

Self-Affirmation and Social Anxiety: Affirming Values Reduces Anxiety and Avoidance

by

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## Abstract

Social Anxiety Disorder (SAD) is a prevalent mental health disorder in Western societies (Stein & Stein, 2008). Having SAD is marked by significant impairment in interpersonal relationships and general life functioning in part because persons with SAD often experience social interactions as threatening and commonly avoid them or perform poorly in them (Katzelnick et al., 2001). Self-affirmation is an intervention shown to help individuals engage effectively in situations they perceive as threatening (Sherman & Hartson, 2011). I hypothesized that self-affirmation would allow socially anxious individuals to participate in more social activities and do so with less anxiety, through abstract construals of experience. Socially anxious university students participated in a mini-longitudinal study which had 3 phases: 1) baseline measurement of social anxiety and other self-report measures; 2) in-person procedures including random assignment to affirming writing, the Trier Social Stress Test (TSST) for Groups (an impromptu speech and mental math), measures of cortisol and anxiety, and SAD psychoeducation; 3) one-month follow-up measurement of baseline measures. There was no immediate benefit of self-affirmation. However, at follow-up, self-affirmed students reported significantly less discomfort, anxiety, and distress with regards to a variety of social behaviors as well as a significantly more engagement in these behaviors, compared with their baseline and non-affirmed students. Contrary to expectations, construals shifted to concrete over the course of the study for both the affirmed and non-affirmed. As it was not clear the immediate threat of the TSST was necessary to reveal the benefit of self-affirmation, a second study was conducted. Study 2 had the same phases as the first but without the in-person components of Phase 2, with a winter term follow-up to examine level of construal, and included both socially phobic and non-socially phobic students. Results indicated an effect of time of term on construals and provided evidence that at

least one of the in-person components of Study 1 may be necessary for there to be a benefit of self-affirmation. Implications of these results for broadening our conceptualization of self-affirmation and for its potential utility as an adjunct to exposure-based therapies for SAD are discussed.

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## Dedication

I dedicate this thesis first and foremost to my children, Angela, Nicholas, and Erica. Their lives were greatly impacted by my decision to pursue a PhD in clinical psychology, beginning with being uprooted from their home in Flin Flon and moved 750 km south to Winnipeg. They were supportive throughout the process of completing a second undergraduate followed by graduate studies, including foraging for food when meals were scarce, proofreading essays, being guinea pig audiences for my presentations, and being understanding when I invariably failed to "get to it all"... or even come close!

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1. Kutcher General Social Anxiety Disorder Scale - Adolescents (modified)
2. Image of Salivette<sup>®</sup> Saliva Collection System, Sarstedt, Inc.

## Self-Affirmation and Social Anxiety: Affirming Values Reduces Anxiety and Avoidance

Social Anxiety Disorder (SAD)<sup>1</sup> is the most prevalent of the anxiety disorders (Stein & Stein, 2008). It is characterized by an activity-curtailing fear of social or performance situations, particularly when the situation is uncontrollable or involves the possibility of negative evaluation (American Psychiatric Association, 2013). Over time, this avoidance of social activities perceived as threatening is associated with significant impairment in interpersonal relationships, mental and physical health, and general life functioning including lower academic, employment, and financial success, increased risk of suicide, and significantly higher rates of other mental health disorders (Davidson, Hughes, George, & Blazer, 1993; Katzelnick et al., 2001; Moitra, Beard, Weisberg, & Keller, 2011). It most commonly manifests during the adolescent and early adult years (Acarturk et al., 2009; Nelson et al., 2000) and has a high likelihood of enduring throughout the lifespan.

Although a widely-recommended and empirically-supported treatment for SAD is available, namely Cognitive behavior Therapy (Canton, Scott, & Glue, 2012; McGinn & Newman, 2013), few individuals with SAD access any treatment (Ormel et al., 2008). Worrying about what others may think is one reason given by those with SAD for not seeking treatment (Chartier-Otis, Perreault, & Bélanger, 2010). Of those who do engage in treatment, slightly more than 15% drop out of treatment (Hans & Hiller, 2013), and, a significant number fail to benefit from CBT treatment (Lincoln et al., 2005). Exposure to feared activities, a key component of CBT for SAD, is significantly associated with greater treatment success (Edelman & Chambless, 1995). Increasing the likelihood of engaging in feared and avoided activities is a

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<sup>1</sup> Social Anxiety Disorder (SAD) is the diagnostic term now used in place of Social Phobia (SP). Both terms are found in the literature. For the purpose of clarity in this document, SAD will be used whether the document or treatment referenced used SAD or SP.

challenge given that avoidance of such engagement is a defining characteristic of SAD.

Self-affirmation, an intervention widely studied in the field of social psychology, may help those with SAD engage in feared activities and is the main focus of the present study.

Since the early 1990s, a growing body of evidence has demonstrated that self-affirmation, a writing intervention which typically involves affirming personally held values, both reduces avoidance of psychologically threatening situations and improves performance in those situations. That is, when faced with situations perceived as threatening, individuals who have self-affirmed are more likely to perform up to potential, to assess the situation accurately, and to engage in behaviors beneficial to long-term well-being than those who have not self-affirmed (Sherman & Hartson, 2011). Part of the challenge for individuals with social anxiety is dealing with the psychological threat<sup>2</sup> they perceive in social interaction (see Uren, Szabo & Lovibond, 2004). It is possible that engaging in self-affirmation before a socially threatening experience will help these individuals to engage in the experience in spite of the perception of threat. It may also help them to interact more effectively when they do engage and, perhaps, to be more likely to engage in subsequent social interactions.

This thesis describes two related studies designed to explore whether self-affirmation can help those suffering from symptoms of SAD approach feared and avoided social situations with less defensiveness and greater success. Study 1 tested two hypotheses. First, self-affirming writing would have a protective effect in the face of a socially challenging situation for socially anxious university students. Second, this protective effect would be the result of a shift to more abstract, less concrete thinking (Schmeichel & Vohs, 2009). In response to criticism that a focus

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<sup>2</sup> Psychological threat refers to a perceived threat to one's sense of self. Within the self-affirmation literature this threat is referred to variously as psychological threat, self-threat, ego-threat, and identity threat, among others. In this paper, "threat" refers to this type of psychological threat, and not to physical or other types of threat.

on just one type of outcome fails to capture the complexity of the threat response system, the present study included a number of behavioral and experiential variables as well as a physiological one, salivary cortisol (sCort). Experiential data were also collected one-month after the self-affirmation manipulation to test for possible recursive benefits of self-affirmation over time (Cohen, Garcia, Purdie-Vaughns, Apfel, & Brzustoski, 2009; Sherman, 2013; Stinson, Logel, Shepherd, & Zanna, 2011). Study 2 was designed to clarify questions raised when examining Study 1 data. Study 2 examined the effect of time of term on the pattern of abstract/concrete thinking. It also examined the effect of self-affirmation on several behavioral and experiential variables in a sample that included both socially anxious and non-socially anxious university students. Unlike Study 1, participants in Study 2 were not exposed to a socially challenging situation.

### Salivette<sup>®</sup> Literature Review

#### **Social Anxiety Disorder**

SAD is characterized by an activity-curtailling fear or anxiety of social or performance situations "in which the individual may be scrutinized by others" (American Psychiatric Association, 2013). The avoidance or distress triggered by the fear must be out of proportion to the "danger" that is part of the situation and must result in significant impairment to the person's daily functioning in order to meet diagnostic criteria (McGinn & Newman, 2013). SAD has an early onset, with the first symptom(s) often presenting in childhood or adolescence (Faravelli et al., 2000; Grant et al., 2005; Shields, 2004). For almost 80% of those diagnosed with SAD, the disorder is thought to have started by age 20 (Stein & Stein, 2008). One-year prevalence rates are around 7% in the U.S., making it the second most diagnosed psychiatric disorder in any given year, (Kessler, Chiu, Demler, & Walters, 2005; Ruscio et al., 2008). With a life-time

prevalence of 12.1% in the U.S., it is the second most common of the anxiety disorders and the fourth most common psychiatric disorder currently diagnosed in the U.S. (Kessler, Berglund, et al., 2005). Canadian data from the 2002 Canadian Community Health Survey: Mental Health and Wellbeing survey describes a somewhat lower incidence of SAD compared with US rates, with a lifetime prevalence rate of 8.1% and a yearly rate of 3% (Shields, 2004).

When looking across the lifespan, the Canadian data showed that the rate of reporting current SAD declines markedly across the lifespan from 4.7% of those 15-24 years old, to 3.1% of those 25 to 54 years old, to just 1.3% of those 55+ years old (Shields, 2004), p.48). Similar patterns are found in other epidemiological research such as that from Australia (Lampe, Slade, Issakidis, & Andrews, 2003). However, given the cross-sectional nature of these studies, one cannot conclude SAD spontaneously remits over time. Since SAD is often untreated, with fewer than 5% of individuals seeking treatment in the year of onset and approximately just one-third of individuals receiving treatment at some stage in their lifetime (Kessler & Ustün, 2008; Shields, 2004) and since SAD has been found to have a lower probability of recovery than either generalized anxiety disorder or panic disorder (Bruce et al., 2005), it seems unlikely that successful treatment and/or spontaneous remission are responsible for the lower rates of SAD found in later life. Instead, this may reflect a cohort effect. One possibility is that the groups of older individuals had lower rates of SAD beginning in adolescence and these lower rates were then carried throughout the lifespan. Indeed, there is evidence from the United States that the incidence of SAD has been increasing, from the 1960s through to 2000, particularly among those with social and economic advantage (Heimberg, Stein, Hiripi, & Kessler, 2000). Another possibility is that SAD was not recognized or diagnosed when the older cohorts were younger and, therefore, is not now self-reported (Dalrymple, 2012). Alternatively, it may be that

spontaneous remission is now less likely than it was in the past. Current thinking is that, once established, SAD endures for years and is resistant to remission (Beard, Moitra, Weisberg, & Keller, 2010; Chartier, Hazen, & Stein, 1998; DeWit, Ogborne, Offord, & MacDonald, 1999; Keller, 2003; Shields, 2004).

