way interaction itself was trivial.

The most interesting original findings are regarding interactions between FNE and IU and between AS and IU. The effect of IU on social anxiety was significant at most levels of FNE, except when the level of FNE was very low and increased with increasing FNE. Conversely, the effect of FNE on social anxiety was significant at all levels of IU. The increasing FNE leads to the increasing social anxiety as IU increases. This indicates that FNE was the principal factor of social anxiety, while IU is the secondary factor; its effect was significant only when FNE already present.

The moderating effect of FNE on the relationship between IU and social anxiety is similar to a result from previous analyses based upon an archival data set conducted by the author (Chapter 2) which reported anxiety similar moderation when the FNE level was moderate-high. However, the reverse path was slightly different. The previous study (Chapter 2) reported that the relationship between FNE and social anxiety was significant when the IU level was moderate to high.

Despite this dissimilarity, both the previous and the current study indicated that IU and FNE strengthen each other in predicting social anxiety. It is worth nothing that this current study used a student sample, examined IU, FNE and AS and employed IUS-12 and SPIN, whereas the previous study used mixed sample (community and student), investigated IU, FNE and shame and employed IUS-12 modification (an ease of language modification of the

IUS-12) and SIPS (Carleton et al., 2009). Therefore, this finding is obviously important for further comprehensive explanation of the development and maintenance of social anxiety.

The interaction between IU and AS in predicting social anxiety was also present. The effect of IU on social anxiety was significant at all levels of AS and this effect became stronger as the AS level increased. Conversely, the effect of AS on social anxiety was significant when the level of IU was moderate-high. Similarly, this effect became stronger as the IU level increased. This indicates that both strengthen each other in predicting social anxiety, but IU may come earlier, as AS was significant only when IU already present. In addition, according to Taylor et al. (2007), AS may act an anxiety amplifier. This is a novel finding and, thus, deserves further study.

Taking both interactions into account, a sequence regarding the cognitive process in predicting social anxiety from the three vulnerabilities was proposed. Based on the fact that FNE accounted for the greatest variance, it is proposed, as in the main models of social anxiety, that FNE is central to social anxiety. Given the significant contribution of IU, it is proposed that IU is an important factor in predicting social anxiety although its effect will be significant when FNE is already present. Subsequently, referring Taylor et al. (2007), AS amplifies the level of social anxiety produced by FNE and IU.

On the other hand, as has been mentioned, there is a slight discrepancy between the result of the previous study (Chapter 2) and the current study regarding the relationship between FNE and social anxiety moderated by IU. Moreover, this study highlighted the important contribution of IU in predicting social anxiety and thus, did not analyse the interaction between AS and FNE. Therefore, an empirical evidence to support the assumption that FNE is truly the first factor that should come prior to the other cognitive factors and AS is truly the amplifier factor, is required. In addition, this assumption can be only be confirmed by either a longitudinal study or an experimental design systematically varying the effect of one on the other, seeing as only both types of studies are able to provide a temporal precedence; although only an experimental study can rule out any possible third variable (Shadish, Cook & Campbell, 2002).

This finding obviously highlights that IU contributes significant unique variance in predicting social anxiety. The effect of IU also enhances the effects of other cognitive risk factors related to social anxiety, and vice versa. Therefore, it complements the Cognitive Model of Social Phobia (Clark & Wells, 1995) and the Cognitive Behavioural Model of Social Phobia (Heimberg, Brozovich & Rapee, 2010; Rapee & Heimberg, 1997), which accentuated the importance of FNE in maintaining social anxiety. It is recommended that IU is added to the model as the additional predictors. Hence, it requires further study, including

any study examining the efficacy of treatment for social anxiety targeting IU on individuals experiencing social anxiety, which would obviously refine the model.

5.2. Intolerance of uncertainty as a transdiagnostic factor

Apart from its contribution to social anxiety, it also replicated findings that IU predicts worry, which is the hallmark of GAD, and also with depression symptoms. Unsurprisingly, the contribution of IU to the variance in worry was the greatest, even when controlling for age, gender, FNE and AS. Conversely, IU's contribution to the variance in depression symptoms was the smallest compared to the contributions of FNE and AS. Notwithstanding the differential contribution of IU across anxiety disorders and depression, the consistency of IU in predicting psychopathological symptoms provide an indication that IU is conceivably a transdiagnostic factor.

As well as providing further replication of IU as a unique transdiagnsitc factor when rigorously assessed against two other cognitive vulnerabilities, this study provides novel evidence that the two-way interactions between IU and either FNE or AS in connection with worry were significant. The effect of IU on worry was significant at all levels of FNE. Conversely, the effect of FNE on worry was significant only when IU was low-moderate. Moreover, the effect of IU on worry was significant only when AS low-moderate. Similarly, the effect of AS on worry was significant only when IU was low-moderate. Interestingly, the significant effect of IU on worry decreased as FNE and AS levels increased as well as the effects of both FNE and AS on worry decreased as IU level increased. This indicates that as both IU and FNE levels increases, the effect of FNE on worry decreased due to the effect of IU on worry become dominant. Moreover, IU and AS weaken each other in predicting worry.

Referring to previous studies that established that IU is the hallmark of worry (e.g., Buhr & Dugas, 2009; Dugas, Marchand & Ladouceur, 2005; Freeston et al., 1994; Zlomke & Jeter, 2013), whereas FNE is the predominant factor of social anxiety (e.g., Carleton et al., 2007; Collins et al., 2005; Stopa, 2001; Weeks et al., 2005; Weeks et al., 2008), the results of both interactions on social anxiety and worry may help to explain the cognitive processes underlying the comorbidity between GAD and social anxiety disorder.

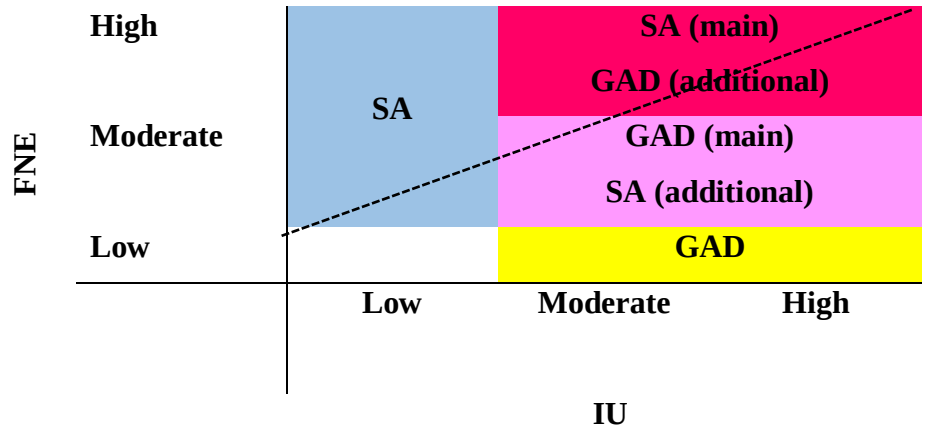


Figure 14. The cognitive process of the comorbidity between GAD and social anxiety

First, individuals may experience GAD as a single diagnosis when IU is present significantly and at a particular level. Conversely, individuals reporting relatively higher FNE may experience social anxiety as a single diagnosis

Second, as those individuals reporting higher IU also report an increasing of FNE, comorbidity between GAD and social anxiety occurs. Regardless of the level of IU, as long as FNE is not too high, GAD would be the primary diagnosis, while social anxiety would be the additional diagnosis.

Third, as the levels of IU and FNE significantly increase, social anxiety emerges as the prominent symptom. Consequently, social anxiety would be the principal diagnosis and GAD would be the additional diagnosis.

Eventually, if Taylor et al.' (2007) proposition is right, AS, which is the amplifier of anxiety, would further increase the social anxiety level caused by the interaction between IU and FNE.

However, similar to the lack of evidence to comprehensively support the sequence of social anxiety maintenance, this assumption regarding the maintenance process of comorbidity between GAD and social anxiety require further study and discussion.

None of the interactions among IU, FNE and AS on depression symptoms were significant. The effect size of the interaction was trivial, indicating that the interaction may be unlikely. It may be, first, related to the less variance overall (54%) in depression being explained by all three cognitive factors examined relative to the variance overall in social anxiety and worry, in addition to the less unique contribution made by IU (2%).

However, it is important to point out that IU, FNE and AS, which are well-known as vulnerability factors relating to anxiety disorders, also independently predicted depression. Therefore, it is also possible that the effects of these cognitive factors on depression are mediated by anxiety disorders. Several previous cross-sectional and longitudinal studies (e.g.

Kessler et al., 1996; Merikangas et al, 1996; Wittchen, Essau & Krieg, 1991; Wittchen, Kessler, Pfister & Lieb, 2000) have reported that anxiety disorders, which typically occur in childhood or early adolescence, occurs long before depression, which is typically occurs in adults. In addition, depression is more likely to arise in people with a prior history of anxiety disorders.

This non-specific nature of IU as a transdiagnostic factor does not mean that this construct lacks utility in theoretical development and clinical practices; instead its characteristics provides more extensive opportunities, such as the development of a more sophisticatedly integrated model of psychopathology and exploration of IU in other domains or other mental disorders, outside of those that have been investigated, or even developing a more comprehensive treatment for comorbidity such as a treatment proposed by Boswell, Hollands, Farchione and Barlow (2013). They examined the efficacy of 18 weeks treatment using Transdiagnostic Cognitive-Behavioural Therapy targeting IU among 37 patients diagnosed with heterogeneous anxiety and depression. They reported that this treatment effectively reduced IU and moreover, the severity of anxiety and depression symptoms.

5.3. Intolerance of uncertainty, social anxiety and alcohol use

Although Buckner, Schmidt and Eggleston (2006) had added alcohol motives as a mediator in their model, their rather simple model has not fully explained the equivocal results of any previous studies investigating the relationship between social anxiety and alcohol use. As predicted, taking a step backward and adding cognitive risk factors related to social anxiety into the model provided a clearer picture. Also, it indeed clarifies those equivocal results.

There are several interesting novel findings standing out. First, as predicted, most of the direct effects of these cognitive risk factors were not significant. This indicates that they cannot stand alone and require mediators.

Secondly, greater levels of IU, FNE or AS were significantly associated with either decreasing alcohol use during life-time or drinking with friends contexts, indirectly through social anxiety symptoms. This highlights that, regardless of the underlying cognitive risk factors, socially anxious individuals basically tend to avoid alcohol use, particularly social drinking activities (drinking alcohol with friends). This signifies that social anxiety is a protective factor particularly for social drinking among students.

Furthermore, this has similarities to depression but conflicting characteristics to worry. As mentioned above, those experiencing excessive social anxiety would be more likely to avoid social drinking activities. This is the same with those suffering depression symptoms,

which dampens their interest to join social activities. Conversely, those who have excessive worry do not have a significant problem with anxiety in any social situation, including participating in drinking. It is possible that individuals who have a high IU would be anxious either with the uncertainty in the social situations or with regards to losing control of their behaviour when they become intoxicated. However, because they have no excessive fear of being socially embarrassed, they are more likely to join social activities. Eventually, they are more likely to participate in social drinking activities; something that will be less likely for individuals who have an excessive fear of being socially embarrassed or a high level of social anxiety.

Third, the indirect effects of all cognitive vulnerabilities were significant and negative indirectly through social anxiety, but the greater levels of IU were not significantly associated with decreasing of alcohol use indirectly through instrumental motives. Interestingly, greater IU was significantly associated with increasing alcohol use when instrumental motives were added as the second mediator following social anxiety. This indicates that IU may be a factor underlying alcohol use among socially anxious students. Individuals reporting high IU may also be experiencing social anxiety. However, their social anxiety was more likely triggered by the uncertainty rather than by the judgement and thus, they may be less anxious to join social activities rather than individuals reporting high FNE. Eventually, they may consume alcohol even at a social occasion, arguably motivated by their positive expectancies regarding the effect of alcohol use.

Fourth, on the other hand, it can be argued that FNE is the factor underlying the equivocal relationship between social anxiety and alcohol use. It is proven from the directions of their indirect effects that alters from initially significant and positive through social anxiety, significant and negative through instrumental motives, and eventually not significant through both mediators. On the one hand, those having FNE are inclined to avoid social activities and thus, less likely to join alcohol use activities; in contrast, they are afraid of receiving a negative evaluation if they reject the invitation to participate in drinking alcohol.

Fifth, instrumental motives play an important role in influencing the socially anxious to eventually join in with social drinking. Although IU, FNE and AS each had negative indirect effects on alcohol use during lifetime and drinking with friends contexts, indirectly through social anxiety symptoms; when instrumental motives was added as the second serial mediator, greater IU and AS indirectly led to increasing alcohol use across time and contexts. These indicate that although those individuals reporting social anxiety presumably tend to avoid drinking alcohol, instrumental motives may drive those individuals to believe that alcohol can enhance their social confidence, helping them to become more relaxed, or even assist them to

examine their problem from a different perspective. Consequently, it is still possible for them to participate in drinking activities because they have been driven by those instrumental motives.

A slightly different explanation is proposed to clarify the relationship between FNE, social anxiety and alcohol use, which is not significant. As reported above, increasing FNE would inevitably lead to an increased level of social anxiety, with FNE being the biggest contributor to social anxiety. Consequently, people who have excessive FNE will be much less likely to participate in social activities. Consequently, they will be much less likely to join social drinking activities, although they believe that alcohol may help them to be more confident, less anxious or even to become more relaxed. It makes sense then that presumably the indirect effect of FNE on alcohol use mediated serially by social anxiety and alcohol use is actually present; similarly the indirect effects of IU and AS, although its effect size is probably smaller.

Finally, regardless of their psychopathological symptoms, instrumental motives could influence many to drink alcohol across times and contexts. Once again, this highlights the important role of instrumental motives in the relationships between both anxiety disorders or depression symptoms and alcohol use.

5.4. Sub-instrumental motives and acculturation (exploratory)

Exploratory analyses examining similar models established that amongst three sub-instrumental motives, the relationship between IU and alcohol use either alone or with friends, were positive significantly only when either social or cognitive motives were added as the second mediator following social anxiety. Meanwhile, IU did not have a significant indirect effect on alcohol use, both alone and with friends, when sexual motives accounted for the second mediator.

This result supports previous analysis (Chapter 3) that social motive and cognitive motives arguably were the main motives underlying recreational alcohol use. Although this result is promising, it is worth nothing that the NSUQ is a new measure. Therefore, any substantive interpretation of the factors (sub-instrumental motives) of the NSUQ needs to go beyond the label (Chapter 3). Thus, the conclusion of these analyses should be taken cautiously and deserves further study.

In addition, this current study established that both dimensions of acculturation had correlations with both alcohol use and instrumental motives, though the correlations were considerably small. Acculturation heritage, or an engagement with an original culture that has influenced most and part of a sense of identity, had a negative correlation. This engagement is

expressed through, as examples, feeling more enjoyment regarding participating in activities with people or even feel more willing to marry a person of the same heritage culture, and consistently maintain values and practices of the heritage culture. Conversely acculturation mainstream, or in this case modern British culture, had a positive correlation; an engagement with a culture that is represented, particularly, by today's British mainstream media.

Interestingly, the bootstrapping approach demonstrated only acculturation heritage in conjunction with social anxiety and social motives that mediated the relationship between IU and social drinking. It is unsurprising that socially anxious people may have a social motive to join in with group drinking if surrounded only by people who they know well, which are predominantly people who come from the same heritage culture. However, this warrants further study.

5.5. Strength and Limitations

This is the first study examining the relative additive and interactive contribution of IU to the variance in social anxiety in the presence of FNE and AS. This study is also the first study investigating the relationship between those cognitive risk factors, anxiety disorders and depression symptoms, and alcohol use. This study is also the first study proposing instrumental motives as the possible mediator in the relationship mentioned above. Therefore, most of the findings are novel and will obviously be beneficial contributions to the body of knowledge related to IU, social anxiety and alcohol use. Moreover, this study was based entirely online (Internet-mediated Research/ IMR; British Psychological Society, 2013). Therefore, it is considered the best approach to investigate such a sensitive topic as social anxiety and alcohol use among students. Lastly, this study also utilised robust analysis methods and software that have been confirmed to be more powerful.

Nevertheless, a number of limitations should be addressed particularly in relation to future studies. Firstly, this current study only utilised a student sample, which commonly drinks alcohol on a recreational basis. Consequently, the current findings may not reflect findings from other sample groups, for instance the general community or a clinical sample. Secondly, though the number of participants is large enough based on the assumed effect size when conducting an estimation of sample size analysis, the results revealed that the correlations were generally small, particularly in the relationship between either cognitive risk factors or psychopathological symptoms measured and the outcome variable, which was alcohol use. A greater sample size that provides greater power to detect a small correlation or small effect would give a more robust result. Thirdly, this current study examined instrumental motives using the NSUQ (Chapter 3). The positive features of the NSUQ are that it is theory driven, has

demonstrated excellent psychometric properties and is an acceptable fit. However, as it is a new measure, more work is essentially required in order to refine the measure, particularly regarding the factor structure of the NSUQ. Consequently, any interpretation, particularly regarding the sub-instrumental motives should be taken cautiously. Finally, the design of this current study was cross-sectional, which thus limits its ability to propose a causal conclusion.

5.6. Conclusion

Most of the findings reported by this current study are novel. This current study highlighted that IU is an important factor of social anxiety. It independently and consistently made additive and unique contributions to the variance in social anxiety. IU also enhances the effects of FNE and SA in predicting social anxiety, and vice versa. IU also significantly predicted worry and depression symptoms; highlighting its role as a transdiagnostic factor. The differential proportion of and interaction between IU, FNE and AS suggests the unique characteristics of social anxiety, GAD and depression symptoms as well as explaining the cognitive process of comorbidity.

This current study also addressed the equivocal results regarding the relationship between social anxiety and alcohol use and, crucially, it advanced our understanding by revealing the paths of the relationship between IU, social anxiety and alcohol use. Thus, it underlines an assumption that social anxiety may be basically a protective factor regarding alcohol use, particularly social drinking which is very common amongst students. In addition, it highlights the importance of instrumental motives in the maintenance of alcohol use amongst socially anxious individuals. More importantly, it proposes IU as the primary factor underlying alcohol use among social anxious students.

Future studies are recommended to address the limitations of this current study and in particular, to take a step forward by utilising an experimental or longitudinal design that allows investigation of the causal nature of IU, social anxiety and alcohol use. Further studies examining the efficacy of treatment targeting IU, which has a critical role in predicting social anxiety, comorbidity between social anxiety and GAD, and also alcohol use, are also recommended: *“one shot for all”.*

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List of appendices

Appendix A. Demographic profiles

Table 19
Demographic profiles

	N	%
Total	534	100
Gender		
Male	114	32.20%
Female	240	67.80%
Age		
18 - 24 years old	234	66.10%
25 - 34 years old	74	20.90%
35 - 44 years old	35	9.89%
45 - 54 years old	6	1.70%
55 - 64 years old	3	.85%
65 years old or older	2	.57%
Education		
Bachelor's degree	196	55.37%
Master's degree	73	20.62%
Doctorate	70	19.77%
Professional qualification (for example teaching, nursing, accountancy)	9	2.54%
Other vocational/work-related qualification	5	1.41%
Foreign qualifications	1	.28%
English as first language		
Yes	253	71.50%
No	101	28.50%
Religion		
No religion	167	47.20%
Christian (incl. Church of England, Catholic, Protestant & all other Christian denominations)	110	31.10%
Buddhist	6	1.70%
Hindu	5	1.41%
Jewish	2	.56%
Muslim	60	16.94%
Any other religion	4	1.13%
Ethnic		
English/Welsh/Scottish/Northern Irish/ British	221	62.43%
Irish	2	.57%
Any other White background	21	5.93%
White and Black Caribbean	1	.28%
White and Black African	3	.85%
White and Asian	9	2.54%
Any other Mixed / Multiple ethnic background	8	2.30%
Indian	3	.85%
Pakistani	3	.85%
Chinese	10	2.82%
Any other Asian background	54	15.25%
African	5	1.41%
Caribbean	2	.56%
Any other Black/African/Caribbean background	1	.28%
Arab	6	1.70%
Any other ethnic group	5	1.41%

Table 20
The proportion of substance users

Substance	Time	N	%	95% CI
Tobacco	Life-time	166	47.56%	+ 5.24
	12 months	120	34.38%	+ 4.98
Alcohol	Life-time	290	83.09%	+ 3.93
	12 months	277	79.37%	+ 4.25
CNS Stimulant (ecstasy etc.)	Life-time	48	13.75%	+ 3.61
	12 months	35	10.03%	+ 3.15
Cannabis	Life-time	103	29.51%	+ 4.79
	12 months	62	17.77%	+ 4.01
Hallucinogen (LSD etc.)	Life-time	24	6.88%	+ 2.66
	12 months	10	2.87%	+ 1.75
Opiates	Life-time	20	5.73%	+ 2.44
	12 months	12	3.44%	+ 1.91
CNS Depressant (Benzodiazepine etc.)	Life-time	24	6.88%	+ 2.66
	12 months	10	2.87%	+ 1.75
Others	Life-time	27	7.74%	+ 2.80
	12 months	17	4.87%	+ 2.26
Illicit drugs (cannabis, hallucinogen, opiates, depressant, others)	Life-time	138	39.54%	+ 5.13
	12 months	90	25.79%	+ 4.59

Appendix B. A Priori Power Analysis

To date, there is not any study examining hypotheses examined in this study so direct estimation of likely effect sizes is not possible. Therefore we developed some assumptions around the theoretical framework presented earlier.

The steps involved were:

1. Operationalizing the statistical hypothesis for each of the study's hypotheses.
2. Estimating an effect size for each, with reason.
3. Converting these estimates to a common effect size (r^2 then f^2).
4. Considering the range of effect sizes expected.
5. Calculating and graphing power for the proposed sample size of N = 300 for the effect sizes expected using G*Power.
6. Conducting sensitivity analyses with N = 200 to 400.
7. Conducting sensitivity analyses if effect size has been overestimated (by a factor of 2).
8. Considering whether the study would be "overpowered" with larger than expected samples or effect sizes.

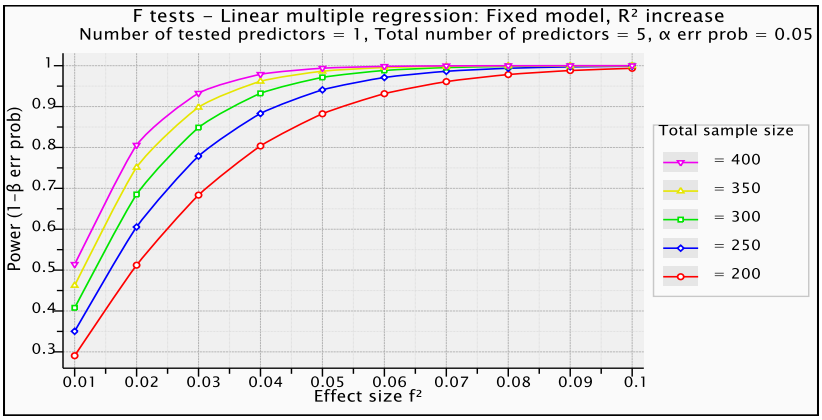

Figure 15. Result of power analysis

It was concluded that 1) N = 300 is a reasonable target sample, 2) this project is robust to smaller effects or smaller sample sizes, and 3) if recruitment is relatively easy, there is no reason at this point to seek a smaller sample than the planned 300 or stop online recruitment from a given source until it "drys up".

Appendix C. Ethical approval

Newcastle University

21 October 2013

Muhamad Salis Yuniardi
Institute of Neuroscience

Faculty of Medical Sciences
Newcastle University
The Medical School
Framlington Place
Newcastle upon Tyne
NE2 4HH United Kingdom

FACULTY OF MEDICAL SCIENCES: ETHICS COMMITTEE

Dear Muhamad

Title: Understanding Intolerance of Uncertainty and Social Anxiety among Students
Application No: 00666/2013
Start date to end date: 01 August 2013 to 30 January 2016

On behalf of the Faculty of Medical Sciences Ethics Committee, I am writing to confirm that the ethical aspects of your proposal have been considered and your study has been given ethical approval.

The approval is limited to this project: **00666/2013**. If you wish for a further approval to extend this project, please submit a re-application to the FMS Ethics Committee and this will be considered.

During the course of your research project you may find it necessary to revise your protocol. Substantial changes in methodology, or changes that impact on the interface between the researcher and the participants must be considered by the FMS Ethics Committee, prior to implementation.*

At the close of your research project, please report any adverse events that have occurred and the actions that were taken to the FMS Ethics Committee.*

Best wishes,

Yours sincerely

M. Holbrough

Marjorie Holbrough
On behalf of Faculty Ethics Committee

cc.
Professor Andy Hall, Chair of FMS Ethics Committee
Ms Lois Neal, Assistant Registrar (Research Strategy)

*Please refer to the latest guidance available on the internal Newcastle web-site.

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Chapter 5. Intolerance of Uncertainty and Social Anxiety among Indonesia Students

Muhamad Salis Yuniardi
110530503

March 2017

Supervisors: Prof. Mark Freeston & Dr. Jacqui Rodgers

10,812 words
(not including abstract, references and appendices)

I declare that this assignment is my own work and I have correctly acknowledged the work of others. This assignment is in accordance with University and School guidance on good academic conduct (and how to avoid plagiarism and other assessment irregularities. University guidance is available at www.ncl.ac.uk/right-cite

Contents

Abstract

Introduction: Nowdays it is predicted that more than 7 million Indonesian may be affected by social anxiety. Social anxiety might be differentially influenced by environmental or cultural aspects. Studies investigating social anxiety in Indonesia appear to have been neglected. This study aims to investigate the relative contribution of intolerance of uncertainty (IU) in predicting social anxiety relative to fear of negative evaluation (FNE) and anxiety sensitivity (AS), IU's possible interactions with these other cognitive risk factors, and also the role of IU as a transdiagnotsic factor across social anxiety, worry (GAD) and depression.

Method: Data were collected using online procedures. There were 540 participants from 12 universities across Indonesia, predominantly undergraduate students. All questionnaires were translated through a rigorous method. A hierarchical regression series was used via SPSS version 21.0 to examine the relative contribution, while interaction analyses using PROCESS macro for SPSS were used to address any possible interactions.

Results: IU, FNE and AS each consistently made additive and unique contributions to the variance in social anxiety, worry and also symptoms of depression. Interestingly, IU contributed accounted the smallest proportion, even in the variance in worry. FNE contributed the greatest proportion across those psychopathological symptoms. None of the interactions in predicting social anxiety were significant. IU, FNE and AS also each consistently contributed to the variance in worry and depression symptoms.

Conclusion: This current study highlighted the significant correlational relationship between IU and social anxiety. However, specifically among the Indonesian sample, IU may not be the principal "sidekick" of FNE in social anxiety, and not even be the 'main character' in worry. These may be related to the cultural dimensions which characterise the people and culture of Indonesia.

Chapter 5. Intolerance of Uncertainty and Social Anxiety among Indonesia Students

1. Background

1.1 Indonesia in a glance

Indonesia is an archipelago country located in Southeast Asia, which is comprised of nearly 18 thousand islands, of which over 6000 are inhabited (www.mapsofworld.com, 2015). There are five major islands, specifically, Java, Sumatra, Kalimantan, Sulawesi and Papua.

According to the official data, the population of Indonesia in 2010 was 237,641,326 people (Badan Pusat Statistik, 2015a). By 2015, it was expected to reach 256,461,700, whilst by 2030 it is estimated that it will be practically 300 million (Departemen Kesehatan, 2015) or that it will have increased by 1.19%/year (Badan Pusat Statistik, 2015b; Departemen Kesehatan, 2015). Furthermore, the current population indicates that Indonesia is the world's fourth most populous nation.

As is characteristic of any developing country, the young comprise the largest percentage of its population. This population inhabits virtually one thousand islands, with almost 57.5 % in Java and the remainder spread across the 1000 remote islands. In the middle of the twentieth century, Indonesia's population was largely rural; however, since the beginning of the twenty-first century, the number of people living in cities slightly outnumbers those who live in rural areas (Badan Pusat Statistik, 2015a). Consequently, several cities have become very crowded and there are currently twenty-six cities with populations of over 200,000 (Cunningham, 2012).

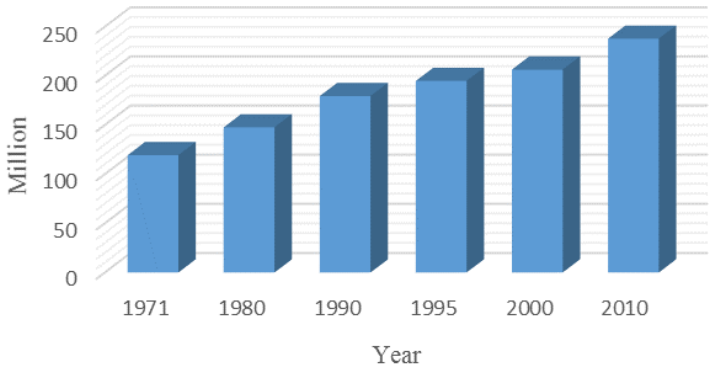


Figure 1. Indonesia Population 1971-2010

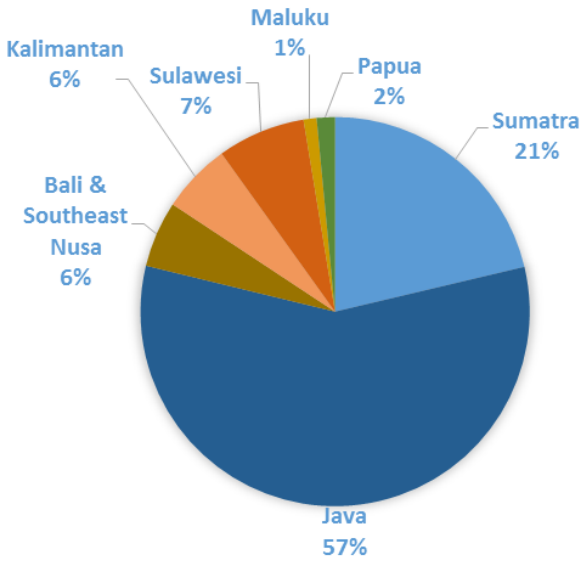


Figure 2. Population distribution based on the island(s)

It is worth noting that Indonesia recovered after the economic crisis in 1998 and the global recession in 2009, and moreover, that the country has recorded strong economic growth over the past 6 years, which has increased gradually by approximately 5%-6.5% (Asian Development Bank, 2015; Focus Economics, 2015). As a result, it is ranked as the 16th largest economy worldwide (Asian Development Bank, 2015). In 2015, Indonesia's GDP per capita (USD) reached $5,214, and developed by 5.8% over the same quarter of the last year, and moreover, is ranked the 5th largest in the ASEAN countries. However, unemployment is still considerably high, accounting for approximately 6% (the Heritage Foundation, 2015).

Indonesia is a multi-ethnic society, consisting of around 1000 ethnicities of which 15 have a population of more than 1 million people (Suryadinata, Arifin & Ananta, 2003). Each ethnicity has its own distinct language and a range of dialects, social norms, belief systems, and even social rules that sometimes oppose each other (Cunningham, 2012). For instance, Javanese emphasise being refined, and believe that it is not polite to speak frankly and convey any negative emotional expression openly in public areas. In contrast, the Bataknese prefer directness in speech and consequently are often considered rude by the Javanese.

Notwithstanding the multiplicity of ethnicities in Indonesia, a number of similar values are generally used to describe the general characteristics of the Indonesian people. Hofstede (1980, 1997) and Hofstede & Hofstede (2005) classified culture based on six cultural dimensions: (i) uncertainty avoidance or the degree to which the society tolerate uncertainty (ii) individualism; the extent to which individuals are interdependent and integrate into society, (iii) power distance or the degree to which a society accepts unequal power distribution or hierarchies, (iv) masculinity vs. femininity; the extent to which emotional rules

associated with gender are distributed, being competitive in order to be the best or highlighting caring for each other (v) indulgence or to what extent society tends to liberate personal desire or behaviours, and (6) long term orientation with regard to what extent society defines the truth in relation to the maintenance of past things and perception of the future.

According to the Hofstede Centre (2015), Indonesia reported a moderate score on uncertainty avoidance, indicating Indonesian people recognise the presence of uncertainty, although they had a low preference for avoiding it. In 1980, it was reported that Indonesia was ranked 47th out of 57 countries assessed in connection with individualism. This is no different to the current result in which Indonesia scored very low on individualism. Moreover, Indonesian people attained a high score in relation to power distance, which means that they accentuate social hierarchy and authority, whilst being classified as less masculine also means that caring for others and quality of life are dominant values. In addition to those four main cultural dimensions, it is also reported that Indonesia has a low score related to indulgence, indicating that they tend to restrain personal desire and behaviours, in order to adhere and conform to the social norms. Finally, Indonesia had a moderate score in connection with the long term orientation index. Therefore, these scores signify that Indonesia is classified as a pragmatic society, which perceives truths as an aspect that literally relates to the situation.

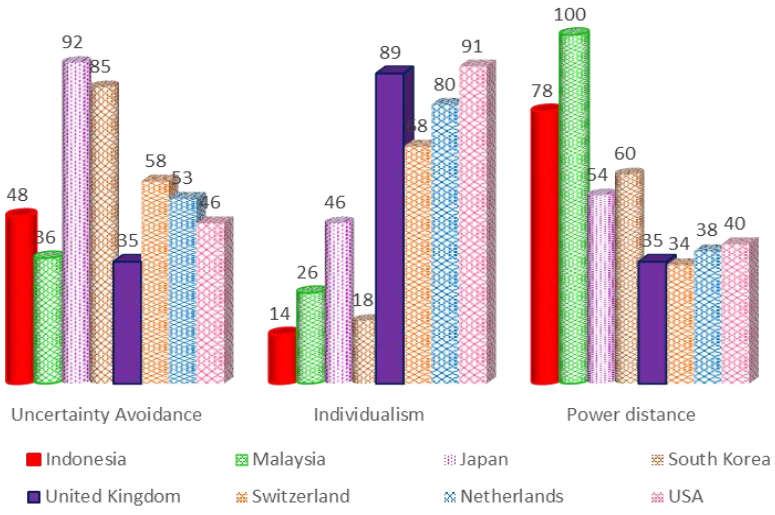


Figure 3. Hofstede's cultural dimensions (The Hofstede Centre, 2015)

In summary, the importance of group harmony, obedience, conformity and social hierarchy are several values that are significantly emphasised in social relationships across culture in Indonesia, while individualism is not really accepted. Thus, it makes sense if Indonesia is classified as one of the so-called collectivistic countries.

Officially, Indonesia has six religions (Badan Pusat Statistik, 2015a), Islam, Protestantism, Catholism, Hinduism, Buddhism and Confucianism. It is the world's most populous Muslim country with approximately 217 million people or 87.12% of the population identified as Muslim. This is followed by Christians (9.87%; with about twice as many Protestants as Catholics, 6.96% and 2.91%, respectively), Hindus (1.69%), Buddhists (0.72%), whereas the remaining are *Konghucu* (the official Indonesian name for Confucianism) and a range of traditional religions (officially called *Aliran Kepercayaan* referring to various forms of indigenous mysticism or animism) (Badan Pusat Statistik, 2015a).

A further aspect is that all official religious holy days are national holidays, indicating that Indonesia is a tolerant country. Most people who practice the main world religions also incorporate elements of local traditions. For example, irrespective of religion and ethnicity, Indonesian people habitually conduct '*selamatan*' rituals at specific times: birth, death, harvest celebration or healing for a family member suffering illness, etc. '*Selamatan*' means "being safe", it is a ritual asking for blessings or mercy from God, saints, or ancestors, who it is believed are able to provide help. In these ceremonies, the host provides food for all guests, whilst some people may preserve *'sesajen'* (the meal offering), while the shamans or prayer masters lead the prayer (Woodward, 2011)

1.2 Health conception in Indonesia

Health conception in Indonesia cannot be separated from culture and religion, values that have been taking place for thousands of years throughout Indonesian history. Indonesian people strongly believe that there is a unity between body and mind as well as between *jagad cilik* (self, humankind, microcosmic) and *jagad gedhe* (the God, nature, macrocosmic). Health is perceived as a state of equilibrium, whereas sickness in addition to being unfortunate is an obvious result of living in unbalance or caused by any imbalance among the elements of the physical and spiritual bodies (Geertz, 1960; Yitno, 1985). Consequently, the healing process should be holistic; rebalancing the relationship between jagad *cilik* and *jagad gedhe,* and humankind should be perceived as more than a physical body that must be freed from any bacteria or viruses. Thus, the holistic healing process means a complete re-understanding of the self and repairing its relationship with society, nature and God (Triratnawati, 2011; Yitno, 1985).

Referring to this belief, for instance, there is a unique illness in Indonesia called *masuk angin*, which presumably is a cultural-bond illness (Prayoga & Pradipto, 2014) that can only be discovered in Indonesia (Kinsela, 2000). Medical conception based on Western philosophy

simply defines it as a common cold caused by viruses, which is dissimilar to the conception embraced in Indonesia, particularly among the Javanese (Kinsela, 2000; Prayoga & Pradipto, 2014; Triratnawati, 2011). *Masuk angin* is perceived as an illness due to too much wind entering into the body. *Masuk angin* has a wide range of symptoms: body temperature becoming colder, headache, stomach ache, fatigue, fever, nausea, diarrhoea, and has even been known to cause death. *Masuk angin* is perceived to have various causes: too much thinking, too much working, lack of rest or sleep, eating late, getting soaked by the rain, or even drinking ice in the middle of the night (Kinsela, 2000). Consequently, taking medicine to destroy the viruses is not sufficient or even inappropriate. Individuals complaining about contracting *masuk angin* should complement it with other treatments: taking a rest, relaxing, eating plenty and drinking a lot of water. Other treatments that are suggested are massage doubled with *kerokan* (coining) and also drinking *jamu* (herbal medicine).When individuals have a massage and coining, not only their physical body is relaxed, but their psychological condition is too, so that they can even share their emotional feeling or problems with the therapist (Kinsela, 2000).

Indonesian culture is also strongly linked with traditional herbal medicine, which is called "*jamu"*, which is consumed for various purposes: preserving health and stamina, enhancing sexual desire, beauty, and furthermore for curative treatment (Geertz, 1960; Subandi, 2009; Sudarti, 2002; Woodward, 2011) including *masuk angin* (Kinsela, 200; Triratnawati, 2011). Nowadays, people are becoming more interested in herbal medicine again given that modern medicine is unaffordable for financial reasons (Supardi & Notosiswoyo, 2005; Triratnawati, 2010). Both "traditional healers" and traditional herbal medicine have a very important place with regards to health amongst Indonesian people, which is simultaneous to modern medical care.

Apart from sickness caused by natural causes, most Indonesians, particularly older people or those who live in rural areas, believe that sickness could also be caused by supernatural causes, for instance: *santet* or *guna-guna* (black magic) or jinn (Geertz, 1960; Soejoeti, 2005; Sudarti, 2002; Syahroen, no date). A number of mental disorders and severe illness are believed to occur as a consequence of supernatural reasons. Consequently, modern medical treatments are not recommended and people prefer to go to a traditional medical practitioner (Faizal, 2012), *dukun* (shaman) or*kyai* (preachers) (Kasnodihardjo & Angkasawati, 2013; Soejoeti, 2005; Sudarti, 2002).

1.3 Health condition in Indonesia

According to *Undang-Undang Kesehatan nomer 23 tahun 1992* (Health Act No. 23, 1992; www.balitbangham.go.id, 1992), the responsibility for most formal public health and social welfare programmes rests primarily with the government. In 2004, the Indonesian government committed to implementing health subsidies for less-well off people through *Asuransi Kesehatan Masyarakat Miskin* (health insurance for the poor) as an implementation of that health act. In 2009, this programme was changed to become *Jaminan Kesehatan Masyarakat* (health insurance scheme for the population). Through this scheme, people can access healthcare services at a low cost (Rokx, Schieber, Harimurti, Tandon & Somanathan, 2009).

At the end of 2014, the Indonesian government officially launched a new healthcare programme, *Kartu Indonesia Sehat* (Health Indonesia Card). It guarantees the provision of healthcare services to disadvantaged people (Tim Nasional Percepatan Penanggulangan Kemisikinan, 2015). Through this health insurance scheme, all low-income earners are granted free services for all admissions to hospital in basic (class-3) hospital beds. Following this programme, the national expenditure with respect to the national healthcare programme significantly increased from 2% of the total national expenditure budget in 2012 (Departemen Keuangan, 2012) to 3.9% in 2015 (Departemen Kesehatan, 2015; Departemen Keuangan, 2015) and moreover, will increase to 5% by 2016 (Departemen Kesehatan, 2015; Kompas, 2015). Currently the total number of general hospitals amounts to 2,368, which has increased from 2,228 in 2013. Of that number, more than half are private hospitals (Departemen Kesehatan, 2015). Furthermore, it is predicted that the number will rise by approximately 10% in the future (Arief, 2014; Departemen Kesehatan, 2015).

Although it seems promising and a considerable amount of essential investments has been made to increase the quality of the healthcare services, the implementation has encountered several obstacles, particularly related to limited accessibility and the quality of human resources regarding the health care services (Franken, 2011) and basic infrastructures that appear to be lacking in many areas (Cunningham, 2012). Cunningham remarked that the problems are created by two particular points: this number is far from enough concerning the ratio of the Indonesian population and, most of the infrastructures are situated on Java Island. An official report from the Indonesian Doctors Association revealed that two-thirds of doctors are based on Java, with aproximatelly 30% of the total operating in the capital (Franken, 2011). In addition, the health insurance system was implemented ineffectively and inequitably (Rokx et al., 2009). The lengthy bureaucratic procedure in accessing this system and

pervasive corruption at every level of the health services was identified as the possible core of the problem.

In relation to mental health issues, National Basic Health Research of Indonesia conducted by the Health Department in 2007 noted that approximately 1 million Indonesians were suffering from severe mental disorders, while 19 million people of age 15 or older had suffered emotional mental disorders such as depression and anxiety (Faizal, 2012; Safitri, 2011), which rose to19.6 million in 2010 (Anna, 2012). A further article reported that the prevalence of mental disorders, mainly depression and anxiety disorders, among Indonesians is 11% (Vitelli, 2011).

There were 35 mental health hospitals and 700 general hospitals that provide psychiatry services (Sundari, 2012) with 616 psychiatrists for a population of over 240 million. Thus, this indicates the ratio is comprised of one psychiatrist for every 400,000 people, when ideally the ratio should be one for every 100,000 people (Kompas, 2012; Marchira, 2011: The Jakarta Post, 2012). Of those numbers, 75% are in Java, whilst 86% are based in Jakarta (Marchira, 2011). Likewise, there are approximately 400 clinical psychologists who are predominately situated in Java (Anna, 2012). It is also noticeable that the expenditure budget for the health mental programme was less than 1% of the total health expenditure health, which was 2.36% of the total national budget (Departemen Keuangan, 2011; Marchira, 2011).