The avoidance that is characteristic of SAD and its tendency to persist lead to significant personal and societal costs. On an individual level, a review of the literature (Beesdo et al., 2007; Davidson et al., 1993; Katzelnick et al., 2001; Magee, 1996; Myrick & Brady, 2003; Schneier, Johnson, Hornig, Liebowitz, & Weissman, 1992; Stein & Kean, 2000) shows SAD is associated with: (a) a lower likelihood both of completing post-secondary education and of working in technical, managerial, or professional occupations; (b) greater utilization of medical outpatient services; (c) lower incomes; (d) difficulty in family and romantic relationships; (e) a higher risk of suicide; and (f) a greater likelihood of suffering from another psychiatric disorder including another anxiety disorder, major depressive disorder, and alcohol dependence or abuse. Further contributing to the suffering experienced by those with SAD, the challenges they face are often under-recognized and trivialized. For example, (Moitra et al., 2011) found in spite of significantly reduced workplace functioning when compared with those with other anxiety disorders, those with SAD were substantially more likely to be expected to be able to work than the others.

Canadian data on social anxiety corroborates these costs of social anxiety. In an examination of the relationship between quality of life and having SAD, panic disorder, or obsessive compulsive disorder, for individuals presenting at an anxiety disorders clinic (Quilty, Van Ameringen, Mancini, Oakman, & Farvolden, 2003), having SAD was found to be significantly and negatively correlated with both "role limitations due to emotional problems and



social functioning" (p. 422). As well, having SAD was associated with significantly greater impairment in daily life outside of work when compared with those diagnosed with panic disorder. A review of Canadian data from 2002 that compared individuals currently suffering from SAD to individuals who had never had SAD (Shields, 2004), showed that those with SAD reported significantly poorer outcomes in a number of different aspects of life. With regards to career success, individuals with SAD were 14% less likely to be working and, those who were working, had a 16% lower average income. With regards to mental health, those with SAD were almost eight times more likely to have major depressive disorder, 11 times more likely to have panic disorder, and three times more likely to have a substance dependence. The study also looked at aspects of day-to-day functioning. Those with SAD were more than twice as likely to report having spent a day in bed or reduced activities due to illness or injury, were 10 times more likely to have taken a mental health disability day in a two-week period; and, were roughly twice as likely to report lower levels of: (a) tangible support (e.g., help with daily chores), (b) affection (e.g., receive a hug), (c) positive social interaction (e.g., have someone with whom to relax), and (d) emotional or informational support (e.g., have someone to confide in or talk about yourself or problems).

At a societal level, the health and loss of productivity costs associated with having SAD—including direct medical costs to the health care system, direct non-medical costs for the individual such as transportation, and indirect non-medical costs such days spent in bed—are estimated to be over twice those seen in individuals without a mental disorder (Acarturk et al., 2009). The greater the number of SAD symptoms endorsed, the higher the cost. Those with subclinical levels of SAD, described as endorsing at least one symptom but not experiencing the significant functional impairment required for diagnosis, reported health and loss of productivity

costs approximately 1.6 times higher than that of those without a mental disorder. Considering all these factors together, the negative impact of SAD for the individual, for those around them, and for society as a whole is substantial. These costs also underscore the importance of seeking ways to enhance treatment and the quality of life for persons with SAD.

### **Cognitive Behavioral Therapy**

The results of a recent systematic review and meta-analysis of both psychotherapy and pharmacotherapy for SAD showed cognitive behavior therapy (CBT) was more effective than other evidence-based psychological techniques and that its beneficial effects were more long-lasting than those of pharmacological interventions (Canton et al., 2012; Dalrymple, 2012; McGinn & Newman, 2013). In the UK, treatment recommendations for SAD include two CBT models as well as CBT self-help ahead of pharmacotherapy (NICE, 2013). Since part of the rationale behind CBT for SAD is that exposure to feared situations will result in a reduction in fear (Brown & Barlow, 2002; Clark & Wells, 1995), a primary focus of CBT intervention is to have clients engage in social activities they have previously avoided because of fears that the interactions will go badly (Foa & Kozak, 1986; Foa & McNally, 1996). Glenn and colleagues (2013) found this engagement in a previously avoided situation to be the most robust predictor of who would benefit from a CBT anxiety treatment called the Coordinated Anxiety and Learning Management intervention (CALM).

Not surprisingly, then, the potential success of CBT can be undermined by avoidance of this kind of exposure, either externally or internally. The threat socially anxious individuals perceive in social situations can result in external avoidance through refusing to engage in treatment-prescribed social activities (i.e., the exposure homework) in spite of agreements with the therapist to do so. In addition to or alternatively, the perception of threat can result in

internal avoidance through engaging in the activities but attempting to limit, control, or distract from the sensate experience of anxiety (Clark & Wells, 1995; Wells et al., 1995). An example of this would be consuming alcohol or some other substance with the goal of reducing the felt experience of anxiety. Individuals with social anxiety, when compared with non-socially phobic controls (Ghaedi, Tavoli, Bakhtiari, Melyani, & Sahragard, 2009; Merikangas et al., 1998; Wittchen & Beloch, 1996), report significantly greater impairment of social interaction, both in terms of avoidance (external avoidance) as well as quality (internal avoidance).

The things individuals do to manage their anxiety during exposure to threatening situations are called safety behaviors (Plasencia, Alden, & Taylor, 2011). Identifying individual safety behaviors and instructing participants to eliminate the use of these behaviors when engaging in exposure exercises has been found to reduce ratings of social anxiety (Morgan & Raffle, 1999) and of anxiety (Wells et al., 1995) when compared with those who engaged in the same exercises but without safety behavior instruction. In a study designed to explore possible predictors and correlates of who seeks, stays in, and benefits from CBT treatment for social anxiety, those who dropped out during treatment reported higher levels of social avoidance than those who completed treatment (Lincoln et al., 2005). Also, higher levels of adherence to between-session exposure-to-feared-situation treatment plans (i.e., less avoidance) were correlated with less fear of negative evaluation immediately following treatment, less anxiety and reduced avoidance of their primary feared situations, as well as significantly less anxiety at six-month follow-up during a speech task (Edelman & Chambless, 1995). Together, these studies suggest an intervention that increases engagement in information or activities perceived as threatening might be a useful adjunct to treatments for social anxiety.

Another way the effectiveness of exposure can be undermined is related to an explicit

assumption of CBT. The assumption is that some of the social interactions will be positive, or, at least, less terrible than feared or imagined. The individual's certainty that these are situations where social disaster is likely will then be disconfirmed and new learning will replace the old certainty. However, it is always possible the treatment-recommended social interaction will confirm rather than disconfirm the individual's fears, either because it actually went badly or because the individual perceives that it did. (Glazier & Alden, 2016) found higher social anxiety predicts significantly poorer recall of the positive aspects of an experience. There is also evidence (Alden, Taylor, Mellings, & Lapsa, 2008) that even if a positive aspect of an experience is recalled, it will be interpreted in a negative manner.

When individuals approach social situations worried the interaction will go badly, as is common for individuals with SAD (Moscovitch, Rodebaugh, & Hesch, 2012), they may act in ways that are perceived by the social partner as unfriendly, lacking in warmth, and awkward (Gee, Antony, Koerner, & Aiken, 2012; Stinson, Cameron, Wood, Gaucher, & Holmes, 2009; Stinson et al., 2011). This socially ineffective behavior is thought to be more likely for those with SAD in part because of what some researchers have defined as the multi-task paradigm within which they are operating. The multi-task paradigm suggests that rather than a single focus on the current interaction, those with SAD are also attempting to simultaneously attend to their own social skills, to how others are responding to them, and to how others perceive them. Having attention split in these ways is thought to negatively impact attention bias and physiological stress response as well as any attempts to self-regulate so as not to appear anxious and to avoid social embarrassment (Hofmann, 2007; MacLeod & Mathews, 1991; Schmader, Johns, & Forbes, 2008). As well, when cognitive resources are consumed with the self-evaluative threat of an experience, performance is impaired on both cognitive and social

tasks (Schmader et al., 2008; Steele & Aronson, 1995; Taylor & Walton, 2011), further increasing the possibility of ineffective social behavior.

In summary, the perception of threat can lead to cognitive and behavioral impairment that then makes it possible the treatment-recommended social engagement will confirm rather than disconfirm the individual's belief in their social inadequacy. Finding a way to reduce the impairment or to attenuate the belief that any one social interaction defines one's social adequacy should increase the likelihood of engaging in avoided activities and increase the success of that engagement. That is, if there was a way to make exposure tasks less threatening, engagement with these tasks would be less aversive, leading to greater compliance with the exposure-to-avoided-activities component of CBT treatment for SAD

### **Self-Affirmation**

Self-affirmation shows promise as just such an intervention. Self-affirmation is an intervention that has been widely used with non-clinical samples. It has shown promise in helping individuals engage effectively in situations they perceive as threatening (Sherman & Hartson, 2011). This beneficial effect has been found in areas as diverse as health-behavior change (Epton, Harris, Kane, van Koningsbruggen, & Sheeran, 2015), decision-making and skill maintenance in the poor (Hall, Zhao, & Shafir, 2014), physiological recovery after interpersonal performance evaluation (Tang & Schmeichel, 2015), and improving awareness of the potential harm of excessive alcohol consumption among at-risk university students (Scott, Brown, Phair, Westland, & Schuz, 2013), to name just a few.

Although there are many variations of self-affirmation intervention, all involve some method of highlighting an important personally held value (McQueen & Klein, 2006). The act of making a personally important value salient has proven to be beneficial in a variety of ways

that may be beneficial for those with SAD including: (a) reducing worry about social rejection (Schimel, Arndt, Banko, & Cook, 2004) and defensive responding in the face of threat to one's self-image (Martens, Johns, Greenberg, & Schimel, 2006; Stone, Whitehead, Schmader, & Focella, 2011); (b) improving executive control, the ability to think logically, and willingness to engage in an activity perceived as ego-threatening (Hall et al., 2014); (c) maintaining the ability to self-regulate in the face of ego-threat (Burson, Crocker, & Mischkowski, 2012; Schmeichel & Vohs, 2009); (d) maintaining effective interpersonal skills in situations potentially threatening to self-image (von Hippel, Wiryakusuma, Bowden, & Shochet, 2011); and maintaining the ability to learn in situations perceived as threatening (Taylor & Walton, 2011). The latter effect is thought to be key in extinguishing the fear that has become attached to situations seen as threatening (Craske et al., 2008). Self-affirmation has also been shown to reduce physiological stress responses (including changes in salivary cortisol, heart rate, mean arterial pressure, and epinephrine) in the face of threatening experiences (Creswell et al., 2005; Creswell, Dutcher, Klein, Harris, & Levine, 2013; Sherman, Bunyan, Creswell, & Jaremka, 2009).

Of perhaps particular relevance for those with SAD, in a study of self-affirmation and relationship-based threat, it was found that those at risk of distancing themselves from their partner and avoiding interaction were less likely to do so when they had engaged in self-affirmation (Jaremka, Bunyan, Collins, & Sherman, 2011). In effect, it seems self-affirmation circumvents a self-fulfilling prophecy (Downey, Freitas, Michaelis, & Khouri, 1998; Stinson et al., 2009) experienced by those with relational insecurity, where the fear of being rejected results in behavior that increases the likelihood of rejection. This is not unlike the experience of those with social anxiety who, fearing they will behave poorly in social interactions (Moscovitch et al., 2012), behave in ways that result in at least some of the very

social costs they fear (Gee et al., 2012), thereby confirming, in their minds at least, the "threat" of social interaction.

There is also evidence that self-affirmation has a positive recursive effect, where an initial positive outcome leads to a positive change for the individual, which then leads to further improvements over time (Sherman & Cohen, 2006). In a study examining the impact of self-affirmation on measures of relational security and social demeanor for those low in relational security (Stinson et al., 2011), engaging in self-affirming writing was found to lead to greater relational security and improved social demeanor two to four weeks later (T2), an increase that had remained stable a further four weeks later (T3). As well, the increase in relational security at T2 predicted additional improvement in social demeanor at T3, over and above that predicted by the T2 level of social demeanor, demonstrating the potential of recursive benefits from self-affirmation.

In the area of academics, there is evidence of a recursive benefit from self-affirmation for middle years students on grade point average (GPA). Cohen and colleagues (2009) found African American students who engaged in self-affirming writing several times over the Grade 7 year showed less decline in their GPA than non-affirmed classmates. This difference was maintained at the end of Grade 8 and appeared to be the result of a positive recursive benefit, as a group of students who completed "booster" self-affirming writing in Grade 8, showed no greater benefit than those who had only engaged in the initial self-affirming writing sessions in Grade 7. In other work involving Latino students in middle years, (Sherman et al., 2013) found engaging in self-affirming writing several times during the school year significantly reduced the decline in GPA that typically occurred in this demographic. Not only was the decline maintained in the following year in spite of no further self-affirmation writing, but the treatment effect was

somewhat larger in the second year, and GPA was maintained in a third-year follow-up. The authors suggested self-affirmation interrupted the negative recursive path that is typical of Latinos in middle years (where a decline in GPA leads to further declines) and instead triggered a positive recursive path.

It should be noted the mechanism by which self-affirmation has its beneficial effect has yet to be clearly determined. Early on in self-affirmation research, self-esteem was frequently examined as a possible mechanism through which self-affirmation operated. However, although level of self-esteem may moderate the effect of self-affirmation, whereby those with lower self-esteem benefit while those with high levels do not (Düring & Jessop, 2015), a higher level of self-esteem is not typically an outcome of self-affirmation (McQueen & Klein, 2006). This moderating effect of self-esteem is consistent with other self-affirmation research which has found self-affirmation benefits those who perceive threat in a particular situation or environment and not those who do not perceive threat. For example, engaging in self-affirmation resulted in: better cognitive performance and decision making for poor participants but not for wealthy ones (Hall et al., 2014), reduced body dissatisfaction for those whose self-esteem was based on their body image but not for those with other bases for their self-esteem (Armitage, 2012), and less fluctuation in minority students' sense of academic belonging but no effect on majority students (Cook, Purdie-Vaughns, Garcia, & Cohen, 2012).

It has been hypothesized that the benefit of self-affirmation is achieved through a bolstering of the self (Napper, Harris, & Epton, 2009) or by satisfying an "overarching and basic need for 'self-integrity', defined as considering oneself a moral and competent being" (Schmeichel & Martens, 2005). These hypotheses suggest it is a reduction in the motivation to protect the self that underlies the beneficial outcomes of self-affirmation (Sherman & Hartson,



2011). In a review of the great variety of studies in which self-affirmation has had a beneficial impact, David Sherman (2013) suggests self-affirmation "works" because it shifts "the way people construe and engage with their social environment" (p. 837) by (a) increasing an individual's psychological coping resources, (b) creating a view of the self that is broader and more expansive than the threat at hand, and (c) detaching self-evaluation from the threat at hand (pp. 837-839). Around the time the current research was completed, Critcher and Dunning, (2015) published research examining an expansion of one's working self-concept as the mechanism by which self-affirmation has its effect. The working self-concept hypothesis will be addressed in the discussion.

An alternative theory, one divorced from motivation and related instead to the cognitive process of psychological distancing, explains the benefits of self-affirmation through its effects on level of construal (Sherman, 2013; Trope & Liberman, 2000, 2010; Wakslak & Trope, 2009). According to this theory, the more psychological distance one has, the more one is able to see the big picture, gist, or ends-related importance of what is currently happening. That is, with psychological distance, the individual is able to step back from the nuts and bolts of what is currently happening and gain the perspective of distance or time (i.e., see the essential and invariant properties of the current experience, as well as the desirability of the experience in terms of their goals). The less psychological distance one has, the greater one's propensity to focus on the immediate features of one's current experiences, and the feasibility of the actions needed to achieve one's immediate goal. There is evidence psychological distance can be created by encouraging individuals to adopt an abstract versus a concrete mind-set (Bar-Anan, Liberman, & Trope, 2006). An abstract or concrete mind-set is referred to as level of construal. Lending support to this theory is evidence self-affirmation shifts individuals to a more abstract mind-set

(Wakslak & Trope, 2009), and it is this shift that mediates self-affirmation's beneficial effect (Schmeichel & Vohs, 2009).

It could be that shifting to a more abstract level of construal as a result of self-affirmation is what allows some to adopt the more expansive view of the self described earlier. Sherman and colleagues (2013) considered the possibility that level of construal was operating in the longitudinal study examining the effect of self-affirmation on the GPA of Latino American middle students described earlier. They also measured level of construal over the three years of this study. Results showed that, for students experiencing threat (i.e., Latino American students), engaging in self-affirming writing resulted in more abstract construals of events and higher GPAs than not engaging in self-affirmation. However, the support for a level of construal explanation of the positive benefits of self-affirmation was only partially supported. Although engaging in self-affirmation did result in a more abstract level of construal and an improvement in GPA, the change in level of construal did not mediate the relationship between self-affirmation and GPA.

Given the evidence that self-affirmation shifts individuals to a more abstract level of construal (Sherman et al., 2013; Wakslak & Trope, 2009), level of construal mediated the effect of self-affirmation in one study (Schmeichel & Vohs, 2009) but not in another (Sherman et al., 2013), and psychological distance theory suggests level of construal will be correlated with whether one is focused on the details of one's current experience rather than the ends-related importance of what is currently happening, level of construal was studied in the present research. The question of interest was, if self-affirmation proved to be beneficial for those with SAD when faced with a socially threatening situation, would the benefit be carried, at least in part, by a move to a more abstract level of construal? Given the literature cited, I hypothesized that

engaging in self-affirming writing would result in a move to a more abstract level of construal. However, given the paucity of research considering level of construal as a mediator as well as the contradictory results, it was uncertain whether this more abstract construal level would mediate any effects of self-affirmation. As Sherman and colleagues (2013) note, the mediational pathways from self-affirmation, through construal, to outcomes of interest may be "direct or heterogeneous, a likelihood in a complex real-world setting" (p. 19).

### **Threat Response**

There is a growing body of evidence that the behavioral, experiential, and physiological facets of the emotional threat response system do not necessarily respond in concert (see Mauss, Levenson, McCarter, Wilhelm, & Gross, 2005). For example, a person may feel anxious but not exhibit behavioral signs of anxiety or show a physiological anxiety response. Or, the individual may have a physiological response and appear anxious to others but not self-report feeling anxious. In a review of 49 studies examining the relationship between measures of physiological and emotional stress response, significant positive correlations were reported in only approximately 25% of cases (Campbell & Ehlert, 2012). Relevant for the present study, the correspondence between the physiological and experiential facets of the threat responses systems of individuals asked to give an impromptu speech was different for individuals with SAD compared to individuals without SAD (Moscovitch, Suvak, & Hofmann, 2010). The physiologic response of increased heart rate was significantly correlated with the experiential response of self-reported negative affect for both groups but with positive affect only for individuals without SAD. Change in skin conductance was significantly correlated with an increase in self-reported negative affect and a decrease in positive affect for those with SAD, but not for those without SAD.

A sampling of studies examining coherence within just the experiential emotional response system paints a similarly mixed picture. Results in one study showed a significant degree of coherence within both the autonomic (e.g., anger accessibility/physiology) and reflective (e.g., anger experience/instrumental behavior) aspects of the emotional response system, but little coherence between the two aspects (Evers et al., 2014). Another study (Bulteel et al., 2014) found emotional response patterning and synchronization exist but that they are highly person-dependent.

Finally, it appears our perception of how our bodies are responding physiologically may not be reflective of reality. Mauss, Wilhelm, and Gross (2004) found actual physiological responding was not significantly correlated with self-reported anxiety experience, behavior, or perceived physiological responding for the high or the low socially anxious. A large number of physiological responses were measured in this study including mean arterial pressure, cardiac output, total peripheral resistance, finger pulse amplitude, skin conductance fluctuations, respiratory tidal volume, respiratory sinus arrhythmia, and somatic activity. Self-reported physiological responses were racing heart, sense of blushing, sweaty palms, and shortness of breath. Non-anxious controls were found to be no more accurate in their perception of their physiological response than were the clinically anxious controls or those with SAD, with the low socially anxious underestimating their physiologic responses and the high socially anxious overestimating the same responses.

It appears the emotional threat response systems are, at best, weakly correlated; no one system provides a comprehensive picture of an individual's response to threat. Accordingly, one or more variables from each of these systems—self-report, behavioral, and physiological—were used in the present study in order to capture different facets of the threat response system. The

inclusion of variables from these three systems also allowed for an examination of whether the expected protective benefit of self-affirmation differs between response systems.

### **Cortisol**

The physiological measure included in the present study was a measure of salivary cortisol. Although changes in many different physiological markers could be and have been measured in response to stress (e.g., Mauss et al., 2004), cortisol is of particular interest when measuring social stress response. Not only is cortisol a widely studied biomarker of stress in psychobiological research (Shirtcliff et al., 2015), but individuals with SAD have been shown to have a hyper-cortisol response in the face of social stress, a response that is positively correlated with avoidance behavior during socially stressful experiences (Roelofs et al., 2009). It is also now well understood that the normally adaptive cortisol response to stress can lead to increase in disease when stress and the consequent cortisol response become chronic (McEwen, 1993; McEwen & Wingfield, 2003). As well, there is previous research (e.g., Creswell et al., 2005; Sherman et al., 2009) that has shown a positive benefit of self-affirmation on levels of cortisol.