It is apparent that the Indonesian government does not highlight mental health issues as one of their principal priorities. Consequently, it is evident that the quality of healthcare services for people with mental disorders is still far from being satisfactory (Anna, 2011; Marchira, 2011) and people have limited access to a lack of viable treatment options (Faizal, 2012; Vitelli, 2011). It is important to note that ideas and beliefs pertaining to mental health (Soejoeti, 2005; Sudarti, 2002) and the negative stigma surrounding mental illness (Faizal, 2012; Vitelli, 2011) are other obstacles that might motivate people not to consider seeking professional therapies, such as psychiatrists, doctors (Marchira, 2011) or clinical psychologists.

1.4 Social anxiety in Indonesia

Social anxiety, which consists of physiological, cognitive, emotional and behavioural aspects, is the third largest mental disorder across the world, following substance use and depression. It is estimated that approximately 3% - 13% of the population suffers from it (American Psychiatric Association, 2013; Beek, 1995; Grant et al., 2005; Kessler, Chiu, Demler & Walters, 2005; Magee, Eaton, Wittchen, McGonagle & Kessler, 1996; Stein & Stein, 2008; Xu et al., 2012). A similar range was established among student samples (e.g.

Baptista et al., 2012; Izgiç, Dogan & Kugu, 2004; Verger, Guagliardo, Gilbert, Rouillon & Masfety, 2010). With regards to the total population of Indonesia, if we take the lowest prevalence rate regarding social anxiety (3%), in order to estimate the incidence of Indonesian people who may be suffering from social anxiety, the result will suggest that more than 7 million are presumably affected by social anxiety nowadays.

Interestingly, social anxiety might be differentially influenced by environmental or cultural aspects (Van Dam Baggen, Kraaimaat & Elal, 2003; Van Dam-Baggen, Van Heck & Kraaimaat, 1992). This makes sense, as numerous studies specifically in cross-cultural psychology have suggested that the development and expression of emotions (Matsumoto, 2001; Matusmoto & Juang, 2012; Mesquita & Frijda, 1992) and also the appraisal of emotion-antecedents (Scherer & Brosch, 2009) varies across cultures. Therefore, a growing interest in social anxiety across cultures is being encouraged.

Despite those previously facts and notions, it appears that studies investigating social anxiety in Indonesia appear to have been neglected. Only a small number of studies in Bahasa (the official language of Indonesia) were found which have mostly investigated the efficacy of a specific treatment upon students who reported high social anxiety. For instance, the effectiveness of a social-guidance service (Syarif & Balqis, 2014), the effectiveness of therapy, which gives meaning to our life-story, in order to reduce social anxiety (Swasti & Martani, 2013), and social skills training (Hapsari & Hasanat, 2010) reduced social anxiety.

Two studies estimated the prevalence of social anxiety. The first one, a study among 200 young employees (25-45 year old) recruited from Jakarta reported that the prevalence of social anxiety was estimated to be in the range of 9.6% - 16% (Ibrahim, 2001). The symptoms were recognised from an early age and prolonged until old age. Unfortunately, there is insufficient information in terms of method, particularly, the measures used, data collection strategy and how participants were classified in relation to their social anxiety level. The second study included 211 undergraduate psychology students from a private Islamic university in Indonesia located in East Java (Suryaningrum, 2006). It reported that 22.27% of respondents indicated suffering from social anxiety and of those, 21.28% required treatment. This study used a brief questionnaire based on social phobia criteria mentioned in the DSM-IV and the diagnosis was classified based on the tertile-split of the scale-total score. Unfortunately, the internal reliability of the questionnaire was not examined. Therefore, when referring to the weaknesses associated to the two studies, their conclusion in connection with the prevalence of social anxiety in Indonesia should be taken very cautiously.

With reference to studies in the English language with keywords “social anxiety disorder” or “social phobia” and “Indonesia”, Google scholar yielded two studies, one of

those similar in Psychinfo, none from Scopus. The first is a study conducted by Kraaimaat, van Dam-Baggen, Veeninga & Sadarjoen (2012). In the research, they compared the emotional/cognitive (discomfort experience in interpersonal situations) and behavioural components (frequency of assertive social responses in those situations) of social anxiety between students from the Netherlands, the United States, which are categorised as individualistic orientated societies, and Indonesia, which represents a collectivistic society. They included 140 undergraduate psychology students from one of the state universities located in West Java. They utilised the Inventory of Interpersonal Situations (Van Dam-Baggen & Kraaimaat, 1987) and moreover, discussed the result based on three cultural dimensions proposed by Hofstede (2001): power distance, individualism and masculinity. As predicted, America was the most individualistic country, while Indonesia was the least. In addition, America was also the most masculine country, while the least masculine, surprisingly, was the Netherlands. The Indonesian participants reported the highest scores regarding power distance with large discrepancies relative to the US and Dutch participants.

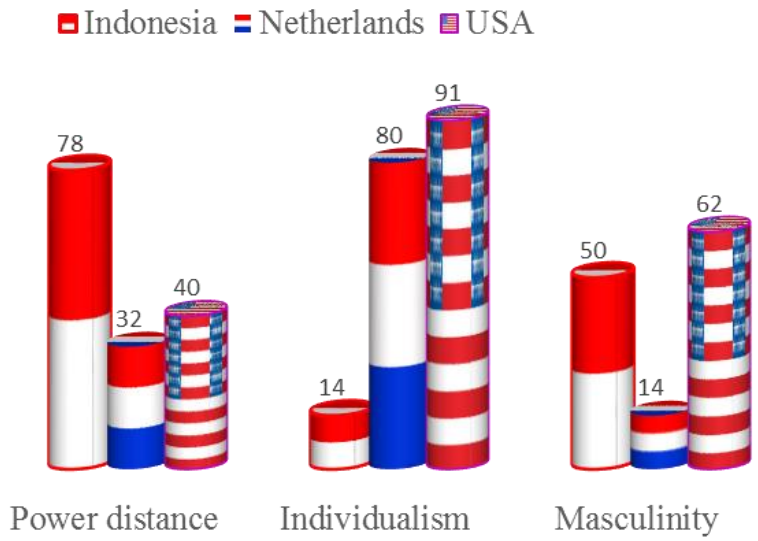


Figure 4. Scores related to cultural dimensions among countries (Kraaimaat et al., 2012)

In relation to the components of social anxiety, American students reported the most discomfort or anxious feeling in interpersonal situations, followed by Indonesian students, whereas the least discomfort was reported by the Dutch students. Conversely, the Dutch were reported to be the most frequent in assertive social responses, while participants from Indonesia and America did not differ in this respect. As a result, their hypothesis that there will be differences between collectivistic Vs individualistic cultures was not supported.

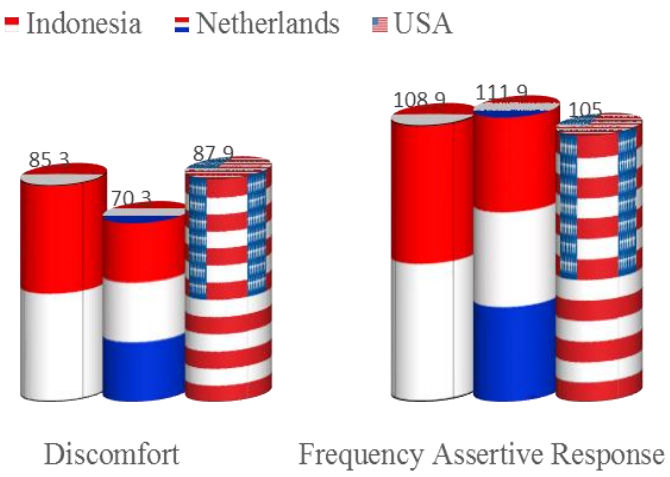


Figure 5. The components of social anxiety among countries (Kraaimaat et al., 2012)

To explain these results, they proposed that this might be related to the difference in cultural dimensions. For instance, the low discomfort amongst Dutch participants was related to their low power distance and high individualism. However, this explanation is not satisfying. It clearly ignored the fact that Indonesian participants reported the highest power distance and the lowest individualism, but their feeling of discomfort in social interaction is lower than American participants, who reported high power distance and the lowest individualism. In addition, although the measure used (the Inventory of Interpersonal Situations) demonstrated an excellent internal reliability (Kraaimaat et al, 2012), it should be noted that this scale does not measure the somatic symptoms of social anxiety, whereas several studies reported that Asians are more prone to somatic symptoms related to anxiety rather (e.g. Chen, Chen & Chung, 2002; Hinton, Park, Hsia, Hofmann & Pollack, 2009; Kirmayer, 2001).

The second study was conducted by Vriends, Pfaltz, Novianti & Hadiyono (2013) who compared the prevalence, social anxiety symptoms and the Taijin Kyofusho Scale (TKS) between Indonesia – a so called collectivistic country, and Switzerland – representing individualistic countries. The TKS is a persistent fear of offending or embarrassing others within interpersonal situations. It might be one of the culturally bound syndrome-related social anxieties, commonly ascertained among Asians (American Psychiatric Association, 2013). Whereas in contrast in Western literature fear of being embarrassed is one of the main symptoms of social anxiety. They included 311 undergraduate psychology students from one of the state universities in Indonesia located in Yogyakarta (Java Island). They used the Liebowitz Social Anxiety Scale (LSAS) to measure social anxiety symptoms and a checklist of DSM-IV social phobia criteria to estimate the prevalence. Unfortunately, there is no

information identifying whether they used cutting point or mean split, in order to make a classification and to justify the diagnosis. In addition, they also compared the self-interdependent and self-independent between those two countries.

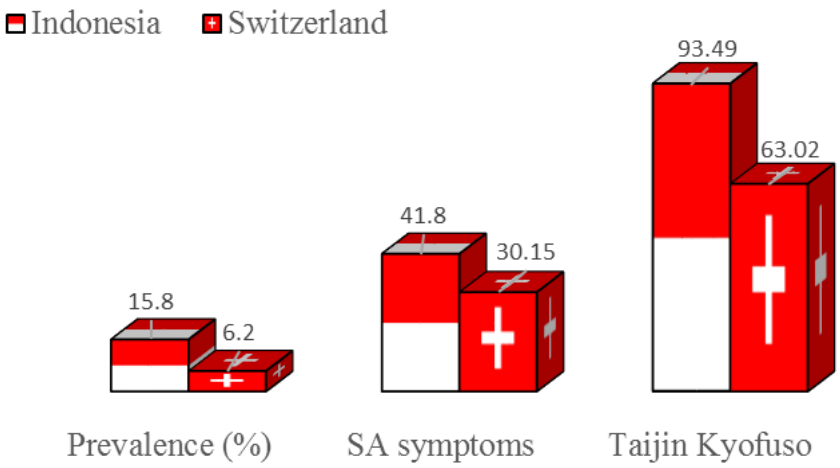


Figure 6. Comparisons of prevalence, social anxiety symptoms and Taijin Kyofuso between Indonesia and Switzerland

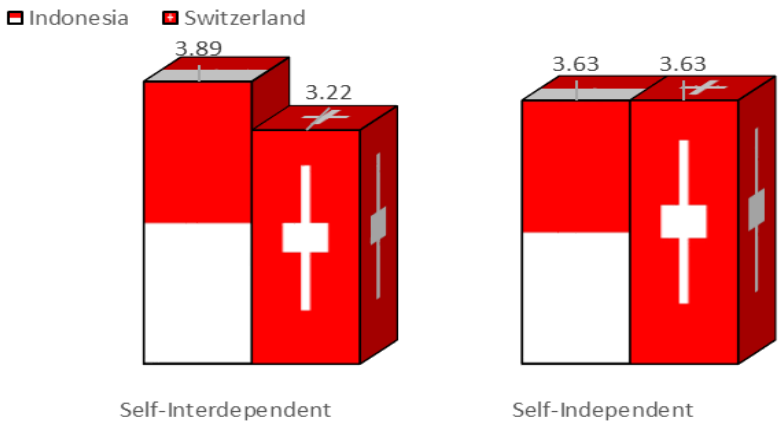


Figure 7. Comparisons of self-interdependence and self-independence between Indonesia and Switzerland

Based on the DSM-IV social phobia checklist, although no further information for the way they came to the conclusion, they reported that 15.8% of participants reported a high level of social anxiety. Interestingly, this finding is in contrast with previous epidemiological studies that reported a very low rate of DSM-IV social phobia in Asia (Hwu, Yeh & Chang, 1989; Lee et al., 1990; Tsuchiya et al., 2009). They assumed that this contrasting result might be related to their homogeneous group of participants who were undergraduate psychology students. Consequently, they might have been aware of the aims of the study and been more conscious with respect to their social anxiety, as they were asked to complete questionnaires

measuring social anxiety-related variables. Specifically regarding the Indonesian culture, they also predicted that different methods of data collection may possibly provide a different prevalence rate of DSM-IV social phobia amongst the Indonesian sample.

They reported that the Indonesian samples had higher TKS and social anxiety symptoms than the Swiss sample. This is partly in line with previous studies comparing Asian and Western countries that reported higher scores in relation to social anxiety symptoms amongst Asians (Dinnel, Kleinknecht & Tanaka-Matsumi, 2002; Heinrichs et al., 2006; Hong & Woody, 2007; Lee, Okazaki & Yoo, 2006; Kleinknecht, Dinnel, Kleinknecht, Hiruma & Harada, 1997). In addition, this study also determined that the Indonesian participants were more interdependent than the Swiss participants. This characteristic may be related to the high prevalence rate and social anxiety symptoms.

Despite any weakness, the equivocal results of both the English studies are exceedingly interesting. However, all these studies investigating social anxiety in Indonesia recruited participants from only one city. Given that Indonesia is a multicultural country, consisting of thousands of ethnicities and also islands, generating the result to represent social anxiety in Indonesia appears unfitting and arbitrary.

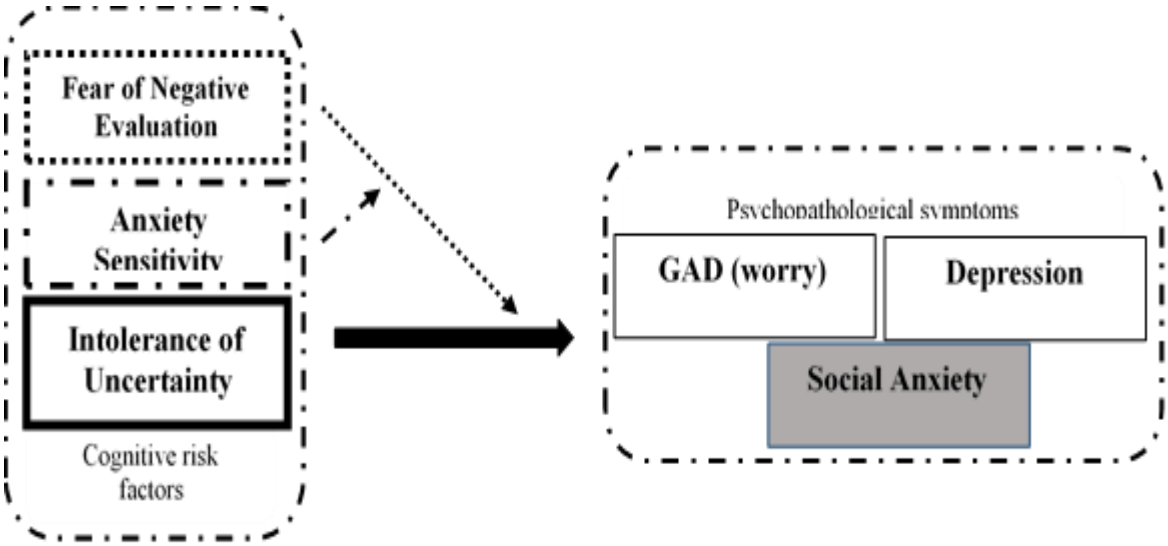
Overall, the rare studies examining social anxiety in Indonesia and the mixed results from studies examining this topic in Asian countries obviously warrant further studies. Underlining that no studies explored the relationship with intolerance of uncertainty, whether in relation to the general population or student samples in Indonesia or Asia, particularly in Muslim countries, will evidently make the result a novel study.

2. The aims of the study

This present study principally aims to investigate:

1. The relative contribution of IU in predicting social anxiety compared to the conrtibutions of FNE and AS
2. Whether IU is a transdiagnostic factor across social anxiety, worry and symptoms of depression

Subsequently, it also aims to explore: to what extent students from the United Kingdom and Indonesia are similar or different?



Note: Solid line = the effect examined; Dot lines = the moderation effect

Figure 8. Possible relationship between variables explored within this study

3. Methods

3.1 Design

The design of this study was identical to the UK study (Chapter 4).

3.2 Recruitment Strategy

This study was conducted in cities where there are higher education institutions and/or students attending universities from various regions of Indonesia. Data were collected using online procedures. Although participants were principally recruited online, due to limited internet access in some remote regions in Indonesia, such as in Papua, a number of participants were recruited by means of lectures.

The recruitment strategy was conducted first through an invitation letter to the gatekeeper, typically the rector, dean or head of school within selected universities. The aims of this stage were to seek permission to invite their students to be involved in this study and to obtain institutional agreement regarding the most appropriate strategy to disseminate the advert to their students.

Twenty universities were contacted and as a result, 12 institutions/universities gave their permission.

(1) University of Muhammadiyah Malang (UMM; Malang-East Java). Permission was given on 4th December 2013.

(2) Psychology Faculty of State Islamic University-Syarif Hidayatullah (UIN Jakarta). Permission was given on 16th December 2013.

(3) Engineering Faculty of University of Muhammadiyah Sorong (UM Sorong; Sorong-Papua). Permission was given on 16th December 2013.

(4) Psychology Faculty of University of Hang Tuah (UHT; Surabaya-East Java). Permission was given on 14th April 2014.

(5) Sociology Department of University of Gadjah Mada (UGM; Yogyakarta). Permission was given on 16th April 2014.

(6) Psychology Faculty of University of Brawijaya (UB; Malang-East Java). Permission was given on 25th April 2014.

(7) Psychology Faculty of University of Medan Area (UMA; Medan-North Sumatra). Permission was given on 2nd May 2014.

(8) Surabaya Shipbuilding State Polytechnic (POLTEK Perkapalan Surabaya; East Java). Permission was given on 9th May 2014.

(9) Psychology Faculty of University of Indonesia (UI; Jakarta). Permission was given on 6th June 2014.

(10) Psychology Faculty of State University of Makassar (UNM-South Sulawesi). Permission was given on 17th June 2014.

(11) Psychology Department of University of Mulawarman (UNMUL; Samarinda-East Kalimantan). Permission was given on 28th August 2014.

(12) Department of Marine Fisheries of Bogor Agricultural University (IPB; Bogor-West). Permission was given on 28th September 2014.

Subsequently, an email containing information on the subject of the study was sent on behalf of the primary researcher by gatekeepers either from an academic unit (e.g. head of school) or from an association/organisation (e.g. president/secretary, etc.) or a brief advert was distributed through the general university news link, e-newspapers, and social media hosted by student associations or by lecturers. Next, potential participants who were interested in ascertaining more about the study were guided to a website link that contained detailed information concerning the study. If they wished to participate, they were able to click on an additional link that led them to the consent web page. Once they consented, they followed a link to the actual questionnaires. Furthermore, if they closed their browser at any point before the end, it was assumed that consent had been withdrawn and any partial data was not used.3.3.

3.3 Participants

It is important to note that 918 accessed the link and 618 participated in this study. However, only 540 participants completed the entire questionnaire and thus, only they were included in the analyses. Of that number, two thirds were female (65.74%). The overwhelming majority were undergraduate students (91.11%) in the range of 18 to 24 years old (88.89%). Approximately 86% of the contributors self-identified as Muslim, approximately 11% were Christian, and the remaining were Hindu, Buddhist or other religions. Regarding ethnicity, more than half were Javanese (57.59%), followed by Bugis, Tionghoa and Banjar (9.07%, 6.48% and 5.37%, respectively), whilst the remaining were other ethnicities. The demographic profiles arguably are similar to the national demographic profiles.

Approximately 540 respondents completed the NSUQ. Of this number, 22.78% (95% CI: $\pm$ 3.54) had smoked tobacco over their lifetime, while the proportion who smoked over the last 12 months was 17.59% (95% CI: $\pm$ 3.21). Regarding alcohol, 19.44% (95% CI: $\pm$ 3.34) had experience of consuming alcohol and approximately 12.96% (95% CI: $\pm$ 2.83) had done so in the last year. Approximately 2.59% (95% CI: $\pm$ 1.34) had experience of either CNS stimulants or cannabis during their lifetime and equally 1.42% (95% CI: $\pm$ 1.00) in the last year. Less than 1% had experience of other substances. Classified as a group of illicit drugs, approximately 7.41% (95% CI: $\pm$ 2.21) had experience of consuming illicit drugs and 3.33% (95% CI: $\pm$ 1.51) had done so in the last 12 months. Although 562 provided sufficient data, the rate of substance use was low, so, for example, only 70 people had consumed alcohol in the last year. Studying the links between alcohol and social anxiety would result in underpowered analyses, despite the large total sample for which data on symptoms and cognitive vulnerabilities are available.

Given this result, this study, therefore, focused primarily on the social anxiety aspects. The model of social anxiety that was tested (and its specificity to social anxiety rather than worry) will still represent a theoretically important piece of work. Demographic profiles; the proportion and the confidence interval of substance users are included in the appendix. This study was granted a full ethical approval by the Research Ethics Committee of the Faculty of Medical Sciences of Newcastle University.

3.4 Translation

The questionnaires were translated into Bahasa Indonesia, the official language of Indonesia, which is used in most educational establishments, following a well-established

method developed by Beaton, Bombardier, Guillemin & Ferraz (2000) for medical, sociological and psychological research. It involved five rigorous steps conducted by four professional independent translators from Ahastirin Language Centre-Malang Indonesia. Detailed explanations follow:

i. Initial translation. A forward translation into target language by two independent translators (August 15th – 23th 2013).
ii. Synthesis of the translations. Both translators discussed any discrepancies and synthesised the result of their translation, in order to formulate one translation (August 26th – 28th 2013).
iii. Back translation. Two translators who were totally blind to the original version independently retranslated into the English language (September 1st – 10th 2013).
iv. Expert committee review. All translators worked together reaching consensus and synthesising the pre-final version (September 11th – 13th 2013).
v. Test of pre-final version. After the translation versions were presented in the form of online questionnaires, they were subsequently tested. The test of the pre-final version used 53 volunteers who were Indonesian university students recruited via social media (December 6th – 16th 2013). All voluntarily completed the online questionnaires, and then they were asked to give their thoughts concerning the pre-final version, any ambiguities, ease of understanding, response options and the presentation. Some suggestions were obtained, mainly regarding the word choices that could more easily be understood. In relation to the online display, all respondents generally said that it was good and straightforward to follow.

3.5 Measures

Measures used in this study were identical to the ones used by the UK study (Chapter 4), except CES-D. Therefore, for a complete explanation of the measures used, please see the Measures section within the UK study (Chapter 4).

Following the result of the reliability analyses that demonstrated a moderate internal reliability for CES-D with regards to the Indonesian version ($\alpha = .67$), a series of investigations were conducted. Analyses of Item-Total Statistics revealed that item number 5 *("I felt that everything I did was an effort")* had a negative Corrected item-Total Correlation and the highest increasing Cronbach's Alpha if the item was deleted ($\alpha = .73$). In order to investigate the cause of this problem, factor analyses was conducted to compare the latent structure of CESD regarding the original version (English) and Indonesian version. Factor analyses revealed that item number 5 within the Indonesian version was loaded to the same group in conjunction with the reverse-score items (having positive meaning), whereas within the original version item number 5 was loaded to the group of items having negative meaning.

Content analyses were conducted and it was established that a mistake occurred during translation of the item. *"Effort"* within the context of this sentence originally means *"difficulty, failure"* (see Cambridge Dictionary), whereas in the translation it was interpreted as *"a work/act to achieve something"*. Consequently, item number 5 was discarded.

3.6 Analyses

Most statistical analyses were identical to the analyses used within the UK study. In the exclusion of comparative analyses which was performed here.

Comparative analyses upon IU and social anxiety were performed across the UK and Indonesia data, with the aim of acquiring a full understanding of any possible similarities and differences. Kernel Density Estimation (KNE), which estimates the probability density functions of a random variable, in order to generate smother histograms than the frequency histograms, was utilised. The curves generated describe empirical distributions of the scores of all variables measured and consequently, better inferences with respect to population can be obtained (Guidoum, 2015; Hansen, 2009: Salgado-Ugarte & Perez-Hernandez, 2003). A Gausian function with bandwidth 4 was used. Subsequently, the KNE curves of variables measured across groups compared (the UK and Indonesia) were compiled in a plot, so as to allow a visually parsimonious comparison upon the distribution features (variance, skewness and kurtosis) (Salgado-Ugarte, Shimizu & Taniuchi, 1994).

4. Results

4.1 Preliminary Analyses

4.1.1. Identification of missing data

Initial inspection revealed no missing data.

4.1.2. Normality test

Univariate outliers were established on ASI, SPIN, CESD, PSWQ. They were winsorized with a value just above the last non-outliers. The winsorized scores were used for subsequent analyses. All winsorized scores were perfectly related to their original scores (r's $> .98$, p's $< .001$).

Table 1
Normality test

	Skewness	Kurtosis	Treatment	New Skew.	New Kurt.	*r*
IUS	0.10	-0.24				
BFNE	0.54	-0.58				
ASI	0.79	0.58	Winsorized	0.67	0.05	1.00
SPIN	0.90	0.34	Winsorized	0.86	0.18	1.00
CESD	0.88	0.82	Winsorized	0.77	0.45	1.00
PSWQ	0.61	0.21	Winsorized	0.57	0.07	1.00

Notes: IUS = Intolerance of Uncertainty Scales-12, P-IU = Intolerance of Uncertainty Scales – Prospective anxiety dimension; I-IU = Intolerance of Uncertainty Scales – Inhibitory anxiety dimension, BFNE =Brief Fear of Negative Evaluation-Straightforward Items, ASI = AS Index-3, SPIN = Social Phobia Inventory, CESD = The Rasch-Derived CES-D short form, PSWQ = Penn State Worry Questionnaire.

4.1.3. Descriptive statistics

The internal consistencies of most measures were considered to be excellent (α's > .90) and acceptable for IUS (α = .81), CES-D (α = .73) and PSWQ (α = .85).

The scores for all variables were analysed as a function of gender and age by way of t-tests for equality of means. Female participants reported significantly higher scores on BFNE, ASI, SPIN and PSWQ. The younger group reported significantly higher scores on most measured variables, except on IUS. Therefore, further analyses would control age and gender.

With regard to the SPIN scores, the results were classified into five groups based on the SPIN cut-off (Connor et al., 2000).

Table 2
Classification of participants' severity from social anxiety based on their SPIN scores

Severity	Score	%
None	Less than 20	9.26%
Mild	21-30	34.97%
Moderate	31-40	29.29%
Severe	41-50	15.18%
Very severe	51 or more	11.30%

Referring to this cut-off, 26.48% participants suffered from severe - very severe symptoms of social anxiety.

Table 1

Descriptive statistics regarding to demographic profiles

		Total		Gender							Age						
				Male (N = 185)		Female (N = 355)					18-24 (N = 480)		>24 (N = 60)				
	α	M	SD	M	SD	M	SD	d	f	p	M	SD	M	SD	d	f	p
IUS	.81	33.97	8.08	34.43	8.23	33.77	7.99	.081	.040	.370	34.07	8.17	33.20	7.38	.112	.056	.434
BFNE	.92	19.62	7.75	17.58	7.27	20.69	7.80	.412	.206	<.001	19.90	7.69	17.35	7.94	.326	.163	.016
ASI	.91	38.12	12.49	35.61	11.14	39.35	12.64	.314	.157	.001	38.56	12.15	33.95	12.56	.373	.186	.006
SPIN	.91	34.33	12.48	32.63	12.64	35.21	12.18	.208	.104	.022	34.77	12.52	30.55	10.71	.362	.181	.013
CESD*	.73	16.02	4.31	15.51	4.18	16.24	4.21	.174	.087	.056	16.16	4.18	14.54	4.20	.387	.193	.005
PSWQ	.89	44.65	11.32	41.10	9.96	46.50	11.36	.505	.252	<.001	45.07	11.54	40.93	11.24	.363	.181	.007

*CESD for this Indonesia version consisted only 9 items (see "Measures-CESD" section above), bold = significant

4.1.4. Comparison of the distribution between the UK and Indonesia data

The descriptive statistics and distributions of IU scores from the UK and Indonesia are compared. In relation to the IU scores, data from studies by Carleton et al. (2012) and Freeston et al. (2016) were added, in order to acquire a broader perspective.

As previously mentioned, there are a large dissimilar proportion of undergraduate students between the UK and Indonesian samples (see Participants section). Referring to this condition, the similarity and differences between these groups across both samples were investigated, following the comparison analyses.

Table 3
Descriptive statistics of IU scores across samples and studies

Studies	Sample	N	Mean	Std. Dev.	Min	Max
Indonesia	Entire students	540	33.97	8.08	12	57
	Undergraduate	491	34.02	8.16	12	57
The UK study	Entire students	354	33.12	10.18	12	59
	Undergraduate	196	34.82	10.39	14	59
Carleton (2012)	Community	571	29.53	10.96	12	60
	Undergraduate	428	27.52	9.28	12	60
Freeston	Community	815	25.97	9.28	12	60
	Undergraduate	478	26.49	8.71	12	54

The following figure displays the KNE curve depicting the comparison of the IU score distribution.

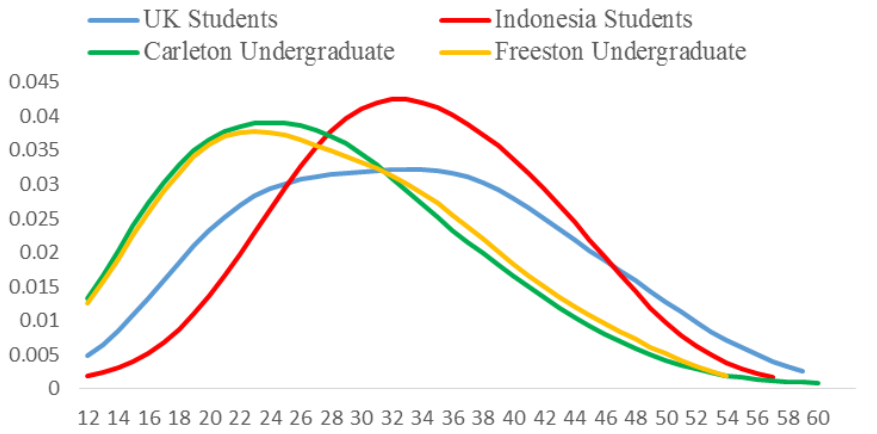


Figure 9. Comparisons of IU score distribution

The distribution figures regarding the IU score across the UK and Indonesian samples were normal and both centred around the medium score, although the UK figures were slightly flatter indicating a wider distribution. Conversely, the distribution of the

undergraduates across Carleton et al. (2012) and Freeston et al. (2016), which interestingly appear similar, were more positively skewed.

4.1.5. Zero-order Correlations

Pearson correlations (two-tailed) were calculated to explore relationships between the study measures.

Table 4
Zero-Order Inter-correlations between study variables

	age	IUS	P-IU	I-IU	BFNE	ASI	SPIN	CES-D
IUS	-.05							
P-IU	-.03	.92						
I-IU	-.04	.90	.66					
BFNE	-.12	.51	.44	.46				
ASI	-.11	.49	.43	.46	.62			
SPIN	-.11	.49	.41	.49	.69	.64		
CESD	-.14	.36	.29	.37	.54	.55	.54	
PSWQ	-.14	.49	.45	.45	.66	.59	.61	.59

Note: Correlation coefficients $r < |.08|$ are significant, $p < .05$.

Age negatively correlated with generally all variables except with IUS ($r(538) = -.05$, $p < .001$). IUS, BFNE, ASI, SPIN, CESD and PSWQ were inter-correlated in the moderate to strong range (r's(538) = .36 - .69; p's < .001). Similar to the previous studies (Chapters 2 & 4), both P-IU and I-IU were very strongly correlated with the total IUS score (r's(538) $\geq$ .90, p's < .001) and strongly correlated with each other ($r(538) = .66$, $p < .001$). Multicollinearity ($r < .80$) was not present.

4.2 Main analyses

4.2.1. Intolerance of uncertainty predicting social anxiety

4.2.1.1. Relative contribution of intolerance of uncertainty on social anxiety

The first analysis was the examination of the contribution of IU on the variance in social anxiety. Addressing this aim, three hierarchical regressions replicating the UK study (Chapter 4) was utilised. In the first regression, FNE was entered in the second step followed by IU and subsequently AS. In the second regression, IU was entered in the second step, followed by AS, with FNE in the fourth step. In the third regression, AS was entered in the second step followed by FNE and subsequently IU in the fourth step. Following individual variables, the

two-way interactions were entered together in the step fifth, while the three-way interaction was entered in the last step. Age and gender were covariates. The contributions of each variable were displayed and compared in the Table 6 below. Subsequently, any possible interactions involving IU was investigated.

Table 5

Regression model of FNE, IU and AS predicted social anxiety

	Variable	Coefficient statistic			Model step statistic			
		β	*t*	*p*	ΔR^2	ΔF	*df*	*p*
1	Age	-0.10	-2.32	.021	.020	5.36	2, 536	.005
	Gender	0.09	2.09	.037				
				Sequence 1				
2	FNE	0.69	21.74	<.001	.460	472.51	1, 535	<.001
3	IU	0.19	5.21	<.001	.025	27.11	1, 534	<.001
4	AS	0.31	8.10	<.001	.054	65.68	1, 533	<.001
				Sequence 2				
2	IU	0.49	13.21	<.001	.241	175.39	1, 535	<.001
3	AS	0.51	13.70	<.001	.192	187.71	1, 534	<.001
4	FNE	0.44	11.32	<.001	.106	128.06	1, 533	<.001
				Sequence 3				
2	AS	0.64	18.79	<.001	.390	353.15	1, 535	<.001
3	FNE	0.48	12.94	<.001	.141	167.47	1, 534	<.001
4	IU	0.11	3.20	.001	.008	10.25	1, 533	.001
				Two-way interactions				
5	IU x FNE	0.01	0.05	.961	.003	1.41	3, 530	.240
	FNE x AS	0.38	1.98	.049				
	IU x AS	-0.35	-1.33	.184				
				Three-way interaction				
6	IU x FNE x AS	-0.18	-0.23	.819	.000	0.05	1, 529	.819

In this case, FNE, IU and AS each consistently predicted social anxiety after controlling for age and gender. FNE contributed the greatest proportion to the variance in social anxiety, when entered in the second step after the covariance (46%) and even when entered in the fourth step (10.6%). Surprisingly, the contributions of IU to the variance in social anxiety, when entered in the second step and the fourth step (24.1% and 0.8%, respectively) were smaller than AS (39% and 5.4%, respectively).

The two-way interactions all entered together did not make an additional interactive contribution to the model (0.3%). Only the two-way interaction between FNE x AS independently made a significant contribution to the model. Meanwhile, the three-way interaction did not make a significant additional contribution (0%). The final model was significant ($F(9,529) = 75.55$, $p < .001$) and accounted for 56.2% of the variance on social anxiety.

4.2.1.2. Interactions in predicting social anxiety

Though the interaction analyses could not be implemented in the three-way interaction model, but is similar to the reasons mentioned concerning the two previous studies conducted by the author (Chapters 2 & 4), two independent interaction analyses upon any two possible interactions involving IU were considerably important.Therefore, interaction analyses utilising PROCESS model 1 were performed.

Both interactions either IU x FNE or IU x AS did not account for additional significant contributions, $\Delta R^2 = 0\%$, $\Delta F(1, 532) = .01$, $p = .904$ and $\Delta R^2 = 0\%$, $\Delta F(1, 532) = .13$, $p = .718$, respectively. This indicates that both interactions were not significant.

4.2.2. Intolerance of uncertainty predicting worry

In order to investigate the specificity of the relationship between IU and social anxiety, the relative contributions of IU to worry was examined. Similarly, any possible interactions amongst the three cognitive risk factors were investigated afterwards.

4.2.2.1. The relative contribution of intolerance of uncertainty on worry

Table 6
Regression Model of FNE, IU and AS predicted worry

	Variable	Coefficient statistic			Model step statistic			
		β	*t*	*p*	ΔR^2	ΔF	*df*	*p*
1	Age	-0.10	-2.32	.021	.062	17.68	2, 536	<.001
	Gender	0.22	5.24	<.001				
				Sequence 1				
2	FNE	0.63	19.24	<.001	.384	370.13	1, 535	<.001
3	IU	.23	6.34	<.001	.039	40.164	1, 534	<.001
4	AS	0.23	5.68	<.001	.029	32.30	1, 533	<.001
				Sequence 2				
2	IU	0.49	13.67	<.001	.243	186.83	1, 535	<.001
3	AS	**0.41**	**10.72**	**<.001**	**.123**	**115.07**	**1, 534**	**<.001**

	Variable	Coefficient statistic			Model step statistic			
		β	*t*	*p*	ΔR^2	ΔF	*df*	*p*
4	FNE	0.40	9.69	<.001	.086	93.97	1, 533	<.001
				Sequence 3				
2	AS	0.56	15.93	<.001	.302	253.74	1, 535	<.001
3	FNE	0.46	11.65	<.001	.129	135.69	1, 534	<.001
4	IU	0.18	4.81	<.001	.021	23.12	1, 533	<.001
				Two-way interactions				
5	IU x FNE	0.30	1.25	.212	.007	2.67	3, 530	.047
	FNE x AS	-0.38	-1.88	.061				
	IU x AS	0.45	1.64	.101				
				Three-way interaction				
6	IU x FNE x AS	0.20	0.24	.808	.000	0.06	1, 529	.808

IU, FNE and AS each consistently explained the variance in worry. Surprisingly, IU, which is the well-known factor that maintains worry, contributed the smallest proportion to the variance in worry, when entered both in the second step (24.3%) and the fourth step (2.1%). FNE contributed the greatest proportion (38% and 8.6%, respectively), followed by AS (30.2% and 2.9%, respectively).

The two-way interactions all entered together made a significant additional interactive contribution to the model (0.7%). None of each of the two-interactions made a significant contribution to the model. Meanwhile, the three-way did not make an additional contribution (0%). The final model was significant (F (9,529) = 63.93, $p < .001$) and accounted for 51.3% of the variance on worry.

4.2.2.2. Interactions in predicting worry

Subsequently, two-way possible interactions involving IU were examined, in order to investigate the border of IU effect on worry. The nature of the interaction was depicted through the Johnson-Newyman Technique.

Both interactions either IU x FNE or IU x AS did not account for additional significant contributions, $\Delta R^2 = 0.32\%$, $\Delta F(1, 532) = 3.57$, $p = .059$ and $\Delta R^2 = 0.33\%$, $\Delta F(1, 532) = 3.65$, $p = .056$, respectively. This indicates that both interactions were not significant.

4.2.3. Intolerance of uncertainty predicting symptoms of depression

Lastly, the relative contributions of IU to depression and any possible interactions involving IU (IU x FNE and IU x AS) were investigated. The identical analyses were repeated.

4.2.3.1. Relative contribution of intolerance of uncertainty on symptoms of depression

Table 7
Regression model of FNE, IU, and AS predicted depression

	Variable	Coefficient statistic			Model step statistic			
		β	*t*	*p*	ΔR^2	ΔF	*df*	*p*
1	Age	-0.12	-2.69	.007	.020	5.48	2, 536	.004
	Gender	0.07	1.67	.095				
	Sequence 1							
2	FNE	0.54	14.55	< .001	.278	211.57	1, 535	< .001
3	IU	0.12	2.77	.006	.010	7.65	1, 534	.006
4	AS	0.33	7.27	< .001	.062	52.82	1, 533	< .001
	Sequence 2							
2	IU	0.36	9.07	< .001	.131	82.27	1, 535	< .001
3	AS	0.48	11.38	<.001	.166	129.54	1, 534	<.001
4	FNE	0.32	6.74	< .001	.054	45.37	1, 533	< .001
	Sequence 3							
2	AS	0.54	14.77	< .001	.284	218.28	1, 535	< .001
3	FNE	0.33	7.43	<.001	.065	55.14	1, 534	<.001
4	IU	0.04	.90	.371	.001	.80	1, 533	.371
	Two-way interactions							
5	IU x FNE	0.76	2.83	.005	.018	5.07	3, 530	.002
	FNE x AS	0.05	0.22	.830				
	IU x AS	0.03	0.10	.925				
	Three-way interaction							
6	IU x FNE x AS	2.14	2.31	.021	.006	5.35	1, 529	.021

IU independently predicted depression symptoms only when entered in the second step following the covariates (13.1%), while conversely, FNE and AS independently and consistently predicted symptoms of depression. AS contributed the greatest proportion when

entered both in the second (28.4%) and the fourth steps (6.2%) followed by FNE (27.8% and 5.4%, respectively).

The three two-way interactions all entered together made a significant additional interactive contribution to the model (1.8%). Only the two-way interaction between IU x FNE independently made a significant contribution. Interestingly, the three-way also made a significant additional contribution (0.6%). The final model was significant ($F(9,529) = 38.16$, $p < .001$) and accounted for 39.4% of the variance regarding symptoms of depression.

4.2.3.2. Interactions in predicting depression

Subsequently, interaction analyses using PROCESS model 3 were utilised with the aim of investigating a multiplicative interaction. Referring to the main aim of this study which is investigating the role of IU, therefore, IU would be entered as the predictor. AS would therefore be entered as the first moderator due to its contribution to the model was the greatest, while FNE would be entered as the second moderator and threated as an ordinal variable (low, moderate, and high).

Similarly to the result of the hierarchical regression above, the three-way interaction provided a significant additional contribution to the variance, $\Delta R^2 = 0.61\%$, $\Delta F(1, 532) = 5.35$, $p = .021$. Subsequently, the nature of this moderation would be depicted through the Johnson-Newyman technique.

Figure 10 plots the regression coefficient for IU on social anxiety at different values of AS (solid blue line) at low FNE. Figure 11 plots the regression coefficient for IU on social anxiety at different values of AS at intermediate FNE. Lastly, Figure 12 plots the regression coefficient for IU on social anxiety at high FNE. The 95% bootstrapped confidence intervals are also plotted (dotted lines). The significant zone, where the low CI exceeds zero, is indicated in pink.