Cortisol is just one part of a broader suite of physiological responses that enable an individual to physically protect him or herself when threat is perceived.<sup>3</sup> The suite of responses is the same whether the threat is physical or psychological. The body's defense system will be triggered to respond based on danger messages sent by the nervous system, related to what we perceive in the moment and our past experiences. Our perceptions and past experiences can either dampen or amplify the defense response. When threat is identified, a cascading response in the hypothalamic pituitary-adrenal (HPA) system is triggered, beginning with activation of the

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<sup>3</sup> This is meant to be a brief overview of the more salient aspects of the physiological stress response system of the human body. For more complete descriptions, please see del Rey, Chrousos, and Besedovsky (2008); Johnson, Kamilaris, Chrousos, and Gold (1992); and Tsigos and Chrousos (2002).

hypothalamus. The hypothalamus, in turn, sends signals to the adrenal medulla, part of the sympathomedullary pathway (SAM), and to the pituitary gland, part of the hypothalamic pituitary axis (Tsigos & Chrousos, 2002). This signaling of the HPA triggers a number of responses, including the release of cortisol, a hormone produced by the adrenal cortex. Cortisol is responsible for: (a) increasing the availability of glucose to ensure a steady supply of blood sugar to cope with a prolonged threat, (b) enhancing the brain's use of this glucose, (c) helping to maintain fluid balance and blood pressure, and, (d) dampening body functions that become less important when faced with threat such as the immune system, digestion, growth, and the libido. Cortisol also helps the body to return to normal following the threat through such mechanisms as controlling swelling after injury.

Cortisol measured in saliva reflects HPA stress responding in the previous 10 to 60 minutes (Miller, Chen, & Zhou, 2007). The typical time taken for cortisol to return to baseline levels varies according to the stressor and the individual. It is also impacted by the chronicity of the individual's experience of stress. In fact, the body's stress response system can become dysregulated in a number of ways including showing a delayed response, a hyper response, and little or no response (McEwen & Wingfield, 2003; Oitzl, Champagne, van der Veen, & de Kloet, 2010). When stress is chronic and the presence of cortisol becomes constant, the normally adaptive effects of the cortisol response, described earlier, can become harmful, and are associated with a host of health problems including: suppression of the immune system, increased blood pressure and sugar levels, decreased interest in sex, memory and concentration impairment, sleep problems, digestive problems, and, increased risk of anxiety and depression (Chrousos, 2000; McEwen, 1993). Since individuals with SAD perceive stress in normal day-to-day social interactions, they are at risk of developing this chronic stress response.

**Summary of Rationale**

To summarize the preceding discussion, SAD typically begins in adolescence and is associated with significant costs for the individual and for society. A highly recommended treatment for SAD, CBT, necessitates that individuals engage in the very activities they experience as threatening, which sometimes results in partial avoidance or even treatment drop-out. Self-affirmation is an intervention that has been shown to facilitate individuals' participation in activities they find threatening, and to help maintain individuals' skill sets and facilitate new learning during this participation. This suggests that, for those with SAD who are seeking to engage in more social activity, self-affirmation may have a variety of positive effects, including reducing the threat experienced when in a socially challenging situation and increasing engagement in behaviors previously avoided. Although a definitive mechanism by which self-affirmation has its effect has not yet been determined, there is some evidence it is the move to a more abstract construal of events following self-affirmation that mediates the relationship between self-affirmation and the variety of positive outcomes described in the self-affirmation literature.

**Study 1**

The aim of this study was to examine the relationship between social challenge, self-affirmation, threat, and future engagement in social behaviors. To do so, I explored the effectiveness of self-affirming writing in reducing the immediate negative impact of social threat and in increasing the longer-term frequency of social behavior for students with symptoms of SAD. To assess both the social and performance fears of SAD (American Psychiatric Association, 2013) for these students the social threat included both speech and mental math components. To get a fuller picture of threat response and the impact of self-affirmation on that

response, at least one outcome measure from each of the behavioral, experiential, and physiological facets of the threat response system was collected. As well, in order to assess whether engaging in self-affirming writing has a positive recursive benefit for those with SAD, self-reports of avoidance of, engagement in, and anxiety related to a number of social behaviors typical of university students were collected at one-month follow-up and compared to baseline self-reports. A between-group (self-affirmed or not) experimental, mini-longitudinal (baseline, pre and post-experimental self-affirmation and threat induction, and 1-month follow-up) design was used.

In addition, there were two exploratory aspects to Study 1. The first examined whether an individual's initial level of SAD moderated the cortisol response to a social stressor. I hypothesized that individuals with higher levels of SAD might show a greater cortisol response to social stress as they would likely experience more threat. Alternatively, given the evidence showing chronic stress can result in a dampening of the cortisol response for some individuals, perhaps higher levels of SAD would be associated with a smaller cortisol response, in spite of perceived threat. In the first case, self-affirmation was expected to result in a lower cortisol response when compared with controls. In the second case, it was difficult to predict just how engaging in self-affirmation would impact cortisol response.

The second exploratory aspect concerned level of construal. There is limited research examining level of construal. The research that does exist supports the theory that self-affirmation results in a more abstract level of construal and that this has psychological benefits for the individual. However, these benefits have not been found to translate consistently into a performance outcome. Consequently, a measure of change in the level of construal from baseline to following self-affirmation was included to see whether it would mediate the impact of



condition (self-affirmed or non-affirmed) on any or all of the experiential, behavioral, and physiological outcomes measured, either at the time of the social stressor or at one-month follow-up.

Although self-affirmation has been extensively researched as a method to reduce defensive reactions to threatening information, there are few studies examining its impact on relational processes such as social interactions. As well, to my knowledge, self-affirmation has not been examined with individuals who self-report moderate to high levels of SAD symptomology. Given that the avoidance of interactions that typifies SAD contributes to suffering, an intervention that reduces this avoidance would be welcome. Further, since initiating, seeking out, and accepting social invitations is a key component of CBT treatment for SAD, if self-affirmation does successfully increase engagement in previously avoided social behaviors, it might possibly be a useful adjunct to current CBT treatment.

On the basis that science best proceeds when strong hypotheses are advanced and tested (Platt, 1964), I set a high threshold for the level of evidence necessary to propose a hypothesis. Those ideas with little, or conflicting, evidence were designated as exploratory.

### **Primary Hypotheses** (see Table 1)

1. For individuals who were above a sub-clinical threshold on a measure of SAD symptoms, engaging in self-affirming writing, when compared with engaging in non-affirming writing, was expected to provide immediate threat protection from a standardized stress-inducing task on:
  - self-reported anxiety and threat,
  - measures of behavioral performance, and
  - cortisol response.

2. Self-affirming writing was expected to have longer-term benefits at one-month follow-up as well as lower self-ratings of social anxiety relative to baseline. This would be evidenced by increased social interaction, and reduced anxiety and avoidance.
3. Self-affirming writing was expected to shift participants' level of construal to a more abstract level.

### **Exploratory Analyses (See Table 1)**

1. The change in level of construal was examined as a possible mediator of the relationship between condition and the following responses measured at the time of the social stress task:
  - self-reported anxiety and avoidance,
  - measures of behavioral performance, and
  - cortisol response.
2. The change in level of construal was also examined as a possible mediator of the relationship between condition and change in anxiety, avoidance, and behavior frequency from baseline to one-month follow-up.
3. Participants' initial level of social anxiety was examined as a possible moderator of the relationship between condition and the physiological response to the social stress task.

Table 1

*Summary of Primary Hypotheses and Exploratory Analyses - Study 1*

Primary hypotheses		
Phase	Hypothesized effect of condition on outcome variables	Outcome variables
Social stress	Self-affirmed <i>lower compared to non-affirmed</i>	<ul style="list-style-type: none"> <li>• perception of threat</li> <li>• distress</li> <li>• cortisol</li> </ul>
	Self-affirmed <i>higher compared to non-affirmed</i>	<ul style="list-style-type: none"> <li>• warmth rating</li> <li>• eye contact rating</li> <li>• mental math</li> <li>• required speech items</li> </ul>
Follow-up	Self-affirmed <i>lower compared with non-affirmed and with baseline</i>	<ul style="list-style-type: none"> <li>• anxiety</li> <li>• avoidance</li> <li>• cortisol</li> </ul>
	Self-affirmed <i>higher compared with non-affirmed and with baseline</i>	<ul style="list-style-type: none"> <li>• engagement in social behaviors</li> </ul>
Exploratory analyses		
Social stress	Level of construal would mediate the relationship between condition and outcome variables	<ul style="list-style-type: none"> <li>• perception of threat</li> <li>• distress</li> <li>• cortisol</li> <li>• warmth rating</li> <li>• eye contact rating</li> <li>• mental math</li> <li>• required speech items</li> </ul>
	Baseline level of social anxiety would moderate relationship between condition cortisol	<ul style="list-style-type: none"> <li>• cortisol</li> </ul>
Follow-up	Level of construal would mediate the relationship between condition and outcome variables	<ul style="list-style-type: none"> <li>• anxiety</li> <li>• avoidance</li> <li>• engagement in social behaviors</li> </ul>

## Method

**Participants.** University students with moderate to high levels of SAD symptomology, as documented by a self-report screening measure, were selected as the target population in this study for several reasons. First, university students with SAD have been shown to have a significantly reduced quality of life compared to students without SAD (Ghaedi et al., 2009; Gültekin & Dereboy, 2011). Second, students with social anxiety report difficulties with many typical academic demands such as presentations, class participation, group work, and asking questions of faculty, difficulties which may lead to dropping out (see Baptista et al., 2012). Third, research shows the incidence of SAD rises steeply throughout the teen years and mid-20s (Heimberg et al., 2000), an age range that includes the majority of university students. Fourth, intervening early, as soon as possible after the onset of a disorder, maximizes the individual's benefits from treatment over their lifespan. Accordingly, it is important to identify potential treatment adjuncts that are effective for individuals in early adulthood. Finally, evidence suggests self-affirmation may be most effective when implemented at transitional points when fear of rejection may be particularly acute, in order to enhance the likelihood of positive recursive outcomes (Sherman et al., 2013; Yeager & Walton, 2011). The students who participated in this study were all enrolled in Introductory to Psychology, a large percentage of whom were first year students, fitting this transitional period recommendation.