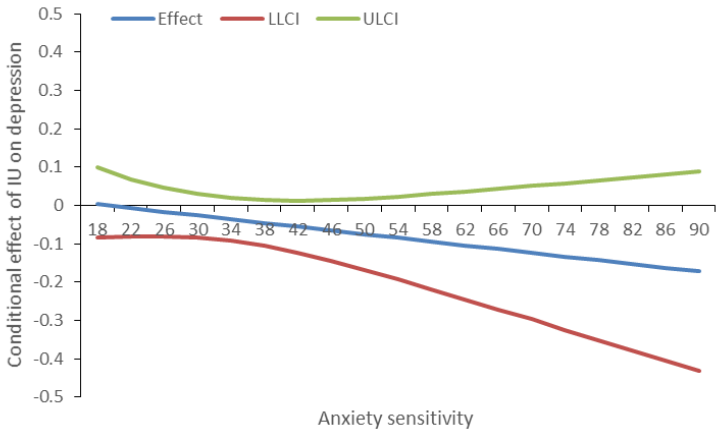


Figure 10. Conditional effect of IU on depression moderated by AS at low FNE

The effect of IU on depression at low FNE was not significant at all levels of AS, indicated by their coefficient bootstrap confidence interval cross zero.

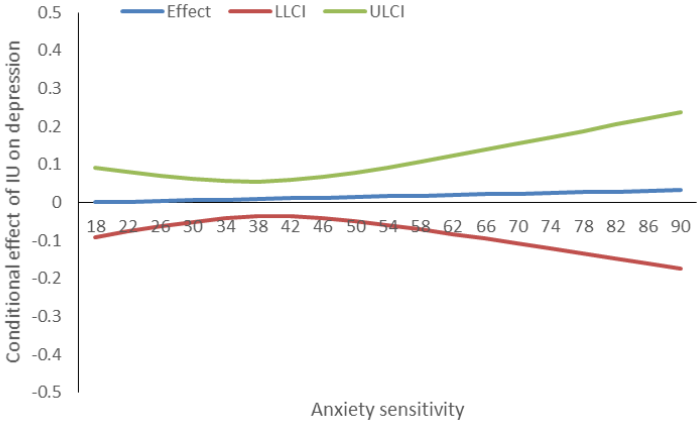


Figure 11. Conditional effect of IU on depression moderated by AS at intermediate FNE

The effect of IU on depression at intermediate FNE was not significant at all levels of AS, indicated by their coefficient bootstrap confidence interval cross zero.

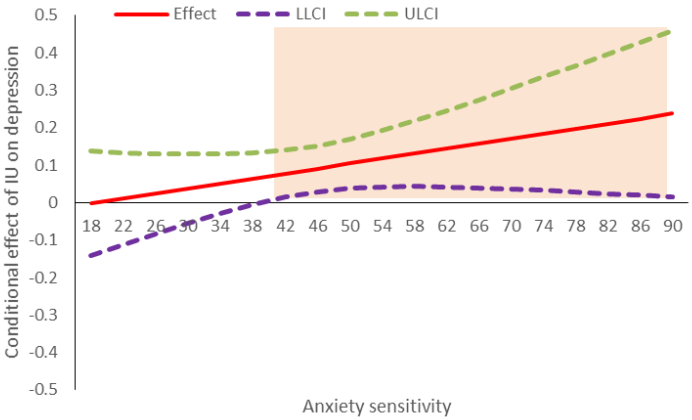


Figure 12. Conditional effect of IU on depression moderated by AS at high FNE

The effect of IU on depression at high FNE was significant only whe AS > 39, indicated by the lower bootstrapped confidence interval lies above zero, the value of *b* at AS = 40, *b* = .0676, $t(1, 529) = 1.99$, $p < .05$. The relationship between IU and depression symptoms becomes positive significantly as AS increase at high FNE.

5. Discussion

This study predominantly aims to advance understanding of the unique contribution of IU in predicting social anxiety amongst Indonesian students. In order to examine the relative contribution of IU underlying social anxiety, the role of other risk factors related to social anxiety, which are FNE and AS, and moreover, any possible interactions amongst these three

cognitive risk factors were investigated. In addition, a possibility that IU may possibly be a transdiagnostic factor across anxiety disorders and depression was also investigated. Parts of the hypotheses are supported and several interesting findings ascertained by this study. The overall results will be explained first, while the explanation will be discussed later.

5.1 Prevalence of social anxiety amongst Indonesian students

Based on the SPIN cut-off (Connor et al., 2000), it was observed that 26.48% participants may suffered from severe - very severe symptoms of social anxiety. This rate is higher than two previous studies in Indonesia (15.8% - 22.27%%; Suyaningrum, 2006; Vriends et al., 2012) and even higher than the global rate both among population (3% - 13%; American Psychiatric Association, 2013; Beek, 1995; Grant et al., 2005; Kessler et al., 2005; Magee et al., 1996; Stein & Stein, 2008; Xu et al., 2012) and student samples (e.g. Baptista et al., 2012; Izgiç et al., 2004; Verger et al., 2010). Consequently, this data is extremely significant, as this research is one of only a few studies conducted on social anxiety in Indonesia. Different to the two previous studies reporting the prevalence of social anxiety among students in Indonesia (Suyaningrum, 2006 and Vriends et al., 2012) which recruited participants from only one city, this study recruited participants from 12 universities, 9 cities and 5 main islands in Indonesia. Therefore, this finding is arguably convincing to represent Indonesia, which is a multicultural country.

5.2 Intolerance of uncertainty's unique relationship with social anxiety

IU independently predicted social anxiety even after controlling for the covariates, FNE and AS. This partly supported a growing body of research, which reported a consistently moderate correlational relationship between IU and social anxiety from various samples: among adolescents (Boelen, Vrinssen & Tulder, 2010), undergraduates only (Norr et al., 2013; Whiting et al., 2014), students (Chapter 4), mixed students and community (Chapter 2), community volunteers (Boelen & Reijntjes, 2009; Boelen, Reijntjes & Carleton, 2014; Carleton, Collimore & Asmundson, 2010) and clinical samples (Brown & Gainey, 2013; McEvoy & Mahoney, 2011& 2012; Sapach, Carleton, Mulvogue, Weeks & Heimberg, 2015).

In addition, FNE and AS independently also played a significant role in predicting social anxiety, which is entirely similar to the result from an identical study conducted by the author in the UK (Chapter 4). This also highlights a suggestion from Fyer and Brown (2009), Hyman (2003) and Levinson et al., (2013) that there is no single cause related to all mental disorders, and that they are in fact often represented by a cluster of several risk factors.

As hypothesised, the contribution explained by FNE noticeably accounted for the greater proportion in relation to the variance in social anxiety, but the contribution of IU was significant. It supports the findings from Whitting et al., (2013) and the two previous studies conducted by the author (Chapter 2 & 4). These studies reported that FNE contributed more variance related to social anxiety relative to IU. Specific to Chapter 4, this previous study also reported that the contribution of FNE was also greater relative to the contribution of AS.

All these previous studies and this current study similarly employed IUS 12 and BFNE. However, it is worth nothing that there are differences in terms of participants and scales used to measure social anxiety. Whitting et al, (2013) recruited undergraduate students in the USA, Chapter 2 recruited mixed sample (general community and university students) in the UK, Chapter 4 recruited university students in the UK, whereas this current study recruited university students in Indonesia. Moreover, Whitting et al, (2013) utilised the Social Performance Scale (SPS) and the Social Interaction Anxiety Scale (SIAS); two scales developed by Mattick and Clarke (1998) to measure two main features of social anxiety (fear and avoidance) in two situational aspects (performance and interaction situations) separately. Chapter 2 utilised Social Interaction Phobia Scales (SIPS; Carleton et al., 2009) which unified SPS and SIAS. Meanwhile, Chapter 4 and this current study used the Social Phobia Inventory (SPIN; Connor et al., 2000) which does not only measure fear and avoidance, but it also measures physiological discomfort related to both performance and social interactions. Despite these differences, all these studies reported the same finding that the contribution of IU in predicting social anxiety is significant, although the contribution of FNE in predicting social anxiety was greater. It underlines the critical role of IU as a predictive factor of social anxiety, although FNE is a reasonably stronger predictor of social anxiety.

Interestingly, this current study found that the contribution made by FNE to the variance in social anxiety was followed by AS, instead of IU, which made the smallest proportion. This is in contrast with the UK study conducted by the author (Chapter 4). In the UK study, IU contributed a significant unique variance that was greater than the proportion explained by AS.

Moreover, this study also verifies that there was no interactions between IU, FNE and AS that made a significant additional explanation to the variance in social anxiety; neither with regards to the two-way or three-way interactions. These findings entirely contradict the finding from the UK study (Chapter 4). The UK study reported that there was a significant two-way interactions between these factors in predicting social anxiety. The non-significant result from this current study is obviously not related to the under-power issue, as this study

was powered to be able to detect a small effect size. It will be discussed later on the following sub-chapters.

In addition, this present study also establishes the role of IU as a transdiagnostic factor. Apart of social anxiety, IU's contribution was present in worry and symptoms of depression. This is also in accordance with the finding from the UK study (Chapter 4), which has a similar methodological context. Therefore, it may possibly be an initial indication that the importance of these three cognitive risk factors in predicting social anxiety, in addition to worry and symptoms of depression, might be universal.

Surprisingly, even with regards to the variance in worry, the proportion explained by IU, which is well known as a feature of worry, was also the smallest within this study in Indonesia. Herein, FNE was the greatest contributor, followed by AS. Specific to the comparison between IU and FNE, this was also in conflict with the finding from two studies conducted by the author and his colleagues; both among the mixed sample (Chapter 2) and student sample (Chapter 4). Both UK studies determined that IU made the greatest contribution to the variance in worry, followed by FNE. The significance of FNE's contribution across social anxiety, worry and symptoms of depression, within this Indonesian study may be related to the explanation proposed below.

5.2.1. Explanation proposed

In order to explain the high rate of prevalence of social anxiety amongst the Indonesian sample, the dominance of FNE, and why the contribution of IU is smaller than AS, even pertaining to the variance in worry, several possible explanations are proposed.

First, it may be related to the translation process. Although the measures have been translated through a rigorous method by four independent translators who have a qualification in translation, it remains possible that there was still a "misunderstanding" in the translation of several constructs, for instance, the case that occurs regarding the translation process of CES-D. All translators interpreted "*Effort*" as "*a work/act to achieve something*", though within the questionnaire it was originally interpreted as "*difficulty, failure*". Moreover, it is possible that a similar case also occurred in relation to other measures.

The other possibility is the translation was correct, nevertheless the construct was perceived in a different way by the Indonesian sample. For instance, how Indonesian people define social anxiety is presumably different to the description explained by British people. Being unwilling to defend an argument in front of authority presumably indicates the politeness of some cultures, while conversely it could be an indication of social anxiety in

various other cultures. This case may similarly occur with respect to the other constructs examined within this study.

The last probability isthat it is also possible that nothing went wrong with the translation. In addition, the constructs examined were defined and perceived similarly by the Indonesian sample. However, it is a fact that the degree of correlations among factors in Indonesia was different to the UK, as demonstrated by this study.

Both the aforementioned possibilities may be related to the cultural dimensions that are characteristic of Indonesian people and culture. The cultural framework proposed by Hofstede (1980) and described in the introduction provides a basis for considering how cultural characteristics could contribute to both the high prevalence of Social Anxiety, but also the relative contributions of FNE and IU. To recap, Hofstede (1980) proposes there are six dimensions along which any given culture can be mapped, namely, individualisic-collectivistic, power distance, masculinity – feminity, indulgence, uncertainty avoidance and long-term orientation. The potential relationships between the different dimensions of culture in Indonesia are presented diagrammatically in the following figure and then described in detail below.

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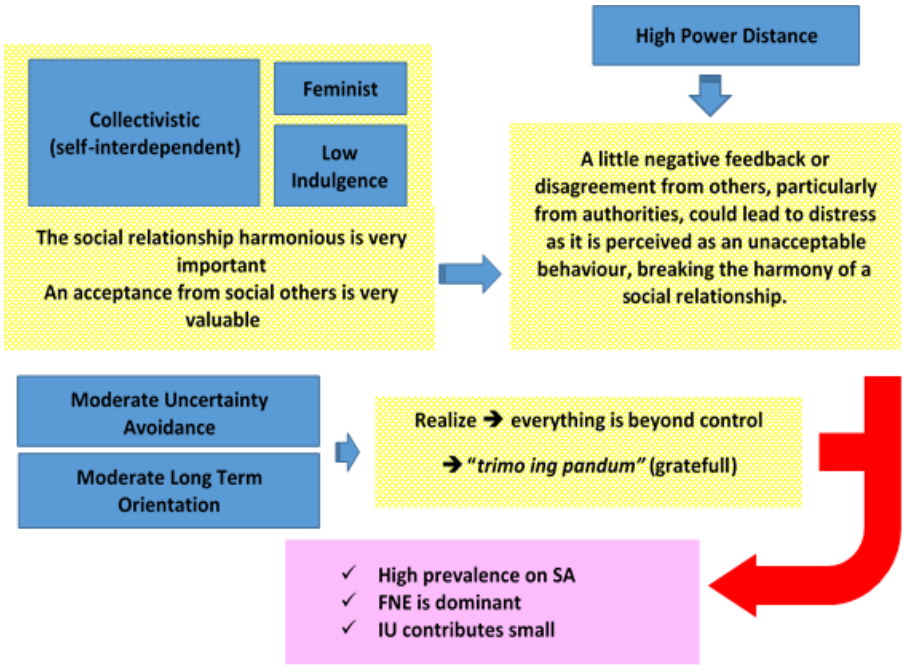

Figure 13. Possible relationship between cultural dimensions and the high rate or prevalence of social anxiety, the dominance of FNE and the small contribution of IU

First, Indonesia is considered to be one of the most **collective** countries in the world. In accordance with Hofstede (1980), Indonesia was ranked 47th on individualistic out of 53 countries or it means 6th on collectivistic. Second, Indonesia is categorised as a **feminine**

society that emphasises harmony and caring for others more, rather than being competitive and pursuing the personal goal of being the best individually. Third, Indonesia also has a low score on **indulgence**, which means Indonesian people tend to restrain their individual desires and behaviour, so as to conform to social rules (the Hofstede Centre, 2015). Thus, **these three characteristics that make a social relationship harmonious are extremely important**, whilst acceptance from others is exceedingly valuable. **Consequently, a little negative feedback or disagreement with others could lead to distress**, as it is perceived as unacceptable behaviour, breaking the harmony of a social relationship. Fourth, given the fact that Indonesian people also tend to be very accepting of hierarchy and respect authorities **(high power distance)**, the feedback could cause greater distress if it comes from authorities or people who have a higher social position.

Fifth, Indonesian people reported a moderate level of **uncertainty avoidance** (the Hofstede Centre, 2015) where by most Indonesian people believe that everything is naturally uncertain, everything has literally been determined by God and therefore, is beyond one's control. Consequently, people only need to be ***nrimo ing pandum*** **or be grateful** for everything that has been given by God, accepting every destiny that has been stored for each individual. *Trimo ing pandum* is a very valuable principle among Indonesians (Ferzacca, 1996; Widayanti, 2011). This *nrimo ing pandum* concept consists of three consecutive values: *pasrah* (surrender), *rila* (willing) and *eling* (remember). Finally, Indonesian people also reported a moderate level of term orientation and Indonesia is categorised as a pragmatic country (the Hofstede Centre, 2015); hence people tend to perceive that the truth is never separated from its context, situation and antecedent. Consequently, flexibility in all aspects of life, social relationships, work and planning for the future is exceedingly important and essential.

Given the interaction between these characteristics, it is perhaps understandable if **the prevalence of social anxiety in Indonesia is high**. In addition, these characteristics may also help explain why this present study found that **FNE is dominant**, and **IU has less influence** on anxiety and even worry.

Moreover, numerous studies reported differences in anxiety symptomatology across cultures and Asians have been reported to be more prone to somatic symptoms. (e.g. Chen, Chen & Chung, 2002; Hinton, Park, Hsia, Hofmann & Pollack, 2009; Kirmayer, 2001). Conversely, somatic symptoms related to fear of anxiety symptoms is one of the aspects measured by AS (Taylor et al., 2007). Consequently, it is understandable that AS eventually contributed a conclusively significant proportion to the variance in social anxiety, worry and depression; which was certainly greater than the contribution of IU.

This explanation is summarised in the following figure:

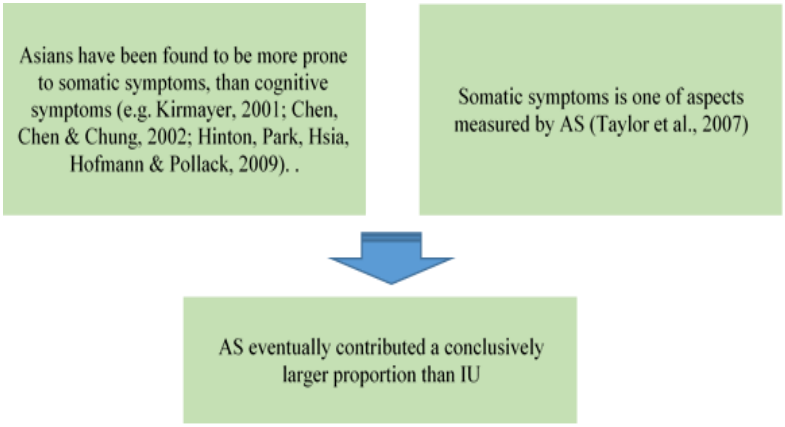

Figure 14. Explanation of the robust influence of somatic symptoms regarding Indonesian people

The influence of culture may also relate to appraisal biases, particularly upon emotion-antecedents (Scherer & Brosch, 2009). These biases, eventually, may influence peoples' interpretation of the situations described in the questionnaires. For instance, being afraid of people in authority may be interpreted as a negative indication by people coming from low power distance cultures, whereas people coming from a culture with a high power distance probably will interpret it in the opposite way. A participant who is not afraid of authority will be judged as an individual who has no respect for social norms. Additionally, avoiding being the centre of attention may also be interpreted as a negative indication by people coming from individualistic and masculine cultures. Conversely, people coming from a collectivistic and feminine culture would perceive it negatively. Both situations are asked by SPIN, item no 1 and 9. Therefore, the high rate of prevalence pertaining to social anxiety in Indonesia may also be related to this cultural bias. The same thing (appraisal biases) may also occur with respect to the other variables.

5.2.2. Strength and limitations

This study notes several strengths. This is the first study to investigate IU using a Southeast Asian sample and one of the few studies to examine social anxiety in Indonesia. This study also utilised the online method which provided more privacy and might be more suitable for a culture with a high level of power distance, such as Indonesia. Another point worth noting is that this research also utilised robust analyses methods and software.

However, it was a cross-sectional study that was literally not able to provide a causal explanation. Moreover, this study used measures that were developed in Western countries.

Consequently, any perspective biases related to culture presumably emerged and possibly influenced the result. Furthermore, the limitation may be related to the method of data collection used in this study, which was Internet-mediated Research (British Psychological Society,~~.~~ ~~(~~2013). Not all regions, universities, and people in Indonesia have internet access. Consequently, participants in this study may represent a specific type of sample, who has no problems with internet access. Finally, this study was advertised by gatekeepers who are lecturers. Therefore, only students who have a keen interest in following any information or participating in any activities associated with university may have been interested in taking part.

5.2.3. Conclusion

Despite several limitations, this study provides some interesting take-home messages. First, IU significantly predicted social anxiety. Second, IU plausibly is a transdiagnostic factor across anxiety and depression. Despite this finding being reported in the UK studies conducted by the author (Chapter 2 & 4), these findings are extremely important, as it is the first evidence to emerge out of Indonesia, Southeast Asian culture and a sample group who were predominantly Muslim. Moreover, further studies investigating possible interactions amongst risk factors related to social anxiety (and other disorders) are also required. Third, specifically among Indonesians, FNE was established to dominate followed by AS, while IU made the smallest contribution to social anxiety, worry and symptoms of depression. Therefore, is IU the real "Robin"? Who is Batman's (FNE) "sidekick" in Social Anxiety City and moreover in Worry City and Depression City? This is a novel interesting finding and obviously further studies are required to understand why FNE is so dominant in Indonesia across three types of symptoms. As a result, further investigation is encouraged of IU and social anxiety across cultures.

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List of appendices

Appendix A: Demographic profiles and the proportion of substance users

Table 8
Demographic profiles

	N	%
Total	540	100%
Gender		
Male	184	34.07%
Female	355	65.74%
Age		
18 - 24 years old	480	86.87%
25 - 34 years old	49	9.07%
35 - 44 years old	8	1.48%
45 - 54 years old	3	0.56%
55 - 64 years old	-	-
65 years old or older	-	-
Education		
Bachelor's degree	492	91.11%
Master's degree	33	6.11%
Doctorate	3	0.56%
Professional qualification (for example teaching, nursing, accountancy)	11	2.04%
Other vocational/work-related qualification	-	-
Foreign qualifications	1	0.19%
Religion		
Islam	468	86.67%
Kristen	39	7.22%
Katolik	19	3.52%
Hindu	1	0.18%
Budha	5	0.93%
Konghucu	-	-
Any other religion	8	1.48%
Ethnicity		
Aceh	1	0.16%
Banjar	29	5.37%
Batak	8	1.48%

Betawi	3	0.56%
Bugis	49	9.07%
Dayak	5	0.93%
Jawa	311	57.59%
Madura	12	2.22%
Melayu	15	2.78%
Minangkabau	5	0.93%
Padang	2	0.37%
Papua	8	1.48%
Sunda	13	2.41%
Tionghoa	35	6.48%
Others	44	8.15%

Table 9
The proportion of substance users

	Time	N	%	95% CI
Tobacco	Life-time	123	22.78%	± 3.54
	12 months	95	17.59%	± 3.21
Alcohol	Life-time	105	19.44%	± 3.34
	12 months	70	12.96%	± 2.83
CNS Stimulant	Life-time	14	2.59%	± 1.34
	12 months	7	1.42%	± 1.00
Cannabis	Life-time	14	2.59%	± 1.34
	12 months	8	1.48%	± 1.02
Hallucinogen	Life-time	5	.93%	± .81
	12 months	2	.37%	± .51
Opiates	Life-time	2	.37%	± .51
	12 months	-	-	-
CNS Depressant	Life-time	4	.74%	± .72
	12 months	2	.37%	± .51
Others	Life-time	12	2.22%	± 1.24
	12 months	6	1.11%	± .88
Illicit drugs	Life-time	40	7.41%	± 2.21
	12 months	18	3.33%	± 1.51

Appendix B. Ethical approval

11 April 2014

Muhamad Salis Yuniardi
Institute of Neuroscience

Faculty of Medical Sciences
Newcastle University
The Medical School
Framlington Place
Newcastle upon Tyne
NE2 4HH United Kingdom

FACULTY OF MEDICAL SCIENCES: ETHICS COMMITTEE

Dear Muhamad

Title: Understanding Intolerance of Uncertainty and Social Anxiety among Students in Indonesia
Application No: 00743/2014
Start date to end date: 15 April 2014 to 30 January 2016

On behalf of the Faculty of Medical Sciences Ethics Committee, I am writing to confirm that the ethical aspects of your proposal have been considered and your study has been given ethical approval.

The approval is limited to this project: **00743/2014**. If you wish for a further approval to extend this project, please submit a re-application to the FMS Ethics Committee and this will be considered.

During the course of your research project you may find it necessary to revise your protocol. Substantial changes in methodology, or changes that impact on the interface between the researcher and the participants must be considered by the FMS Ethics Committee, prior to implementation.*

At the close of your research project, please report any adverse events that have occurred and the actions that were taken to the FMS Ethics Committee.*

Best wishes,

Yours sincerely

M. Holbrough

Marjorie Holbrough
On behalf of Faculty Ethics Committee

cc.
Professor Andy Hall, Chair of FMS Ethics Committee
Ms Lois Neal, Assistant Registrar (Research Strategy)

*Please refer to the latest guidance available on the internal Newcastle web-site.

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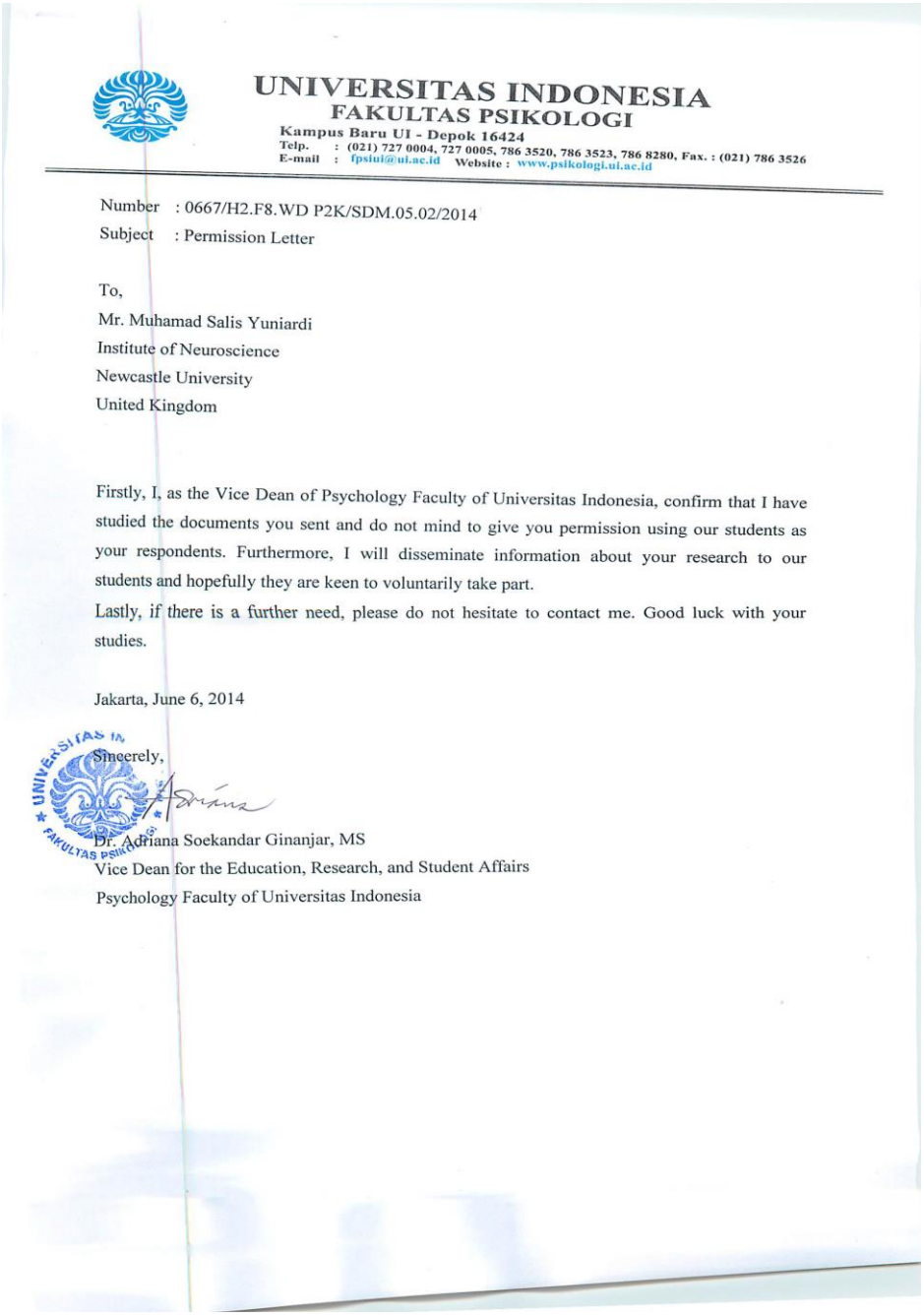
Appendix C. Examples of the Permission Letter



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Telp. : (021) 727 0004, 727 0005, 786 3520, 786 3523, 786 8280, Fax. : (021) 786 3526
E-mail : fpsiui@ui.ac.id Website : www.psikologi.ui.ac.id

Number : 0667/H2.F8.WD P2K/SDM.05.02/2014
Subject : Permission Letter

To,
Mr. Muhamad Salis Yuniardi
Institute of Neuroscience
Newcastle University
United Kingdom

Firstly, I, as the Vice Dean of Psychology Faculty of Universitas Indonesia, confirm that I have studied the documents you sent and do not mind to give you permission using our students as your respondents. Furthermore, I will disseminate information about your research to our students and hopefully they are keen to voluntarily take part.
Lastly, if there is a further need, please do not hesitate to contact me. Good luck with your studies.

Jakarta, June 6, 2014

Sincerely,

Dr. Adriana Soekandar Ginanjar, MS
Vice Dean for the Education, Research, and Student Affairs
Psychology Faculty of Universitas Indonesia

UNIVERSITAS MUHAMMADIYAH MALANG
DIREKTORAT PENELITIAN DAN PENGABDIAN KEPADA MASYARAKAT (DPPM)
Jl. Raya Tlogomas No. 246 Telp.0341-464318-319 (ext. 164-165) Fax. 0341-460435,460782 Malang 65144
E-mail : dppm@umm.ac.id / dppm_umm@yahoo.co.id

December 4, 2013

Dear Mr Muhamad Salis Yuniardi

With reference to your letter and several other documents received on December 1th, we confirm your data collection process is considered in line with our ethical principles. Accordingly, we can grant you permission to gather data from our students and have pointed Mrs. Dra. Tri Dayakisini, M.SI, as the Dean of Psychology Faculty to guide you throughout the data collection process. I have discussed with her, and she is so very pleased to help you.

Moreover, do not hesitate to let me know if I can be any further assistance. Wishing all the best for you both in your PhD years and your research as well.

Sincerely,

Prof. Dr. Sujono, M.Kes.

Director Directorate of Research and Service the Community
University of Muhammadiyah Malang
Indonesia

KEMENTERIAN AGAMA
UNIVERSITAS ISLAM NEGERI (UIN)
SYARIF HIDAYATULLAH JAKARTA
FAKULTAS PSIKOLOGI

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December 16th, 2013

To,
Mr. Muhamad Salis Yuniardi

Institute of Neuroscience
Newcastle University
United Kingdom

Dear Mr Yuniardi,
As per your previous correspondence for the permission regarding your intention to gather data from our students, I have seen all your documents. I do not see any potential interference to our students and I thought my students can learn from your work instead. Thus I on the behalf of the Dean of Psychology Faculty of UIN Syarif Hidayatullah Jakarta grant you permission. I will also directly guidance you in throughout your data collection process.

Finally, wishing success for your study. I will be available for any kind of further help from my side always.

Sincerely,

Yufi Adriani, M.Psi, Psychologist
Head of Psychology Laboratory

FAKULTAS PSIKOLOGI
UNIVERSITAS MEDAN AREA
Jl. Kolam No. 1 Medan Estate Telp. (061) 7366878, 7360168, 7364348 Fax (061) 7366998 Medan 20223
e-mail : univ_medanarea@uma.ac.id

Medan, May 2nd 2014

To Mr Muhamad Salis Yuniardi

Institute of Neuroscience

Newcastle University

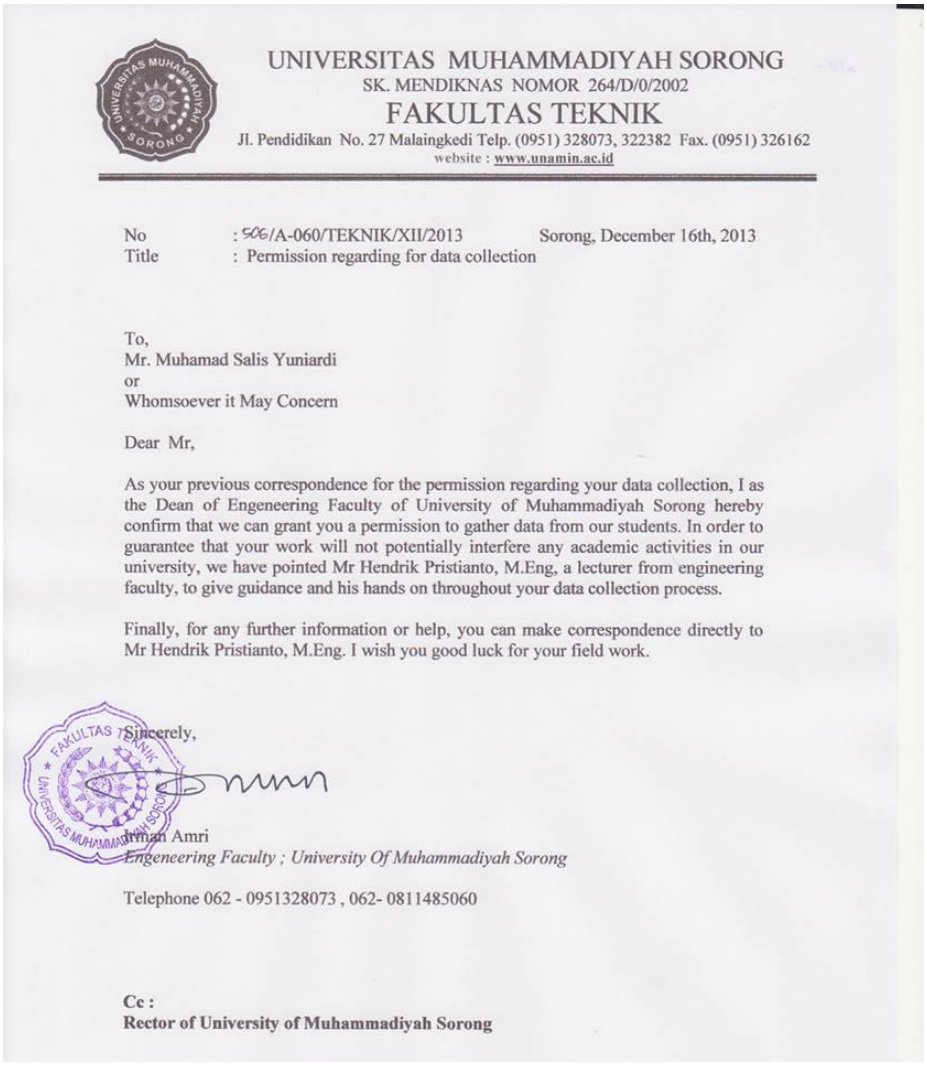
Dear

I, the undersigned, is the Vice Dean Of Academic Affairs Of Psychology Faculty of Medan Area University. After I studied the documents you have already sent, here I can confirm that I do not mind you doing research in our place. I also would be happy to forward your invitation to participate in the research to our students, advising them about your research and asking them to contact you directly if they were interested in participating.

Do not hesitate to contact me if you have further questions. Wishing good luck for your research and your study.

Sincerely,

Irwan Budiman, M.Psi.



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No : 506/A-060/TEKNIK/XII/2013 Sorong, December 16th, 2013
Title : Permission regarding for data collection

To,
Mr. Muhamad Salis Yuniardi
or
Whomsoever it May Concern

Dear Mr,

As your previous correspondence for the permission regarding your data collection, I as the Dean of Engeneering Faculty of University of Muhammadiyah Sorong hereby confirm that we can grant you a permission to gather data from our students. In order to guarantee that your work will not potentially interfere any academic activities in our university, we have pointed Mr Hendrik Pristianto, M.Eng, a lecturer from engineering faculty, to give guidance and his hands on throughout your data collection process.

Finally, for any further information or help, you can make correspondence directly to Mr Hendrik Pristianto, M.Eng. I wish you good luck for your field work.

Sincerely,

Irman Amri
Engeneering Faculty ; University Of Muhammadiyah Sorong

Telephone 062 - 0951328073 , 062- 0811485060

Cc :
Rector of University of Muhammadiyah Sorong

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Samarinda, 28 Agustus 2014

Head of Psychology Department

Mulawarman University

Samarinda, East Borneo

Indonesia

Dear Mr Yuniardi

Institute of Neuroscience

Newcastle University

United Kingdom

Firstly, thank you for the invitation letter. Here I, as the Head of Department, can confirm that I do not mind you are doing research involving our students. I also would be happy to disseminate information about your research to our students. Hopefully they are keen to participate.

Do not hesitate to contact me if you have further questions. Good luck for your research.

Yours sincerely,

Drs. Badruddin Nasir, M.Si
NIP. 19641231 199303 1 022

To Mr Muhamad Salis Yuniardi

Institute of Neuroscience

Newcastle University

United Kingdom

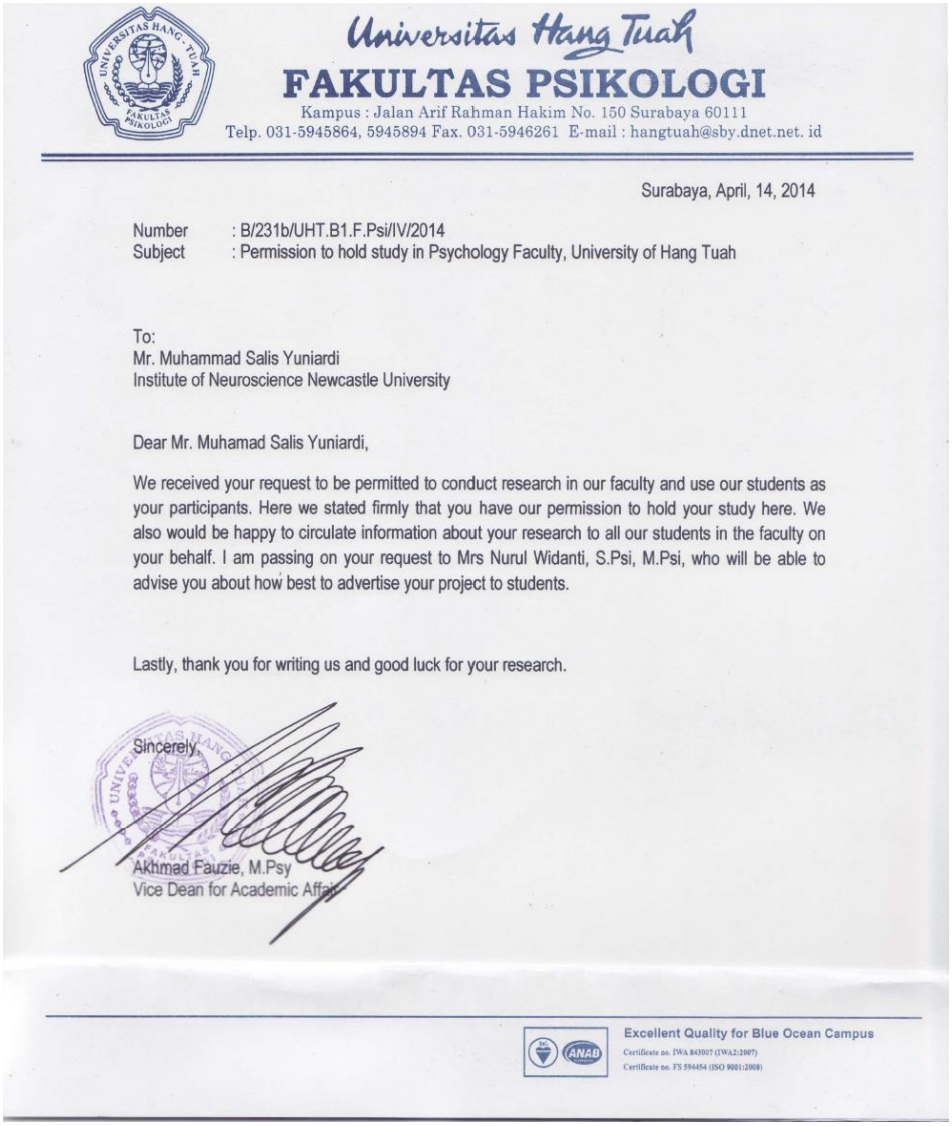
Dear

This letter is in response to your request to conduct a study in our faculty and inviting our students as the participants. With this letter I, as the Head of Psychology Department of Brawijaya University, expressed no objection to help disseminating information about your research to our students. Regarding how the best way to do this, I hereby authorize Mrs Ari Pratiwi, S.Psi, M.Psi to guide you.

In case you need to further discuss something regarding your field study in our Department, please contact her directly.

Sincerely yours,

Yoyon Supriyono, S.Psi., M.Psi



Universitas Hang Tuah
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Surabaya, April, 14, 2014

Number : B/231b/UHT.B1.F.Psi/IV/2014
Subject : Permission to hold study in Psychology Faculty, University of Hang Tuah

To:
Mr. Muhammad Salis Yuniardi
Institute of Neuroscience Newcastle University

Dear Mr. Muhamad Salis Yuniardi,

We received your request to be permitted to conduct research in our faculty and use our students as your participants. Here we stated firmly that you have our permission to hold your study here. We also would be happy to circulate information about your research to all our students in the faculty on your behalf. I am passing on your request to Mrs Nurul Widanti, S.Psi, M.Psi, who will be able to advise you about how best to advertise your project to students.

Lastly, thank you for writing us and good luck for your research.

Sincerely,

Akhmad Fauzie, M.Psy
Vice Dean for Academic Affair

Excellent Quality for Blue Ocean Campus
Certificate no. IWA 843007 (IWA2:2007)
Certificate no. FS 594454 (ISO 9001:2008)

Institute of Neuroscience

Chapter 6. Intolerance of Uncertainty as a Plausible Causal Factor of Social Anxiety: A Vignette Based Approach

Muhamad Salis Yuniardi

110530503

March 2017

Supervisors: Prof. Mark Freeston & Dr. Jacqui Rodgers

21,461 words
(not including abstract, references and appendices)

I declare that this assignment is my own work and I have correctly acknowledged the work of others. This assignment is in accordance with University and School guidance on good academic conduct (and how to avoid plagiarism and other assessment irregularities. University guidance is available at www.ncl.ac.uk/right-cite

Contents

Abstract

Introduction: This study aimed to replicate and extend the previous study investigating intolerance of uncertainty (IU), social anxiety and social drinking through adding safety behaviours that could be used in social situations. It also aimed to experimentally investigate to what extent dispositional IU and fear of negative evaluation (FNE) interact with situational IU and FNE (which were represented by the manipulations) to cause dependent variables (DVs: social anxiety, safety behaviours and in addition specific for the social interaction situation, the social motive for alcohol use).

Method: Part 1 was a classification stage where 200 students completed online questionnaires. Subsequently, they were re-invited to take part in part 2 or the experimental stage. There were 164 students participated who were asked to read two vignettes (social performance and social interaction situations) and to answer a set of questions mainly asking about manipulation checks (IU-MC and FNE-MC) and DVs.

Results: In part 1: First, each of IU, FNE and anxiety sensitivity (AS) made additive and unique contributions to the variance in social anxiety. Second, each had both direct and indirect effects on safety behaviours mediated by social anxiety. Third, each had significant and negative indirect effects on social drinking mediated by social anxiety. However, when social motives were added as the second mediator, the indirect effect of IU changed direction to significant and positive. This indicates that high IU was associated with greater social drinking through the expanded indirect path with social motives for drinking. However, the indirect effects of FNE and AS through social anxiety and social motives for alcohol use were not significant.

In part 2: For the social interaction situation, the main effect of IU manipulation was significant on two MCs, social anxiety and safety behaviours, but not on social motive for alcohol use. Conversely, none of the effects of FNE manipulation or the interaction were significant on either the MCs or any of the DVs. Moreover, dispositional IU has a significant effect on both MCs and safety behaviours, but not on social anxiety; although its effect size is nearly medium. The main effect of dispositional FNE was significant for both MCs and all DVs. The main effect of the IU manipulation remained significant, whereas the main effect of the FNE manipulation and most interactions were not significant.

For the social performance situation, the main effects of both the IU and FNE manipulations were significant on IU-MC with a small to medium effect size, but not on

FNE-MC or any DVs. None of the interactions were significant. Moreover, the main effect of dispositional IU was significant only for IU-MC, whereas the main effect of dispositional FNE was significant for both MCs and both DVs. The main effect of the IU manipulation on IU-MC remained significant, although it was reduced. None of the main effects of the IU manipulation on FNE-MC and both DVs, along with the main effects of the FNE manipulation on both MCs and both DVs were significant. Most interactions were not significant.

Conclusion: Part 1: First, IU has an important relationship with social anxiety. Second, IU predicts the use of safety behaviours either in the absence or in the presence of social anxiety. Third, individuals reporting social anxiety are less likely to join in with social activities and thus, less likely to consume alcohol. However, they may consume alcohol when motivated by a belief that alcohol can improve social interaction. Only IU is implicated in these pathways.

Part 2 provided important novel evidence that situational IU in the social interaction situation can cause social anxiety and safety behaviours. Situational IU in the social performance situation did not cause social anxiety due to weak manipulation of participants' experience of uncertainty. The FNE manipulations which represents situational FNE failed in both situations. Part 2 also provided temporal precedence that dispositional IU leads to more safety behaviours in the social interaction situation. Dispositional IU did not significantly influence social anxiety in either situations, perhaps due to low power. The dispositional FNE influenced social anxiety and safety behaviours in both situations. Most of the main effects were separated from the other main effects.

Chapter 6. Intolerance of uncertainty as a plausible causal factor of social anxiety: A vignette based approach

1 Background

1.1. Intolerance of uncertainty and social anxiety

The definition of intolerance of uncertainty (IU) is relatively broad and has evolved. Initially it was defined as a psychological response to an uncertain situation in daily-life (Freeston, Rheaume, Letarte, Dugas & Ladouceur, 1994; Ladouceur, Dugas & Freeston, 1995, as cited in Carleton, 2012). The focus of this definition is on perception and thus, IU is considered temporary (situational). The recent notion perceives IU more as a dispositional characteristic, thus, can be reasonably stable. IU is a disposition to excessively perceive that uncertainty is intolerable (Buhr & Dugas, 2002; Carleton, 2012; Carleton, Sharpe & Asmundson, 2007; Dugas, Schwarzt & Francis, 2004; Ladouceur, Gosselin & Dugas, 2000).

Although there has been a growing number of studies reporting a consistently moderate correlational relationship between IU and social anxiety (Boelen & Reijntjes, 2009; Boelen, Vrinssen & van Tulder, 2010; Brown & Gainey, 2013; Carleton, Collimore & Asmundson, 2010; McEvoy & Mahoney, 2011& 2012; Michel, Rowa, Young & McCabe, 2016; Norr et al., 2013; Sapach, Carleton, Mulvogue, Weeks & Heimberg, 2015; Whiting et al., 2014) including three previous studies conducted by the author (Chapters 2, 4 & 5), to our understanding, an unequivocal causal relationship between IU and social anxiety has not been established.

Three studies have provided some initial indication that a reduction in intolerance of uncertainty (IU) is associated with a reduction in social anxiety. The first was a single case design examining the effectiveness of 6-sessions of Cognitive Behavioural Therapy (CBT) targeting IU (Hewitt, Egan & Rees, 2009) for a patient mainly diagnosed with social anxiety that comorbid with depression and/or other anxiety disorders. It found that there were reductions in both IU and social anxiety following the treatment. This treatment was subsequently replicated for a larger number of patients (N = 32) suffering from social anxiety as the main diagnosis and depression and/or other anxiety disorders as the additional diagnosis (Mahoney & McEvoy, 2012). They reported a replication that there were reductions

in IU and social anxiety following the treatment. Furthermore, the reduction in IU was correlated (r = .57, $p < .001$) with a reduction in social anxiety, not with depression.

More recently, Boswell, Hollands, Farchione and Barlow (2013) examined the efficacy of 18 weeks Transdiagnostic Cognitive-Behavioural Therapy targeting IU. They recruited 37 patients diagnosed with heterogeneous anxiety and subsequently, they were randomly allocated to either immediate-treatment (N = 26) or delayed-treatment (N = 11; waiting for 16 weeks). A Randomized Control Trial (RCT) design compared the efficacy between these two groups. Similar with two previous treatment studies, they established that T-CBT effectively reduced IU, anxiety and depression symptoms. Interestingly, the reduction in IU was significantly associated with the reduction in symptom severity across diagnoses, not only with social anxiety.

Although these studies are a step forwards in the investigation of IU as a plausible causal factor of social anxiety, the studies did not demonstrate a temporal precedence. Consequently, a causal relationship of IU on social anxiety cannot yet be concluded.

1.2. Intolerance of uncertainty as the causal factor of worry and anxiety

While relatively little is known concerning the causal relationships in social anxiety, there is stronger evidence in worry (the hallmark of Generalized Anxiety Disorder (GAD)). The evidence comes from three types of studies: a longitudinal naturalistic study, a laboratory study examining a model and a treatment study on clinical participants that examined temporal precedence.

First, up to now, only one longitudinal study has examined IU. Dugas, Laugesen and Bukowski (2012) followed 338 adolescents for 5 years, with each participant assessed twice a year. They established that changes in fear of anxiety and IU predicted changes in worry. Of interest was that it established that IU plays a greater role than fear of anxiety. However, it is worth noting that a longitudinal study cannot fully control any third variables, unlike an experimental design (Shadish, Cook & Campbell, 2002).

Second, to date eight laboratory studies have reported the causal relationship between IU and worry. For instance, Ladouceur et al. (2000) reported that they had manipulated IU through differential instructions on a gambling game. As a result, those allocated to the experimental group (who were told that the chances of winning were virtually impossible) reported more worry than those allocated to the control group (who were told that the chances of winning were extremely likely), which suggested that an increase in IU led to greater

worry. However, it appears that the manipulation was more about optimism-pessimism or presumably the expectation of winning rather than uncertainty. In addition, it also appears that they measured worry in relation to concern about winning the game rather than worry as the outcome of uncertainty.

Next, Buhr and Dugas (2009) manipulated fear of anxiety into two groups: one group of participants had a lecture explaining that anxiety is harmful, while the other group received a lecture explaining that anxiety is normal. Previously, all participants completed a series of memory tests and were informed that they would be tested again, after the lecture. As hypothesised, the increasing anxiety led to worry and IU also predicted worry. Given this study did not involve manipulation of IU, the conclusion of the role of IU in GAD is considered debatable.

Recently, Reuman, Jacoby, Fabricant, Herring and Abramowitz (2015) and Chapman (2015) successfully manipulated IU. Reuman et al. (2015) manipulated uncertainty (explicit vs. implicit) and threat level (high vs. low) using a vignette approach. As hypothesised, explicit uncertainty, a high level of threat and their interaction lead to increasing anxiety levels and a tendency to perform safety behaviours. However, they did not measure or control baseline levels of anxiety or not. Consequently, the result should be interpreted prudently.

Chapman (2015a) also manipulated uncertainty (high vs. low). In his study, participants were presented with a video vignette involving a human actor. Subsequently, participants were asked to give a rating of the person in the scenario. As expected, increasing IU leads to an elevation in worry. Although this study had anticipated any potential serious flaws such as demand characteristics, low ecological validity and hypothesis guessing, randomisation to condition was partially ineffective. There were significantly higher baseline IUS and worry in one group which might affect the results although statistical controls indicated that this may not be the case.

Finally, with regards to treatment, Dugas and Ladouceur (2000) examined the efficacy of 16 treatment sessions targeting IU for four GAD patients in a multiple baseline single case experimental design. Employing the Box-Jenkins multivariate autoregressive moving average (ARMA) model, it demonstrated that a reduction in IU preceded a reduction in worry, although the reverse was not true in three out of four cases. Despite a failure in one case that cannot be ignored, by establishing temporal precedence the result provides an initial indication that IU may cause worry.

With some caveats, these studies, particularly from the Reeuman and Chapman experiments, provide increasingly convincing evidence that IU may serve as a vulnerability factor for the development of worry. However, as mentioned, the limitations noted lead to the conclusion that further studies are still required.

1.3. Intolerance of uncertainty, fear of negative evaluation and social anxiety

In conjunction with increasing evidence of the cross-sectional or correlation between IU and social anxiety, we are interested in examining to what extent IU interacts with fear of negative evaluation (FNE) in causing social anxiety. FNE is the fear of receiving negative judgements from other people (Levinson et al., 2013; Watson & Friend, 1969). A large number of cross-sectional studies have proposed that fear of negative evaluation may be the primary predictor of social anxiety (e.g., Carleton, Collimore & Asmundson, 2007; Collins, Westra, Dozois & Stewart, 2005; Stopa, 2001; Weeks et al., 2005; Weeks, Heimberg, Rodebaugh & Norton, 2008). The Cognitive Model of Social Phobia (Clark & Wells, 1995) and the Cognitive Behavioural Model of Social Phobia (Heimberg, Brozovich & Rapee, 2010; Rapee & Heimberg, 1997), two well-known models explaining the aetiological process of social anxiety, also highlights the critical role of FNE in the development and maintenance of social anxiety (see Chapter 1). However, somewhat surprisingly we are not aware of any studies to date that provide evidence that FNE is a causal factor of social anxiety.

Recently, we analysed an archival data set (a mixed student-community sample; Chapter 2), and conducted two cross-sectional studies, among students from the UK (Chapter 4) and Indonesia (Chapter 5). As hypothesised, FNE and IU consistently made independent and additive contributions to the variance in social anxiety. Furthermore, all three studies established that the contribution of FNE was greater compared to the contributions of other cognitive risk factors. From both the UK studies (Chapters 2 & 4), evidence supporting the significant contribution of the interaction between IU and FNE was present. However, these studies used cross-sectional methods and thus, could not provide evidence of causal effects.

Several studies have reported that a reduction in FNE strongly predicted a reduction in social anxiety during cognitive behavioural therapy (CBT) for individuals with social phobia (e.g. Cox, Swinson & Direnfeld, 1998; Heimberg et al., 1990). Several other studies compared those who scored high versus those who scored low FNE in a laboratory setting (Friend & Gilbert, 1973; Leary, 1983; Smith & Sarason, 1975; Watson & Friend, 1969; Winton, Clark & Edelmann, 1995). For instance, Winton et al. (1995) asked their participants

to perform two tasks, identifying the affect expressed by slides of faces briefly presented, and giving an overall rating of the emotion conveyed in brief video clips, prior to and after a social threat induction. Individuals who scored high with regards to FNE were more likely to identify others' facial expression as negative. These treatment-outcome and laboratory studies provide initial evidence of a possible causal relationship between FNE and social anxiety, although none of them have examined the temporal precedence of changes in FNE on social anxiety. Moreover, similar to IU, whilst the literature suggests that FNE may lead to social anxiety, it is too early to reach a firm conclusion.

1.4. Intolerance of uncertainty, safety behaviours and social anxiety

Salkovskis (1991) initially proposed the concept of safety-seeking behaviours that is a range of behaviours that "arises out of, and is logically linked to, a perception of a serious threat" (p. 19) in a social situation. Later on, Clark and Wells (1995) highlighted the importance of safety behaviours in their Cognitive Model of Social Phobia. Those with social phobia tend to develop a variety of behaviours that aim to reduce the risk of negative evaluation. Therefore, Hofmann suggested that safety behaviours may play a crucial role in the maintenance of social anxiety (Hofmann, 2007)

Although in the short term these behaviours may be able to help individuals to reduce the threats either by anticipation or avoidant, in the long term these behaviours prevent socially anxious individuals from confirming what they believe to be true. For example, whether or not their beliefs concerning fears in social situations are correct, observing what might occur if the fear is experienced, and prevents them from developing beneficial skills and confidence, in order to deal with such situations and try to cope with the situation through controlling his/her mental state (mind, emotion and behaviour) rather than being reactive**.**

Several studies either based on laboratory manipulating safety behaviours (Kim, 2005; McManus, Sacadura & Clark, 2008; Rowa et al., 2015; Taylor & Alden, 2010) or based on treatment of clinical participants (Wells, Clark, Salkovskis & Ludgate, 1995) supported and provided evidence that the use of safety behaviours results in more social anxiety. It sounds logical then, with particular reference to McManus et al., (2009) to suggest that safety behaviours not only play a crucial role, but are a key maintenance factor in social anxiety.

Trying to unravel the mechanism underlying the causal correlation between safety behaviours and social anxiety, several experimental studies have provided evidence that safety behaviours lead to a bias in perceiving enhanced threat, (Deacon & Maack, 2008;

Lovibond, Mitchell, Minard, Brady & Menzies, 2009; Olatunji, Etzel, Tomarken, Ciesielski & Deacon, 2011), even with an objectively safe stimulus (Engelhard, Uijen, Seters & Velu, 2015).

Overall, it appears that a vicious circle occurs. Social anxiety encourages the use of safety behaviours and subsequently, the increasing safety behaviours lead to increased perception of threat and so resulting in greater social anxiety. Interestingly, a previous study conducted by the author (Chapter 4) indicated that IU predicted social anxiety. Therefore, it was hypothesised that IU had a direct and indirect effect on safety behaviours by way of social anxiety. Furthermore, it can be argued that IU causes safety behaviours.

1.5. Intolerance of uncertainty, Social Anxiety and Alcohol Use

Several studies have examined the association between drinking alcohol and social anxiety among adolescents or students with equivocal results. For instance, social anxiety correlated significantly with alcohol abuse disorder (Buckner & Turner, 2009; Zimmerman et al., 2003) or alcohol dependence disorder (Nelson et al., 2000; Zimmerman et al., 2003). Robust evidence comes from a 14-year longitudinal study by Buckner et al. (2008) (N = 1,709; Mean age T1 = 16.6, SD T1 = 1.2). This study established that social anxiety diagnosed in T1 was significantly associated with either alcohol or cannabis dependence disorder, although it was not associated with alcohol or cannabis abuse in T4.

Nevertheless, other studies reported that symptoms of social anxiety did not elevate the incidence of alcohol use, and in fact highly anxious students drank less frequently because they preferred to avoid social interactions (Frojd, Ranta, Kaltiala-Heino & Marttunen, 2011; Ham, Zamboanga, Olthuis, Casner & Bui, 2010; Johnson, Wendel & Hamilton, 1998). This is in line with the results from Moreno et al. (2012), which revealed that there were no differences regarding fear of anxiety and depressive symptoms between recreational users and non-users. The authors suggest that students who drink alcohol recreationally were driven more by sensation seeking rather than to cope with symptoms of anxiety or depression.

Given a possible link between IU and social anxiety and also between social anxiety and drinking alcohol, a previous cross-sectional study conducted by the author (Chapter 4) also examined a possible connection between IU and drinking alcohol. It established that although IU did not have a direct effect on alcohol use during life-time and in the last 12 months, there was a positive indirect effect mediated serially by social anxiety and instrumental motives to consume alcohol, specifically social and cognitive motives (Chapter 4).

Therefore, the next stage in the examination of the role of IU in social anxiety is to consider the potential causal influences of IU on social anxiety and safety behaviours. Moreover, we are also interested in the causal influence of FNE on social anxiety and safety behaviours given its long-standing role in social anxiety as this has not yet been demonstrated, as well as its possible interaction with IU. In addition, following the results from Chapter 4, this study will also explore the causal influence of IU and FNE on social motives for alcohol use. Hence, this study will be the first to specifically examine the causal relationship of IU and FNE and their interactions on social anxiety and safety behaviours. The results obtained will hopefully clarify how the model of the development and maintenance of social anxiety can be made more precise.

2 The Aims of the Study

This study aims to replicate and extend the previous study investigating intolerance of uncertainty (IU), social anxiety and social drinking through adding safety behaviours. It also aimed to experimentally investigate to what extent dispositional IU and fear of negative evaluation (FNE) interact with situational IU and FNE (which were represented by the manipulations) to cause social anxiety.

This study also aims to address these exploratory questions:

(1) To what extent do dispositional IU and FNE interact with situational IU and FNE to cause safety behaviours?

(2) To what extent do dispositional IU and FNE interact with situational IU and FNE to cause social motive for alcohol use during social interaction situations?

3 Methods

3.1. Design

This study consisted of two parts: the classification stage (Part 1) and the experimental stage (Part 2).

Part 1 served two purposes. First, it sought to replicate, refine and extend the previous findings corresponding to IU's relation to social anxiety (Chapter 4) by adding safety behaviours. Second, it was a classification stage based on participants' gender and scores on

dispositional IU and FNE (baselines) that enabled a balanced design for part 2. A demographic questionnaire and a series of questionnaires were completed.

Part 2 was an experimental stage, which was the novel part of this study. While behavioural tests can provide the most convincing demonstration of a causal link, to create convincing standardized on both performance and interaction situations that varied on both evaluation and uncertainty would require considerable resource. To do this in "real life" (although in a laboratory situation) would require either a significant number of actors if actually experience or deception if they were led to believe they would encounter the situation, but in fact they did not. Alternatively, virtual reality environments could provide a reasonable proxy for real life immersion. While these are all possible, they present a significant number of challenges. Consequently, a vignette approach was considered.

Vignettes are based on the assumption that people can imagine. One of the features of social anxiety is people anticipating the situation before they go; imagery is important in social anxiety. Therefore, to the extent that vignettes engage the imaginal system, vignettes may provide a reasonable proxy.

Importantly, vignette approaches allow easier and more controlled manipulation of more than a single independent variable through systematic differences as well as to control the variables compared to behavioural approach where participants experience the situation. According Ashill and Yavas (2006), "vignettes allow for systematic variation of the characteristics used in the situation description and make possible more precise assessments of each study variable. Furthermore, these variations can be standardised so that respondents receive the same set of social stimuli" (p. 28). In this experiment, the IVs manipulated were both IU and FNE and across performance and interaction settings leading to a 2 x 2 x 2 design.

In addition, vignette protects participants ethically due to it allows investigation of sensitive topics, or stimuli that may be upsetting or may raise negative emotions without participants experience the real situation (Bradbury-Jones, Taylor & Herber, 2012). For instance within this study is a possibility of feeling embarrassed due to receiving a negative evaluation, especially among those who may have high dispositional levels of FNE.

The design for this experiment was a mixture of between-participants and within-participants features. It comprised of three levels of person variables: dispositional IU, dispositional FNE, and gender (male vs. female). There were two experimental manipulations: IU manipulation (high vs. low) and FNE manipulation (high vs. low), which

were between subject variables. Social situation (social interaction vs. social performance) was the within the subject variables. Therefore, cells 1-4 and 5-8 (see Figure 2 below) were identical 2 x 2 x 2 (IU manipulation X FNE manipulation X Social situation) manipulations of situations amongst high dispositional IU (cells 1-4) and low dispositional IU (cells 5-8) across gender.

		FNE manipulation (between participants)		
		High	Low	
IU manipulation (between participants)	High	1 : Social Performance Vs Social Interaction; within participants	3 : Social Performance Vs Social Interaction; within participants	High dispositional IU - FNE & Gender (between participants)
	Low	2 : Social Performance Vs Social Interaction; within participants	4 : Social Performance Vs Social Interaction; within participants	

		FNE manipulation (between participants)		
		High	Low	
IU manipulation (between participants)	High	5 : Social Performance Vs Social Interaction; within participants	6 : Social Performance Vs Social Interaction; within participants	Low dispositional IU - FNE & Gender (between participants)
	Low	7 : Social Performance Vs Social Interaction; within participants	8 : Social Performance Vs Social Interaction; within participants	

Figure 1. The experimental design

In addition to the previously rationale pertaining to this study, using a vignette approach, it can be seen from Figure 1 that eight conditions will be provided within this experimental study. Therefore, it will be challenging work, if not to say extremely difficult to arrange, manipulate and control eight different situations where participants will randomly experience both uncertainty and evaluative conditions.

The experiment was conducted 2 to 3 weeks after part 1, when the baselines (dispositional IU and FNE) were taken. Therefore, this design also provides evidence of the temporal precedence of the two dispositional variables (dispositional IU and FNE) and evidence of causality of the manipulations (situational IU and FNE).

In order to limit the possibility that participants will be influenced by the goal of the study or guess the hypotheses, camouflaging was used. This was performed in two ways. First, participants were informed that the main aim of this research study was to investigate the relationship between self-confidence and safety-seeking behaviours. Second, a self-confidence questionnaire was provided as a cover story and participants were asked to complete it as well. The original aims of the study were revealed after completing part 2. In line with best practice (British Psychological Society, 2010), participant's' re-consent was sought at this point. Therefore, participants who completed part 1 were only thanked and provided with information about availability of advice regarding the issues and the contact details for the main researcher, if they had any concerns or distress after completing the questionnaire. They were not informed about the camouflaging.

This study was granted a full ethical approval by the Research Ethics Committee of the Faculty of Medical Sciences of Newcastle University.

3.2. Participants

This study recruited analogue samples (university students) from 10 universities across the North East of England: Newcastle University, Northumbria University, Durham University, Sunderland University, Teesside University, Leeds University, Leeds Beckett University, York University, Sheffield University and Hull University.

Two hundred and eighty nine students accessed the links for part 1 and 200 participants completed the questionnaires in part 1. Of this number, 74.5% were female. In terms of education, 67.5% were undergraduate students, 20.5% were studying a Master degree, 8% were pursuing a PhD and the remaining 4% were pursuing professional qualifications or other work-related qualifications. In terms of age, 68.5% were in the range of 18-24 years old, 19.5% were in 25-34 years old, 6.5% were in 35-44 years old and the remaining 5.5% were 45 years old or above. Moreover, 65.5% of the participants identified as having no religion, 20.5% were Christian, 8.5% were Muslim and the remaining 5.5% embraced other religions. In terms of ethnicities, 81% were Caucasians, 10.5% were Asians, 5% were of a mixed ethnic background and the remaining 3.5% were other ethnicities. Of 200 participants, 86.5% (95% CI: $\pm$ 4.74) reported having experience with alcohol use, and 83% (95% CI: $\pm$ 5.21) had done so in the last 12 months.

Of those who completed part 1, 164 participants completed the task in part 2. Similar to the demographic profile for part 1, 74.5% of the sample in part 2 was female. In terms of education, 67.7% were undergraduate students, 21.3% were studying a Master degree, 6.7% were pursuing PhD and the remaining 4.2% were pursuing professional qualifications or other work-related qualifications. In terms of age, 69.5% were in the range of 18-24 years old, 20.1% were in 25-34 years old, 5.5% were in 35-44 years old and the remaining 4.9% were 45 years old or above. Moreover, 67.7% reported that they had no religion, 20.1% were Christians, 6.1% were Muslims and the remaining 5.2% embraced other religions. In terms of ethnicities, 82.9 were Caucasian, 8.5% of participants were Asians, and 4.8% were mixed; the remaining 5.8% were other ethnicities.

3.3. Inclusion/Exclusion criteria

Participants were selected from university/college students aged 18 years and above. In order to take into account the aim of the study, the methodology used and the fundamental principles of research ethics, particularly underpinning the fourth principle, which is maximising benefits and minimising harm (British Psychological Society, 2010 and 2013), those currently in receipt of treatment for a mental health problem were advised not to take part, but were not prevented from taking part.

3.4. Recruitment Strategy

This study used online recruitment based (internet-mediated research) on both suitability and feasibility considerations to recruit a range of target participants. Three individual opt-in consent forms (online equivalent of signed consent) were provided.

3.4.1. Part 1

The recruitment strategy used was identical to Chapter 4.

3.4.2. Part 2

Participants who took part and submitted their email address in part 1 were individually invited (after 2 to 3 weeks) to participate via e-mail and received a specific link based on allocation to the condition. As previously mentioned (see 3.1., Design), there were four different links to each of the four conditions (high IU/high Evaluation vs. high IU/low Evaluation vs. low IU/high Evaluation vs. low IU/low Evaluation). Each of these links led

them to identical information about part 2. They had sufficient time to read the information on the web page prior to making a decision before clicking the following link. Subsequently, a consent form and the information page were provided. A similar procedure to part 1 was implemented. Given this study involved camouflaging, the third consent form asked for permission to use the data after the original aim was revealed in the debriefing at the end of part 2 (see 3.1.). Participants were included in part 2 only if they were willing to provide this final re-consent.

In order to encourage people to take part, an incentive was offered. This is acceptable as long as it is proportional, should be reasonable recompense but does not expose participants to take any risk beyond that which they would be likely to refuse or face in their day-to-day life (British Psychological Society, 2006 & 2010; King, 2010). Following this guidance; a draw for a £20 Amazon voucher was considered to be proportional. All the participants completing part 1 had the chance to enter into a prize draw with at least a 1 in 50 chance of winning a £20 Amazon voucher at the end of the data collection process. Additionally, all the participants completing part 2 had the opportunity to enter a separate prize draw with at least a 1 in 10 chance of winning a £20 Amazon voucher.

Psychology students from Newcastle and Leeds Beckett Universities had the option either to enter the prize draw or receive research credits toward their degree through the institutions' research participation scheme; half a credit for participation in part 1 if completed and an additional credit for part 2, if completed. The flowchart of the recruitment process can be seen in Appendix 4.

3.5. Apparatus

Participants individually accessed the tasks in both Parts 1and 2, which were operated through Qualtrics software and could be run on any computer, tablet, etc. This strategy enabled the ecological validity of the experimental design to be improved and to reduce the possibility of experimental bias and demand effects (Chapman, 2015b).

3.6. Procedures

3.6.1. Part 1

The procedure was identical to Chapter 4 except for the debrief where **a**fter completing all the questionnaires participants were provided with debriefing information containing: a)

thank you for participation, b) the availability of advice with that provide brief information of links to appropriate sources of additional information, c) information about the part 2, and d) contact details for the main researcher.

3.6.2. Part 2

3.6.2.1. Randomization

Participants needed to be allocated into equal groups; therefore, stratified and random allocation was performed. Participants were stratified into eight strata according to their gender and the cut-off based on participants' IU and FNE scores.

Subsequently, participants were randomly allocated to one of four experimental conditions. A random assignment is one of a gold standard related to a good experimental design (Efron, 1971). However, a perfectly random strategy, particularly that in an experiment involving a limited to a small number of participants, could suffer from an essential disadvantage, which is a possibility of generating an unbalanced assignment (Chen, 2006; Efron, 1971). This unbalanced assignment could lead to both losing power, depending on the number of assignments for each condition (Chen, 2006) and a bias of inference results due to a major difference between the conditions in the participants' characteristic that may influence response (Kraemer, 1984). Eventually, the experiment fails to detect the differences across contrasting conditions and to provide accurate evidence of the efficacy of the manipulation.

This study design was very likely to fail as a consequence of this issue. First, the randomisation itself is very likely to produce an unequal randomisation. Second, the number of participants in part 2 across groups could be unequal to a degree. Hence, to cope with this problem, Efron's Biased Coin Design (Efron, 1971) was used. It is a restricted randomisation procedure to promote balance between groups. This procedure was more robustly recommended than other strategies due to its simplicity, minimal susceptibility to experimental biases and ability to empirically provide more power than other procedures (Antognini, 2008; Chen, 2006; Kraemer, 1984; Markaryan & Rosenberger, 2010).

The strategy implemented involved the 1st group of 50 participants who completed part 1 being initially randomly assigned. Subsequently, the 2nd group of 50 participants, who completed part 1, was randomly allocated based on specific rules adjusting to the result of the 1st group. The same approach was implemented with the remaining participants. For instance, the proportion of participants from the 1st group, who completed part 2 on conditions 1, 2, 3

and 4 were: 6, 9, 6 and 12, correspondingly. Therefore, participants from the 2nd group had three- chances to enter into either condition 1 or 3, two chances in relation to condition 2, and 1 chance in favour of condition 4.The final allocation on conditions 1, 2, 3 and 4 were: 52, 51, 47 and 50, correspondingly. Meanwhile, the final distribution of participants, who completed part 2 on conditions 1, 2, 3 and 4 were: 41, 44, 41, and 38, correspondingly.

3.6.2.2. Information and form consent

Within the invitation email, the link for allocated conditions was provided. Firstly, the entire link led to the same information page explaining part 2. Once participants had accessed the information sheet and were interested in taking part, they had to complete the consent form. Once the consent form was completed, the vignettes were automatically displayed. Subsequently, the experiment was able to commence.

3.6.2.3. Manipulations

First, participants were presented with a vignette and were asked to read it carefully and subsequently answer the questions. Participants then clicked the "arrow" button after completing the questions or whenever they wanted to omit the questions concerning this vignette. Subsequently, the next vignette was displayed. Each participant was presented with two vignettes representing a social performance situation and a social interaction situation.

3.6.2.4. Manipulation measures

Following the presentation of each vignette, the specificity of the manipulation was verified. The manipulation check (MC) comprised of two pairs of questions. The first pair was questions to ascertain whether participants were perceiving uncertain regarding the manipulated condition and whether it bothered them. The second pair was questions to confirm whether participants were perceiving being evaluated within the manipulated condition and thus, being bothered by the judgement.

3.6.2.5. Dependent variables measure

Next, questionnaires measuring dependent variables (DVs) were presented. Participants were asked to answer all the questions, although they did not have to. If they did not answer a question, they were prompted once to do so once. However, if they decided not to they could still continue by clicking the 'arrow' button and move to another vignette.

3.6.2.6. Hypothesis - guessing

Referring to the deception strategy used, a questionnaire measuring self-confidence was presented to cover the original aim of the study and participants were also asked to answer it. After completing questions, participants were asked to state their guess with respect to the aim of the study, multiple options of possible aims were provided and also the possibility to write down their own opinion if it was not mentioned in the list of options provided. Finally, participants were asked to rate their confidence with reference to their guess.

3.6.2.7. Debrief and re-consent

After completing the vignettes, participants were provided with the debriefing sheet revealing the original aim of the study. Afterwards, participants' re-consent was sought regarding whether or not they still wished to take part and allow their data to be used for the study.

3.6.2.8. Winner announcement

A week later, information about the winning participant was announced via email. The prize was sent a week after the announcement.

The complete procedure is in Appendix 2.

3.7. Measures and materials

3.7.1. Part 1

A series of short questionnaires were used in part 1. A number of questionnaires were identical to the measures used in the previous study (Chapter 4). Those similar questionnaires were: The Intolerance of Uncertainty Scale-12 (IUS-12; Carleton, Norton & Asmundson, 2007), Brief Fear of Negative Evaluation scale, Straightforward items (BFNE-S; Weeks et al., 2005), Anxiety Sensitivity Index-3 (ASI-3: Taylor et al., 2007), The Social Phobia Inventory (SPIN; Connor et al., 2000) and The Newcastle Substance Use Questionnaire-Alcohol section (Chapter 3). For a detailed explanation regarding those questionnaires, please see Chapter 4. The rest of questionnaires are:

3.7.1.1. The Subtle Avoidance Frequency Examination (SAFE)

The SAFE (Cuming et al, 2009) assesses safety-seeking behaviours that are crucial in both the maintenance and management of social anxiety. It consists of 32 items endorsed on a five-point Likert scale (1 = never, 2 = occasionally, 3 = sometimes, 4 = often, 5 = always). Higher responses indicate that one was more inclined to perform a particular safety behaviour

when feeling anxious. It demonstrated an excellent internal consistency when used in both clinical (Cuming et al., 2009; Moscovitch, Rowa, Paulitzki, Antony & McCabe, 2015) and non-clinical adult populations (Cuming et al., 2009), in addition to adolescents (Thomas, Daruwala, Goepel & Reyes, 2012).

3.7.1.2. The Personal Evaluation Inventory-Short Version (PEI)

The PEI (Shrauger, 1990) examines self-confidence or self-perception about his/her capability to deal effectively with various situations. It originally consists of 54 items, each endorsing a four-option Likert scale (strongly disagree to strongly agree). Given that self-confidence is only used to cover the original aim of the study and reduces the possibility of participants inferring the original aim of the experiment, only 18 items will be used without being further analysed.

3.7.2. Part 2

Part 2 used two vignettes on the subject of social situations (presentation to a seminar group and attending an informal gathering or party) that students typically encounter and also represented two types of social situation (social performance vs. social interaction). There were four versions of each situation describing: a highly uncertain condition with a high evaluative context, a highly uncertain condition with a low evaluative context, a low uncertain condition with a high evaluative context, and a low uncertain condition with a low evaluative context.

Each vignette presentation was followed by a set of questions for different purposes, specifically, manipulation check questions, cover story questions (self-confidence), questions examining a confounding variable (anxiety sensitivity), and questions examining dependent variables (social anxiety level, safety-seeking behaviours, and, in the social interaction situation, motives to use alcohol).

The manipulation-check, measuring the preciseness of the manipulations, consists of: First, **the IU manipulation check** was a term used to explain the degree of *participants' experience of uncertainty in the given situation* (***situational IU***); represented by a combination of two items: "*I feel that this situation is uncertain"* altogether with *"This uncertain feeling is bothering me"*. Second, **the FNE manipulation check** was a term used to explain the degree of *participants' experience of being evaluated* in the given situation ***(situational FNE)***. It represented by a combination of two items: "*I feel others judging me in this situation"* and *"This feeling of being judged by others is bothering me"*.

Questions exploring self-confidence comprised five items modified from the PEI (Shrauger, 1990). Questions concerning social anxiety were three items and they were modified from the Mini-SPIN (Wait, Abbott & Rapee, 2009). Mini-SPIN, consisted of three items modified from the original SPIN (Connor et al., 2000). Additionally, it was reported that Mini-SPIN was able to differentiate between clinical and non-clinical individuals, had a high correlation with its original version and had excellent internal reliability (Wait al., 2009). Questions regarding safety behaviours consisted of 10 items modified from the SAFE (Cumming et al., 2009); four items representing active safety behaviours, four items signifying restriction behaviours, and two items representing any behaviours related to avoiding physical symptoms. Specific to the social interaction vignette (attending a party), there were three additional questions exploring instrumental motives for alcohol use: social, cognitive and sexual motives (Chapter 3). All the questions used a 9-point Likert scale ranging from 0 (not at all) to 8 (very much).

3.8. Proposed Analysis

3.8.1. Part 1

The analyses of part 1 were identic to the previous study (Chapter 4).

3.8.2. Part 2

3.8.2.1. Power analysis

A Priori Power Analysis was utilised in order to determine the sample size required. First, based on existing literature examining the relationship between IU, FNE and social anxiety, the effects (*f*) of interest were estimated to be approximately in the range of .61 to .70. The estimates regarding the effect size were then utilised to calculate the required sample size for ANCOVA, power .80 and $p = .05$ using G*Power (Faul *et al.*, 2010). Given the possibility of a decreasing number of participants taking part in part 2, the number of required sample size generated for part 1 was increased by a factor of four. With N = 300, effect sizes of $f = .19$ could be detected with power = .80, N = 200 for $f = .24$, and $f = .34$ for 100. Thus even with N = 100, a relationship between IU, FNE and SA that can be detected is even smaller than the effect of interest. Detail in relation to the process determining the required sample size can be seen in Appendix 3.

3.8.2.2. Preliminary Analyses

3.8.2.2.1. Scale Reliability (Cronbach's α)

Cronbach's α was used to measure and describe the internal consistency of all measurement tools used in this study.

3.8.2.2.2. Data screening

Prior to data analyses, data screening was conducted in order to identify and manage any missing data. The strategy used to manage the missing data was the same as to the strategy employed in the previous study (Chapter 4). Next, univariate outliers were identified via analysis of the scale total score by means of the plots of the distributions, examination of skewness, and kurtosis statistics. Outliers were handled by winsorizing using a value just above the last non-outliers. Skewed distributions may be transformed.

3.8.2.3. Main analysis

The overall framework was ANCOVA controlling gender and age. The homogeneity of the slope assumption for ANCOVA was examined. However, it would not be reported unless it was significant.

3.8.2.3.1. The equality of baseline scores across conditions

Means and standard deviations of the baseline scores were reported. Subsequently, a series of 2 x 2 between-groups ANCOVAs (IU allocation X FNE allocation) via SPSS version 21.0 were conducted, in order to measure the equality of baseline scores across conditions.

3.8.2.3.2. The specificity of manipulations

Next, the specificity of manipulations was verified. The two items within each manipulation check were treated as repeated measures using the 2 x 2 between-groups ANCOVA (IU manipulation X FNE manipulation) through SPSS version 21.0. This strategy is conceptually stronger due to the fact that testing for the interaction would illustrate that the environment was not only uncertain or evaluated, but that participants were also affected by it. Further, repeated measures provides greater power and less type 1 errors due to fewer analyses.

3.8.2.3.3. Hypotheses testing

There were two sets of between participant independent variables (IVs), namely the IU and FNE manipulations. The effects of IV(s) and their interaction on each DV (see Figure 1) were examined using a series of 2 x 2 ANCOVAs (IU manipulation X FNE manipulation)

models through SPSS version 21.0. For the social interaction vignette only, the effects of manipulations on social motive for alcohol use were also investigated.

3.8.2.3.4. The role of disposition examination

Finally, the roles of the two dispositional variables (dispositional IU and FNE) and their possible interactions with the situational variables (situational IU and FNE) were examined. Two new grouping variables using baseline scores, which divided participants into four strata for dispositional IU and two for dispositional FNE, were created. It should be noted that these were the same strata used to balance the design at allocation. Subsequently, a series of 4 x 2 x 2 x 2 ANCOVAs (dispositional IU X dispositional FNE X IU manipulation X FNE manipulation) models were performed.

All the effects were tested for significance at $p < .05$. Effect sizes were reported using partial eta-squared (η_p^2). In order to ease the interpretation of the effect and the comparison with previous studies, the partial eta-squared would be converted to *f*. Following the general rule of thumb suggested by Cohen (1988), $f = .10$ represents a 'small' effect size, $f = .25$ indicates a 'medium' effect size, while $f = .40$ reveals a 'large' effect size.

4 Results

4.1. Preliminary Analyses

Initial screening revealed 0.5% missing values for the data in part 1, none of the data from part 2. Moreover, univariate outliers were not found. There were no significant issues with respect to skew and kurtosis in either data set.

4.2. Analyses of part 1

4.2.1. Descriptive statistics and zero order correlations

The internal consistencies of all measures were excellent (α's> .90). The t-tests for equality of means were performed to examine the effect of gender. ANOVA via SPSS General Linear Model Univariate was run to examine the effect of age. Most scores were not different (p's > .05) as a function of gender or age group. The exceptions were on frequency of drinking alcohol with friends and social motives for alcohol use where younger participants reported higher scores. This result is in contrast to the previous study (Chapter 4), which

indicated that the scores of IUS, BFNE, ASI, SPIN and social motives differed (p's < .05) as a function of gender and age. The exception was only frequency of drinking alcohol with friends where females reported more frequent consumption.

Table 1
Descriptive statistics

			IUS	BFNE	ASI	SPIN	SAFE	AU friends	SOCMOT
		α	.91	.96	.93	.93	.94	-	.89
	Total	*M*	31.88	24.48	39.24	42.87	81.65	3.69	13.05
		SD	10.16	9.37	15.29	14.19	21.54	1.79	5.70
Gender	Male	*M*	32.53	25.59	39.38	42.57	80.73	3.45	11.92
	(N = 51)	*SD*	9.35	9.93	15.45	14.00	21.11	1.98	6.06
	Female	*M*	31.65	25.44	39.19	42.97	81.96	3.77	13.43
	(N = 149)	*SD*	10.44	9.20	15.29	14.30	21.75	1.71	5.54
		d	.088	.015	.012	.028	.057	.017	.026
		f	.044	.008	.006	.014	.029	.086	.130
		p	.576	.924	.941	.862	.721	.306	.121
Age	18-24	*M*	32.14	26.49	40.25	44.28	82.51	**4.02**	**14.05**
	(N = 137)	*SD*	9.87	8.89	14.89	14.21	22.00	**1.63**	**5.53**
	25-34	*M*	30.37	23.41	37.69	39.23	79.97	**3.46**	**12.11**
	(N = 39)	*SD*	11.29	10.34	17.79	12.58	20.94	**1.93**	**5.65**
	35-above	*M*	32.63	23.58	36.04	40.88	80.38	**2.17**	**8.83**
	(N = 24)	*SD*	10.14	9.71	12.91	16.01	20.42	**1.63**	**4.66**
		d	.126	.320	.167	.110	.332	.357	.356
		f	.063	.160	.083	.055	.167	.178	.178
		p	.729	.123	.362	.114	.795	<.001	<.001

Note: IUS = Intolerance of Uncertainty Scale, P-IU = Prospective-IU; I-IU = Inhibitory-IU, BFNE = Brief Fear of Negative Evaluation, ASI = Anxiety Sensitivity, SAFE = Subtle Avoidance Frequency Examination, AU friends = Alcohol use with friends, SOCMOT = Social motives for alcohol use; bold = significant differences

The Person correlation (two-tailed) was presented in the table 2.

Table 2
Zero-order inter-correlations between study variables

	age	IUS	P-IU	I-IU	BFNE	ASI	SPIN	SAFE	AU friends
IUS	-.01								
P-IU	.01	**.94**							
I-IU	-.02	**.91**	**.72**						
BFNE	-.13	**.59**	**.51**	**.59**					
ASI	-.10	**.61**	**.49**	**.65**	**.56**				
SPIN	-.12	**.64**	**.55**	**.65**	**.73**	**.64**			
SAFE	-.04	**.59**	**.49**	**.61**	**.66**	**.71**	**.73**		
AU friends	**-.33**	**-.16**	-.14	**-.17**	.02	.02	-.11	.01	
SOCMOT	**-.30**	.14	.13	**.15**	**.38**	**.28**	**.26**	**.41**	**.26**

Note. N = 200, Correlation coefficients $r < |.14|$ are significant, $p < .05$. Bold = significant

There were significant negative correlations between age and both alcohol use with friends and social motives for alcohol use. The relationship between age and other variables were not significant. This is in line with the results of the other study conducted by the author among a mixed sample from the UK (N = 112; Chapter 2). However, more recent studies conducted by the author among undergraduate samples recruited from the UK (N = 349; Chapter 4) and Indonesia (N = 540; Chapter 5) demonstrated negative correlations between age and BFNE, ASI and SPIN. Given the equivocal findings concerning the effects of age and gender upon social anxiety-related variables, further analyses would maintain gender and age as covariates.