All students registered in Introduction to Psychology at the University of Manitoba (U of M) were invited to participate in a screening which included a screen for SAD, the Social Phobia Inventory (SPIN; Connor et al., 2000), among other measures. Of the 2218 students screened and who provided complete useable data 46 % ( $n = 1015$ ) scored 23 or higher on the SPIN, a cut-off score at the high end of scores found to be consistent with subclinical levels of SAD (Ranta,

Kaltiala-Heino, Rantanen, Tuomisto, & Marttunen, 2007). This cut-off score was chosen so the population would include those likely to meet SAD diagnostic criteria as well as those with high anxiety but unlikely to meet criteria. Of the 1015 students eligible (70% female, mean age 19.20, age range 16 to 58), 900 provided permission to be contacted for further research, 377 of these (chosen through quasi-random selection) were reached by email and invited to participate, 194 provided baseline data, 91 participated in the social stress phase, and 81 participated in the one-month follow-up phase. Based on a meta-analysis measuring cortisol response to acute stressors (Dickerson & Kemeny, 2002), a sample size of 40 participants per condition was expected to have sufficient power to detect effects. See Figure 1 for the flow of participants through the study.

All participants were given partial course credit in return for their participation. In addition, two further incentives were offered to participants owing to the demanding nature of the social stress phase and to encourage participation one month later in the follow-up phase. Social stress and follow-up phase participants were entered once per phase in a draw to win an Apple iPod Touch, 5th generation or one of eight \$20 gift certificates to a favorite coffee shop or the UM bookstore.

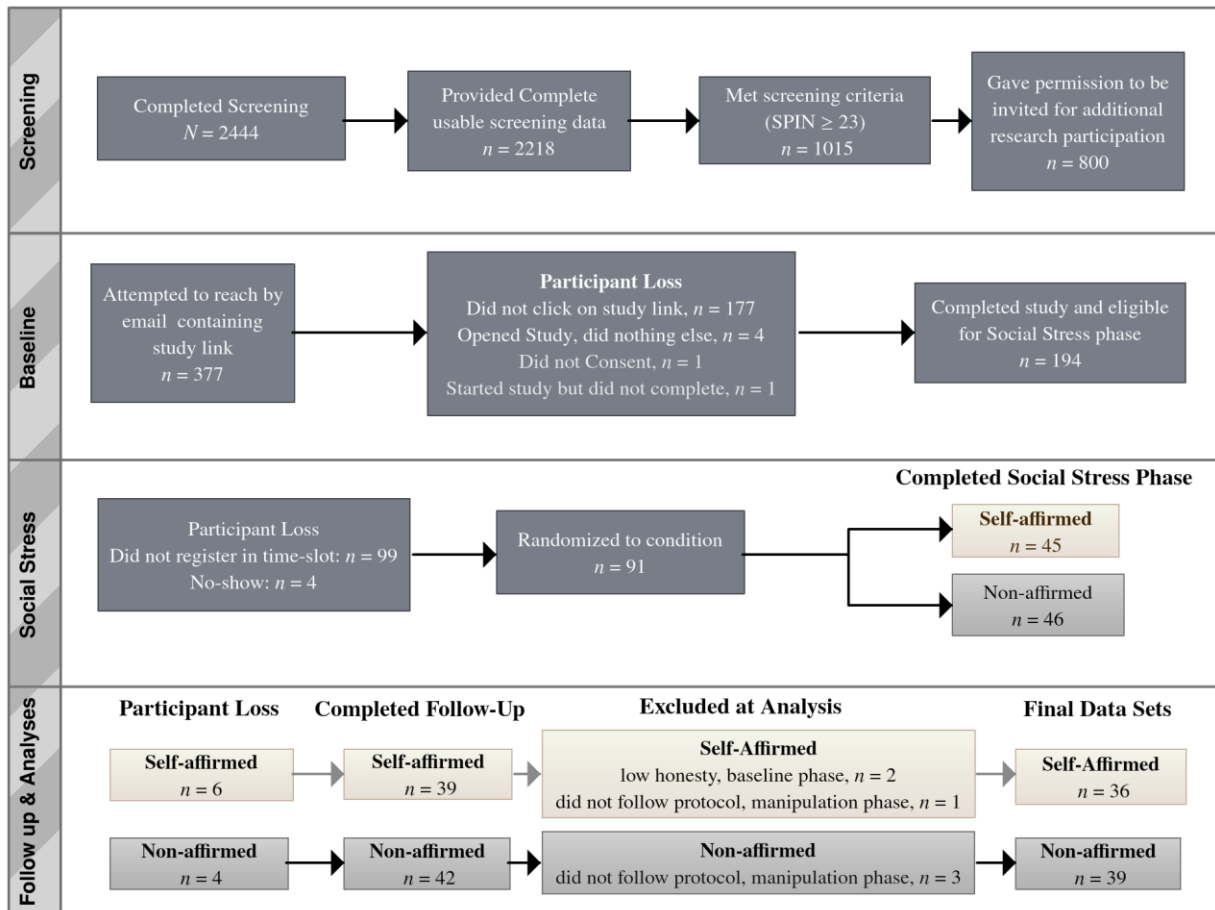


Figure 1. Participant flow, Study 1, from initial screening through to analyses. In the baseline phase, the 377 of the possible 800 who were sent email invites were chosen through quasi-random selection. Once sufficient participation was obtained, no more email invites were sent.

**General.** The Psychology/Sociology Research Ethics Board at the University of Manitoba approved all aspects of the study. All online components of the study were created and administered using the online survey creation tool Qualtrics ([www.qualtrics.com](http://www.qualtrics.com)). There were four different data collection points for this study. See Table 2 for a summary of procedure. The procedures, including measures and interventions, are described separately below for each of the four data collection points. Consent for participation was obtained at each point (see Appendix A).



their responses. Fourteen different classes participated, varying in size from approximately 50 to 200 students. Students also completed a consent form and a demographic questionnaire, and were invited to supply contact information if they were willing to be contacted for possible future research participation. Students completed a social anxiety screening measure, the Social Phobia Inventory (SPIN; Connor et al., 2000), as part of this screening.

The SPIN is a 17-item self-report instrument designed to measure the fear, avoidance, and somatic symptoms of social anxiety. Individuals are asked to evaluate each item (e.g., I avoid talking to people I don't know) with reference to the previous week and to rate how much they experienced, or were bothered by, each symptom using a 5-point Likert scale ranging from 0 (*not at all*) to 4 (*extremely*). An evaluation of the scale in a clinical sample found it to have excellent internal consistency ( $\alpha = .95$  for the scale as a whole, and .91, .88, and .79 for the fear, avoidance, and somatic subscales respectively), good test-retest reliability over a period of one to three weeks ( $r = .86$  for the scale as a whole, and .84, .83, and .78 for the fear, avoidance, and somatic subscales), good sensitivity to changes in social anxiety following intervention, good convergent and discriminant validity and to be successful in distinguishing between those with social anxiety and those with other anxiety disorders (Antony, Coons, McCabe, Ashbaugh, & Swinson, 2006). The SPIN has been used in several samples of randomly selected university students to screen for those with sub-clinical and clinical social anxiety, using a cut-off of 19 and 24 respectively (Baptista et al., 2012; Osório, Crippa, & Loureiro, 2010; Ranta et al., 2007). In this study a cut-off of 23 was used, which captures the very top end of the subclinical range and the entire clinical range. An analysis of the SPIN data obtained showed that internal consistency was excellent ( $\alpha = .90$  for the scale as a whole, and .80, .80, and .69 for the fear, avoidance, and somatic subscales). In the Canadian Psychiatric Association's Clinical Practice Guidelines



(Canadian Psychiatric Association, 2006), the SPIN is recommended as an appropriate tool for measuring response to treatment for SAD.

**Baseline phase.** This phase took place entirely online, two to four weeks after the screening phase. A dataset of those students who met the screening criteria of a SPIN score  $\geq 23$  was created. As there were more students who met criteria than were needed for this study, batches of approximately 60 students were quasi-randomly selected and sent an email-invitation (Appendix B) to participate in the baseline phase until a sufficient number of students ( $n = 200$ ) had signaled their interest in participation by clicking on the study link contained in the invitation. By clicking, students were taken first to an online consent form that described the current phase of the study and informed them that providing complete baseline data would make them eligible to participate in the social stress and follow-up phases of the study. Those who chose to participate then completed the following measures, in the order in which they are described.

**Level of Construal.** To assess the degree to which an individual has organized his or her actions into abstract, meaningful categories, participants completed the Behavioral Identification Form (BIF; Vallacher & Wegner, 1989). The BIF describes 25 different behaviors. For each behavior, individuals must choose between an abstract and a concrete explanation. For example, for the statement "Making a list", a participant would decide which option, in their opinion, best explained the statement: a) getting organized or b) writing things down. Vallacher and Wegner report the scale is unidimensional and internally consistent (Cronbach's alpha = .85). The BIF has been shown to be responsive to experimental manipulation, with self-affirming writing causing a significant increase in abstract construals relative to non-affirmation writing (Schmeichel & Vohs, 2009). In order to allow for repeated assessments using the BIF, the

original scale was supplemented with 25 items created by Marsh and colleagues (2010) and by Sherman and colleagues (2013) to create a pool of 50 items. This pool was broken up into five sets, with 10 unique items in each set. The final set also contained an additional 10 items, which had already appeared in one of the first four sets. Together, this created a list of 60 items, the 10 unique items from each set plus the 10 repeated items. For this study, this set of 60 was broken into three sets of 20, one set administered in each of the three phases. The 20-item set of the follow-up phase contained 10 unique items plus the 10 repeat items: four items from the baseline phase and six items from the social stress phase. The items of each set were presented in random order to participants. There was no significant difference,  $F(2, 222) = 2.02$ ,  $p = .135$ ,  $\eta^2 = .018$ , between the mean of items unique to Phase 3 ( $M = .60$ ) and those of the four Phase 1 items ( $M = .51$ ) and the six Phase 2 items ( $M = .52$ ) which were included in the Phase 3 BIF. The baseline BIF scores had a Cronbach's alpha of .70, the social stress BIF scores an alpha of .80 and the follow-up BIF scores an alpha of .82.

***Social Behaviours.*** Next, participants completed The Kutcher Generalized Social Anxiety Disorder Scale for Adolescents - Modified (Mod. K-GSADS-A; Brooks & Kutcher, 2004). The K-GSADS-A is a clinician-rated instrument containing 32 items divided into three sections including: (a) Section A where participants rate a number of behaviors according to the distress and the avoidance associated with each behavior; (b) Section B where the clinician prompts for the three situations the individual finds most distressing; and (c) Section C which measures somatic distress. For the purposes of this study, only Section A was used (hereinafter referred to as K-GSADS-A Behaviour). Section A is comprised of a list of social behaviors which are often avoided by, or that elicit discomfort/anxiety/distress (hereinafter shortened to distress) in, adolescents with social anxiety. For use with an adult university student population,

Section A was modified in two ways. First, it was completed as a self-report scale as it was assumed university students would not need clinician help in rating the items. Second, three items in Section A that did not typically apply to most university students were deleted (e.g., attending overnight group activities such as camps, school trips, etc.; showering in a common locker room), one item was divided into two, and four items considered important for successful interpersonal functioning at university were added (e.g., making eye contact with friends; sharing your own ideas, opinions, thoughts, and preferences when in a group). The final scale had 20 items. Participants first reported how much distress they felt over the last month with regard to each behavior listed and then reported how much avoidance they felt in response to the same list of behaviors, using a scale from 0 (*never*) to 3 (*severe*) for the distress rating and from 0 (*never*) to 3 (*total avoidance*) for the avoidance rating.