There were moderate to high inter-correlations between IUS, BFNE, ASI, SPIN and SAFE (*r*'s (198) = .56 - .73; *p'*s < .001). Only IUS correlated with drinking alcohol with friends (*r* (198) = .16, *p* = .020). All study variables except age correlated positively with social motives for alcohol use (*p*'s < .01).

4.2.2. Intolerance of uncertainty predicting social anxiety

First, the unique contributions of each cognitive factor were examined. Three hierarchical regressions replicating the UK study (Chapter 4) was utilised. In the first regression, FNE was entered in the second step followed by IU and subsequently AS. In the

second regression, IU was entered in the second step, followed by AS, with FNE in the fourth step. In the third regression, AS was entered in the second step followed by FNE and subsequently IU in the fourth step. Following individual variables, the two-way interactions were entered together in the step fifth, while the three-way interaction was entered in the last step. Age and gender were covariates.

Table 3

Regression Model predicting social anxiety symptoms

	Variable	Coefficient statistic			Model step statistic			
		β	*t*	*p*	ΔR^2	ΔF	*df*	*p*
1	Age	-.012	-1.71	.090	.02	1.47	2,196	.233
	Gender	-0.01	-0.14	.889				
				Sequence 1				
2	**FNE**	**0.73**	**14.92**	**< .001**	**.525**	**222.49**	**1, 195**	**< .001**
3	**IU**	**0.33**	**5.87**	**<.001**	**.069**	**34.440**	**1, 194**	**<.001**
4	**AS**	**0.24**	**4.08**	**< .001**	**.031**	**16.67**	**1, 193**	**<.001**
				Sequence 2				
2	**IU**	**0.64**	**11.82)**	**< .001**	**.411**	**139.76**	**1, 195**	**< .001**
3	**AS**	**0.38**	**5.97)**	**<.001**	**.089**	**35.61**	**1, 194**	**<.001**
4	**FNE**	**0.47**	**8.20)**	**< .001**	**.125**	**17.16**	**1, 193**	**< .001**
				Sequence 3				
2	**AS**	**0.63**	**11.40**	**< .001**	**.394**	**110.04**	**1, 195**	**< .001**
3	**FNE**	**0.55**	**10.12**	**<.001**	**.204**	**102.37**	**1, 194**	**<.001**
4	**IU**	**0.23**	**3.82**	**< .001**	**.027**	**14.62**	**1, 193**	**< .001**
				Two-way interactions				
5	IU x FNE	0.42	1.23	.221	.006	1.05	3, 190	.373
	FNE x AS	0.29	0.86	.391				
	IU x AS	-0.38	-1.17	.244				
				Three-way interaction				
6	IU x FNE x AS	0.59	0.48	.633	.000	0.23	1, 189	.633

IU, FNE and AS each consistently made additive and unique contributions to explain the variance in social anxiety. FNE accounted for the greatest proportion of the variance. When entered in the second step, the contributions of FNE, IU and AS were: (52.5% Vs 41.1% Vs 39.4%, correspondingly. However, when entered in the fourth step, the contribution

of FNE remained the greatest (12.5%) with smaller contributions from AS (3.1%) and IU (2.7%).

Neither the two-way interactions entered together (0.6%) nor the three-way interaction (0.0%) made significant additional contributions to the variance in social anxiety. The final model was significant (F (9,189) = 38.42, $p < .001$) and accounted for 64.7% of the variance in social anxiety.

Referring to the principal aim of the study, which was conducting an investigation into the extent to which IU's contribution to social anxiety depended on FNE and AS, the interactions between IU with FNE and AS were examined using interaction analyses via PROCESS model 1. Age and gender were controlled.

Neither interaction made an additional significant contribution to the variance; IU X FNE, $\Delta R^2 = 0.30\%$, $\Delta F(6, 192) = 1.64$, $p = .202$ and IU X AS. $\Delta R^2 = 0.21\%$, ΔF 6, 192) = 1.10, $p = .296$, correspondingly. Although part 1was powered to detect a small to medium effect size ($f^2 = .06$, $R^2 = .05$, with $\alpha = .05$ and power = .80), the effect size regarding the interactions were trivial.

4.2.3. Intolerance of uncertainty predicting safety behaviours

Extending the previous study (Chapter 4), we examined safety behaviours as the outcome variable and social anxiety was entered as the mediator. Age and gender were covariates. Mediation analyses using PROCESS model 4 were performed.

Table 4

The direct and indirect effect of IU, FNE and AS on SB

	Coefficient	Se	LLCI	ULCI
		Direct effect		
IU→[SA]SB	**.465**	**.134**	**.301**	**.7288**
FNE→[SA]SB	**.685**	**.159**	**.372**	**.998**
AS→[SA]SB	**.610**	**.079**	**.455**	**.765**
		Indirect effect		
IU→SA→SB	**.783**	**111**	**.576**	**1.006**
FNE→SA→SB	**.833**	**.148**	**.562**	**1.149**
AS→SA→SB	**.389**	**.068**	**.268**	**.532**

Note: SA = social anxiety, SB = safety behaviours

Each cognitive risk factor had both significant direct and indirect effects on safety behaviours mediated by social anxiety; indicated by their coefficient bootstrap confidence interval that lies above zero.

4.2.4. Intolerance of uncertainty predicting alcohol use

Subsequently, the relationships between IU, social anxiety and alcohol use were investigated. Referring to the results in Chapter 3, most students frequently consume alcohol with friends and rarely drink alcohol alone. Moreover, Chapter 4 reported that only social and cognitive motives mediated the relationship between IU and drinking alcohol with friends (social drinking). Therefore, this study first replicated Chapter 4 by examining only social motives and drinking alcohol with friends. The direct and indirect effects of IU, FNE and AS on alcohol use with friends (AU friends) mediated serially by social anxiety (SA) and social motives for alcohol use (SOCMOT) were investigated. Moreover, this study subsequently expanded the model proposed by adding safety behaviours (SB) as the second mediator following social anxiety.

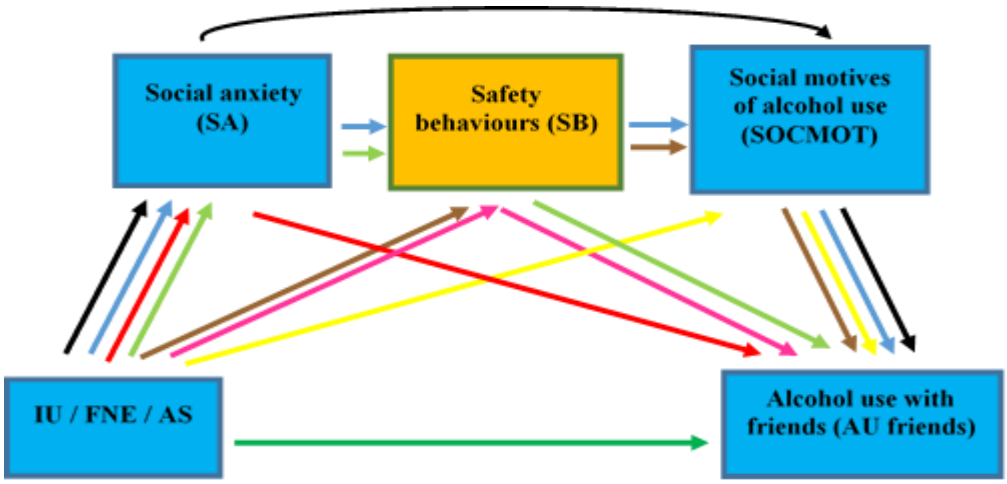

Figure 2. Model predicting alcohol use

Note:

Variables have been examined in the previous study (Chapter 4)

Additional variable

IU→AU friends

IU→SA→AU friends

IU→SB→AU friends

IU→SOCMOT→AU friends

IU→SA→SB→AU friends

IU→SA→SOCMOT→AU friends

IU→SB→SOCMOT→AU friends

IU→SA→SB→SOCMOT→AU friends

PROCESS model 6, which accounts for two or more serial mediators, was used. The significance of the effects is indicated by their coefficient bootstrap confidence interval lying above zero. The results from the replication can be seen in Table 5 below.

Table 5
The findings from the replication

Models	Effect	Se	LLCI	ULCI
Direct effect				
IU→[SA-SOCMOT] AU friends	-.206	.012	-.044	.003
FNE→[SA-SOCMOT] AU friends	-.014	.015	-.043	.016
AS→ [SA-SOCMOT] AU friends	.002	.008	-.018	.014
Indirect effect (replication)				
IU→SA [SOCMOT]→AU friends	**-.025**	**.008**	**-.042**	**-.011**
FNE→SA [SOCMOT]→AU friends	**-.035**	**.010**	**-.056**	**-.016**
AS→SA [SOCMOT]→AU friends	**-.023**	**.005**	**-.034**	**-.013**
IU→SOCMOT [SA]→AU friends	.001	.010	-.021	.020
FNE→SOCMOT [SA]**→AU friends**	**.050**	**.012**	**.027**	**.073**
AS→SOCMOT [SA]**→AU friends**	**.014**	**.016**	**.001**	**.026**
IU→SA→SOCMOT→AU friends	**.017**	**.007**	**.004**	**.031**
FNE→SA→SOCMOT→AU friends	-.005	.009	-.023	.014
AS→SA→SOCMOT→AU friends	.006	.004	-.003	.014

Note: inside […] = variable(s) being controlled

In order to gain a comprehensive understanding about the result of this replication as presented in Table 5, above along with the similarities and differences with the result from Chapter 4, the summaries of both results were presented in Table 6 below.

Table 6
Similarities and differences between the results from Chapter 4 and this replication

Cognitive vulnerabilities – drinking alcohol with friends	Direct effect	Indirect effect		
	X [SA-INMOT] → **Y**	**X → SA** [INMOT] → **Y**	**X → INMOT** [SA] → **Y**	**X → SA → INMOT → Y**
Previous study (Chapter 4)				
IU - AU friends	NS	-	NS	+
FNE - AU friends	NS	-	+	NS

Cognitive vulnerabilities – drinking alcohol with friends	Direct effect	Indirect effect		
	X [SA-INMOT] → **Y**	**X → SA** [INMOT] → **Y**	**X → INMOT** [SA] → **Y**	**X → SA → INMOT → Y**
AS - AU friends	NS	-	NS	+
Replication				
IU - AU friends	**NS**	-	NS	+
FNE - AU friends	NS	-	+	NS
AS - AU friends	NS	-	+	NS

Note: (+) = significant and positive, (-) = significant and negative, NS = not significant

The results of the replication are almost identical to Chapter 4, except for two issues related to AS. **First**, as in Chapter 4, the direct effects of IU, FNE and AS on drinking alcohol with friends were not significant. This indicates that these cognitive vulnerabilities require mediators to lead to social drinking.

Second, again similar to Chapter 4, the indirect effects of IU, FNE and AS *through social anxiety* on drinking alcohol with friends were significant and negative. This indicates that *increasing* these cognitive vulnerabilities was associated with *decreasing* social drinking when social anxiety was present.

Third, as in Chapter 4, the indirect effect of IU *through social motives* on drinking alcohol with friends were *not significant,* whereas the indirect effect of FNE *through social motives* on drinking alcohol with friends was significant and positive. This indicates that *greater* FNE was associated with *increasing* social drinking when social motives for alcohol use was present. Unlike in Chapter 4, the indirect effects of AS *through social motives* on drinking alcohol with friends were now *significant and positive*.

Fourth, as in Chapter 4, the indirect effects of IU *through social anxiety and social motives* on drinking alcohol with friends were significant and positive. This indicates that *increasing* IU was associated with *increasing* social drinking when both social anxiety and social motives for alcohol use were present. Meanwhile, once again as in Chapter 4, the indirect effects of FNE *through social anxiety and social motives* on drinking alcohol with friends were *not significant.* The second difference between the replication and the previous study (Chapter 4) is that the indirect effect of AS *via SA and social motives* was *not significant* now, while in Chapter 4 it was significant and positive.

Prior to the examination of the expanded model, the additional contribution of safety behaviours to the previous model predicting drinking alcohol with friends was examined. Addressing this aim, two hierarchical regressions were performed. Age and gender were covariates, whereas social anxiety was entered in the 2nd step at both regressions. For the first regression, safety behaviours were in the 3rd step, followed by social motives in the 4th step. This was reversed for the second regression (see Table 7, Steps 3 and 4).

Table 7

Regression Model predicting drinking alcohol with friends

	Variable	Coefficient statistic			Model step statistic			
		β	*t*	*p*	ΔR^2	ΔF	*df*	*p*
1	Age	-0.31	-4.56	<.001	.10	11.08	2,197	<.001
	Gender	0.04	0.54	.593				
2	SPIN	-0.14	-2.07	.039	.02	4.30	1, 196	.039
3	SOCMOT	0.65	11.93	< .001	.37	142.21	1, 195	< .001
(4)		(0.68)	(11.67)	(< .001)	(.35)	(136.12)	(1, 194)	(< .001)
4	SAFE	-0.11	-1.36	.174	.00	1.86	1, 194	.174
(3)		(0.22)	(2.25)	(.026)	(.02)	(5.06)	(1, 194)	(.026)

As can be seen from Table 7, safety behaviours (2.2%) significantly predicted drinking with friends when entered before social motives for alcohol use (35.3%). However, more importantly, safety behaviours (0.5%) did not account for additional variance that has been explained by social anxiety (1.9%) and social motives for alcohol use (37.1%; total = 49.1% before SAFE). Given this result, mediation analysis related to the expansion of the model explaining social drinking was not pursued. The final model was significant (F (5,194) = 38.12, $p < .001$) and accounted for 49.6% of the variance in drinking alcohol with friends.

4.3. Analyses of part 2

4.3.1. The equality of baseline scores in each condition following allocation

Table 8 reveals descriptive statistics of the baseline scores.

Table 8
Means and standard deviations of the baseline measures

	Low IU allocation				High IU allocation			
	Low FNE allocation		High FNE allocation		Low FNE allocation		High FNE allocation	
	N = 38 [Fe=65.79%]		N = 41 [Fe=81.49%]		N = 44 [Fe=79.55%]		N = 41 [Fe=70.73%]	
	Mean	*SD*	*Mean*	*SD*	*Mean*	*SD*	*Mean*	*SD*
IUS	29.87	9.01	31.56	11.04	33.34	10.79	33.16	9.51
BFNE	24.95	9.61	24.88	9.60	25.85	9.01	26.80	9.59
SPIN	41.50	13.27	42.07	15.45	44.10	14.11	43.41	13.55
SAFE	81.13	21.94	81.24	22.90	83.49	17.99	83.93	20.27

A series of 2 x 2 ANCOVAs (IU Allocation X FNE Allocation) controlling age and gender were conducted to examine whether the groups differed in baseline characteristics following allocation.

Regarding the baseline IUS scores, the main effects of IU allocated experimental condition and FNE allocated experimental condition were not significant ($F(1,160) = 2.35$, $p = .128$, $\eta_p^2 = .015$, observed power = .33; $f = .123$ and $F(1,160) = 0.41$, $p = .525$, $\eta_p^2 = .003$, observed power = .09; $f = .055$, correspondingly). The interaction was also not significant ($F(1,160) = 0.22$, $p = .640$, $\eta_p^2 = .001$, observed power = .08; $f = .032$). These indicate that there were no significant differences in baseline IUS scores across those allocated to uncertain condition and evaluation condition; all effects sized were trivial to small.

For baseline FNES scores, there were no significant main effects in relation to IU allocated experimental condition and FNE allocated experimental condition ($F(1,160) = 1.01$, $p = .315$, $\eta_p^2 = .006$, observed power = .17; $f = .078$ and $F(1,160) = 0.13$, $p = .723$, $\eta_p^2 = .001$, observed power = .07; $f = .032$, correspondingly). Additionally, there was no significant interactions between IU allocated experimental condition and FNE allocated experimental condition ($F(1,160) = 0.14$, $p = .710$, $\eta_p^2 = .001$, observed power = .07; f

= .032). These indicate that there were no significant differences in baseline FNE scores across those allocated to uncertain condition and evaluation condition; all effects sized were trivial.

Likewise, there were no significant main effects regarding both IU allocated experimental condition and FNE allocated experimental condition on the SPIN scores ($F(1,160) = 0.89$, $p = .347$, $\eta_p^2 = .006$, observed power = .16; $f = .078$ and $F(1,160) = 0.06$, $p = .800$, $\eta_p^2 = .000$, observed power = .06; $f = .000$, correspondingly). There was also no significant effect regarding the interaction ($F(1,160) = 0.00$, $p = .986$, $\eta_p^2 = .000$, observed power = .05; $f = .000$). These indicate that there were no significant differences in baseline SPIN scores to those allocated to uncertain condition and evaluation condition; all effects sized were trivial.

Finally, for baseline SAFE scores, the effect of both IU allocated experimental condition and FNE allocated experimental condition were also not significant ($F(1,160) = 0.57$, $p = .450$, $\eta_p^2 = .004$, observed power = .12; $f = .063$ and $F(1,160) = 0.00$, $p = .950$, $\eta_p^2 = .000$, observed power = .05; $f = .000$, correspondingly). There was also not a significant effect of the interaction ($F(1,160) = 0.01$, $p = .974$, $\eta_p^2 = .000$, observed power = .05; $f = .000$). These indicate that there were no significant differences in baseline SAFE scores of those allocated to uncertain condition and evaluation condition; all effects sized were trivial.

Overall, these results signify that the stratified randomisation was successful to the degree that there were no significant differences in baseline scores between conditions. However, these analyses are only powered to detect a medium effect size ($f = .27$) with a = .05 and power = .80. This together with observed effect sizes, all in the $f = .000$ to .123 range (i.e. nil to small), lead to the cautious conclusion that the groups are equivalent at baseline, although the possibility remains that undetected differences in the small-medium range may be present.

In addition, as can be seen in Table 8, the number of participants (N) was not largely different across conditions. It indicates that Efron's strategy was successful.

4.3.2. Social Interaction Scenario

4.3.2.1. Descriptive statistics

The means and the standard deviations of the post-manipulation scores of the manipulation check questions (MCs: IU manipulation check and FNE manipulation check) and dependent variables (DVs: social anxiety and safety behaviours) across four conditions in the social interaction scenario are presented in Table 9 below. In addition, the correlations between these post-manipulation scores and the baseline scores (dispositional IU and FNE which were measured 2-3 weeks prior to manipulations) are also presented in the same table below.

Table 9

Post-manipulation scores and their correlation with baseline measure

	Low IU manipulation				High IU manipulation				Correlation with Baseline	
	Low FNE manipulation		High FNE manipulation		Low FNE manipulation		High FNE manipulation			
	Mean	*SD*	*Mean*	*SD*	*Mean*	*SD*	*Mean*	*SD*	*IU*	*FNE*
Manipulation check (MCs)										
IU manipulation check										
Uncertainty	3.92	2.35	3.66	2.35	5.55	2.53	6.66	2.15	.38	.36
Bothered	3.32	2.19	3.32	2.44	4.82	2.78	6.10	2.60	.43	.48
FNE manipulation check										
Judged	4.40	2.31	4.39	2.59	5.18	2.61	6.27	2.57	.51	.54
Bothered	4.05	2.55	3.93	2.59	5.50	2.82	5.93	2.62	.50	.59
Dependent Variables (DVs)										
Social anxiety	10.84	5.97	10.39	6.20	12.48	7.12	14.17	6.97	.52	.52
Safety behaviours	28.39	12.52	29.03	16.05	35.72	16.58	36.11	15.80	.56	.59
Social motive for alcohol use	5.37	2.76	5.98	2.81	5.86	2.97	5.46	2.75	.14	.27

The items in the IU manipulation check ("*uncertainty*" and "*bothered by the uncertainty*") strongly correlated with each other, $r(162) = .88$, p's $< .001$. The items in the

FNE manipulation check ("*being judged*" and "*bothered by the judgement*") were also strongly correlated with one other, $r(162) = .84$, p's $< .001$.

Dispositional IU and FNE had moderate correlations with both items in the IU manipulation checks (r's$(162) = .38$ - $.48$, p's $< .001$). Dispositional IU and FNE had strong correlations with both items in the FNE manipulation check, social anxiety and safety behaviour post-manipulations (r's$(162) = .50$ and $.59$, p's $< .001$). Moreover, only dispositional FNE had a significant correlation with social motive for alcohol use post-manipulation (r $(162) = .27$, $p < .001$), while dispositional IU did not (r $(162) = .14$, $p = .085$).

Overall, these moderate to strong correlations between both baseline scores and the post-manipulation scores indicate that whatever the effects of the manipulations (IU manipulation and FNE manipulation), any strength related to the manipulations and indeed their effects on the DV are set against the background of dispositional variables. Moreover, it also highlights how important it was to ensure that the groups do not differ at the baseline, for the reason that any difference between groups on MCs or DVs could be due to baseline differences. It is worth nothing that the results of the baseline scores analyses (see 4.3.1) revealed that that the groups are equivalent at baseline.

4.3.2.2. The specificity of manipulations

4.3.2.2.1. Intolerance of uncertainty manipulation check (IU-MC)

A 2 x 2 x 2 Mixed Model ANCOVA was utilised in order to examine the effects of the between groups factors (IU Manipulation and FNE Manipulation) on the two items in the IU manipulation check. These two items were treated as repeated measures and referred respectively to the perception of uncertainty and being bothered by the uncertainty. This analysis enables examination of any differential effects on the two variables (Items) through the main effects of Items or interactions of Items with either or both manipulations. Both manipulations were entered as the IVs. Age and gender were entered as covariates.

There was a significant main effect of the IU manipulation on the IU manipulation check items ($F(1,160) = 37.80$, $p < .001$, $\eta_p^2 = .193$, observed power = 1.00; $f = .489$). However, there was no significant main effect of the FNE manipulation ($F(1,160) = 2.16$, $p = .143$, $\eta_p^2 = .014$, observed power = .31; $f = .119$), nor the interaction ($F(1,160) = 2.38$, $p = .125$, $\eta_p^2 = .015$, observed power = .34; $f = .123$).

These indicates that the IU manipulation increased participants' experience of uncertainty with a large effect size ($f = .489$). Participants in *the high uncertain condition* (*M*

= 5.78, Std. Error = .26) reported *experiencing more uncertainty* than those in *the low uncertain condition* (*M* = 3.55, Std. Error = .27). The non-significant effect of the FNE manipulation (*f* = .119) with a small effect size (*f* = .119) indicates that the FNE manipulation failed to influence participants' experience of uncertainty. Meanwhile, the non-significant effect of the interaction with a small effect size (*f* = .123) indicates that the effect of the IU manipulation was independent from the effect of the FNE manipulation.

There were no significant effect of the Items ("*uncertainty*" and "*bothered by the uncertainty*" ($F(1,160) = 3.79$, $p = .053$, $\eta_p^2 = .023$, observed power = .49; $f = .153$), Items X IU manipulation ($F(1,160) = 0.72$, $p = .398$, $\eta_p^2 = .005$, observed power = .13; $f = .071$), Items X FNE manipulation ($F(1,160) = 1.03$, $p = .313$, $\eta_p^2 = .006$, observed power = .17; $f = .078$) and Items X IU manipulation X FNE manipulation ($F(1,160) = 0.01$, $p = .913$, $\eta_p^2 = .000$, observed power = .05; $f = .000$).

The non-significant effects of Items and its interactions indicate that there was no differential effect on the perception of uncertainty versus being bothered by the uncertainty.

4.3.2.2.2. Fear of negative evaluation manipulation check (FNE-MC)

Next, an identical analysis was repeated to examine the effects of the between groups factors on the two items of the FNE-MC. Both items of FNE-MC were entered as the DVs and were treated as repeated measures. Again, both manipulations were entered as the IVs, whereas age and gender were covariates.

There was a significant main effect of IU manipulation ($F(1,160) = 15.46$, $p < .001$, $\eta_p^2 = .089$, observed power = .98; $f = .313$) on the FNE manipulation check; neither of the FNE manipulation ($F(1,160) = 0.71$, $p = .402$, $\eta_p^2 = .004$, observed power = .13; $f = .063$) nor the interaction ($F(1,160) = 1.38$, $p = .242$, $\eta_p^2 = .009$, observed power = .22; $f = .095$).

This indicates that the IU manipulation increased participants' experience of being evaluated with a medium effect size (*f* = .313). Participants in *the high uncertain condition* (*M* = 5.72, Std. Error = .27) reported *experience being more evaluated* than those in *the low uncertain condition* (*M* = 4.19, Std. Error = .28). Yet again, the FNE manipulation (*f* = .063) failed to influence participants' experience of being evaluated. The non-significant effect of the interaction indicates that the effect of the IU manipulation was independent from the effect of FNE manipulation.

There were no significant effects of the Items ("*being judged*" and "*bothered by the judgements*" ($F(1,160) = 2.24$, $p = .137$, $\eta_p^2 = .014$, observed power = .32; $f = .119$), Items X

IU manipulation ($F(1,160) = 2.36$, $p = .127$, $\eta_p^2 = .015$, observed power = .33; $f = .123$), Items X FNE manipulation ($F(1,160) = 2.63$, $p = .107$, $\eta_p^2 = .016$, observed power = .36; $f = .128$) and Item X IU manipulation X FNE manipulation ($F(1,160) = 0.88$, $p = .348$, $\eta_p^2 = .006$, observed power = .15; $f = .078$).

The non-significant effects of the Items and its interactions indicate that there was no differential effect on the perception of uncertainty versus being bothered by the uncertainty either through Item or its interactions.

4.3.2.3. Hypothesis testing

A series of 2 x 2 ANCOVAs were conducted to test the effect of manipulations on the main DVs, specifically social anxiety and safety behaviours. Specific to this social interaction situation only, an additional hypothesis regarding the impact of manipulation on social motive for alcohol use was also examined. Once again, age and gender were covariates.

For social anxiety, there was a significant effect of the IU manipulation ($F(1,160) = 6.92$, $p = .009$, $\eta_p^2 = .042$, observed power = .74; $f = .209$). Conversely, there were no significant effects of either the FNE manipulation ($F(1,160) = 0.36$, $p = .551$, $\eta_p^2 = .002$, observed power = .09; $f = .045$) or the interaction ($F(1,160) = 0.92$, $p = .339$, $\eta_p^2 = .006$, observed power = .16; $f = .078$).

Only the IU manipulation increased social anxiety post-manipulation and its effect size was nearly medium ($f = .209$). Participants in *the high uncertain condition* ($M = 13.34$, Std. Error = .72) reported *higher social anxiety* than those in *the low uncertain condition* ($M = 10.60$, Std. Error = .75). The FNE manipulation failed to increase participants' levels of social anxiety ($f = .045$). This is due to the failure of the FNE manipulation to affect participants' experience of uncertainty and/or being evaluated. The non-significant effect of the interaction indicates that the effect of the IU manipulation was independent from the effect of the FNE manipulation.

For safety behaviours, there was also a significant effect of IU manipulation ($F(1,160) = 8.64$, $p = .004$, $\eta_p^2 = .052$, observed power = .83; $f = .234$). However, there were no significant effects of either the FNE manipulation ($F(1,160) = 0.04$, $p = .848$, $\eta_p^2 = .000$, observed power = .05; $f = .000$) or the interaction ($F(1,160) = 0.01$, $p = .945$, $\eta_p^2 = .000$, observed power = .05; $f = .000$).

Once again, only the IU manipulation increased safety behaviours post-manipulation and its effect size was nearly medium ($f = .237$). Participants in *the high uncertain condition*

(*M* = 35.88, Std. Error = 1.68) reported *more safety behaviour* than those in *the low uncertain condition* (*M* = 28.76, Std. Error = 1.74). The FNE manipulation failed to encourage participants to perform safety behaviours (*f* = .000). Identically, the non-significant effect of the interaction indicates that the effect of the IU manipulation was independent of the effect of FNE manipulation.

Regarding social motive for alcohol use, there were no significant effects of the IU manipulation ($F(1,160) = 0.01$, $p = .936$, $\eta_p^2 = .000$, observed power = .05; $f = .000$), the FNE manipulation ($F(1,160) = 0.55$, $p = .460$, $\eta_p^2 = .003$, observed power = .11; $f = .055$) and the interaction ($F(1,160) = 0.75$, $p = .388$, $\eta_p^2 = .005$, observed power = .14; $f = .071$).

The non-significant effects with trivial effect sizes (*f*'s < .071) signify that neither manipulation nor their interaction successfully increased social motives for alcohol use. The hypotheses that both situational IU and FNE determine social motives for alcohol use are not supported.

4.3.2.4. Investigation of the role of the dispositional variables

Further analyses aimed to investigate to what extent dispositional IU and FNE interact with situational IU and FNE (the manipulations) to influence participants' experience of uncertainty and experience of being evaluated (MCs), social anxiety and safety behaviour post-manipulations (DVs). These would also address the question whether either dispositional variables, which were measured 2-3 weeks before, may have confounded the results of the manipulations.

There were two sets of between participant independent variables: first, two new grouping variables using baseline scores dividing participants into four strata for dispositional IU and two for dispositional FNE and second, the IU and FNE manipulations as before. These two new grouping variables were the same strata used to balance the design at allocation. Once again age and gender were entered as covariates. This resulted in a 4 x 2 x 2 x 2 ANCOVA.

4.3.2.4.1. Further intolerance of uncertainty manipulation check

The first 4 x 2 x 2 x 2 ANCOVA was to examine the effects of both dispositional and situational variables and their interactions on the IU manipulation check. The two items of IU manipulation check were entered as the IVs and treated as a repeated measure. Both dispositional and situational variables were entered as the DVs. Age and gendered were entered as the covariates.

There were significant main effects of dispositional IU ($F(3,158) = 3.64$, $p = .015$, $\eta_p^2 = .075$, observed power = .79; $f = .285$) and dispositional FNE ($F(1,160) = 11.34$, $p = .001$, $\eta_p^2 = .077$, observed power = .92; $f = .289$). The main effect of IU manipulation was significant ($F(1,160) = 27.12$, $p < .001$, $\eta_p^2 = .167$, observed power = 1.00; $f = .448$), but the main effect of FNE manipulation was not ($F(1,160) = 1.69$, $p = .196$, $\eta_p^2 = .012$, observed power = .25; $f = .110$). Only the interaction between IU manipulation and FNE manipulation was significant ($F(1,160) = 5.95$, $p = .016$, $\eta_p^2 = .042$, observed power = .68; $f = .209$), while the other interactions were not significant (F's < 1.48, $p > .05$).

The results indicate that the two dispositional variables, which were measured approximately 2 to 3 weeks prior to the experiments, influenced participants' experience of uncertainty. Supporting the previous ANCOVA which examined the specificity of IU manipulation, the IU manipulation increased participants' experience of uncertainty, whereas the FNE manipulation did not. Interestingly, the two manipulations now significantly interacted to increase participants' experience of uncertainty. Moreover, the non-significant interactions between dispositional IU, dispositional FNE and IU manipulation indicate that these three variables made separate but additive contributions. Finally, despite the significant main effects of the two dispositional variables, the effect size of IU manipulation remained the largest ($f = .448$ Vs. .285 and .289). Together the larger IU manipulation effect and the lack of interaction between dispositional IU and the situational variables indicates that although the two dispositional variables did influence the impact of the manipulations, they did not confound it.

4.3.2.4.2. Further fear of negative evaluation manipulation check

Subsequently, an identical analysis was repeated with regards to the FNE manipulation check. The two items in the FNE manipulation check were entered as the IVs and treated as a repeated measure. Both dispositional and situational variables were entered as the DVs. Age and gendered were entered as the covariates.

There were significant main effects of dispositional IU ($F(3,158) = 7.04$, $p < .001$, $\eta_p^2 = .135$, observed power = .98; $f = .395$) and dispositional FNE ($F(1,160) = 19.06$, $p < .001$, $\eta_p^2 = .124$, observed power = .99; $f = .376$). Again, the main effect of the IU manipulation was significant ($F(1,160) = 10.08$, $p = .002$, $\eta_p^2 = .069$, observed power = .88; $f = .272$), but not with the main effects of the FNE manipulation ($F(1,160) = 0.66$, $p = .419$, $\eta_p^2 = .005$, observed power = .13; $f = .071$). Once again, only the interaction between IU manipulation

and FNE manipulation was significant ($F(1,160) = 5.50$, $p = .021$, $\eta_p^2 = .039$, observed power = .64; $f = .202$), while the other interactions were not significant ($F < 2.57$, $p > .05$).

Likewise the results on the further IU-MC sub-section (see 4.3.2.4.2), the two dispositional variables and the IU manipulation influenced participants' experience of being evaluated, whereas the FNE manipulation did not. However, the presence of the two dispositional variables reduced the effect size of the IU manipulation (*f* from .313 to .272). In addition, the effect sizes of dispositional IU and FNE were larger (*f*'s = .395 and .376, respectively) than the effect size of IU manipulation. This indicates that the two dispositional variables influenced and confounded the impact of IU manipulation. In addition, it also demonstrates the critical role of the two dispositional variables to influence participants' experience of being evaluated. However, the non-significant interactions between dispositional IU, dispositional FNE and IU manipulation indicate that these three variables made separate but additive contributions. Finally, both manipulations interestingly now interacted each other to increase participants' experience of being evaluated.

4.3.2.4.3. Further investigation on dependent variables

Three 4 x 2 x 2 x 2 ANCOVAs were performed to examine the effects of both dispositional and situational variables and their interactions on social anxiety, safety behaviours and social motive for alcohol use, respectively. Both dispositional and situational variables were the IVs, whereas age and gender entered as the covariates.

For social anxiety, there was no significant main effect of dispositional IU ($F(3,158) = 1.96$, $p = .123$, $\eta_p^2 = .042$, observed power = .50; $f = .209$), but there was significant main effect of dispositional FNE ($F(1,160) = 19.57$, $p < .001$, $\eta_p^2 = .127$, observed power = .99; $f = .381$). There was a significant main effect of the IU manipulation ($F(1,160) = 4.25$, $p = .041$, $\eta_p^2 = .030$, observed power = .53; $f = .176$). The effects of the FNE manipulation was not significant ($F(1,160) = 0.40$, $p = .527$, $\eta_p^2 = .003$, observed power = .10; $f = .055$). None of the interactions were significant (F's < 3.61, $p > .05$).

These indicate that only dispositional FNE influenced participants' levels of social anxiety. Although dispositional IU statistically did not determine social anxiety, its effect size is considered nearly medium ($f = .209$). However, it is worth nothing that this analysis is only powered to detect a medium effect size ($f = .26$) with a = .05 and power = .80. Therefore, low power is proposed as the explanation for this non-significant result. The effect of the IU manipulation remained significant and its effect size was in both cases. This indicates that

dispositional FNE did not confound the impact of the IU manipulation. The non-significant main effect of the FNE manipulation with a trivial effect size (f = .055) suggested that the FNE manipulation failed. Moreover, the non-significant interactions indicate that the effects were separate.

For safety behaviours, there were significant main effects of dispositional IU (F(3,158) = 3.98, p = .0.09, $\eta_p^2 = .081$, observed power = .82; f = .297) and FNE (F(1,160) = 16.34, p < .001, $\eta_p^2 = .108$, observed power = .98; f = .348). The main effect of the IU manipulation was also significant (F(1,160) = 5.83, p = .017, $\eta_p^2 = .041$, observed power = .67; f = .207), but the effects of the FNE manipulation was not significant (F(1,160) = 0.09, p = .762, $\eta_p^2 = .001$, observed power = .06; f = .032). None of the interactions were significant (F's < 1.70, p > .05).

These indicate that the two dispositional variables and the IU manipulation influenced safety behaviours. The effect of the IU manipulation remained significant, however, it was reduced (f from .234 to .207). This indicates that the two dispositional variables confound the impact of the IU manipulation. Once again, the non-significant main effect of FNE manipulation with a trivial effect size (f = .032) suggested that the FNE manipulation failed, whereas the non-significant interactions indicate that the effects were separate.

For social motive for alcohol use, only the main effect of dispositional FNE was significant (F(1,160) = 5.29, p = .023, $\eta_p^2 = .038$, observed power = .63; f = .277), while the main effects of dispositional IU was not significant (F(3,158) = 0.32, p = .811, $\eta_p^2 = .007$, observed power = .11; f = .084). There were no significant effects of either IU manipulation (F(1,160) = 0.17, p = .677, $\eta_p^2 = .001$, observed power = .07; f = .032) or FNE manipulation (F(1,160) = 0.00, p = .982, $\eta_p^2 = .000$, observed power = .05; f = .000). Only the interaction between dispositional IU X dispositional FNE X IU manipulation was significant (F(1,160) = 0.17, p = .677, $\eta_p^2 = .001$, observed power = .07; f = .032), whereas the other interactions were not significant (F's < 1.41, p > .05).

These indicate that only dispositional FNE influenced the social motive for alcohol use. The non-significant main effect of dispositional IU with a trivial effect size (f = .084) suggested that dispositional IU did not influence social motive for alcohol use and this non-significant result is unlikely to be related to low power. The non-significant main effects of the IU manipulation and the FNE manipulation with trivial effect sizes (f = .032 and .000, respectively) suggested that neither manipulations influenced social motive for alcohol use.

Interestingly, the two dispositional variables in conjunction with IU manipulation interacted to influence social motives for alcohol use.

4.3.3. Social Performance Scenario

4.3.3.1. Descriptive statistics

Likewise on the social interaction scenario, the means and the standard deviations of the post-manipulation scores of both MCs and the DVs across four conditions and their correlations with the baseline scores of IU and FNE are presented in Table 10 below.

Table 10

Post-manipulation scores and correlation with baseline measure

	Low IU manipulation				High IU manipulation				Correlation with Baseline	
	Low FNE manipulation		High FNE manipulation		Low FNE manipulation		High FNE manipulation			
	Mean	*SD*	*Mean*	*SD*	*Mean*	*SD*	*Mean*	*SD*	*IU*	*FNE*
Manipulation check (MCs)										
IU manipulation check										
Uncertainty	4.11	2.17	5.30	2.30	5.11	2.52	6.49	2.06	.37	.45
Bothered	4.03	2.33	5.49	2.80	4.84	2.65	6.27	2.06	.46	.43
FNE manipulation check										
Judged	6.18	2.58	6.49	2.39	5.64	2.69	6.17	2.66	.33	.49
Bothered	5.50	2.47	5.98	2.63	5.59	2.73	5.98	2.87	.39	.62
Dependent Variables (DVs)										
Social anxiety	15.11	8.57	14.24	7.80	14.02	8.57	14.37	7.18	.45	.57
Safety behaviours	37.18	16.30	38.99	14.78	37.51	14.50	38.47	15.34	.47	.59

The items in the IU manipulation check ("*uncertainty*" and "*bothered by the uncertainty*") were strongly correlated with each other; similarly, both FNE manipulation check items ("*being judged*" and "*bothered by the judgement*") were also strongly correlated; *r'*s(162) = .84 and .87, *p'*s < .001, correspondingly.

Dispositional IU had moderate correlations with all items in the MCs and both DVs (*r'*s(162) = .33 - .47, *p*'s < .001). Dispositional FNE had moderate correlations with both items in the IU-MC (*r'*s(162) = .37 and .46, *p*'s < .001) and strong correlations with both

items in the FNE-MC (*r'*s(162) = .49 and .62, *p*'s < .001) and both DVs (*r'*s(162) = .57 and .59, *p*'s < .001).

Once more, these moderate to strong correlations between both baseline scores and the post-manipulations scores indicate that whatever the effects of the manipulations on the DV are set against the background of the dispositional variables. Thus, it underlines the importance of the equality of the baseline scores across groups to ensure that any difference between groups on MCs or DVs is not caused by baseline differences. Additionally, referring back to the results of the baseline score analyses (see 4.3.1), it reported that the groups are equivalent at baseline.

4.3.3.2. The specificity of the manipulations

4.3.3.2.1. Intolerance of uncertainty manipulation check (IU-MC)

An identical 2 x 2 x 2 Mixed Model ANCOVA likewise on the social interaction scenario (see 4.3.2.2.1.) was performed in order to examine the specificity of the IU manipulation. The two items of the IU-MC were entered as the DVs and were treated as repeated measures. The two manipulations were entered as the IVs, whereas age and gender were entered as covariates.

There were significant main effects of the IU manipulation ($F(1,160) = 7.32$, $p = .008$, $\eta_p^2 = .044$, observed power = .77; $f = .214$) and FNE manipulation ($F(1,160) = 14.20$, $p < .001$, $\eta_p^2 = .082$, observed power = .96; $f = .299$). However, the interaction was not significant ($F(1,160) = 0.03$, $p = .869$, $\eta_p^2 = .000$, observed power = .05; $f = .000$).

These indicate that both the IU manipulation (with a nearly medium effect size; $f = .214$) and FNE manipulation (with a medium effect size; $f = .299$) increased participants' experience of uncertainty. Participants in *the high uncertain condition* ($M = 5.68$, Std. Error = 0.25) reported *experiencing more uncertainty* than those in the low uncertain condition ($M = 4.73$, Std. Error = 0.26). Interestingly, participants in *the high evaluation condition* ($M = 5.88$, Std. Error = 0.25) also reported *experiencing more uncertainty* than those in the low evaluative condition ($M = 4.52$, Std. Error = 0.25). The non-significant interaction with trivial effect indicates that both manipulations have separate effects on the IU-MC.

There was a significant effect of Items ("*uncertainty*" and "*bothered by the uncertainty*") ($F(1,160) = 0.72$, $p = .396$, $\eta_p^2 = .005$, observed power = .14; $f = .071$). However, there were no significant effects of Items X IU manipulation ($F(1,160) = 2.30$, $p = .132$, $\eta_p^2 = .014$, observed power = .33; $f = .119$), Items X FNE manipulation ($F(1,160) =$

0.52, p = .474, $\eta_p^2 = .003$, observed power = .11; f= .055) and Items X IU manipulation X FNE manipulation (F(1,160) = 0.03, p = .873, $\eta_p^2 = .000$, observed power = .05; f = .000).

The significant main effect of Items for the repeated measure Items indicates that there was a differential effect on the perception of uncertainty versus being bothered by the uncertainty through the effects of Items. Participants reported slightly more uncertainty (M = 5.25, Std. Error = 0.18) than being bothered by the uncertainty (M = 5.16, Std. Error = 0.19). Conversely, the non-significant interactions with either or both manipulations indicate that there were no differential effects on the perception of uncertainty versus being bothered by the uncertainty through the interactions.

4.3.3.2.2. Fear of negative evaluation manipulation check (FNE-MC)

Subsequently, an identical analysis was repeated to examine the effects of the between groups factors on the two items of the FNE manipulation check. Again, both items of FNE-MC were entered as the DVs and were treated as repeated measures, whereas the two manipulations were entered as the IVs. Age and gender were covariates.

There were no significant main effects of the IU manipulation (F(1,160) = 0.17, p = .678, $\eta_p^2 = .001$, observed power = .07; f = .032), FNE manipulation (F(1,160) = 0.93, p = .338, $\eta_p^2 = .006$, observed power = .16; f = .078) and the interaction (F(1,160) = 0.05, p = .818, $\eta_p^2 = .000$, observed power = .06; f = .000).

These indicate that neither manipulations nor their interaction influenced the participant's experience of being evaluated.

There were no significant effects of the Items ("*being judged*" and "*bothered by the judgement*" (F(1,160) = 0.00, p = .978, $\eta_p^2 = .000$, observed power = .05; f = .000), Items X FNE manipulation (F(1,160) = 0.00, p = .997, $\eta_p^2 = .000$, observed power = .05; f = .000) and Items X IU manipulation X FNE manipulation (F(1,160) = 0.76, p = .383, $\eta_p^2 = .005$, observed power = .14; f = .071). However, there was a significant effect of Items X IU manipulation (F(1,160) = 5.83, p = .017, $\eta_p^2 = .036$, observed power = .67; f = .193).

The non-significant main effects and interactions with either FNE manipulation only or both manipulations for the repeated measure Items indicate that there were no differential effects on the perception of uncertainty versus being bothered by the uncertainty through either the Items or these two interactions. However, there was a differential effect on the perception of uncertainty versus being bothered by the uncertainty through interaction between the Items and IU manipulation. As can be seen from Figure 4 below, unexpectedly,

participants in *the low uncertain condition* (*M* = 6.33, Std. Error = 0.29) perceived that the situation is *more evaluative* than those in *the high uncertain condition* (*M* = 5.91, Std. Error = 0.28). Conversely, those in *the high uncertain condition* (*M* = 5.80, Std. Error = 0.29) reported feeling slightly bothered in contrast to those in *the low uncertain condition* (*M* = 5.71, Std. Error = 0.30).

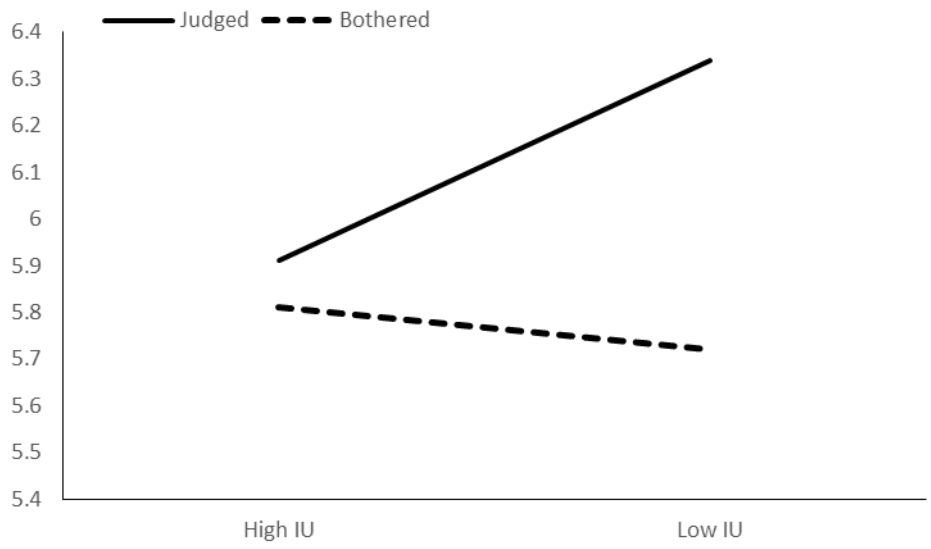

Figure 3. Items in the FNE manipulation check

4.3.3.3. Hypotheses testing

Although the effects of the manipulation were less clear for this scenario than the social interaction scenario, the fact that the uncertainty manipulation was successful indicated that it was still pertinent to test the main hypotheses, albeit any effects of the judgement manipulation may be hard to interpret. Subsequently, two 2 x 2 ANCOVAs were conducted to test the two main hypotheses, specifically, high (vs. low) situational IU via an IU manipulation and high (vs low) situational FNE via a FNE manipulation would increase social anxiety post-manipulation and furthermore, encourage safety behaviours post-manipulation. Age and gender were controlled.

For social anxiety, there were no significant effects of IU manipulation ($F(1,160)$ = 0.13, p = .720, $\eta_p^2 = .001$, observed power = .07; f = .032), FNE manipulation ($F(1,160)$ = 0.09, p = .769, $\eta_p^2 = .001$, observed power = .06; f = .032) and their interaction ($F(1,160)$ = 0.43, p = .514, $\eta_p^2 = .003$, observed power = .10; f = .055).

For safety behaviours, there were no significant effects of IU manipulation ($F(1,160) = 0.00$, $p = .971$, $\eta_p^2 = .000$, observed power = .05; $f = .000$), FNE manipulation ($F(1,160) = 0.28$, $p = .601$, $\eta_p^2 = .002$, observed power = .08; $f = .045$) and their interaction ($F(1,160) = 0.00$, $p = .968$, $\eta_p^2 = .000$, observed power = .05; $f = .000$).

Neither manipulation nor their interaction increased social anxiety and safety behaviour post-manipulations. The hypotheses are not supported with regards to the social performance scenario. All the effect sizes are considered trivial (f's < .05)

4.3.3.4. Investigation of the role of the dispositional variables

An identical series of 4 x 2 x 2 x 2 ANCOVAs were repeated in order to investigate the role of the dispositional variables as being implemented on the social interaction scenario (see 4.3.2.4).

4.3.3.4.1. Further intolerance of uncertainty manipulation check

In this 4 x 2 x 2 x 2 ANCOVA, the two items in the IU manipulation check were entered as the IVs and were treated as a repeated measure. Both dispositional and situational variables were entered as the DVs. Age and gendered were entered as the covariates.

The main effects of the two dispositional variables were significant, dispositional IU ($F(3,158) = 3.31$, $p = .022$, $\eta_p^2 = .068$, observed power = .74; $f = .270$) and FNE ($F(1,60) = 10.39$, $p = .002$, $\eta_p^2 = .071$, observed power = .89; $f = .277$). Similarly, the main effects of both manipulations were also significant; IU manipulation ($F(1,160) = 5.47$, $p = .021$, $\eta_p^2 = .039$, observed power = .64; $f = .202$) and FNE manipulation ($F(1,160) = 20.44$, $p < .001$, $\eta_p^2 = .131$, observed power = .99; $f = .388$). None of interactions were significant (F's < 3.79, $p > .05$).

The results indicate that both dispositional and situational variables influenced participants' experience of uncertainty in the situation. The non-significant interactions indicate that they all made separate but additive contributions. The effect sizes (f's) of dispositional IU and FNE were .270 and .277, respectively. Meanwhile, the effect sizes (f's) of the IU manipulation and the FNE manipulation were .202 and .388. Therefore, even when considering the baseline dispositional variables, the largest effect on the experience of uncertainty was from the FNE manipulation. In conclusion, although the two dispositional variables did influence the impact of the manipulations, they did not confound it.

4.3.3.4.2. Further fear of negative evaluation manipulation check

Subsequently, an identical analysis was repeated on the FNE-MC. Herein, the two items of FNE-MC entered as the IVs and were treated as a repeated measure. Both dispositional and situational variables entered as the DVs. Age and gendered entered as the covariates.

The main effect of dispositional IU was not significant ($F(3,158) = 0.94$, $p = .423$, $\eta_p^2 = .020$, observed power = .25; $f = .143$), while the main effect of dispositional FNE was significant ($F(1,160) = 27.65$, $p < .001$, $\eta_p^2 = .170$, observed power = 1.00; $f = .453$). Conversely, there were no significant main effects of either the IU manipulation ($F(1,160) = 0.11$, $p = .740$, $\eta_p^2 = .001$, observed power = .06; $f = .032$) or FNE manipulation ($F(1,160) = 1.70$, $p = .195$, $\eta_p^2 = .012$, observed power = .16; $f = .110$). None of interactions were significant (F's < 1.60, $p > .05$).

Only dispositional FNE influenced participants' experience of being evaluated in the given situation, dispositional IU did not. Neither manipulation nor their interaction increased participants' experience of being evaluated. These indicate that dispositional FNE, rather than dispositional IU or the manipulations, was the only determinant of the experience of being evaluated.

4.3.3.4.3. Further investigation on dependent variables

Lastly, two 4 x 2 x 2 x 2 ANCOVAs were conducted to examine the effects of both dispositional and situational variables and their interactions on social anxiety and safety behaviours, respectively.

For social anxiety, there was no significant main effect of dispositional IU ($F(1,158) = 2.51$, $p = .061$, $\eta_p^2 = .053$, observed power = .61; $f = .237$), but there was a significant main effect of dispositional FNE ($F(1,160) = 31.01$, $p < .001$, $\eta_p^2 = .182$, observed power = 1.00; $f = .472$). There were no significant main effects of either IU manipulation ($F(1,160) = 1.91$, $p = .170$, $\eta_p^2 = .014$, observed power = .28; $f = .119$) or FNE manipulation ($F(1,160) = 0.04$, $p = .835$, $\eta_p^2 = .000$, observed power = .05; $f = .000$). None of the interactions were significant (F's < 2.33, $p > .05$), the only exceptions were dispositional IU x dispositional FNE x IU manipulation ($F(2,159) = 1.91$, $p = .170$, $\eta_p^2 = .014$, observed power = .28; $f = .119$) and dispositional IU x IU manipulation x FNE manipulation ($F(3,158) = 1.91$, $p = .170$, $\eta_p^2 = .014$, observed power = .28; $f = .119$) which were significant.

This result indicates that only dispositional FNE influenced social anxiety. Although dispositional IU statistically did not determine social anxiety, its effect size is considered nearly medium ($f = .237$). However, this analysis is only powered to detect a medium effect

size (f = .26) with a = .05 and power = .80. Therefore, once again, low power is proposed as the explanation for this non-significant result. In line with the result from the previous hypothesis testing related to the effects of manipulation on social anxiety, both manipulations did not determine social anxiety. Interestingly, the two significant interactions indicate that there were interactions among several variables to make additive contributions.

Similar to social anxiety, the main effect of dispositional IU on safety behaviours was not significant (F(3,158) = 1.93, p = .127, $\eta_p^2 = .041$, observed power = .49; f = .207), nevertheless, the main effect of dispositional FNE on safety behaviours was significant (F(1,160) = 30.72, p < .001, $\eta_p^2 = .185$, observed power = 1.00; f = .476). There were no significant main effects of the IU (F(1,160) = 0.25, p = .616, $\eta_p^2 = .002$, observed power = .08; f = .045) and FNE manipulations (F(1,160) = 0.62, p = .434, $\eta_p^2 = .005$, observed power = .12; f = .071). None of the interactions were significant (F's < 1.66, p > .05).

Yet again, only dispositional FNE encouraged participants to perform safety behaviours. Likewise regarding social anxiety, although the main effect of dispositional IU statistically is not significant, its effect size is nearly medium (f = .207). This analysis is also only powered to detect a medium effect size (f = .26) with a = .05 and power = .80. Therefore, low power is once again proposed as the explanation. A similar explanation is not proposed for the non-significant main effects of both manipulations, where their effect sizes are trivial (f's < .10). The non-significant interactions indicate that there was no interaction among the four variables measured to make additive contributions.

4.3.4. Hypothesis-guessing

It is always possible, particularly during psychological experiments, that participants might deduce the experiment's purpose and, thus, subconsciously generate a response to fit their understanding. To examine this possibility, a multi-choice hypothesis-guessing question was provided and analysed.

Table 11
Frequency and percentage of hypotheses-guessers

	Options	Frequency	Percent
1	Self-confidence and safety-seeking behaviours	32	19.51%
2	Self-confidence and social anxiety	49	29.88%
3	Self-confidence and alcohol use	0	0%

	Options	Frequency	Percent
4	Safety-seeking behaviours and social anxiety	19	11.58%
5	Intolerance of uncertainty and fear of negative evaluation	7	4.27%
6	Intolerance of uncertainty and social anxiety	8	4.88%
7	Self-confidence, social anxiety, and alcohol use	31	18.90%
8	Safety-seeking behaviours, fear of negative evaluation and alcohol use	14	8.54%
9	Don't know	1	0.61%
10	Other	2	1.22%
	Total	164	100%

Options number 5 and 6 were the true aim of this recent study. Fifteen participants (9.15%, CI 95% = 4.74% to 13.56%) were classified as hypotheses-guessers. This number is smaller than the number of participants who would be expected to correctly guess the hypotheses (N = 18) from the number of options provided (N = 149/9) though the difference was not significant (*hs`* = .04, *Z* = .40, *p* = .344).

Therefore, repeating the main analyses after all the hypotheses-guessers were removed was considered important to ensure the effects. The re-analyses indicated identical patterns of significant and non-significant results to those reported from the previous analyses with similar effect sizes.

5 Discussion

This study consists of two parts. Part 1 is the classification stage, which also aims to replicate and refine a previous study conducted by the author (Chapter 4). The result highlights the significant relationship between IU, social anxiety and alcohol use. Part 2, which is the principal part, primarily aims to experimentally examine a potential causal role played by IU on social anxiety and safety behaviours. The findings provide support for the main hypotheses that the enhancement of IU would lead to an increase in social anxiety and safety behaviours. For this part, the overall results will be explained first, while the implications for the theory will be discussed later.

5.1. Part 1

5.1.1. Relative contribution of intolerance of uncertainty on social anxiety

Firstly, replicating a previous study conducted by the author (Chapter 4), this current study reveals that IU, FNE and AS each made additive and unique contributions to the variance in social anxiety. These support an increasing number of studies that reported a consistently moderate correlational relationship between IU and social anxiety from various samples (Boelen & Reijntjes, 2009; Boelen et al., 2010; Brown & Gainey, 2013; Carleton et al., 2010; McEvoy & Mahoney, 2011& 2012; Michel et al., 2016; Norr et al., 2013; Sapach et al., 2015; Whiting et al., 2014). Different to a number of these previous studies (Boelen et al., 2010; Boelen & Reijntjes, 2009; Brown & Gainey, 2013; McEvoy & Mahoney, 2011; Norr et al., 2013), which utilised IUS-27 (Freeston, Rheaume, Letarte, Dugas & Ladoucer, 1994), this study employed IUS-12 (Carleton, Norton et al., 2007) that has been reported to have a stable factor structure (Carleton, Norton et al., 2007). Different to several of these previous studies (McEvoy & Mahoney, 2011 & 2012; Norr et al., 2013; Riskind, Tzur, Williams, Mann & Shahar, 2007; Sapach et al., 2015; Whiting et al., 2014), who used the Social Performance Scale (SPS) and/or the Social Interaction Anxiety Scale (SIAS) developed by Mattick and Clarke (1998) and measured two situational aspects (performance and interaction situations) of social anxiety separately. This study utilised the Social Phobia Inventory (SPIN) that measures two situational aspects of social anxiety collectively (Connor et al., 2000). So, consistent results have been found, although the exact combination of measures is different.

Secondly and more importantly, FNE made the greatest contribution, followed by IU and subsequently AS. This is identical with the results of the original study (Chapter 4). Furthermore, it partially supports the other study also conducted by the author in the UK among a mixed sample (Chapter 2) and the Indonesian study (Chapter 5) recruiting university students. The UK study among mixed sample investigated IU, FNE and shame, and which reported that only IU and FNE provided a significant contribution to the variance. The contribution of IU was smaller than the contribution of FNE. The Indonesian study investigated IU, FNE and AS, which is the same as this current study. However, it reported that the contribution of IU was the smallest compared to FNE, which was the largest, and AS. Despite the inconsistency of the Indonesia data, all these studies indicate that the contribution of IU to the variance in social anxiety was significant. It suggest the important role played by

IU in the maintenance of social anxiety even when tested against other cognitive vulnerabilities.

However, part 1 failed to support the result of the previous studies that there were interactional relationships between both IU and FNE (Chapters 2 and 4) and between IU and AS (Chapter 4). This is not only related to low power, given this study had a smaller number of participants than the previous study, but the effect size of the interactions was trivial. So, this must be considered as a failure to replicate.

Extending the previous study (Chapter 4). Part 1 also found that each of the three cognitive risk factors had significant direct and indirect effects on safety behaviours mediated by social anxiety. It suggests that IU can lead to increasing motivation to perform safety behaviours with or without the presence of social anxiety. This makes sense given individuals may have IU, but not social anxiety due to a low level of FNE (Chapter 4). Moreover, more than two decades ago, Clark and Wells (1995) and Salkovskis (1991) suggested that socially anxious individuals tend to develop safety behaviours. Therefore, the finding of this present study complements the suggestion mentioned above. It provides an initial explanation with reference to the pathway pertaining to the generating of safety behaviours.

Overall, this study supported previous studies particularly those conducted by the author. Not only did IU have a significant relationship with social anxiety, but that IU also made a significant additional contribution to the variance in social anxiety over and above FNE, a more well-known main risk factor of social anxiety, and AS, which has been linked to social anxiety even before IU. Individuals who are intolerant of uncertainty would evaluate social situations as being more uncertain, and consequently, this uncertainty is disturbing and threatening and thus, leads to socially anxious feeling. As stated by Carleton et al. (2010), "it's not the judgment, it's that I don't know" (p. 189).

5.1.2. Intolerance of uncertainty, social anxiety and social drinking

The results of the replication regarding a proposed model predicting social drinking are almost identical to Chapter 4. First, both results reveal that, first, IU, FNE and AS had no significant direct effects on drinking alcohol with friends. These non-significant direct effects indicate that these cognitive vulnerabilities cannot stand alone and require mediator(s) to be able to predict social drinking.

Second, both studies also reported that IU, FNE and AS had negative indirect effects via social anxiety on social drinking, indicating that social anxiety may be a protective factor for

students from participating in social drinking. However, this finding is in opposition to some studies (e.g. Bakken, Landheim & Vaglum, 2005; Buckner, et al. 2008; Nelson et al., 2000; Zimmerman et al., 2003) suggesting that Social Anxiety is a strong risk factor of Alcohol Use Disorders, which consists of Alcohol Abuse Disorders and Alcohol Dependence Disorders (American Psychiatric Association, 2013). It is worth noting that this study measured social anxiety symptoms and did not diagnose Social Anxiety Disorders. In addition, this study recruited students who consume alcohol frequently, not individuals diagnosed with Substance-Related Disorders (Substance-Induced Disorders and Substance Use Disorders; American Psychiatric Association, 2013). Therefore, the discerpant findings may be due to threshold or severity effects.

Third, the indirect effect of FNE to frequency of social drinking by means of social motives alone was significant and positive, while the indirect effect of IU through social motives alone was not significant. However, the indirect effect of FNE through social anxiety and social motives was not significant, whereas the indirect effect of IU through social anxiety and social motives was significant and positive.

These results are also identical to the results of the original study (Chapter 4). These results are very interesting and suggest that among the cognitive vulnerabilities underlying social anxiety, FNE and IU may help explain the discrepant results from previous studies.

More specifically, FNE, which is the stronger predictor of social anxiety, may drive people to avoid social activities. However, reporting fear of possible evaluation from others is more likely to mean that they may also consume alcohol for any social reasons: either drinking alcohol to improve self-confidence or to reduce anxiety around people or even to avoid the possibility of receiving a negative judgement if the individual declines the invitation to drink with others. These results are not contradictory. Referring to FNE, which is the main of factor of social anxiety, thus, individuals reporting high FNE are very likely, if not obviously, suffering social anxiety. Consequently, their excessive fear of being embarrassed or socially rejected that leads them to avoid social activities against their socially positive expectancies regarding the impact of alcohol. This explains the non-significant result of the indirect effect of FNE through social anxiety and social motives serially.

Conversely, although students who report IU may perceive that social activities are uncertain and threatening, but they may not be excessively anxious to the point of not participating in social activities. Consequently, they may participate in social activities where alcohol is consumed and furthermore, they may also believe that alcohol can help them in

relation to social reasons. Thus, these instrumental motives may drive a person reporting IU and social anxiety to consume alcohol.

However, they may also perceive that being involved in social drinking could lead individuals to become inebriated. It means, if individuals drink alcohol and subsequently become intoxicated, they place themselves in uncertain situations where they may lose control of their behaviour, do something embarrassing, be embarrassed or eventually, receive negative judgements from people. Consequently, although these individuals may believe that alcohol is "a good social lubricant", they are afraid of the negative impact of being inebriated. This reason may explain why the indirect effect of IU on social drinking via social motives was not significant.

Lastly, specific for AS, its indirect effect through social motives was not significant in Chapter 4. However, it was significant and positive in this replication. Conversely, its indirect effect through social anxiety and social motives was significant and positive in Chapter 4, but not significant in this replication. Any possible explanation underlying these inconsistent results is not yet evident. For instance, initially it was supposed related to the differences in demographic profiles, such as differential ethnicity. The proportion of Asians in this current study was approximately 10%, while for Chapter 4, the Asians were approximately 21%. As has stated in Chapter 3, the Indonesian data reported a different proportion regarding the contribution of AS relative to IU and FNE in predicting social anxiety. It suggested that a variety of cultures may influence the differential effects of AS in predicting psychopathological symptoms. However, exploratory analyses of the data of both studies after Asians were excluded found most identical results to the previous inconsistent results. The only exception is the indirect effect of AS through social anxiety and social motives was not significant now. The indirect effects of IU through social motives remained different. Therefore, further study is required that focus on AS.

Overall, these studies identify the importance of IU as the only one of the three cognitive vulnerabilities examined as underlying social anxiety that may lead to an increase in social drinking. It also highlights the importance of social motives for alcohol use, which appears to drive socially anxious students to eventually consume alcohol with friends. Therefore, a study examining the efficacy of treatment targeting both IU and social motives among students who consume alcohol recreationally is strongly recommended and may make a significant clinical contribution to overcome problems related to alcohol use among students.

INTOLERANCE OF UNCERTAINTY AS A PLAUSIBLE CAUSAL FACTOR

The pathway of relationships between these cognitive risk factors, social anxiety and alcohol use with friends is explained in the Figure 14. Given only IU and FNE demonstrate consistent results, the focus will be on IU and FNE only.

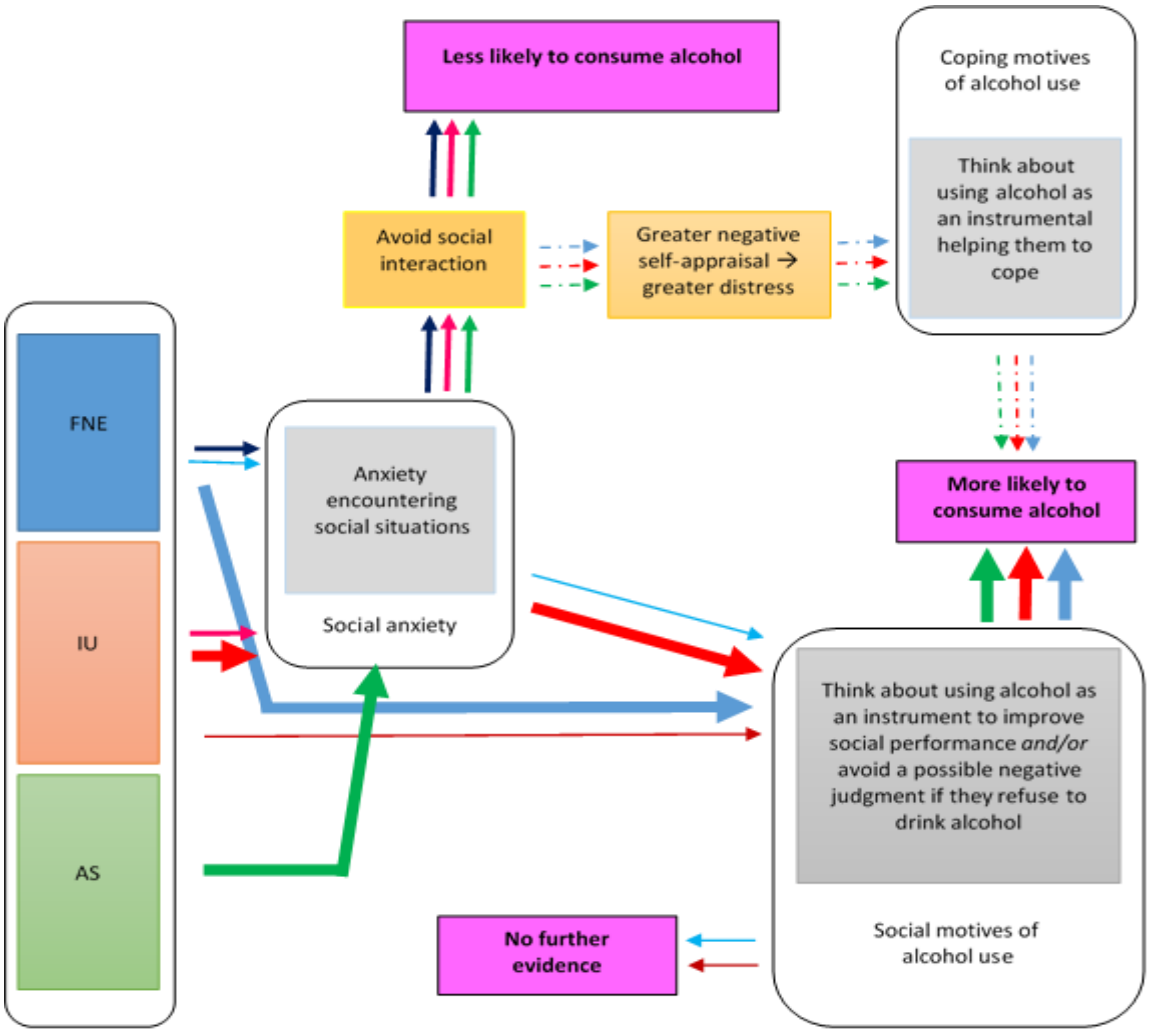

Figure 4. The pathway demonstrating the relationship between cognitive risk factors, social anxiety and social drinking

Note:

	Possible outcomes
Solid line	Observed pathway explaining alcohol use among recreational users
Dot line	Hypothesized pathway explaining Alcohol Use Disorders
Thin line	Pathway that goes to "No further evidence"
Medium line	Pathway that goes to "Less likely to consume alcohol"
Thick Line	Pathway that goes to "More likely to consume alcohol"
→	FNE→SA→less likely to consume alcohol

FNE→SOCMOT→more likely to consume alcohol

FNE→SA→SOCMOT→no further evidence

IU→SA→ less likely to consume alcohol

IU→SOCMOT→ no further evidence

IU→SA→SOCMOT→ more likely to consume alcohol

AS→SA→ less likely to consume alcohol

5.2. Part 2

5.2.1. Summary of the results

5.2.1.1. Social interaction

The IU manipulation check (IU-MC) and FNE manipulation check (FNE-MC) reveals that IU was manipulated. Participants in the high uncertain condition reported experiencing more uncertainty and more being evaluated than those in the low uncertain condition. Conversely, the main effect of the FNE manipulation and the interaction were not significant with effect sizes that were trivial. This indicates that FNE was not successfully manipulated and the impact of IU was independent of the FNE manipulation, respectively.

The hypothesis testing reveals that those in the elevated IU condition reported significantly higher social anxiety in addition to the increasing tendency to perform safety behaviours. Conversely, reducing IU decreased social anxiety and safety behaviours. There were no significant effects of FNE manipulation and the interaction on social anxiety and safety behaviours. In addition, their effects sizes were trivial. This suggest that the FNE manipulation failed and again, the impact of the IU manipulation was independent of the FNE manipulation, respectively. Finally, neither the IU manipulation and the FNE manipulation nor their interaction had significant effects on social motive for alcohol use.

Investigations on the role of dispositional variables reveal that dispositional IU and FNE each significantly influenced participants' experience of uncertainty and being evaluated, in addition to safety behaviours. However, only dispositional FNE influenced social anxiety. Dispositional IU did not influence social anxiety although its effect size is considered nearly medium.

In addition, the main effects of the IU manipulation on participants' experience of uncertainty and being evaluated, social anxiety and safety behaviours remained significant after the presence of the two dispositional variables. Its effect on participants' experience of uncertainty and social anxiety was not reduced after the presence of the two dispositional

variables. This indicates that the manipulation of IU was not confounded by presence of the two dispositional variables and it signifies that the manipulation of IU was successful. Conversely, its effect on participants' experience of being evaluated and safety behaviour reduced after the presence of the two dispositional variables. This indicates that the two dispositional variables had slightly confounded the impact of the IU manipulation. Moreover, the main effects of the FNE manipulation after the presence of the two dispositional variables remained not significant on all further analyses on MCs and DVs. In addition, its effect size was trivial. It suggests that the FNE manipulation failed.

Only the interaction between the IU manipulation and the FNE manipulation influenced participants' experience of either uncertainty or being evaluated, whereas the other interactions were not significant. None of the interactions influenced social anxiety and safety behaviours. This indicates that each main effect on both DVs was independent of the other main effects.

An additional interesting finding is that although none of the manipulations were successful regarding social motive for alcohol use, dispositional FNE was able to influence social motive for alcohol use, but dispositional IU did not. Both manipulations also remained not significant. Interestingly, the interaction between dispositional IU X dispositional FNE X IU manipulation was now significant, whereas the other interactions remained not significant. This indicates that the two dispositional variables in conjunction with IU manipulation together made interconnected contribution.

5.2.1.2. Social performance

The IU manipulation check analysis indicates that IU and FNE were both experimentally manipulated, though the combined effect was not significant. Participants in either the high uncertain condition or the high evaluation condition reported experiencing more uncertainty than those in either the low uncertain condition or the low evaluation condition. Conversely, the FNE manipulation check reveals that neither the IU manipulation nor the FNE manipulation and their interaction were significant.

Moreover, the hypothesis testing reveals that neither the increase in situational IU nor enhancement of situational FNE nor their interaction increased either social anxiety or safety behaviours.

However, analysis investigating the role of the dispositional variables demonstrates that dispositional IU and FNE each significantly influenced participants' experience of uncertainty, social anxiety and safety behaviours. However, only dispositional FNE

influenced participants' experience of being judged. None of the interactions were significant. In addition, the significant main effects of the IU manipulation and the FNE manipulation on participants' experience of uncertainty remained and moreover, their effect sizes were not reduced. This indicates that neither of the dispositional variables confounded the impacts of the manipulations on participants' experience of uncertainty. Moreover, the main effects of the IU manipulation and the FNE manipulation on participants' experience of being evaluated, social anxiety and safety behaviours remained not significant and their effect sizes were trivial. These confirm that both manipulations failed.

None of the interactions were significant on both MCs and safety behaviours. There were only two significant effects of dispositional IU x dispositional FNE x IU manipulation and dispositional IU x IU manipulation x FNE manipulation on social anxiety. These indicate that that dispositional IU in conjunction with either dispositional FNE and IU manipulation only or the two manipulations together made interconnected contribution.

5.2.2. Causal relationship between intolerance of uncertainty and social anxiety

Previously, three studies provided an initial indication that a reduction in IU was associated with a reduction in social anxiety. Hewitt et al. (2009), Mahoney and McEvoy (2012), who replicated a study by Hewitt et al. and Boswell et al. (2013) reported that CBT treatment was able to reduce IU and SA and the reduction in IU was associated with SA. However, those three previous studies did not reveal a temporal precedence. Consequently, the evidence reported by each of the studies is arguably too weak to establish a causal relationship.

Most recently, Reuman et al. (2015), who implemented a vignettes approach, provided the first evidence that explicit uncertainty significantly increased anxiety and the urge to perform safety behaviours. Their novel finding is obviously significant though Reuman's study did not specifically measure social anxiety.

Moreover, IU itself was initially defined as a state of bothered feelings resulting from perception of an uncertain situation (Ladouceur et al., 1995), but recently it has been seen more as a dispositional characteristic as the result of negative beliefs in relation to uncertainty (Ladouceur et al., 2000). However, the recent notion perceives that IU is more than a temporary cognitive bias, IU is considered a dispositional characteristic, thus, can be relatively stable (Carleton, 2012). This thesis examined both: (i) The causal effect of situational IU, through IU manipulation and represented a psychological response. Thus, it is

temporary. (ii) The temporal precedence of dispositional IU, which was measured 2-3 weeks prior to the post-manipulation and represented a stable characteristic.

More than having a significant correlational relationship, the main part of this study provides strong evidence that *situational IU may be considered as a causal factor for social anxiety and safety behaviours* in the social interaction situation. Further analysis indicates that the effect of IU manipulation to predict participants' social anxiety was not confounded by the presence of either dispositional IU or FNE. This confirms that the IU manipulation was successful and it means the effect of situational IU was truly present at all levels of dispositional IU.

IU may affect the way people face social situations; it's not only about the judgement, but "it's that I don't know" (Carleton et al., 2010; pp. 189). Therefore, the findings above demonstrate that individuals who, will simply encounter or have already been in a social situation, perceive that the situation is uncertain, consequently, they may feel threatened and become socially anxious. The more they perceive that the situation is uncertain, the more likely their perception of threat and social anxiety will be escalated. This social anxiety subsequently enhances the tendency to perform safety behaviours which they believe would reduce the uncertainty related to a possibility of the threat when they encounter social situations.

As far as we know, this is the first evidence establishing the causal relationship between IU and social anxiety and safety behaviours. This causal evidence is also the most interesting novel finding from this study. This is a crucial milestone in building a comprehensive picture of the development and maintenance processes in social anxiety and safety behaviours. It contributes to the refinement of the Cognitive Model of Social Phobia proposed by Clark and Wells (1995) and the Social Behavioural Cognitive Model of Social Anxiety proposed by Rapee and Heimberg, (1997) and further developed by Heimberg et al. (2010), which highlighted FNE as the main factor, although no study has yet presented evidence to support the causal relationship between FNE and social anxiety. The additional contribution of this present study is that IU has been established as a causal factor of social anxiety and safety behaviours.

However, the causal role of IU on social anxiety and safety behaviours likewise being found in the social interaction situation is not evident within the social performance situation investigated in this study, even though IU was successfully manipulated and determined participants' experience of uncertainty with a small-medium effect size. However, the IU

manipulation in the social performance situation was not strong enough to increase participants' social anxiety level, and moreover, it did not encourage them to perform safety behaviours. Further analyses also revealed that the effect of the IU manipulation on participants' experience of uncertainty was reduced when baseline levels of dispositional IU and FNE were in the model. This indicates that the significant effect of the IU manipulation has been partially confounded by the presence of the two dispositional variables. This was different to the effect observed in the social interaction situation that was clearly larger and was not reduced by the presence of dispositional variables. Moreover, the FNE manipulation check in the social performance situation also demonstrated that the low uncertain condition has been perceived more evaluative than the high uncertain condition. This indicates that the vignette is ambiguous at best and hard to interpret.

Overall, the weak and ambiguous IU manipulation in the social performance scenario may explain the absence of a causal relationship between IU and social anxiety, as well as with safety behaviours, within the social performance situations.

Unexpectedly, dispositional IU only influenced safety behaviours in the social interaction situation. Dispositional IU did not influence social anxiety in both social interaction and social performance situations and also safety behaviours in the social performance situation. However, it is worth nothing that the main effect sizes of dispositional IU are considered nearly medium (f = .209 and .237 and .207, respectively). This study itself is only powered to detect a medium effect size (f = .26) with a = .05 and power = .80. Therefore, a possibility that the effect size was undetected due to low power is likely. Despite this unexpected result, this is the first study to provide evidence of temporal precedence of dispositional IU on safety behaviours in a social interaction situation. This supports the Cognitive Model of Social Phobia proposed by Clark and Wells (1995). When individuals encounter a social situation or simply anticipate it and they feel socially anxious, they will subsequently employ a range of safety behaviours in order to reduce their social anxiety.

In relation to FNE, Part I of this present study, in conjunction with the three previous studies conducted by the author (Chapters 2, 4 & 5), reveals that, as mentioned above, the contribution of FNE to social anxiety was consistently the largest. It supports previous findings that stated that FNE is the main factor in social anxiety (e.g., Carleton et al., 2007; Collins et al., 2005; Stopa, 2001; Weeks et al., 2005; Weeks et al.,2008), although none of the studies provide causal evidence.

Nevertheless, this experiment failed to provide evidence of causal relationships between situational FNE and either social anxiety or safety behaviours within both social performance and social interaction situations. Furthermore, the manipulation check analysis indicates that FNE manipulation was not able to determine participants' experience of being evaluated in both social interaction and social performance situations. There were no significant differences related to the means of FNE-MC between those who were allocated in the high FNE manipulation and those who were in the low FNE manipulation. All the main effect sizes of the FNE manipulation are also trivial. This confirms that the FNE manipulation failed and a refinement of the vignette is required.

Previous literature may provide some indications of how the vignette may be modified. Previously, few studies have manipulated constructs that close with FNE. For instance, Iliggins & Marlatt (1975) manipulated fear of interpersonal evaluation to determine alcohol use among male social drinkers. The experimental group reported that their drinking behaviours would be evaluated by a group of women, while the control group did not expect to be evaluated. As hypothesised, subjects in the first group drank more than those from the control group. Moreover, DePaulo, Epstein & LeMay (1990) manipulated the prospect of interpersonal evaluation, in order to examine the effect of social anxiety on inhibited and withdrawal behaviours. There were groups of socially anxious subjects and non-socially anxious subjects. There were two conditions: suggesting that their performance would be evaluated versus suggesting that there would not be any evaluation following the performance. As predicted, socially anxious subjects who had been informed that their performance would be evaluated made up a less unique shorter story compared to the other groups.

Those two studies illustrated that to achieve the expected effect; the two conditions (high FNE and low FNE) presumably will be more powerful if they have a similar theme but clearly contrasting levels of evaluation. Therefore, refinement of the vignette used by this study by eliminating the ambiguity of the FNE manipulation would be recommended. For instance, in the social interaction situation, comparing a fancy dress party where there will be a costume competition versus a no costume competition would provide a more evaluative impact it is predicted, in contrast to comparing a fancy dress party versus a tea party. In addition, in the social performance situation, excluding the element of the 3 minute Q &A session following the presentation in the low FNE manipulation, presumably would decrease the sense of being evaluated.

INTOLERANCE OF UNCERTAINTY AS A PLAUSIBLE CAUSAL FACTOR

Although the FNE manipulation failed, this study found that dispositional FNE influenced social anxiety and safety behaviours in both social interaction and social performance situations. Its effects size also stands out as the largest. This signifies the crucial role of FNE and supports previous studies which stated that FNE may be the principal cognitive risk factor of social anxiety through providing evidence of the temporal precedence of dispositional FNE on social anxiety and safety behaviours in hypothetical situations.

For social anxiety in the social performance scenario, two significant interactions were found, specifically dispositional IU x dispositional FNE x IU manipulation and dispositional IU x IU manipulation x FNE manipulation. Roughly speaking, this gives an initial indication of the interaction between dispositional and situational variables to predict social anxiety. For instance, regarding the significant effect of dispositional IU X dispositional FNE X IU manipulation, those individuals who have dispositional characteristics to excessively perceive uncertainty in a negative way or to excessively fear of negative evaluation would *be more socially anxious* when in the middle of a *social interaction* that is uncertain compared to individuals in the same situations who have low dispositional IU and FNE.

Ultimately, although the effect of the IU manipulation within the social interaction situation was reasonably strong, the IU manipulation did not elevate the social motive for alcohol use. Recently, Kraemer, McLeish and O'Bryan (2015) investigated the relationship between IU and drinking motives among college students. They determined that greater IU significantly predicted increasing coping and conformity motives, but not social or enhancement drinking motives. To our knowledge, this is the only study examining the contribution of IU on alcohol-related variables. It should be noted that this study examined conventional motives, the one proposed by Cox and Klinger (1988), and the proposed model was a single direct path (IU → alcohol motives).

Further exploratory analysis showed that only dispositional FNE positively predicted social motives of alcohol use, while dispositional IU did not. It supports the result from Chapter 4 and the replication that among IU, FNE and AS, only FNE had a significant and positive indirect effect through social motives of alcohol use on social drinking. Reporting FNE is more likely to mean a greater believe that alcohol is a good social lubricant that can improve self-confidence as well as reduce anxiety around people.

5.3. Strengths and limitations

There are a number of strengths within this study. The first is that this is the first study to investigate and suggest the causal role of IU on social anxiety. Second, this experiment was based entirely online, which both theoretically and empirically, enhanced the ecological validity of the experimental design. In terms of privacy, this strategy is considered the best approach to investigate such a sensitive topic as social anxiety and alcohol use among students. Third, both peer-discussions explored the everyday events that most students would relate to, in addition to a pilot study, prior to commencing the real study, facilitated the development of an ecologically valid design, regarding the experiment.

The fourth strength is related to the elements of the experimental design. Referring to a range of methodological issues related to previous experimental manipulations of IU addressed by Chapman (2015b) and also refining his experimental design investigating the causal role of IU on worry (Chapman, 2015a), several strategies were implemented within this study.

First, coping with the possibility of obtaining an unbalanced assignment, a stratified randomisation method (Efron, 1971) was used on baseline IUS and BFNE scores. This strategy was recommended due to its simplicity, minimal experimental biases and as it is more powerful (Antognini, 2008; Chen, 2006; Kraemer, 1984; Markaryan & Rosenberger, 2010) and it eventually worked well within this recent study. This strategy, originally called Efron's Biased Coin Design, assigned participants equally, whilst significantly, this strategy also successfully randomised participants, indicated by the differential baseline scores across conditions which were not significant.

Second, camouflaging comprised of two strategies, which informed participants of the false aim of the research and provided several other variables covering the story of the main hypotheses, were implemented. The aim was to reduce the possibility that participants would be influenced by the goal of the experiment or guess the hypotheses.

Related to this, third, a hypothesis-guessing question enabling control over those correctly guessing the true aim of the study was also provided. This was in order to investigate the possible influence of the demand effect; however, the analysis suggested that it was not present. Subsequently, the manipulation check-questions were also provided and analysed. The number of correct hypothesis guessers was smaller than the expected number. Even after removing all those hypothesis guessers, the results were identical to the results of

analysis involving all participants. Hence, the analysis revealed the efficacy of the manipulation.