In a review of scales used to assess child and adolescent social anxiety, the behavior section of the K-GADS-A was reported to have excellent internal consistency ( $\alpha = .96$ ), good content validity, adequate construct validity and to be sensitive to treatment effects (Tulbure, Szentagotai, Dobrean, & David, 2012). In the present study, the modified K-GSADS-A Behaviour distress and avoidance ratings together had excellent internal consistency ( $\alpha = .90$  at baseline and  $.94$  at follow-up). Looking at the distress and avoidance ratings of the modified K-GSADS-A Behaviour separately, both sets of ratings showed good internal consistency. The distress ratings had an alpha of  $.81$  at baseline and  $.88$  at follow-up and the avoidance ratings had an alpha of  $.81$  at baseline and of  $.89$  at follow-up.

The items of the modified K-GSADS-A Behaviour were also used to measure engagement in potentially anxiety-producing social behaviors by asking participants to report how many times they did engage in each of the 20 behaviors that are part of the measure in this

study (hereinafter referred to as behavior frequency). A positive change in behavior frequency between baseline and follow-up phases was used as a behavioral index of increased social engagement.

Participants then completed a series of demographic questions (Appendix C) including gender, age, and ethnicity. Responses to these questions were used to describe the participants, to assess for equivalency of conditions on these descriptors, and to inform the discussion of the generalizability of the study.

Finally, participants completed two validity questions that asked all participants to rate themselves on a 5-point Likert scale, from 1 (*not at all*) to 5 (*completely*), as to their level of honesty and attentiveness (Appendix D). Self-report data from participants with honesty ratings less than 4 were considered unreliable and data from participants scoring in this range were deleted from the final data set ( $n = 2$ ). A participant's data was also considered unreliable if the attentiveness rating was less than 4 and the data was suspect (e.g., every item in a scale given the same rating). No data was deleted on these grounds.

**Social stress phase.** Participants who provided complete baseline data received an email invitation to participate in the social stress phase (Appendix E), an in-person lab-based phase. Those who chose to participate were instructed to click on a Doodle Poll link (<http://doodle.com/>) where they were able to choose a day and time to come to the lab that fit their schedule. There were up to four time slots available (2:00 to 3:30 pm; 3:30 to 5:00 pm; 5:00 to 6:30 pm; 6:30 to 8:00 pm) on nine different days spread over two weeks. These time slots were chosen based on the time frame when salivary cortisol is likely to be at its diurnal peak (Dickerson & Kemeny, 2002) as well as to limit the number of days of data collection for this phase so as to allow for at least four weeks between this phase and the follow-up phase. Up

to four participants were able to register in each time slot. This resulted in 16 time slots with four participants and nine time slots with three participants. Participants were able to see if someone else had already registered in that time slot but they were not able to see the name of that registrant.

Once all participants in a particular time slot had arrived at the computer lab, they sat down at a computer to read through the consent form. Following the consent process, the first of three saliva samples (T1) was collected. Participants were then verbally informed that the socially stressful task, described as such in the study description, participation invitation, and consent form, involved giving an impromptu speech and another task. They were informed the tasks would be further described later. Participants then returned to their computers and completed the Affirmation Manipulation which involved completing a Values Questionnaire followed by a writing task that involved either self-affirmation or non-affirmation. Participants in both conditions were represented in all time slots through Qualtrics programming which randomly assigned the two writing tasks to participants with the restriction of keeping the number of participants in each time slot and each condition equal (or near equal). All research assistants were blind to condition. Following the writing task, participants completed an affirmation manipulation check, the second set of BIF questions, several Stress Appraisal questions, and the first of two Subjective Units of Distress (SUDS) ratings.

At this point, participants blindly picked one of four speech topics: capital punishment, cloning, space colonization, or religion in schools. The socially stressful task was described to participants in more detail. It was at this point that participants were asked to include their name, where they were from, and their program of study at university in their speech. Participants then left the computer lab, walked up two flights of stairs and down a hallway to the speech lab.

Once in the lab, participants completed the Trier Social Stress Test - Group (TSST-G) version (described below). At approximately T1 + 30 minutes (T2; range 29 to 31 minutes), the second saliva sample was taken. This time was chosen as 25 to 35 minutes after anticipatory anxiety has been triggered by describing the TSST has been found to be the time period in which cortisol levels peak (Dickerson & Kemeny, 2002). Due to unforeseen variation in the length of time taken to complete the writing task and self-report measures among participants, T2 occurred at different points during the TSST-G protocol (e.g., between the speech and math tasks, in the middle of the speech task, or in the middle of the math task). Participants then returned to the computer lab where they completed the SUDS for a second time. At this time, I gave a partial debrief about the purpose of the study (Appendix F). I also shared a psychoeducational description of social anxiety similar to what might be given in a clinical therapy session with a socially anxious client, highlighting that: (a) avoidance of feared activities will worsen social anxiety over time, (b) increasing engagement in feared activities will reduce it over time, and (c) "cheating" by using a safety behavior will reduce or eliminate the benefit of social engagement. Finally, I handed each client a list of free or low-cost social events taking place on campus or in the City of Winnipeg over the coming month as examples of social activities in which they may wish to participate (see Appendix G for an outline of the information shared). At approximately T1 plus 50 minutes (T3), the third and final saliva sample was collected. In case any participant experienced lingering distress at the end of this phase, they were given a list of mental health resources they could contact for support (Appendix H).

***Salivary Cortisol.*** Saliva was collected using a Salivette<sup>®</sup> Saliva Collection System (Sarstedt, Inc.; see Figure 2), which consists of a small cotton tube and a two-part sterile plastic storage tube. Each participant placed the cotton tube under their tongue for 1 minute and 30

seconds and then placed the swab in a sterile tube. The tubes were collected and placed on ice in a small cooler until all T1, T2, and T3 saliva samples in a particular time slot had been collected. The samples from each time slot were then immediately transferred to a freezer and stored at -20°C until sCort analysis could take place. As there are daily fluctuations in cortisol levels, with maximums typically occurring in the afternoon (Creswell et al., 2005; Dickerson & Kemeny, 2002), an attempt was made to schedule all time slots and, therefore, all saliva collection in the mid- to late-afternoon and early evening.



*Figure 2.* Salivette<sup>®</sup> Saliva Collection System (Sarstedt, Inc.; used with permission)

The saliva samples were thawed approximately two months later and centrifuged at 2,500 rpm for 20 minutes at 21 °C to extract the saliva from the cotton tubes. SCort analysis was then done using the DetectX Cortisol Enzyme Immunoassay Kit (Arbour Assays, 2009). The Arbor Assays protocol supplied with the kit was followed for saliva extraction and assay (Appendix I). All samples were divided into two separate subsamples which were then both tested. The average of the two scores was used in all sCort analyses. This duplicate testing was done to reduce variance due to measurement error. Validation data for the DetectX Cortisol

Enzyme Immunoassay Kit found sensitivity of the kit to be 17.3 pg/ml and limit of detection to be 45.4 pg/ml. Expressed in System International Units of nmol/l the values are 0.05 and 0.13 nmol/l respectively. It was decided to represent the salivary cortisol measurements in this study using nmol/l (as per Jessop & Turner-Cobb, 2008; Quest Diagnostics, n.d.). Higher numbers represent higher concentrations of cortisol and signify a stronger physiological stress response.

***Self-affirmation.*** For the affirmation manipulation, participants first completed a Values Questionnaire (Allport, Vernon, & Lindzey, 1960; Appendix J) in which they ranked 11 values and characteristics (e.g., sense of humor, social skills, athletics) in terms of personal importance. This was followed by a writing task, which directed those in the self-affirmed condition to write about why their top-ranked value from the Values Questionnaire was important to them (Cohen, Aronson, & Steele, 2000) and then to list the top two reasons for choosing that value as their top-ranked value and to describe to what extent it has influenced their life and is an important part of their self-image (Stinson et al., 2011). Those in the non-affirmed condition, following a commonly used control condition for examining the effects of affirmation (McQueen & Klein, 2006), were asked to write about why their 11th ranked value on the Values Questionnaire might be important to someone else. As this writing task was expected to take significantly less time than the writing task of those in the self-affirmed condition, to help equalize writing time across the two groups, the participants in the non-affirmed condition were also asked to "Please describe as accurately as possible the route you take to come to the university, whether you walk, drive, take the bus, car pool, or cycle. Note the street names that you remember, landmarks, etc."

To assess whether the affirmation manipulation was effective, participants completed an affirmation manipulation check (Appendix J) which consisted of five items designed to measure



awareness of, and concern with, self. This affirmation manipulation check was devised by Napper, Harris, and Epton (2009, Study 1) and was shown to have good sensitivity to experimental manipulation. In this study, the five items had good internal reliability ( $\alpha = .80$ ).

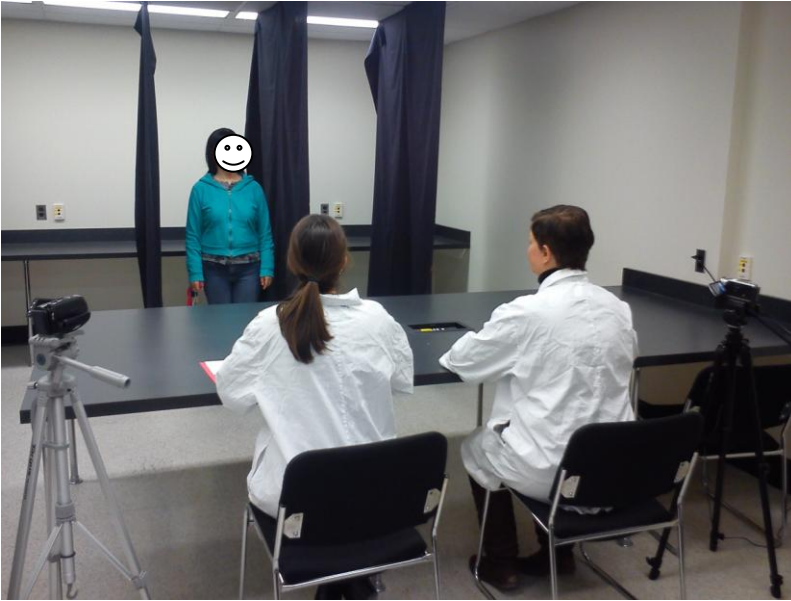
***Self-report distress items.*** Participants' perception of threat associated with the upcoming social stress task was assessed with a series of questions asking participants to rate how stressful, difficult, and threatening they expected each of the two tasks, speech and arithmetic, to be (Appendix K). Ratings were done using a 7-point Likert scale ranging from 0 (not at all) to 7 (extremely). These questions were taken from a previous study (Blascovich & Tomaka, 1996) and have been shown to be sensitive to experimental manipulation (Creswell et al., 2005). In this study, the mean inter-item correlation was .30 for the speech stress items ( $r = .31, p = .006$  for stress and threat,  $r = .51, p < .000$  for stress and difficulty,  $r = .07, p = .53$  for threat and difficulty) and .62, for the arithmetic stress items ( $r = .51, p < .001$  for stress and threat,  $r = .86, p < .001$  for stress and difficulty,  $r = .51, p < .001$  for threat and difficulty).