Lastly, further analyses investigating the role of the dispositional variables also confirm that the effects of uncertain manipulation on social anxiety and safety behaviours significantly remained, although it had reduced. It signifies that the IU manipulation itself had a significant impact on the level of social anxiety and safety behaviours regardless of the baseline levels of IU.

Despite these strengths, it is important to discuss a number of limitations that will provide directions for future studies. The first is related to the vignettes. Despite the IU manipulation demonstrating reasonably strong effect in the social interaction situation, the IU manipulation failed in the social performance situation and the FNE manipulations failed with regards to both, in the social performance and the social interaction situations. It indicates that refinement of the vignettes is greatly recommended.

Moreover, second, the vignette approach is probably less robust in comparison with a manipulation, where participants experience the situation. Consequently, a further experimental study using a different method is required.

Within this online strategy, participants were able to accomplish the tasks from anywhere, at any time, whilst there was no specific time limit for participants to complete all the tasks. A number of participants took less than 1 hour; several others required more than a day, which indicated that they completed the tasks on several occasions. Therefore, third, there was a lack of control over the experimental environment that could possibly have accounted for participants' responses. Conducting the experiment in the lab with a specific time limit, where the privacy of participants is completely guaranteed is an option that is exceedingly recommended; although it requires more sophisticated preparation and considerable logistical management.

Fourth, a further possible limitation is related to the participants' demographic profiles. All participants were students (non-clinical samples) with practically 70% of them being undergraduates. Although this has been decided purposely for theoretical and methodological reasons and is entirely appropriate for this study, it indicates that the generalisation of the results is limited. In addition, approximately two thirds of the sample was female. Although previous research, including the result of part 1, indicated an equivocal result related to the effect of gender upon the study variables, future research may benefit from equal gender proportions.

5.4. Conclusion

This study supports previous studies conducted by the author that reveal IU has a significant contribution in predicting social anxiety. This study also ascertains that socially anxious individuals may tend to avoid social drinking; however, as being driven by social motive of alcohol belief, they may eventually participate in the occasion.

Most importantly, this study provides the first evidence pertaining to the causal role of situational IU in the development and maintenance of social anxiety and the use of safety behaviours. This study also provides the first evidence pertaining to the temporal precedence of dispositional IU in relation to safety behaviours. Moreover, this study also provides the first evidence pertaining to the temporal precedence of dispositional FNE in relation to social anxiety and safety behaviours.

Given this is the first study to investigate the causal role of IU on social anxiety, further studies are still required. A further development of the experimental design is recommended, particularly the development of a more robust method to investigate the causal role of FNE and its interaction with IU in underlying social anxiety. Refining the previous treatment studies (Boswell et al., 2013; Hewitt et al., 2009; Mahoney & McEvoy, 2012), further treatment studies that provide evidence of a temporal precedence are also warranted.

Overall, this novel finding is valuable, both for theoretical and practical reasons. It further refines the Cognitive Model of Social Phobia (Clark & Wells, 1995) and the Cognitive Behavioural Model of Social Phobia (Heimberg, Brozovich & Rapee, 2010; Rapee & Heimberg, 1997). Furthermore, it also encourages development of treatments that address IU, particularly those targeting social anxiety and alcohol use-related problems.

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List of appendices

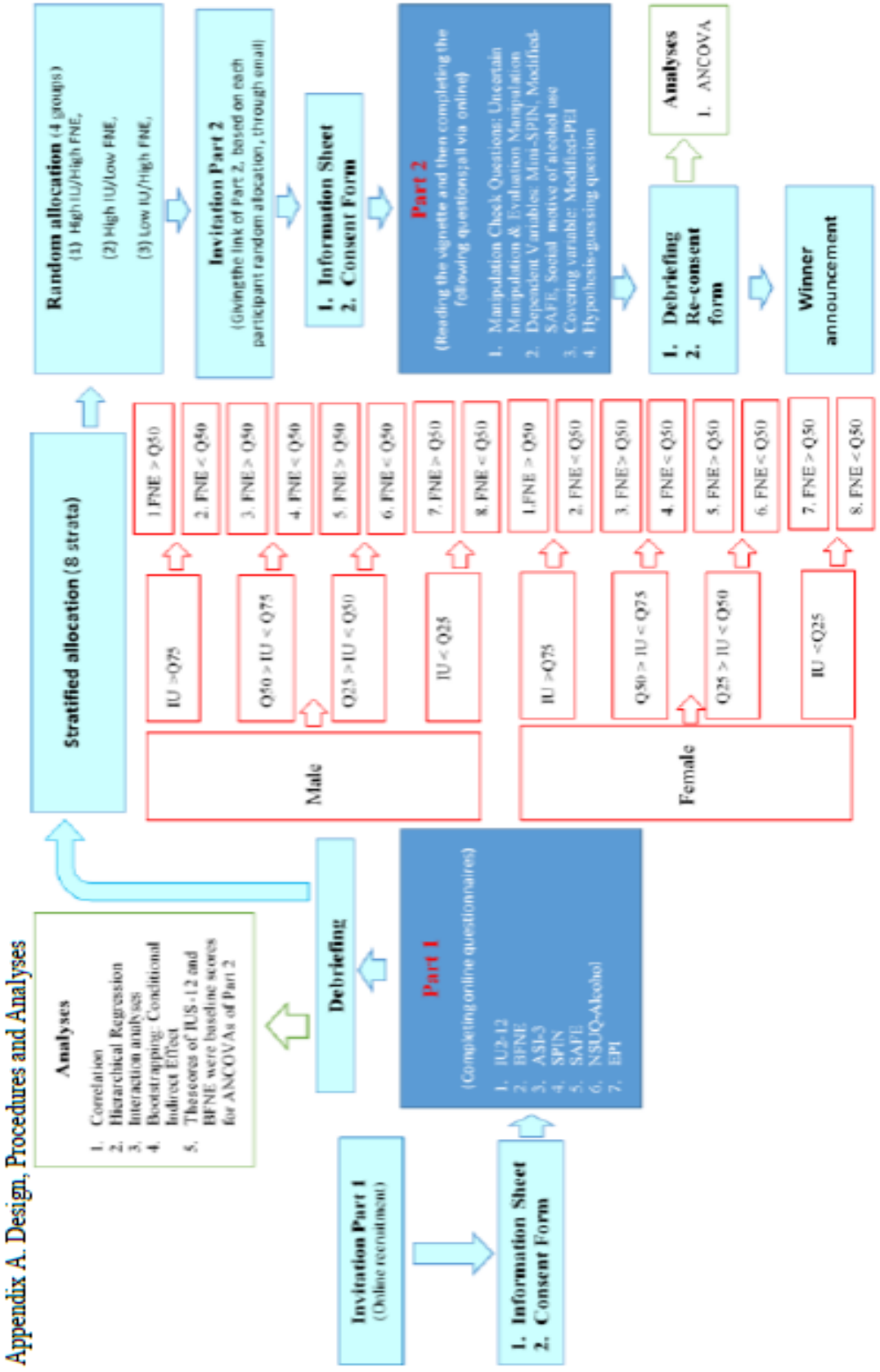


Figure 1. Design, Procedures and Analyses

Appendix B. A priori power analysis

The following table displays the summary of any previous studies examining variables measured within this study (IU, FNE and SA). They were used to estimate the effect size for the proposed study.

Table 12

Table zero order correlations between measures in any previous studies

	Author	Sample	Measures	N	IU-FNE	IU-SA	FNE-SA
1	Boelen & Reijntjes, 2009	Community	IUS 27, BFNE, SPIN	283	0.59	0.7	0.63
2	Boelen, Reijntjes, Carleton, 2014	Undergraduate	IUS-12, SPIN	215		0.58	
3	Carleton, Collimore & Asmundson, 2010	Community	IUS-12, BFNE, SIPS	286	0.59	0.69	0.68
4	Fergus, Kevin, 2011	Undergraduate	IUS-27, SIAS	725		0.53	
5	Khawaja & McMahon, 2011	Undergraduate	IUS-27, SPIN	253		0.57	
6	Norr et al., 2013	Undergraduate	IUS-27, SIAS	217		0.51	
7	Yuniardi et al, 2014	Undergraduate	IUS-M, BFNE, SIPS	129	0.61	0.59	0.69
8	Yuniardi, 2015	Undergraduate	IUS-12, BFNE, SPIN	379	0.64	0.67	0.78
Mean r					0.61	0.61	0.70
Effect size *f*							
Required sample size					34	34	27
N x 4					136	136	108

In summary, as can be seen in table above, the effects of interest are estimated to approximately be in the range of .61 to .70.

The estimates of effect size were then utilised to calculate the required sample size for ANCOVA, power .80 and $p = .05$ using G*Power (Faul *et al.*, 2010). Given a possibility of a decreasing number of participants taking part in the second phase, the number of required sample size generated for the first phase was increased four times.

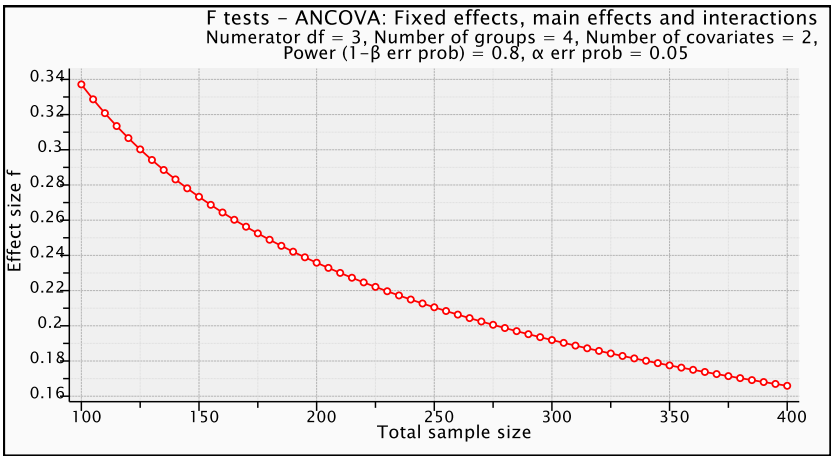
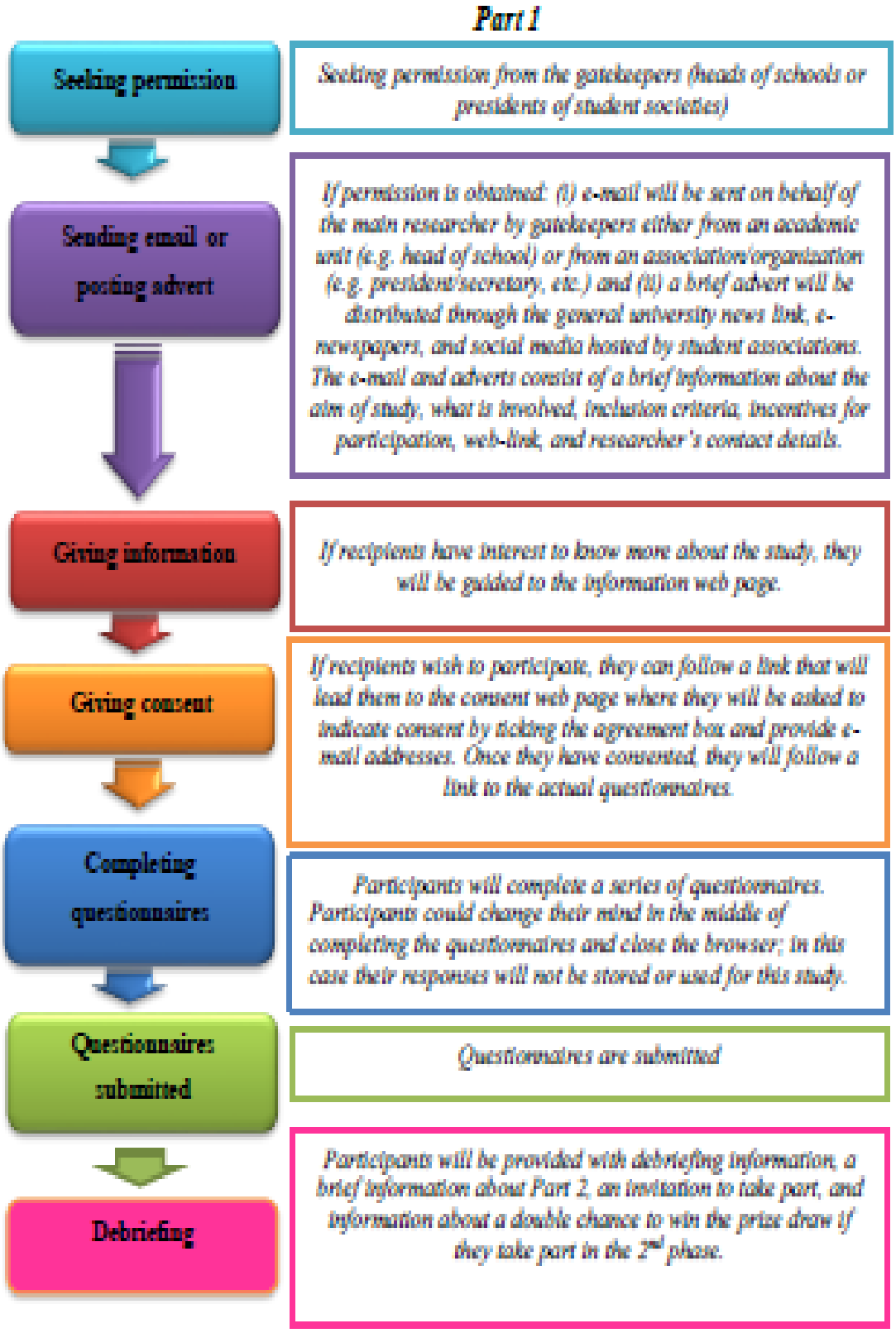


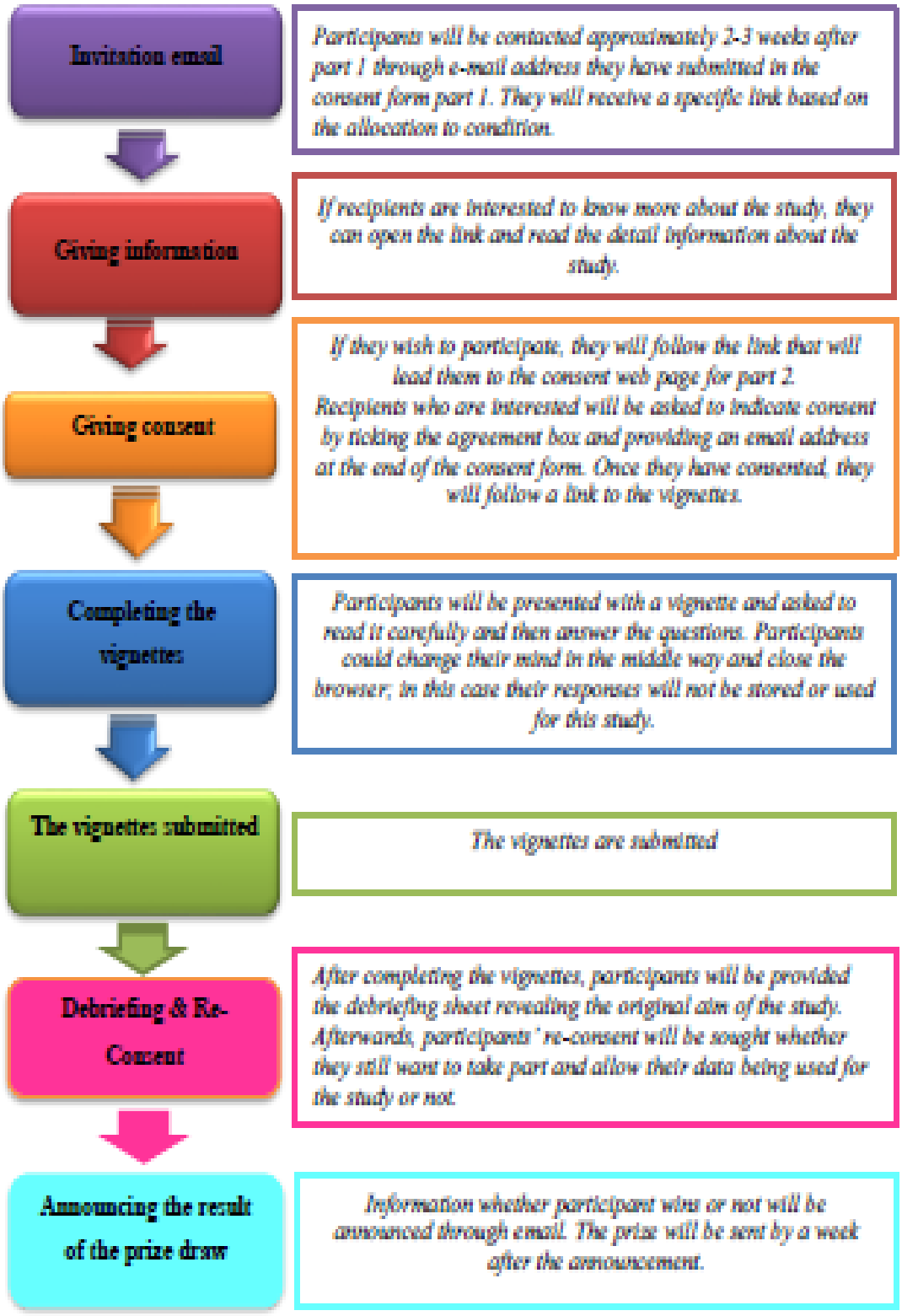
Figure 5. Result of G*Power test

As can be seen in the figure above, with N = 300, effect sizes of *f* = .19 could be detected with power = .80, N = 200 for *f* = .24, and *f* = .34 for 100. Thus even with N = 100, the relationships between IU, FNE and SA that can be detected are even smaller than the effect of interest.

Appendix C. Flowchart recruitment strategies



Part 2


Invitation email
Participants will be contacted approximately 2-3 weeks after part 1 through e-mail address they have submitted in the consent form part 1. They will receive a specific link based on the allocation to condition.
Giving information
If recipients are interested to know more about the study, they can open the link and read the detail information about the study.
Giving consent
If they wish to participate, they will follow the link that will lead them to the consent web page for part 2. Recipients who are interested will be asked to indicate consent by ticking the agreement box and providing an email address at the end of the consent form. Once they have consented, they will follow a link to the vignettes.
Completing the vignettes
Participants will be presented with a vignette and asked to read it carefully and then answer the questions. Participants could change their mind in the middle way and close the browser; in this case their responses will not be stored or used for this study.
The vignettes submitted
The vignettes are submitted
Debriefing & Re-Consent
After completing the vignettes, participants will be provided the debriefing sheet revealing the original aim of the study. Afterwards, participants' re-consent will be sought whether they still want to take part and allow their data being used for the study or not.
Announcing the result of the prize draw
Information whether participant wins or not will be announced through email. The prize will be sent by a week after the announcement.

Appendix D. Ethical approval

Newcastle University

30 September 2015

Muhamad Salis Yuniardi
Institute of Neuroscience

Faculty of Medical Sciences
Newcastle University
The Medical School
Framlington Place
Newcastle upon Tyne
NE2 4HH United Kingdom

FACULTY OF MEDICAL SCIENCES: ETHICS COMMITTEE

Dear Muhamad

Title: Intolerance of uncertainty as a plausible causal factor of social anxiety: A vignette based approach
Application No: 00892/2015
Start date to end date: 15 July 2015 to 30 July 2016

On behalf of the Faculty of Medical Sciences Ethics Committee, I am writing to confirm that the ethical aspects of your proposal have been considered and your study has been given ethical approval.

The approval is limited to this project: **00892/2015**. If you wish for a further approval to extend this project, please submit a re-application to the FMS Ethics Committee and this will be considered.

During the course of your research project you may find it necessary to revise your protocol. Substantial changes in methodology, or changes that impact on the interface between the researcher and the participants must be considered by the FMS Ethics Committee, prior to implementation.*

At the close of your research project, please report any adverse events that have occurred and the actions that were taken to the FMS Ethics Committee.*

Best wishes,

Yours sincerely

M. Holbrough

Marjorie Holbrough
On behalf of Faculty Ethics Committee

cc.
Professor Daniel Nettle, Chair of FMS Ethics Committee
Ms Lois Neal, Assistant Registrar (Research Strategy)

*Please refer to the latest guidance available on the internal Newcastle web-site.

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Appendix E. Vignette and questionnaires used in the Part 2

Vignettes

There will be two short vignettes that will be displayed on the monitor one by one. I would like you to read the vignette and imagine that the vignette is entirely about you and really happening. Following each vignette, you will be asked to rate some questions enquiring about what you might think or feel about the situations described in the vignette. Subsequently, just click the "arrow" button whenever you have finished and the next vignette will be displayed then.

Uncertainty Condition (UC) high – Evaluative Condition (EC) high

Social Performance	*As part of your study, you have to give a presentation in front of a mixed group of peers and academic staff sometime in the next week. Your presentation is going to be evaluated and marked by them. The score has a large part contribution for the result of your study. Information about the exact date, the location and format of the presentation will be sent by e-mail a day before presentation.*
Social Interaction	*You have been invited to attend a fancy dress party by a new friend. There will be a best costume competition judged by audiences. The winner will get a prize. The guests are his/her friends. There will be no one at the party that you know them. The party will be held in a pub that you have never been to.*

Uncertainty Condition (UC) high – Evaluative Condition (EC) low

Social Performance	*As part of your study, you have to give a presentation in front of a small group of peers sometime in the next week. Your presentation will not be evaluated. It aims only to give students a practice and an experience giving presentation. Information about the exact date, location and format of the presentation will be sent by e-mail a day before presentation.*
Social Interaction	*You have been invited to attend a tea party by a new friend. This is only an informal small party to enjoy the weekend. There is no any dress code. The guests are his/her friends. There will be no one at the party that you know them. The party will be held in a pub that you have never been to.*

Uncertainty Condition (UC) low – Evaluative Condition (EC) high

Social Performance	*As part of your studies, you have to give a presentation in front of a mixed group of peers and academic staff next Wednesday. Your presentation is going to be evaluated and marked by them. The score has a large part contribution for the result of your study. You have 7 minutes presentation and 3 minutes for Q & A. The presentation will be held in one of teaching rooms.*

Social Interaction	*You have been invited to attend a fancy dress party by a classmate. There will be a best costume competition judged by audiences. The winner will get a prize. Some of the guests are your classmates. You know most of them. The party will be held in a pub that you often come in it.*

Uncertainty Condition (UC) low – Evaluative Condition (EC) low

Social Performance	*As part of your studies, you have to give a presentation in front of a small group of peers next Wednesday. Your presentation will not be evaluated. It aims only to give students a practice and an experience giving presentation. You have 7 minutes presentation and 3 minutes for Q & A. The presentation will be held in one of teaching rooms.*
Social Interaction	*You have been invited to attend a tea party by a classmate. There is no any dress code, only an informal small party to enjoy the weekend. Some of the guests are your classmates. You know most of them. The party will be held in a pub that you often come in it.*

Notes:

High Uncertainty Condition

Low Uncertainty Condition

High Evaluative Context

Low Evaluative Context

Questionnaires

Not at all		*A little*		*Moderately*		*Quite a bit*		*Very much*
0	1	2	3	4	5	6	7	8

	Manipulation-check questions:									
A.1.	I feel that this situation is uncertain	1	2	3	4	5	6	7	8	9
A.2.	This uncertain feeling is bothering me	1	2	3	4	5	6	7	8	9
B.3.	I feel others judging me in this situation	1	2	3	4	5	6	7	8	9
B.4.	This feeling of being judged by others is bothering me	1	2	3	4	5	6	7	8	9
	Confound Variable (Anxiety sensitivity)									
C.5.	It is important for me not to appear nervous during this situation	1	2	3	4	5	6	7	8	9
C.6.	When my heart beats rapidly during this situation, obviously it will scare me	1	2	3	4	5	6	7	8	9
C.7.	When I begin to sweat in this situation, I fear people will think negatively of me	1	2	3	4	5	6	7	8	9
C.8.	When my mind possibly goes blank, I worry there is something terribly wrong with me	1	2	3	4	5	6	7	8	9
	Main enquiry questions (DVs):									
	Social anxiety symptoms (DV 1)									
D.9.	Fear of embarrassment causes me to avoid giving presentation	1	2	3	4	5	6	7	8	9
	Fear of embarrassment causes me to avoid attending the party	1	2	3	4	5	6	7	8	9
D.10	I avoid giving presentation because obviously I will be the centre of attention	1	2	3	4	5	6	7	8	9
	I avoid attending the party because very likely I will be the centre of attention	1	2	3	4	5	6	7	8	9
D.11.	Being embarrassed or looking stupid during my presentation are among my worst fears	1	2	3	4	5	6	7	8	9
	Being embarrassed or looking stupid during the party are among my worst fears	1	2	3	4	5	6	7	8	9
	Safety behaviours (DV 2)									
E.12.	I excessively rehearse sentences in prior my presentation	1	2	3	4	5	6	7	8	9

	I excessively rehearse sentences in prior going to the party	1	2	3	4	5	6	7	8	9
E.13.	I tightly control my behaviour during my presentation	1	2	3	4	5	6	7	8	9
	I tightly control my behaviour during the party	1	2	3	4	5	6	7	8	9
E.14.	I avoid eye contact during my presentation	1	2	3	4	5	6	7	8	9
	I avoid eye contact during my presentation	1	2	3	4	5	6	7	8	9
E.15.	I am very likely getting blank or switch off mentally during presentation	1	2	3	4	5	6	7	8	9
	I am very likely getting blank or switch off mentally when speak with people attending the party	1	2	3	4	5	6	7	8	9
E.16.	I would wear cool clothes to prevent sweating	1	2	3	4	5	6	7	8	9
E.17.	I would say, “Apologize, I didn’t have enough time for the presentation because…”	1	2	3	4	5	6	7	8	9
	I would say, “Apologize, I didn’t have enough time to prepare for gong to this party because…”	1	2	3	4	5	6	7	8	9
E.18.	I would spend hours on grooming prior the presentation	1	2	3	4	5	6	7	8	9
	I would spend hours on grooming prior the party	1	2	3	4	5	6	7	8	9
E.19.	I would pretend feeling hot to cover being ashamed because sweating or blushing	1	2	3	4	5	6	7	8	9
	Covering story questions (self-confidence)									
F.20.	During this event, I found that I am fortunate to be as good looking as I am	1	2	3	4	5	6	7	8	9
F.21	For me meeting new people during this presentation day is an enjoyable experience that I look forward to	1	2	3	4	5	6	7	8	9
	For me meeting new people during this party is an enjoyable experience that I look forward to	1	2	3	4	5	6	7	8	9
F.22	When things going poorly during this event, I am confident that I can successfully deal with them	1	2	3	4	5	6	7	8	9
F.23.	I am as capable as most people at giving presentation	1	2	3	4	5	6	7	8	9
	I am as capable as most people at speaking with other people I meet in any party	1	2	3	4	5	6	7	8	9

F.24	I feel more confident about myself today than I usually do	1	2	3	4	5	6	7	8	9
Exploratory questions (DV 3; only for social interaction scenarios)										
If in this party alcohol (e.g. wine, beer, sparkling wine, etc.) is available,……..										
F.25.	I believe that it would help me to feel more confident and less anxious around people	1	2	3	4	5	6	7	8	9
F.26.	I believe that it would help me to think differently and give me mental boost	1	2	3	4	5	6	7	8	9
F.27.	I believe that it would increase my sexual desire and my sexual stamina as well	1	2	3	4	5	6	7	8	9

Manipulation-check questions

Please select one option that best describes what you think this study is about:

- Self-confidence and safety-seeking behaviours
- Self-confidence and social anxiety
- Self-confidence and alcohol use
- Safety-seeking behaviours and social anxiety
- Intolerance of uncertainty and fear of negative evaluation
- Intolerance of uncertainty and social anxiety
- Self-confidence, social anxiety, and alcohol use
- Safety-seeking behaviours, fear of negative evaluation and alcohol use
- Don't know
- Other

	1.	2.	3.	4.	5.	6.	7.	8.	9.	
Not sure at all	○	○	○	○	○	○	○	○	○	Sure at all

Appendix F. Development of the Vignette used in the Part 2

The vignette used in this study was developed by means of:

1. Initially generating various themes representing social situations commonly faced by students, specifically: undertaking a class presentation, participating in a group discussion, accomplishing group homework, attending a party, preparing a social event with friends, joining an activity conducted by a student society.
2. Discussing with supervisors to select themes/situations most students are confronted by and representing two types of social situations (social performance and social situation). Consequently, two themes/situations, which are undertaking a class presentation and attending a party, were selected.
3. Developing the selected themes into vignettes. Each theme consists of four conditions: high uncertainty-high evaluative, high uncertainty-low evaluative, low uncertainty-high evaluative and low uncertainty-low evaluative.
4. Conducting a series of discussions with supervisors to evaluate and improve the clarity and validity of the vignette. This included looking at choice of words, length of vignette, consistency across variants, etc. Consequently, a draft of the vignette was accomplished.
5. Piloting the draft by asking seven students (four were doctorate students, two were Masters students and one was an undergraduate) to rate both the uncertainty and evaluative level of each vignette. The presentation of the vignette had previously been randomised. The result of their ratings can be seen in the table below:

	Vignette	**Variable**	**Degree**	**Participants**							**mean**
				1	2	3	4	5	6	7	
1	As part of your study, you have to give a presentation in front of a mixed group of peers and academic staff sometime in the next week. Your presentation is going to be evaluated and marked by them. The score has a large part contribution for the final result of your study. Information about the exact date, the location and format of the presentation will be sent by e-mail a day before presentation.	IU	H	8	8	8	9	7	9	9	11.6
		FNE	H	8	7	8	9	7	9	9	11.4

	Vignette	Variable	Degree	Participants							mean
				1	2	3	4	5	6	7	
7	As part of your studies, you have to give a presentation in front of a mixed group of peers and academic staff next Wednesday. Your presentation is going to be evaluated and marked by them. The score has a large part contribution for the final result of your study. You have 7 minutes presentation and 3 minutes for Q&A. The presentation will be held in one of teaching rooms.	IU	L	6	4	4	3	5	1	5	5.6
		FNE	H	6	4	4	8	7	9	5	8.6
5	As part of your study, you have to give a presentation in front of a small group of peers sometime in the next week. Your presentation will not be evaluated. It aims only to give students a practice and an experience giving presentation. Information about the exact date, location and format of the presentation will be sent by e-mail a day before presentation.	IU	H	6	5	6	3	7	1	3	6.2
		FNE	L	6	5	6	3	3	1	3	5.4
3	As part of your studies, you have to give a presentation in front of a small group of peers next Wednesday. Your presentation will not be evaluated. It aims only to give students a practice and an experience giving presentation. You have 7 minutes presentation and 3 minutes for Q&A. The presentation will be held in one of teaching rooms.	IU	L	5	2	1	2	3	1	3	3.4
		FNE	L	5	2	1	2	5	1	1	3.4
4	You have been invited to attend a fancy dress party by a new friend. There will be a best costume competition judged by audiences. The winner will get a prize. The guests are his/her friends. There will be no	IU	H	3	3	3	8	8	7	7	7.8
		FNE	H	3	3	3	8	7	9	7	8

	Vignette	Variable	Degree	Participants							mean
				1	2	3	4	5	6	7	
	one at the party that you know them. The party will be held in a pub that you have never been to.										
2	You have been invited to attend a fancy dress party by a classmate. There will be a best costume competition judged by audiences. The winner will get a prize. Some of the guests are your classmates. You know most of them. The party will be held in a pub that you often come in it.	IU	L	3	2	1	3	3	1	3	3.2
		FNE	H	3	3	2	3	5	7	5	5.6
6	You have been invited to attend a tea party by a new friend. This is only an informal small party to enjoy the weekend. There is no any dress code. The guests are his/her friends. There will be no one at the party that you know them. The party will be held in a pub that you have never been to.	IU	H	2	3	3	7	4	5	5	5.8
		FNE	L	2	3	3	8	2	1	4	4.6
8	You have been invited to attend a tea party by a classmate. There is no any dress code, only an informal small party to enjoy the weekend. Some of the guests are your classmates. You know most of them. The party will be held in a pub that you often come in it.	IU	L	1	1	1	2	5	1	1	2.4
		FNE	L	1	1	1	2	3	1	1	2

6. Working together with supervisors to revise and finalise the vignette.

Institute of Neuroscience

Chapter 7. General Discussion and Conclusion

Muhamad Salis Yuniardi

110530503

March 2017

Supervisors: Prof. Mark Freeston & Dr. Jacqui Rodgers

9,567 words
(not including abstract, references and appendices)

I declare that this assignment is my own work and I have correctly acknowledged the work of others. This assignment is in accordance with University and School guidance on good academic conduct (and how to avoid plagiarism and other assessment irregularities. University guidance is available at www.ncl.ac.uk/right-cite

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Chapter 7. General Discussion and Conclusion

This thesis principally aims to investigate the precise role of intolerance of uncertainty (IU) in the development and maintenance of social anxiety and alcohol use. Development of the Newcastle Substance Use Questionnaire, a series of independent cross-sectional studies, and an experimental study were conducted.

Two main hypotheses were supported. First, IU has a robust relationship with social anxiety and, furthermore, IU causes social anxiety. Second, IU had an indirect effect on alcohol use, mediated serially by social anxiety.

1. Intolerance of uncertainty and social anxiety

1.1. Relative contribution of intolerance of uncertainty to social anxiety

The initial finding of this thesis is that IU, fear of negative evaluation (FNE) and anxiety sensitivity (AS) independently made significant additive and unique contributions regarding the variance in social anxiety (Chapters 4, 5 & 6). This result accords with various theorists, who argue that there is no single cause in relation to mental disorders, but that mental disorders are in fact represented by a cluster of several risk factors (Fyer & Brown, 2009; Hyman, 2003; Levinson et al., 2013).

Pertaining to the significant contribution of IU, which is the main focus of this thesis, on social anxiety, all the cross-sectional studies conducted by author supported it. The evidence was first from a mixed sample (Chapter 2), and second from students recruited in the UK (Chapters 4 & 6) and third, students from Indonesia (Chapter 5). The study, which employed the mixed sample, primarily examined IU, FNE and shame (Chapter 2), while the other studies compared the relative contributions of IU, FNE and AS (Chapters 4, 5 & 6).

This finding is also in line with an increasing number of studies reporting the consistently moderate correlational relationship between IU and social anxiety (Boelen & Reijntjes, 2009; Boelen, Vrinssen & van Tulder, 2010; Brown & Gainey, 2013; Carleton, Collimore, & Asmundson, 2010; McEvoy & Mahoney, 2011 & 2012; Michel, Rowa, Young & McCabe, 2016; Norr et al., 2013; Sapach, Carleton, Mulvogue, Weeks & Heimberg, 2015; Whiting et al., 2014). Reviewing most of these previous studies, Prousky (2016) suggested that IU might play a significant role in social anxiety.

However, there is variability in how the key constructs have been measured by these previous studies. Half of these previous studies (Boelen et al., 2010; Boelen & Reijntjes, 2009; Brown & Gainey, 2013; McEvoy & Mahoney, 2011; Norr et al., 2013; Riskind, Tzur, Williams, Mann & Shahar, 2007) used the original version of the Intolerance of Uncertainty Scale (27 items; Freeston, Rheaume, Letarte, Dugas, & Ladoucer, 1994). The factor structure of the IUS-27 has been reported unstable across studies investigating its latent structure (Buhr & Dugas, 2002; Carleton, Norton & Asmundson, 2007; Freeston et al., 1994; Norton, 2005) and none of solutions were superior in terms of meeting with the criteria for goodness of fit (Carleton, Norton et al., 2007). Half of these previous studies used the Social Performance Scale (SPS) and/or the Social Interaction Anxiety Scale (SIAS), either using both scales (McEvoy & Mahoney, 2011 & 2012; Whiting et al., 2014) or just one (Norr et al., 2013; Sapach et al., 2015). Both SPS and SIAS were developed by Mattick and Clarke (1998) and measure two separate situational aspects (performance and interaction situations) of social anxiety.

On the other hand, this thesis used IUS-12 (Carleton, Norton et al., 2007) with the two factor structures consistently stable (Birrell, Meares, Wilkinson & Freeston, 2011; Carleton, Norton et al., 2007) and performed comparatively to the original IUS-27 in terms of the psychometric properties (internal consistency, convergent and divergent validity) to the IUS-27. In addition, the total score of the IUS-12 strongly correlated to the total score of the IUS-27, indicating that the extra 15 items from the IUS-27 are redundant and thus, IUS-12 is a more efficient tool (Carleton, Norton et al., 2007). In addition, this thesis utilised the Social Phobia Inventory (SPIN) that measures two situational aspects of social anxiety collectively, covering all principal aspects of social anxiety (fear, avoidance and physiological components) and has demonstrated excellent psychometric properties (Connor et al., 2000).

Despite the differences in terms of participants, cultural backgrounds of the participants, and the exact combination of measures used by the previous studies (e.g. Boelen & Reijntjes, 2009; Brown & Gainey, 2013; Carleton et al., 2010) and the four cross-sectional studies conducted by the author, a consistent result has been found. This thesis confirms that IU has a moderate correlational relationship with social anxiety.

Contrasting with those aforementioned previous studies investigating the relationship between IU and social anxiety, this thesis also compared the relative contribution of IU to the relative contributions of FNE and AS. Boelen and Reijntjes (2009) and Whiting et al., (2014) have compared the relative contribution of IU and FNE. They reported that the contribution of FNE was greater than the contribution of IU, but Boelen and Reijntjes suggested that the difference was not significant. Most recently, Sapach et al. (2015) examined FNE, fear of

positive evaluation (FPE), IU's sub dimensions and AS's sub dimensions jointly, using data from a clinical sample. A hierarchical regression analysis was performed to address this aim. They entered FNE after the covariates and the other anxiety-related variables. The contributions of FNE and FPE were compelling. Only the cognitive dimension of AS and prospective IU made significant contributions.

Therefore, none of the previous studies have distinctly compared the relative contribution of IU to the variance in social anxiety relative to the contributions of FNE and AS. Although Sapach et al., (2015) examined a similar model, they did not perform a series of hierarchical regression comparing each contribution when the variables were rotated and entered into the first (after covariates) and last steps. Consequently, a clear comparison of each contribution could not be produced. In addition, none of the previous studies had considered the relative contribution of IU, FNE and AS. They did not investigate any possible interactions between IU and other cognitive risk factors in predicting social anxiety.

The second finding of this thesis, which is considered a novel finding and more important, is that the contribution of IU was smaller than the contribution of FNE which was consistently contributed the greatest proportion in relation to variance (Chapters 2, 4, 5 & 6). From the UK studies, UI was subsequent to FNE (Chapters 2, 4 & 6), and then, the lowest contributor was AS (Chapters 4 & 6). Interestingly, the contribution of IU was smaller than AS among the Indonesia sample (Chapter 5).

This thesis supports a statement highlighting FNE as the foci of social anxiety (Clark & Wells, 1995; Haikal & Hong, 2010; Rodebaugh et al., 2004). Furthermore, this thesis refined previous cross-sectional studies supporting the critical role of FNE on social anxiety (e.g., Carleton, Collimore & Asmundson, 2007; Collins, Westra, Dozois & Stewart, 2005; Stopa, 2001; Weeks et al., 2005; Weeks, Heimberg, Rodebaugh & Norton, 2008) by providing distinct evidence that the contribution of FNE was consistently higher when compared to other risk factors.

This thesis supported previous studies reporting that AS is significantly related to social anxiety (e.g. Alkozei, Cooper & Creswell, 2014; Essau, Sasagawa & Ollendick, 2010; Hazen et al., 1994; Naragon-Gainey, Rutter & Brown, 2014; Panayiotou, Karekla & Panayiotou, 2015; Rodriguez, Bruce, Pagano, Spencer & Keller, 2004). It was also in accordance with the finding from several previous studies, which showed that AS contributed to various types of anxiety disorders, including social anxiety (Michel et al., 2016; Olatunji & Wolitzky-Taylor, 2009; Rabian, Peterson, Ritchers & Jensen, 1993; Taylor et al., 2007; Taylor, Koch, & McNally, 1992), although it has been reported that AS has the strongest association with panic disorder (Taylor et al., 1992). Nevertheless, this is the first thesis to confirm that AS

made additive and unique contributions to the variance in social anxiety over and above FNE and IU. An explanation of the different pattern of the contributions of IU and AS in Indonesia (Chapter 5) will be discussed later.

The third finding and also one of most interesting findings taken from this thesis, is that the interactions between IU and FNE (Chapters 2 & 4) or AS (Chapter 4) were significant. First, the effect of IU on social anxiety was significant when FNE was moderate to high, and this effect became stronger with the increase in FNE (Chapters 2 & 4). Conversely, the effect of FNE on social anxiety was significant at all levels of IU (Chapter 4). Chapter 2 reported an unpredicted finding, which was the effect of FNE on social anxiety was significant only when IU was moderate to high. Despite this dissimilarity, Chapters 2 and 4 reported that the effect of FNE became stronger with the increase in IU.

Again, it highlights the critical role of IU in predicting social anxiety. Not only does IU significantly predict social anxiety, IU and FNE strengthen each other in predicting social anxiety. Moreover, it is proposed that FNE is the primary factor underlying social anxiety and the effect of IU on social anxiety is significant only when FNE is already present.

IU is a cognitive bias in perceiving uncertainty negatively (Buhr & Dugas, 2002; Carleton, 2012; Carleton, Norton et al., 2007; Dugas, Schwarzt & Francis, 2004) and in fact most aspects of life including social situations, are uncertain. Consequently, IU may affect the way people face social situations. However, this cognitive bias may cause social anxiety only when the individual already has a tendency to fear any possible negative judgement. At this point, IU interacts with FNE in predicting social anxiety. Those having high FNE and IU collectively are more likely to interpret social situations more rapidly as full of threats and to make a poor impression in social performance, and as a result, obtain negative judgements. As a result, they are more likely to avoid it rather than face it. Inevitably, individuals who have both cognitive risk factors will be much more vulnerable to experiencing social anxiety than those individuals who have only one risk factor.

Second, the effect of IU on social anxiety was significant at all levels of AS and the increasing level of AS strengthened the effect of IU on social anxiety (Chapter 4). Conversely, the effect of AS on social anxiety was significant when the level of IU was moderate to high. Similarly, this effect became stronger as the IU level increased. This demonstrates that they both strengthen each other in predicting social anxiety, but IU may arise earlier as the effect of AS was significant only when IU was already present.

This is consistent with Taylor et al., 2007 who have identified AS as an anxiety amplifier. When individuals begin to feel anxious about uncertainty in their lives, they will become more concerned about arousal of bodily-sensation related to their anxiety. They may

think that this arousal of bodily-sensation is an alarm indicating a harmful thing will occur. This could vary from fainting, becoming unwell, having a heart attack, to dying. Subsequently, these thoughts amplify their anxiety. So, this is a type of vicious cycle. This thesis is the first to report this interaction and, thus, it warrants replication and further study.

A cognitive process maintaining social anxiety can be proposed based on the FNE x IU and AS x IU interactions. FNE would be the main vulnerability factor for social anxiety. IU is the secondary factor and its effect on social anxiety is significant, although its contribution depends on the level of FNE. Then AS would act as the amplifier of social anxiety caused by FNE and IU.

However, this model could only be tested through either a longitudinal study or experimental design. Both designs are able to meet two of the three criteria required to establish a causal relationship: temporal precedence (the cause precedes the effect) and covariance (the cause and effect are related). Only an experimental design can rule out any possible third variable (Shadish, Cook & Campbell, 2002). A cross sectional study utilising regression analyses as employed in this thesis only reports interaction.

The model above would predict the presence of the three-way interaction between FNE, IU and AS on social anxiety. Unexpectedly, this thesis does not provide evidence to support it. The three-way interaction made a trivial additional contribution to the variance in social anxiety. A further study powered to detect a small effect size is required. It can be done not only through recruiting a larger number of participants, but through conducting an extreme group design and/or narrowing definitions of the constructs which could then achieve a greater sensitivity. For instance, a factor structure analysis established the three-factor solutions of AS: fear of physical sensation of anxiety, fear of cognitive dyscontrol and fear of public observation of anxiety (Zinbarg, Molman & Hong, 1999). Of those sub-scales, the fear of public observation of anxiety (the social sub-scales) had the strongest relation to social anxiety (e.g. Rector, Szacun –Shimizu & Leybman, 2007; Zinbarg & Barlow, 1996). Consequently, investigating AS sub-dimensions separately or targeting only the social sub-scales may lead to a better test of the hypothesized model. Notwithstanding this limitation, this is the first thesis that provides original evidence of the possible interaction of the relationship between those three cognitive risk factors and social anxiety.

However, studies both in Indonesia (chapter 5) and the UK (chapter 6) did not replicate the interaction. The explanation regarding data obtained from Indonesia (Chapter 5) will be discussed later, while the non-significant result from the replication in the UK (Chapter 6) is also related to the under-power issue. The replication study (Chapter 6) had a smaller number

of participants than the original one (Chapter 4). Therefore, a further study powered to detect a small effect size is recommended.

The fourth finding of this thesis is that shame did not predict social anxiety (Chapter 2). It was not in line with the finding from several studies that reported a positive relationship between shame and social anxiety (Fergus, Valentiner, McGrath & Jencius, 2010; Gilbert, 2000; Hedman, Strom, Stunkel & Mortberg, 2013). This contradiction may be related to the scale employed to examine shame. These previous studies utilised TOSCA-shame sub-scale (Tangney, Wagner & Gramzow, 1989). Several studies critiqued TOSCA (Cohen, Wolf, Panter & Insko, 2011; Luyten, Fontaine & Corveleyn, 2002; Sorolla, Piazza, & Espinosa, 2011). For instance, TOSCA-shame measures negative self-esteem, not shame itself (Luyten et al., 2002), while low/negative self-esteem had been reported to positively correlate with social anxiety (e.g. Harman et al., 2005; Jong, 2005; Kocovski & Endler, 2000). In addition, TOSCA-shame measures negative emotions associated with guilt and shame; and not specific to shame (Sorolla et al., 2011). This thesis utilised GASP-shame sub-scale, which measures shame under its original definition and is able to distinguish between guilt and shame empirically (Cohen et al., 2011).

Overall, despite IU's contribution being smaller than the contribution of FNE (Chapters 2, 4, 5 & 6), and its relationship with social anxiety presumably dependent on the level of FNE (Chapter 4), it should be highlighted that the additive and unique contributions of IU on social anxiety are consistently significant (Chapters 2, 4, 5 & 6). In addition, more robust evidence is required to demonstrate that IU's contribution is greater than the contribution of AS (Chapters 4 & 6). Moreover, there are interactions between IU and FNE or AS and IU that enhance the effects of FNE and AS, and vice versa.

Therefore, it is proposed that IU is one of the most important factors underlying social anxiety, after FNE. IU may be "the Robin" who accompanies FNE, "the Batman" in "Gotham City's" social anxiety. They work collectively and complement each other in predicting social anxiety. However, this claim requires further study, particularly referring to the result from Indonesia, which demonstrated a different pattern.

1.2. Intolerance of uncertainty as a causal factor of social anxiety

There is relatively strong evidence suggesting IU as a causal factor in GAD, either from the laboratory study examining a model (Buhr & Dugas, 2009; Chapman, 2015; Ladouceur, Gosselin, & Dugas, 2000), treatment study on clinical participants that examine temporal precedence (Dugas & Ladouceur, 2000), or even from, a longitudinal naturalistic study (Dugas, Laugesen, & Bukowski, 2012). However, relatively little is known concerning the

causal relationships between IU and social anxiety. Three studies investigating the efficacy of Cognitive Behaviour Therapy have provided initial indications that IU may be a potential causal factor of social anxiety. They reported that CBT was able to significantly reduce both social anxiety and IU (Boswell et al., 2013; Hewitt, Egan & Rees, 2009; Mahoney & McEvoy, 2012b). Furthermore, the reduction in IU was significantly related to the reduction in social anxiety (Boswell et al., 2013; Mahoney & McEvoy, 2012b). However, none of these studies demonstrate temporal precedence. Consequently, a causal relationship regarding IU on social anxiety cannot be concluded.

A further important point is that although there is extensive evidence suggesting the robust relationship between FNE and social anxiety from cross-sectional studies (e.g., Carleton, Collimore et al., 2007; Collins et al., 2005; Stopa, 2001; Weeks et al., 2005 & 2008), several treatment outcome studies (e.g. Cox, Swinson, & Direnfeld, 1998; Heimberg et al., 1990) and some particularly dated laboratory studies (Friend & Gilbert, 1973; Leary, 1983; Smith & Sarason, 1975; Watson & Friend, 1969; Winton, Clark, & Edelmann, 1995), no studies have manipulated FNE or examined the temporal precedence of changes in FNE with regard to social anxiety. Therefore, it is actually too early to draw a firm conclusion that FNE is the pivotal causal factor of social anxiety.

Addressing the absence of evidence to support a potential causal relationship between either IU or FNE and social anxiety, an experimental study using a vignette approach was conducted (Chapter 6). IU has been defined as either a psychological response to an uncertain situation in daily-life (Freeston, 1994; Ladouceur, Dugas & Freeston, 1995, as cited in Carleton, 2012) or a dispositional characteristic, as the result of negative beliefs that uncertainty is intolerable (Ladouceur et al., 2000). However, as summarized by Carleton (2012), the recent notion perceives that IU is more than a temporary cognitive bias; IU is considered to be a dispositional characteristic, thus, is arguably rather stable. This thesis examined both the causal role of the situational IU, representing psychological response which is temporary, and the temporal precedence of the dispositional IU, representing a stable characteristic (Chapter 6).

The most important original finding from this thesis is that situational IU may be considered a causal factor for social anxiety and safety behaviours in social interaction situations. Individuals who perceive that the social situation is uncertain will feel threatened and anxious socially. It's not only about the judgement, but "it's that I don't know" (Carleton et al., 2010; pp. 189). The more they perceive that the situation is uncertain, the more likely their perception of threat and social anxiety will be escalated. This social anxiety subsequently enhances the tendency to perform safety behaviours which they believe would

reduce the uncertainty related to a possibility of the threat when they encounter social situations.

With regards to the social performance situation, the increasing situational IU did not enhance the levels of social anxiety and the use of safety behaviours, though it has been successfully manipulated with a small effect size. Moreover, the FNE manipulation check in social performance situation also demonstrated that the low uncertain condition has been perceived more evaluative than the high uncertain condition. This indicates that the vignette is ambiguous at best and hard to interpret. This weak and ambiguous IU manipulation in the social performance scenario may explain the absence of a causal relationship between IU and social anxiety, as well as with safety behaviours.

Moreover, this thesis also provides evidence of temporal precedence of dispositional IU on safety behaviours in a social interaction situation. Unexpectedly, dispositional IU did not influenced social anxiety in both social interaction and social performance situations and also safety behaviours in social performance situation. Referring to their effects sizes which are considered nearly medium, an explanation related to low power is proposed. Despite this unexpected result, this is the first study to evidence of temporal precedence of dispositional IU on safety behaviours.

In addition, this result is consistent with the results of the mediation analyses (Chapter 6, Part 1) which reported that IU had significant direct and indirect effects on safety behaviours after controlling for social anxiety. Furthermore, situational IU caused safety behaviours (Chapter 6, Part 2). Therefore, IU can lead to an increasing motivation to perform safety behaviour even in the absence of a direct path from IU to social anxiety. Referring back to the results from the interaction analyses in social anxiety (Chapter 4), individuals may have IU, but not social anxiety due to have a low level of FNE.

However, it appears that there is still a noticeable gap, particularly regarding the role of FNE where no studies have been found which provide evidence confirming a temporal precedence of FNE on social anxiety and safety behaviours. All cross-sectional studies illustrated that FNE accounted for variance in social anxiety (e.g., Chapters 4, 5, & 6; Carleton et al., 2007; Collins et al., 2005; Stopa, 2001; Weeks et al., 2005 & 2008), and moreover, that its contribution is greater in comparison with IU and AS (Chapters 4, 5, & 6). This thesis provides evidence that dispositional FNE influenced social anxiety and safety behaviours, both in social interaction and social performance situations (Chapter 6). Unexpectedly, situational FNE was not effectively manipulated to cause social anxiety and safety behaviours (Chapter 6). The vignettes used were not specific to manipulate experience

of being evaluated. Therefore, refinement of the vignette used by this thesis would be recommended.

This is the first thesis reporting a causal relationship between situational IU and social anxiety and safety behaviours. This is also the first thesis reporting evidence of temporal precedence of dispositional IU on safety behaviours. This is a crucial milestone in the process of building a comprehensive picture related to the development and maintenance of social anxiety.

This thesis support for the fundamental fears proposed by Carleton et al. (2014) through provided clear evidence that IU, FNE and AS may be the fundamental fears that essentially contribute to anxiety-related psychopathologies. Therefore, it would also be a theoretical contribution. Not only for SA, but for worry and presumably depression as well.

Finally, This thesis supports and furthermore, refines the Cognitive Model of Social Phobia (Clark & Wells, 1995) and the Cognitive Behavioural Model of Social Phobia (Heimberg, Brozovich & Rapee, 2010; Rapee & Heimberg, 1997). From the comparison and interaction analyses, this thesis provides further clear evidence that FNE would be the main vulnerability factor concerning social anxiety. Given the significant contribution and evidence indicating a causal role of IU on social anxiety, this thesis suggests that **IU should be considered and included in models that explain the development and maintenance of social anxiety.** Although IU would only possibly lead to social anxiety when FNE is already present, the presence of IU would strengthen the effect of FNE on social anxiety. Moreover, AS may subsequently act as the amplifier of social anxiety caused by FNE and IU.

1.3. Intolerance of uncertainty and social anxiety among Indonesia sample

With regard to the total population of Indonesia, which is more than 250 million people (Badan Pusat Statistik, 2015), it is estimated that more than seven million Indonesians are affected by social anxiety today. However, the lack of studies exploring social anxiety in Indonesia indicates that social anxiety may be neglected as a research field; although social anxiety might be influenced by environment or culture in a different way (e.g. Van Dam Baggen, Kraaimaat & Elal, 2003; Van Dam-Baggen, Van Heck & Kraaimaat, 1992). Only a small number of studies in Bahasa (the official language of Indonesia; Suryaningrum, 2006; Swasti & Martani, 2013; Syarif & Balqis, 2014) and two studies in English (Kraaimaat, van Dam-Baggen, Veeninga & Sadarjoen, 2012; Vriends, Pfaltz, Novianti & Hadiyono, 2013) were discovered. Most of the studies in Bahasa examined the efficacy of a specific treatment upon students reporting high social anxiety and two studies reported prevalence. The two

studies in English compared aspects of social anxiety between Indonesia – a so-called collectivistic country - and some countries representing individualistic countries. All those previous studies recruited participants from only one city. In fact, Indonesia is a multicultural country, and thus, generating their result to represent Indonesia is arbitrary. Most of those studies did not provide sufficient information in terms of method, particularly, the measures used and their internal reliability, data collection strategy and how participants were classified in relation to their social anxiety level. Therefore, their conclusion should be taken with caution. In addition, no studies have been conducted in Indonesia investigating IU.

This thesis initially aimed to examine the relationship between IU, social anxiety and alcohol use in Indonesia, which is the most populous Muslim country in the world. However, the proportion of alcohol users successfully recruited was small, which would lead to lack of power, if planned analyses were pursued. Alcohol is forbidden under Islam and, thus, is illegal in educational institutions across Indonesia. Further, the recruitment strategy using lecturers as the gatekeepers, who helped the author to advertise and recruit participants, in all probability resulted in this failure. A recruitment strategy using student societies or directly approaching clinical institutions working with substance users may be recommended for further study.

First, this thesis established that, using the published SPIN cut-off (Connor et al., 2000), 26.5% (143) of participants would suffer from severe to very severe symptoms of social anxiety (Chapter 5). This SPIN cut-off was established in the UK based on data from healthy volunteers and psychiatric patients both with and without social anxiety. The prevalence reported by this thesis is higher than the previous data reported from a sample of Indonesian students; 15.8% (Vriends et al., 2013) to 22.27% (Suryaningrum, 2006) and the prevalence among students reported by previous studies (e.g. Baptista et al., 2012; Izgiç, Dogan & Kugu, 2004; Verger, Guagliardo, Gilbert, Rouillon & Masfety, 2010), which is approximately 3% - 13%.

Second, similar to the result gathered from the UK (Chapters 2, 4 & 6), IU had made significant additive and unique contributions to the variance in worry and depression symptoms among the Indonesian student sample (Chapter 5). Interestingly, IU made the smallest contribution to social anxiety, worry and depression symptoms compared to the contributions of FNE and AS. Conversely, FNE made the greatest contribution to all three-symptom measures, including the variance in worry. Specifically regarding worry, this result is not in accordance with the extensive evidence, predominantly from Western countries (e.g., Buhr & Dugas, 2009; Dugas, Marchand & Ladouceur, 2005; Zlomke & Jeter, 2013),

including a cross-sectional study conducted by the author in the UK using similar methodology and identical scales (Chapters 4).

Referring to the result of meta-analyses conducted by Barclay (2014; see appendix), it appears that the correlation between IU and social anxiety among the Indonesian sample (r = .49) falls below the range of the 95% confidence interval for effects from previous studies (r = .55 - .60). Similarly, when compared with all three cross-sectional studies conducted by the author in the UK (Chapters 2, 4 & 6), the correlation between IU and social anxiety among the Indonesia sample falls below the range of the 95% confidence interval for effects from the those UK studies (r = .59 - .68). Generally speaking, the contribution of IU in explaining symptoms among the Indonesian sample is smaller compared with other data, which predominantly comes from Western countries.

The high rate regarding the prevalence of social anxiety, the relative dominance of FNE and the smaller contribution of IU may be related to some possible issues. First, it may be related to a possible misunderstanding during the translation process, although all scales were translated rigorously by four qualified independent translators. Second, it may be related to the differential perception regarding the key constructs investigated within this thesis between the UK and Indonesia sample. For instance, the UK participants might perceive uncertainty and IU differently to the perception of the Indonesian sample. This may be likened to the understanding of democracy in the US and North Korea, where the people of both countries would describe their country as democratic. Third, the translation may be accurate and the constructs perceived similarly by both the Indonesian and the UK sample. However, it is a fact that substantive results and the strength of the correlations among the factors in Indonesia were different to the UK as portrayed by this thesis.

The latter possibilities may be related to the cultural dimensions that are characteristic of Indonesia people and culture. Referring to the characteristics proposed by Hofstede (1980), Indonesia is one of the most collectivist countries in the world, emphasizing harmony, in contrast to being competitive. Therefore, people have a tendency to restrain their own desires and behaviour, in order to conform to social rules. In addition, Indonesian people also tend to accept hierarchy and respect authorities (The Hofstede Center, 2015). These aspects make for harmonious social relationships, which in addition to social acceptance are very important for Indonesian people. Consequently, negative feedback, particularly from respected authorities, or a disagreement with others, could lead to distress. Conversely, an Indonesian tends to believe that everything is naturally uncertain, seeing as everything has literally been determined by God and therefore is beyond one's control (The Hofstede Center, 2015).

Consequently, people only need to be *nrimo ing pandum* or be grateful for everything that has been provided by God (Ferzacca, 1996; Widayanti, 2011).

It is important to note that several studies identified differences in anxiety symptomatology in relation to culture; Asians complain more about somatic symptoms rather than cognitive and emotional symptoms (e.g. Chen, Chen & Chung, 2002; Hinton, Park, Hsia, Hofmann & Pollack, 2009; Kirmayer, 2001). Somatic symptoms related to the fear of anxiety symptoms are one of the characteristics determined by AS (Taylor et al., 2007). Therefore, it is plausible that AS ultimately made a greater contribution to the variance in social anxiety, worry and depression than the contribution of IU.

Considering these characteristics, it is would seem logical that prevalence of social anxiety in Indonesia may be high. Additionally, these characteristics could explain why FNE is extremely dominant, whereas IU has less influence on social anxiety and even worry in the Indonesian sample.

1.4. Intolerance of uncertainty as a transdiagnostic factor

This thesis also reported that IU has an important correlation with worry, which is the hallmark of GAD, and also with symptoms of depression (Chapters 4 & 5). However, there was a difference between the contributions of IU in the UK (Chapter 4) and Indonesia (Chapter 5). From the UK study, the contribution of IU was the greatest when linked with worry and the second greatest following FNE with depression. Conversely, data from Indonesia revealed that the contribution of IU was the least across both anxiety disorders and depression; both FNE and AS made greater contributions.

Although the relative contribution of IU particularly in Indonesia (or non-Western countries) merits further study, the consistency of IU in predicting worry, social anxiety and depression supports a growing body of literature which suggests IU as a transdiagnostic factor (e.g. Boelen et al, 2010; Boelen & Reijntjes 2009; Boswell, Hollands, Farchione & Barlow 2013; Carleton et al., 2012; Fetzner, Horswill, Boelen, & Carleton, 2013; Khawaja & Mcmahon, 2011; Mahoney & McEvoy, 2012a; McEvoy & Mahoney, 2011 & 2012; Whiting et al., 2014) and extends this to an Indonesian sample (Chapter 5). Differing from these previous studies, this thesis is the first one comparing the relative contribution and interactions among IU, FNE and AS across social anxiety, worry and depression.

This thesis reported an interesting original finding that the effect of IU on worry was significant either at all levels of FNE or when AS was low to moderate (not when AS high). The effect of IU on worry decreased as the level of either FNE or AS increased (Chapter 4). Conversely the effect of FNE on worry was significant only when IU was low to moderate,

whereas the effect of AS on worry was significant only when IU was low to moderate. The effects of FNE and AS on worry decreased as IU level increased.

This demonstrates that as both IU and FNE levels increased, the effect of FNE on worry decreased due to the effect of IU on worry becoming dominant. Moreover, IU and AS weaken each other in predicting worry. These results are in contrast to social anxiety where the strength of the effect of IU increased with increasing FNE and AS.

These results may help to explain the cognitive process underlying comorbidity across anxiety disorders. Comorbidity is the co-occurrence of two or more disorders. Comorbidity diagnoses have a strong association with more severe conditions of patients (Kendall, Kortlander, Chansky & Brady, 1992; Kessler, Chiu, Demler & Walters, 2005; Kessler, McGonagle, Zhao, Nelson & Hughes, 1994), and severity is a negative prognostic indicator (Kessler et al., 2005). More than two decades ago, a hierarchical model for the anxiety disorders was proposed by Barlow (1991, in Mineka, Watson & Clark, 1998) and afterwards, a comprehensive review supported it (Mineka et al., 1998). This model suggests that each anxiety disorder has a shared component(s) (common and primarily responsible for overlapping across diagnosis) that represents the higher order factor and the unique component(s) to each type of disorder that represents the lower order factor. Initially Barlow proposed anxious apprehension as the shared factor (Barlow, 1991, in Mineka et al., 1998; Brown & Barlow, 1992), but accordingly Barlow acknowledged negative affect (Brown, Chorpita & Barlow, 1997; Zinbarg & Barlow, 1996).

Moreover, a model of cognitive process on the comorbidity across anxiety disorders is proposed. For instance, the cognitive processes underlying comorbidity between GAD and social anxiety. First, IU would be the initial factor in worry and individuals having high levels of worry would be diagnosed suffering GAD exclusively. Second, if those individuals also have FNE, comorbidity between GAD and social anxiety would occur. Regardless of the level of IU, but when FNE is not too high, GAD would be the principal diagnosis, while social anxiety would be the additional diagnosis. Third, with the increasing levels of FNE, social anxiety emerges as the more prominent symptom. Ergo social anxiety would be the principal diagnosis and GAD would be the additional diagnosis. Ultimately, AS, which is the amplifier of anxiety, would increase the anxiety level caused by the interaction between IU and FNE.

This concurs with Farmer, Gros, McCabe and Antony (2014) who investigated the frequency of social anxiety as either the only diagnosis, the principal diagnosis or the additional diagnosis. They determined that greater FNE was more likely to be discovered among participants with social anxiety as a principal diagnosis. Conversely, high levels of IU were more frequent among those who reported comorbidity. Similarly, Hong and Cheung

(2015) conducted meta-analyses upon 73 articles to examine six cognitive vulnerabilities (pessimistic inferential style, dysfunctional attitudes, ruminative style, IU, FNE and AS), related to anxiety disorders and depression. They established that the cognitive vulnerabilities loaded onto a single factor, indicating a shared common factor. Further comparison of analyses across all cognitive vulnerabilities determined that IU had the strongest factor loading; suggesting that IU plays a critical role in the comorbidity across anxiety disorders and depression.

Based on the cognitive process explained above, this thesis proposes IU as a higher order shared component and underlies the comorbidity across anxiety disorders. This partly supports a strong suggestion from Carleton (2016a and 2016b) to an extent that IU is a basic cognitive component of comorbidity across anxiety disorders and depression. Carleton (2016b) suggested that the "uncertainty" is one type of the "unknown", the other one is the "the unfamiliarity". Based on this rationale, he proposed a novel variable which is the "fear of unknown", excessive propensity to fear caused by the absence of information, as the most basic component of comorbidity across anxiety disorders and depression indeed. His theoretical proposal obviously requires evidence and further articulation of its relationship to IU as currently understood.

Given IU is the hallmark of worry, this thesis proposes that then GAD may lead to comorbidity. This suggestion extends the proposal of Brown and Barlow (1992), who in their expert review found GAD differs from other anxiety disorders due to the fact that only GAD has no outstanding key features that facilitate differential diagnosis. Therefore, they suggested that GAD might serve as the basic process underlying the development of various emotional disorders.

Overall, first, this thesis provides more evidence to support the critical role of IU as a transdiagnostic factor across two anxiety disorders and depression. This non-specific nature of IU does not mean that this construct lacks utility in the theoretical development and clinical practices, instead its unique characteristic provides wider opportunities to develop a more sophisticated and integrated model of anxiety disorders and depression. Secondly, this thesis provides original evidence supporting the presence of interactions between IU and other cognitive risk factors in predicting maladaptive responses. Furthermore, this original evidence suggests that IU presumably is the shared cognitive component that could explain comorbidity across anxiety disorders and depression.

2. Intolerance of uncertainty's relationship with substance use

Substance use is a significant issue experienced by numerous countries worldwide. Notwithstanding increasing research investigating different issues around substance use, it is still true that the amount of substance users, predominantly among young people or students, who primarily use substances recreationally, continues to rise. Consequently, further research is required, principally research which attempts to understand the exact causes of substance use among students.

People use substances for a variety of reasons. Numerous measures to investigate the reasons regarding alcohol use have been promoted as part of these attempts. Some studies examine specific types of substances and therefore lack flexibility with their choice of criteria, while others strive to consider an extensive range of substance types; but they may be restricted with regard to the aspects measured.

A novel measure named the Newcastle Substance Use Questionnaire (NSUQ) was developed, with the aim of addressing the limitations linked to previous measures and to acquire a greater, more detailed understanding about substance use across a range of substances. The NSUQ comprises three sections, specifically, the class and frequency of substances used, the patterns in using substances and the motives underlying substance use. The 'motives' section is based on the theoretical framework of instrumental drug use developed by Muller and Schumann (2011), which is more sophisticated than the most recognised model of alcohol motives suggested by Cox and Klinger (1988).

This thesis demonstrates that the NSUQ is comprehensive, theory driven, flexible and that it can be applied to a range of samples with various substances. Concerning construct validity, there is early evidence related to the NSUQ-Alcohol Motives and, to a lesser extent, the NSUQ-Cannabis Motives containing factors that have an acceptable fit and are interpretable (Chapter 3). Only alcohol and cannabis were analysed because the number of participants who reported using alcohol and cannabis were considered sufficient for factor analysis.

For both the NSUQ-Alcohol Motives and the NSUQ-Cannabis Motives, the exploratory analyses determined a three-factor model (Chapter 3). Both of the three-factor models were superior to models with fewer factors, demonstrated better goodness-of-fit criteria, had higher loadings and were more comprehensive. For the NSUQ-Alcohol Motives, the model indicated three factors: social, cognitive, and sexual factors. The social factor accounted for the largest contributor to the explained variance. This was followed by the cognitive factor, and finally the sexual factor. The NSUQ-Cannabis Motives comprised three principal factors: cognitive,

social and physical. The largest contributor to the amount concerning the explained variance was the cognitive factor, followed by the social factor, whilst the physical factor contributed the least.

These factors, primarily the social and cognitive reasons, indicate important motives underlying recreational alcohol and cannabis use amongst the student samples. With regards to social factors, several studies have noted the significance of social causes for both alcohol and cannabis use amongst students (e.g. Kong & Bergman, 2010; Lee, Neighbors, & Woods, 2007; Read, Wood, Kahler, Maddock, & Palfai, 2003). Furthermore, several studies have also reported expanded cognitive performance as one of the reasons behind alcohol and/or cannabis use among students (Chabrol, Duconge, Casas, Roura, & Carey, 2005; Simons, Correia, & Carey, 2005; Simons, Correia, Carey, & Borsari, 1998; Simons, Gaher, Correia, Hansen, & Christopher, 2005). All of these previous studies investigated alcohol motives as being proposed by Cox and Klinger (1988).

A comparison of the motives demonstrated a result that mirrors the outcome obtained from factorial analyses. The highest mean with regards to alcohol use was social reasons, followed by cognitive motives. Conversely, the mean of cognitive motives was highest in relation to cannabis use, which may demonstrate the differences in students' awareness regarding both types of substances. It is most likely that alcohol is considered more of a *'social lubricant',* whereas cannabis is thought to expand perspective taking. Thus, this hypothesis appears to agree with (Simons, Correia, et al., 2005), who concluded that social reasons lie behind alcohol use, whereas cognitive improvements are at the heart of cannabis use.

For both alcohol and cannabis, using them with friends was the most frequent context. Conversely, using these substances alone is something that is not common among students. It, again, supports an assumption that recreational users may use substances for enhancing social performance, not for coping with stress. This also agrees with the result of factor analyses, which proved that emotional coping motives did not load highly on any factor (Chapter 3). Coping with emotional problems may not be the primary motive for substance use among students, as suggested by extensive evidence from previous studies (e.g. Ham, Zamboanga, Olthuis, Casner, & Bui, 2010; Norman, Conner, & Stride, 2012; Read et al., 2003). However, as substance use increases and turns to substance use-related problems, such as abuse or dependence, then the coping with negative emotions motive may emerge.

This unique characteristic regarding substance use behaviour among students who normally use substance recreationally for social reasons, may account for the mixed result of studies investigating the relationship between social anxiety and alcohol use. Several previous

studies reported the non-significant relationship between social anxiety and alcohol use (e.g. Frojd, Ranta, Kaltiala-Heino & Marttunen, 2011; Ham et al., 2010; Johnson, Wendel & Hamilton, 1998), while some others reported the opposite (e.g. Buckner et al., 2008; Buckner & Turner, 2009; Nelson et al., 2000; Zimmerman et al., 2003). These contradicting results may be accounted for in the different terms and measures used by these previous studies.

Few studies have tried to address these equivocal results. For instance, Buckner, Schmidt and Eggleston (2006) added drinking motives as a mediator (social anxiety→alcohol motive→frequency of alcohol use). Their simple model explains the nature of how some socially anxious individuals may be at greater risk of using alcohol, but it is limited, as it does not explain why others may be protected from alcohol use. Consequently, a more sophisticated model that identifies additional factors and accurately explains the pathway related to the relationship between social anxiety and alcohol use is required. As predicted, adding cognitive risk factors related to social anxiety as the predictor variable and social motives for alcohol use as the second serial mediator to the model offers a clearer picture, and may help clarify the ambiguous results of previous studies.

This thesis determined several interesting original findings regarding the relationship between IU, social anxiety and alcohol use, particularly social drinking (drinking alcohol with friends; Chapters 4 & 6). First, None of IU, FNE and AS consistently had significant direct effects on social drinking (Chapters 4 & 6). Secondly, IU, FNE and AS had consistently significant and negative indirect effects via social anxiety on social drinking (Chapters 4 & 6). Third, only IU had no significant indirect effect on social drinking through social motives (Chapters 4 & 6), while FNE (Chapters 4 & 6) and AS (chapter 6; not significant at Chapter 4) had significant and positive indirect effects on social drinking via social motives. Interestingly, fourth, only IU consistently had significant and positive indirect effect via social anxiety and social motives on social drinking (Chapters 4 & 6). FNE (Chapters 4 & 6) and AS (Chapter 6; significant and positive at Chapter 4) had no significant indirect effects on social drinking via social anxiety and social motives.

These findings can be interpreted that, first, these cognitive vulnerabilities cannot stand-alone and thus, require mediators. Secondly, the significant and negative indirect effects of these cognitive vulnerabilities via social anxiety on social drinking indicates that social anxiety is one of protective factors of social drinking among students. Given socially anxious students excessively fear negative evaluation and thus, avoid social interaction, they are not predisposed to participate in social drinking activities. It makes sense, as alcohol is associated with social activities, as suggested by a number of reports or studies. For instance, Finlay, Ram, Maggs and Caldwell (2012) reported that the frequency of alcohol use is higher among

students who are socially active. In addition, students are more likely to drink heavily at weekends when they spend most of their time with friends. Finlay et al. only investigated the frequency of drinking behaviour; they did not examine any factor that could inform the causal direction of associations related to alcohol use.

This is supported by the results from the specificity of social anxiety analyses (Chapter 4). Apart of social anxiety, depression is also a protective factor of social anxiety. Students who are suffering depression symptoms may have less interest to join social activities and therefore, have less chance to take part in social drinking. Conversely, those suffering worry may have a lower tendency to avoid social activities relative to those suffering social anxiety or depression. Therefore, they are more likely to eventually take part in social drinking rather than those suffering social anxiety or depression.

Moreover, third, this thesis also indicates that IU is the factor underlying alcohol use among socially anxious students. Individuals reporting high IU may be also reporting social anxiety. However, they may have less socially anxious to join social activities relative to those reporting high FNE. Therefore, they are more likely to eventually consume alcohol even in the social occasion due to being motivated by their positive expectancies of the effect of alcohol use.

Conversely, FNE presumably is the factor underlying the equivocal relationship between social anxiety and alcohol use. Greater FNE indicates an inclination to avoid social activities. However, greater FNE is also more likely to mean believing that alcohol increase self-confidence and reduce anxious around people; in addition to believing that refusing the invitation to drink together can make them receiving a negative judgement. This contradiction explains the indirect effects of FNE on social drinking was significant and negative through social anxiety only, significant and positive through social motives only, but not significant through both mediators.

Lastly, social motives play a critical role in driving socially anxious students to participate in social drinking. The indirect effects of IU and AS on social drinking through social anxiety were initially significant and negative (Chapters 4 & 6), now the effects of FNE (Chapters 4 & 6) and AS (Chapter 4) turned out to be significant and positive when social motives were added as the second mediator. In addition, regardless of the psychopathological symptoms entered as the first mediator, all the indirect effects of IU on social drinking were significant and positive when social motives were added as the second mediator (Chapter 4).

Overall, the opposing direction of all indirect effects may indicate the cognitive process underlying alcohol use among socially anxious students. It is worth speculating about possible processes. First, IU, FNE and AS provoke social anxiety. Second, socially anxious individuals

may think to use alcohol as an instrument to ease them into social situations. They may have expectations that the alcohol could be used as a social lubricant (Chapter 3): enhancing their ability to cope with a social situation and improving their social performance or attractiveness. Ultimately, these social motives of alcohol use may drive or at least enable socially anxious students to participate in the social activities and eventually to consume alcohol. However, third, socially anxious feelings trigger a tendency to avoid the situation. Thus, they use avoidance to maintain certainty, to avoid receiving negative judgement and to prevent them from feeling anxious. However, this inability to enter social situations leads to greater negative self-appraisal, increased anxiety and greater distress. Subsequently, they may think to use alcohol as a way to cope with this psychological stress (reducing tension) or to self-medicate. However, the cognitive process underlying alcohol use among socially anxious students depicts a causal process that in fact can only be proven through an experimental design or a longitudinal study.

Moreover, this thesis actually investigated the causal relationship of FNE and IU on social motives underlying alcohol use among students (Chapter 6). Unexpectedly, the manipulation of FNE failed. However, the experimental study established that only dispositional FNE significantly influenced the social motives underlying alcohol use, particularly in situations where social interaction is required. The effect of dispositional IU was not significant. This is in line with the results from the cross sectional studies (Chapter 4 & 6) which reported that only FNE had a positive indirect effect on alcohol use via social motives of alcohol use. It indicates that when social anxiety was controlled, greater FNE is also more likely to mean believing that alcohol is a good social lubricant.

Hence, conducting both an experimental or longitudinal study, specifically investigating the causal relationship between IU or FNE, social anxiety and social motives underlying alcohol use, would be very informative and is recommended. It also suggests that further study and treatment for at risk alcohol users, particularly who use alcohol recreationally, may target IU and the instrumental motives underlying alcohol use as an important focus.

3. Limitations

The study conducted in Indonesia was only able to recruit a small proportion of student-alcohol users. Therefore, the investigation of relationship between IU, social anxiety and alcohol use among Indonesia students can be accomplished. However, the study investigating relationship between IU and social anxiety among Indonesia students are still novel given there is no previous study addressing this aim there.

Problem related to an insufficient number of students-alcohol users did not happen in the UK, though the number of participants who reported having experience with other substances remains small, including cannabis, but proportional to national data (Webb, Ashton, Kelly & Kamali, 1996). Consequently, the construct validity of the cannabis motives should be interpreted cautiously.

In relation to participant issues, this thesis employed a non-clinical sample comprised of students predominantly (Chapters 3, 4, 5 & 6). Only one study used a combination of students and community members (Chapter 2). It should be noted that this analogue sample has deliberately been chosen for both theoretical and methodological reasons. For instance, University students are constituted as a high-risk group for social anxiety and substance use. In addition, a correlational study of this type requires the full range of experiences on all key variables from for example, abstinence through low and moderate levels of drinking to those with high levels of alcohol use. The ability to recruit large numbers provides sufficient power to address multivariate questions. If only clinical participants were recruited, there is likely to be a limited range on key variables and difficulty recruiting large numbers. There may also be additional processes (associated with dependency) that explain alcohol use at clinical levels such as expectancies about the negative effects of alcohol withdrawal. Nevertheless, this means that the findings cannot be generalised to other sample groups, for instance the wider community or extrapolated to clinical samples.

In relation to the tools developed in this study, several issues arise around their validity. Although the NSUQ is comprehensive, theory driven, flexible and demonstrated good psychometric properties, its development procedure did not include a group discussion involving students who have experience of consuming substances and the draft was not piloted (tried-out) prior to being used. These limitations may explain the ambiguity of some items.

Moreover, a similar problem was found with the vignette used in the experimental study. Although the development procedure of the vignette took in a piloting, the FNE manipulations failed to determine participants' experience of being evaluated in both social interaction and social performance situations. Therefore, refinement of the vignette is strongly recommended.

4. Future directions

Whilst several original findings have been established by this thesis, some recommendations are advised for future studies. All novel results require replication, but some results should be interpreted cautiously for several reasons.

Investigation of psychological disorders, as well as substance use among students is obviously categorised as a risky topic. Ethical issues either related to participants' well-being, the privacy of participants, and confidentiality, in addition to illegal behaviour and negative stigma related to substance use requires sensitive and robust methods, especially for the recruitment strategy. An inappropriate recruitment study could result in the failure to recruit either the expected number or a specific type of participant.

In relation to participant issues, recruiting other sample groups, for instance the wider community or extrapolated to clinical samples, would be recommended. In addition, generally this thesis was powered to detect a small to medium effect size, while several observed effects were small to trivial. Given the base rates of substance use other than alcohol, a much larger number of participants would be required, and alternatively or as well as higher proportion of students who have experience with substance use by careful marketing and/or reconsideration of the ethical issues around incentives. In Indonesia, a study recruiting through student societies (as was done in the UK) or through clinical institutions working with student substance users would be greatly recommended.

Moreover, this is the first thesis to investigate IU in Indonesia and the first to examine IU in an Asian country, which is predominantly Muslim. Consequently, a further study utilising a larger proportion of alcohol users is required. Although the questionnaires all demonstrated adequate internal consistency, it would be greatly recommended to first conduct a study that specifically refines the Indonesia version of all measures used and more formally analyses the psychometric properties of the scales. Further studies exploring the same topic based on a cross-cultural psychology approach, particularly across South East Asian countries would be also interesting.

Lastly, the experimental design addressed a range of methodological issues related to the experimental manipulations of IU (Chapman, 2015) such as demand characteristics, low ecological validity and hypothesis guessing. However, the failure of the FNE manipulation indicates that refinement of the vignettes is recommended. Moreover, through the vignette approach, participants are asked to imagine experiencing the situation. Therefore, to what extent does the impact of the manipulation also depend on to what degree participants are able to or are willing to imagine that they are in a real life situation. The result from this design

may be less robust in comparison with a manipulation where participants actually experienced the situation or were led to believe that they would do so imminently.

5. Conclusion

There are two important conclusions. First, this thesis establishes the important role of IU in social anxiety alongside FNE and ASI, but also provides some initial evidence that IU may in fact have a causal role in social anxiety and safety behaviours. Cultural dimensions may moderate the size of the effect in the Indonesian sample; however, the contribution of IU is consistent. In addition, this thesis confirms that IU is a transdiagnostic factor across at least two anxiety disorders and depression. Furthermore, it can be argued that IU is the cognitive vulnerable factor that underlies comorbidity across anxiety disorders.

Secondly, this thesis addresses the equivocal results found in previous studies, in terms of direction of the relationship between social anxiety and alcohol. It suggests that socially anxious students in the UK may on the one hand be less inclined to participate in social activities because of the social nature of situations where alcohol is drunk. However, on the other hand, their social anxiety may cling to social motives to drink alcohol and so to greater consumption of alcohol. More importantly, this thesis proposes IU and social motives as risk factors underlying alcohol use among students.

Finally, this thesis confirms the critical role of IU on social anxiety. To date, no studies have addressed IU as a central target of a treatment in clinical trials upon students suffering from social anxiety disorder. It may be timely to do so, especially as Mahoney and McEvoy (2012b) demonstrated that the reduction in IU predicted the post-treatment social phobia symptoms after controlling for pre-treatment social phobia symptoms. Although they did not target IU, they asked participants to learn a skill to tolerate uncertainty before, during and after the treatment. Therefore, the result of further studies with even greater emphasis on IU would be expected to increase the efficacy and effectiveness of social anxiety treatment protocol. In addition, this thesis proposes IU as a shared factor that underlies comorbidity across anxiety disorders and a cognitive factor underlying alcohol use among socially anxious students. Therefore, there are significant implications for those who have been diagnosed suffering comorbid anxiety disorders or those who have a problem with alcohol use and require treatment. This is the essence derived from these results; “aim for IU and hit several disorders”.

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Appendix A. Comparison of Confidence Interval of Correlation

Table 1

IU-Social Anxiety

					IU total		P-IU		I-IU	
		sample	measure	N	*r*	CI 95%	*r*	CI 95%	*r*	CI 95%
1	Meta analyses	Various	Various	3211	.57	.55-.60	.39	.34-.45	.53	.46-.59
2	Archival data set	Mixed	IUS12R*-SIPS	112	.57	.43-.68	.49	.33-.62	.58	.44-.69
3	UK study	Student	IUS12-SPIN	349	.70	.64-.75	.60	.53-.66	.70	.64-.75
4	UK-Final study	Student	IUS12-SPIN	200	.64	.55-.71	.55	.44-.64	.65	.56-.72
5	All UK studies (3-5)		Various	661	.64	.59-.68	.55	.50-.60	.64	.59-.68
6	Indonesia study	Student	IUS12-SPIN	540	.49	.42-.55	.41	.34-.48	.49	.42-.55

Table 2

IU-Worry

					IU total		P-IU		I-IU	
		sample	measure	N	r	CI 95%	r	CI 95%	r	CI 95%
1	Meta analyses	Various	Various	8718			.52	.48-.55	.52	.48-.57
2	Archival data set	Mixed	-	-	-	-	-	-	-	-
3	UK study	Student	IUS12-PSWQ	349	.70	.64-.75	.66	.60-.71	.64	.57-.70
4	UK-Final study	Student	-	-	-	-	-	-	-	-
5	Indonesia study	Student	IUS12-PSWQ	540	.49	.42-.55	.45	.38-51	.45	.38-51

Table 3

IU-Depression

					IU total		P-IU		I-IU	
		sample	measure	N	r	CI 95%	r	CI 95%	r	CI 95%
1	Meta analyses	Various	Various	6422			.39	.34-.44	.51	.45-.56
2	Archival data set	Mixed	-	-	-	-	-	-	-	-
3	UK study	Student	IUS12-CESD	349	.61	.54-.67	.51	.43-.58	.64	.57-.70
4	UK-Final study	Student	-	-	-	-	-	-	-	-
5	Indonesia study	Student	IUS12-CESD	540	.36	.28-.43	.29	.21-.37	.37	.29-.44