The final measurement before the social stress task was the Subjective Units of Distress Scale (SUDS; (Wolpe, 1988), which is a visual analogue scale traditionally used with exposure treatment and behavioral assessment to measure subjective units of anxiety, disturbance, or distress. Following (Rodebaugh & Shumaker, 2012), participants were asked to mark how anxious they felt in the current moment on a line with five anchor points ranging from 0 (*no anxiety, calm, relaxed*) to 100 (*Very severe anxiety, worst ever experienced*). Participants completed the SUDS twice during this phase, before and after the social stress task.

***Social stress task.*** The social stress task used in this study was the Trier Social Stress Test for Groups (TSST-G; Kirschbaum, Pirke, & Hellhammer, 1993; von Dawans, Kirschbaum, & Heinrichs, 2011). The TSST was chosen as a recent meta-analysis of 208 studies found this

task to be the best standardized method of inducing stress in the laboratory, as measured by cortisol response (Dickerson & Kemeny, 2002). The group version was chosen as it is a more time efficient way to administer the TSST and still elicits the desired significant increases in both physiological and psychological stress responses (von Dawans et al., 2011). The TSST-G has two parts: a speech task and an arithmetic task. In this study, participants were asked to prepare a speech up to two minutes in length on one of four blindly selected speech topics considered to be controversial in Canada (capital punishment, cloning, space exploration, or religion in schools). They were given approximately three minutes to mentally prepare this speech.

Participants then entered the speech lab where two speech evaluators (research assistants posing as non-verbal speech evaluators) wearing white lab coats were seated. There were also two working video cameras present. Participants were instructed to stand in the position that corresponded to their computer position, position 1, 2, 3, or 4. Hanging dividers between each position prevented the participants from being able to make eye contact with each other but allowed each participant to easily see the evaluators and the video cameras. See Figure 3 for the room arrangement.



*Figure 3.* Configuration of speech lab for the TSST. Fabric dividers prevented participants from having eye contact with each other during the TSST.

Speech evaluator #1 (two research assistants played this role) gave the instructions for the speech, letting participants know that the order in which they presented would be random and they had up to two minutes to speak. Randomization of order was accomplished using a random number generator (<https://www.randomizer.org>). Speech evaluator #1 also told each participant “you still have some time left” if the participant stopped before the two-minute limit. If a participant stopped a second time before the limit, the time at which they chose to stop was recorded. Speech evaluator #1 also recorded the number of the required speech elements each participant remembered to include. Speech evaluator #2 (one research assistant played this role) rated each participant as to warmth and eye contact as well as noted any unusual behaviors of the participants (e.g., fidgeting with hands, hands in pockets, crossing arms). The speech task was followed by a mental arithmetic task in which participants were asked to count backwards from a given number by 16, out loud as quickly as possible, for two minutes. Each participant within a

time slot was given a different starting number in order to prevent learning effects. In the standard TSST, the speech evaluators are asked to maintain a disapproving facial expression, give stern admonishments to “keep talking” if the participant should end before the allowable time, and to “go faster” at the halfway mark of the mental arithmetic task. However, since it has been found that a less stressful speech task (Beidel, Turner, Jacob, & Cooley, 1989) is effective in eliciting significant physiological and psychological stress responses for those with SAD (Moscovitch & Hofmann, 2006; Price & Anderson, 2011; Schmidt et al., 2012), in this study speech evaluators were instructed to keep a neutral facial expression instead of a disapproving one and there were no stern admonishments in either task. Written instructions as to procedures to be followed were given to each of the speech evaluators (Appendix L). At approximately T1+30 minutes, which occurred at varying points during the speech and math tasks, the 2nd sCort sample was collected.

***Performance items.*** Participants' performance was assessed with four separate items. The first was a mental math score, calculated by counting how many times each participant was successfully able to subtract 16 from one of four starting points: 4878, 3850, 3842, and 4834. In each time slot, participants were uniquely and randomly assigned one of the four starting points. The second was a required items score which is the number of the required items (name, where they are from, and program of study at the university) each person remembered to include in their speech. The third was a subjective rating of eye contact and the fourth was a subjective rating of the perceived warmth or friendliness of the participant during the speech task. In addition to ratings made by the #1 speech evaluator, eye contact and warmth ratings were also made by four independent coders who individually watched video recordings of the speeches. All eye contact and warmth ratings were made using visual analogue scales with anchor points of

0 (none/inadequate) to 100 (ample/excellent) for eye contact and 0 (cool/distant) to 100 (warm/personable) for warmth (Appendix M). The four coders were psychology students hired as research assistants (RA) for this aspect of the study. Each coder was given written coding criteria and individually trained in its use. Coders were instructed to use their subjective experience or response to the participant as the basis for their ratings (see Appendix N for the instructions given to the coders).

Due to the subjective nature of this rating, meant to represent a subset of the variety of subjective responses people would have regarding the quality of the eye contact and warmth of interaction of the participants, no attempt was made to require agreement among coders. Instead, an average of eye contact and warmth ratings of the five coders was used in the analysis.

Intraclass correlation one-way random analysis (Landers, 2015) showed the mean eye contact rating of the five coders explained 71% of the variance in eye contact ratings,  $F(64, 260) = 3.46$ ,  $p < .001$ , 95% CI [0.58, 0.81]. The mean warmth rating explained 70% of the variance in the five coders rating of warmth,  $F(63, 256) = 3.38$ ,  $p < .001$ , 95% CI [0.57, 0.80]. Intraclass correlation one-way random analysis was chosen as the best method of assessing interrater reliability in the current data given that there was more than one rater and not all raters rated all participants. Choosing one-way random gives the most conservative estimate of reliability. According to Cicchetti (1994), these levels of agreement fall at the upper end of "good" and are just below "excellent".

**Follow-up phase.** Participants who completed the social stress phase were sent an email invitation to participate in the follow-up phase. This phase was entirely online and took place the last week of the fall term, approximately four weeks after the completion of the social stress phase. By clicking on the study link embedded in the email invitation, participants were taken

first to an online consent form which described the current phase of the study (Appendix A). Those who chose to participate then completed the following measures, in the order listed: SPIN, BIF, mod. K-GSADS-A Beh., and validity check questions. The questions of the BIF were presented in randomized order to reduce familiarity effects with the items as ten of them were presented on two different occasions. These measures are described above in the screening and baseline sections. Approximately two weeks later, participants who participated in any phase of the study were emailed a final and complete debrief (Appendix O).

## Results

**Determination of sample for analysis.** There were 194 participants who provided baseline data, 46 in the non-affirmed and 45 in the self-affirmed conditions who participated in the social stress phase, and 36 non-affirmed and 39 self-affirmed participants who provided follow-up data one month later. Two participants in the self-affirmed condition were removed from the final data set due to low self-reported honesty when completing baseline measures and another four were removed due to researcher failure to follow proper protocol for the first social stress phase time slot (one from the self-affirmed condition, three from the non-affirmed condition). This left a final data set of 75 individuals. See Figure 1 in the methods section for the flow of participants through the study.

The 75 participants in the final data set are reasonably representative of the 1015 Introduction to Psychology participants who completed the screening and who scored at or above the cut-off of 23 on the SPIN. A comparison of the final data set with the screening data set showed no significant difference in mean age,  $t(81.76) = 1.16, p = .251, d = 0.16$ , equal variances not assumed, in gender composition,  $\chi^2(1) = 0.36, p = .547, \phi = .018$  or in SPIN scores,  $t(1088) = 0.46, p = .647, d = 0.06$ . However, the final data set was not representative of the Introduction to

Psychology student body in terms of country of birth. In the screening, the ratio of Canadian-born to non-Canadian born was just under 3:1 whereas in the final data set, it was approximately 3:2,  $\chi^2(1) = 4.14, p = .042, \phi = .063$  (see Table 3).

Table 3

*Demographics of Screening and Final Data Set Participants*

Demographic Variable	Descriptor	Participants	
		Screening, SPIN $\geq 23$	Final data set
<i>n</i>		1015	75
Age (mean)		19.20	19.73
Sex	% Female	70	67
Born in Canada	% Yes	72	61
SPIN (mean)		33.9	34.4

*Note.* SPIN = Social Phobia Inventory

Another way in which the final data set may be unrepresentative of those who began the study, is that those students with higher SAD or avoidance may have dropped out over the course of the study. That is, the final data set could be a subset of participants who self-report less impairment from SAD than the group of participants who initially provided full baseline data (i.e., completed the screening and the baseline phases) but did not participate in the social stress and follow-up phases. Two different analyses suggest this is not the case and that the final data set is, in fact, representative of the socially anxious participants who provided complete baseline data. First, a *t*-test comparison showed mean baseline SPIN scores of the final 75 participants ( $M = 34.43, SD = 8.65$ ) did not differ significantly,  $t(176) = 0.25, p = .804, d = 0.04, 95\% CI [-.34, .26]$  from that of the 103 who were eligible for the social stress phase but who did not choose to participate ( $M = 34.09, SD = 9.22$ ). Secondly, the 103 participants eligible for the social stress phase who chose not to participate were asked in a separate anonymous survey if

they were discontinuing due to a) no need for further credit, b) not interested in the next phase, c) further participation was too anxiety provoking, d) further participation was too time-demanding, or e) other, with an opportunity to describe the other reason. Of the 54 participants who chose to respond to this anonymously collected data, only nine selected anxiety as the reason why they did not continue with the study. The most frequently reported reason by participants was they were not interested in participating ( $n = 29$ ) followed by it being logistically challenging (e.g., no available time slot that would fit into schedule;  $n = 26$ ). Although not definitive, it appears the final data set does not represent a self-selected group of participants with more moderate levels of SAD and/or less avoidance than those who chose not to continue to the social stress phase of the study.

**Data preparation.** Prior to analysis, all variables were examined for accuracy of data entry, missing values, and for any violations of assumptions of  $t$ -test and multivariate analysis. There was one missing data point in the final data sets used for analysis. One participant in the self-affirmed condition did not give a pre-TSST anxiety rating. Because of this, for analyses that included the pre-TSST anxiety rating, the number of self-affirmed condition participants was reduced by one.

Mahalanobis distance analysis of the baseline variables (SPIN, BIF, and the mod. K-GSADS-A Beh. distress, avoidance and frequency) found no multivariate outliers. However baseline SPIN and all three social stress phase sCort measurements had distributions skewed such that they violated parametric statistical assumptions. Square root transformation normalized the baseline SPIN distribution. Log transformation normalized the cortisol distributions. Nevertheless, even after log transformation, one participant in the control condition remained an extreme sCort outlier, with  $z > 5$  at both T1 and T2 and  $z > 4$  at T3. It was



decided this participant did not belong to the same population as the rest of the participants with regards to sCort and, as such, this participant was not included in any sCort analyses.

Consequently, for analysis including the sCort measure,  $n = 74$ .

**Randomization check.** Means, standard deviations, and Cohen's  $d$  for the baseline measures are reported by condition in Table 4. Independent  $t$ -tests revealed the two groups did not significantly differ on any of the baseline measures, ranging from  $t(73) = 0.09, p = .931$  to  $t(73) = 1.31, p = .194$ . However, as the difference between conditions on the screening measure, SPIN, approached significance,  $t(73) = -1.91, p = .060, d = 0.44, 95\% \text{ CI } [0.02, 0.90]$ , for greater statistical rigor square root transformed baseline SPIN (SPINSqRt) will be included as a covariate in all relevant between condition analyses. For analyses considering only the SPIN score (e.g., change in SPIN from baseline to one-month follow-up), non-transformed SPIN scores will be used so that the values will be more readily comprehensible. sCort is presented as nmol/l for comparison with other published research as well as log transformed because of the significant skew in the sCort distributions.

Table 4

*Mean, Standard Deviation, and Effect Size for Baseline Measures by Condition*

Measure	Condition				<i>d</i>
	Self-affirmed		Non-affirmed		
	M	SD	M	SD	
	<i>n</i> = 36		<i>n</i> = 39		
SPIN	32.47	8.01	36.23	8.93	0.23
SPIN SqRt	5.66	0.67	5.98	0.72	0.46
Mod. K-GSADS-A Beh. anxiety	27.83	7.66	28.64	7.49	0.11
Mod. K-GSADS-A Beh. avoidance	27.31	9.04	29.10	8.86	0.20
Mod. K-GSADS-A Beh. frequency	45.22	12.22	49.18	13.94	0.30
BIF	14.92	3.52	14.85	3.46	-0.02
	<i>n</i> = 36		<i>n</i> = 38		
sCort (T1) nmol/l	2.35	2.30	2.30	1.28	-0.03
sCort (T1) Log (10)nmol/l	0.25	0.31	0.30	0.24	0.18

*Note.* SPIN = Social Phobia Inventory; SqRt = Square Root; Mod. K-GSADS-A Beh. = modified Kutcher Generalized Social Anxiety Disorder Scale for Adolescents -- Behaviour section; BIF = Behavior Identification Form; sCort = salivary cortisol; nmol/l = nanomoles per litre.

**Manipulation checks.** Manipulation checks revealed the affirming writing manipulation had the intended effect on participants. Participants who engaged in self-affirming writing reported greater focus on personal values and awareness of valued aspects of the self compared with those who engaged in non-affirming writing. Self-affirmed individuals scored significantly higher on the self-affirmation manipulation check ( $M = 21$ ) than non-affirmed individuals ( $M = 19$ ),  $t(65.9) = 2.67$ ,  $p = .01$ ,  $d = 0.61$ , 95% CI of  $M_{diff}$  [0.48, 3.34], equal variances not assumed.

A review of the writing exercise showed the self-affirmed and non-affirmed participants followed the writing instructions. All self-affirmed participants wrote about why their top ranked value was important to them and the role it played in their lives. Suggesting they were engaged in the writing task, they generally wrote at some length ( $M = 248$  words,  $SD = 110$ ,

range 48 - 615). Non-affirmed participants also followed directions, writing about why their bottom ranked value might matter to someone else ( $M = 40$  words,  $SD = 25$ , range 6 - 132). As this lower engagement in the writing task by the non-affirmed participants was expected, they were additionally asked to write about the route they took to the university and were encouraged to include as many details as possible. All non-affirmed participants did this ( $M = 78$ ,  $SD = 54$ , range 18 - 301). However, the total non-affirmed word count ( $M = 118$ ,  $SD = 64$ , range 29 - 327) was still significantly less than the self-affirmed word count,  $t(55.196) = 6.148$ ,  $p < .001$ ,  $d = 1.45$ , with word count significantly correlated with condition,  $r = .59$ ,  $p < .001$ ,  $d = 1.42$ .

Manipulation checks also indicated participants found the TSST to be stressful. Participants' showed a physiological stress response, as measured by sCort levels, to engaging in the TSST. Simple contrast analysis, with Bonferroni adjustment for multiple comparisons, shows sCort levels collected at T3 ( $M = 0.42$ ,  $SD = 0.36$ ), during the psychoeducation/partial debrief section of the social stress phase, were significantly higher,  $F(1, 73) = 10.29$ ,  $p = .002$ ,  $\eta_p^2 = .12$ , 95% CI of  $M_{diff}$  [0.06, 0.24], than baseline levels collected at T1 ( $M = 0.27$ ,  $SD = 0.27$ ), just before describing the TSST. T3 sCort levels were also significantly higher,  $F(1, 73) = 32.36$ ,  $p < .001$ ,  $\eta_p^2 = .31$ , 95% CI of  $M_{diff}$  [0.12, 0.26], than levels collected at T2 ( $M = 0.23$ ,  $SD = 0.25$ ), during the TSST speech and arithmetic tasks. T3 levels were compared to T2 levels as well as to T1 as the T2 levels in this study appeared to be functioning more like a baseline score, given that the mean T2 score was lower than the T1 score. (See Figure 4).

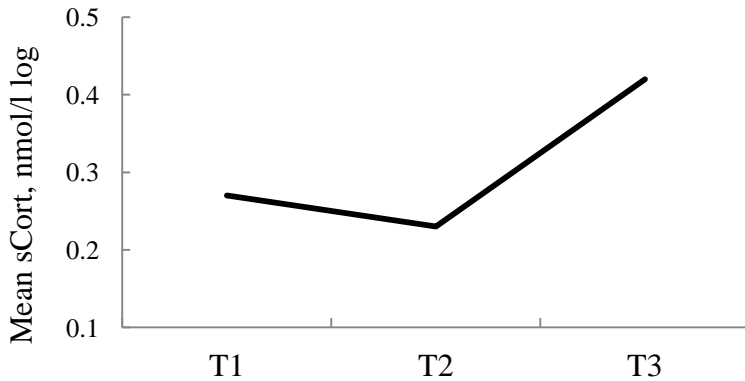


Figure 4. Mean (log transformed) levels of sCort by collection point. sCort = salivary cortisol, nmol/l = nanomoles per litre, T1 = Time 1, T2 = Time 2 (T1 + 30 minutes), T3 = Time 3 (T1 + 50 minutes).

The increase in self-report distress from before to after the TSST also suggested the TSST was stressful. Participants' mean SUDS rating ( $M = 36.64$ ) immediately following the TSST was significantly higher than their rating immediately before ( $M = 30.61$ ),  $t(73) = 2.16$ ,  $p = .03$ ,  $d = .36$ , CI of  $M_{diff}$  [0.45, 11.6]. These levels are both higher than the peak anxiety rating of approximately 24 on a VAS given by participants in the TSST condition in the TSST-G study by (von Dawans et al., 2011). Also, participants' mean Speech Stress rating, made while anticipating engaging in the TSST, was above the mid-point of the scale ( $M = 5.45$ ,  $SD = 1.10$ ). Participants' mean Math Stress rating was at the mid-point of the scale ( $M = 3.50$ ,  $SD = 1.53$ ).

**Test of hypothesis 1.** Overall, and contrary to expectations, analysis of social stress phase data showed no benefit of self-affirming writing relative to non-affirming writing in the face of the stressful TSST. Analysis of covariance, controlling for initial level of SPINSqRt, was used to examine separately the impact of affirmation condition on each of the three types of outcomes, experiential, behavioral, and physiological. These analyses produced  $F$  scores ranging from 0.0003 to 0.81,  $p$  values from .986 to .372,  $\eta_p^2$  values from .000 to .011. Means and

standard deviations for affirmed and non-affirmed conditions, as well as the *F* scores, *p* values, and  $\eta_p^2$  values associated with their comparisons, are shown in Table 5. The magnitude of the effect of the covariate, SPINsqrt measured by  $\eta_p^2$ , ranged from = .0006 to .007.

Table 5

*Means (Standard Deviations) and Effect of Condition for Social Stress Phase Variables (controlling for baseline SPIN)*

Outcome Variable	Self-affirmed	Non-affirmed	<i>F</i>	<i>p</i>	$\eta_p^2$
	M (SD) <i>n</i> = 36	M (SD) <i>n</i> = 39			
<b>Experiential</b>					
SUDS Pre <sup>a</sup>	30.20 (16.40)	30.97 (17.12)	0.002	.963	.000
SUDS Post <sup>b</sup>	35.47 (23.46)	38.10 (22.11)	0.0003	.986	.000
Change in SUDS <sup>a</sup>	4.80 (25.42)	7.13 (23.06)	0.001	.971	.000
Speech stress appraisal	4.59 (1.01)	4.48 (1.19)	0.52	.472	.007
Math stress appraisal	3.74 (1.57)	3.44 (1.57)	0.72	.400	.010
<b>Behavioral</b>					
Speech number of elements <sup>b</sup>	1.03 (1.23)	1.10 (1.21)	0.04	.834	.001
Speech length	105.53 (24.89)	101.28 (23.04)	0.17	.679	.002
Correct math responses	4.86 (4.47)	5.31 (4.21)	0.17	.682	.002
Eye contact rating	68.45 (20.15)	70.49 (15.51)	0.38	.538	.005
Warmth rating	61.31 (17.83)	63.18 (14.38)	0.42	.519	.006
<i>n</i> = 36 <i>n</i> = 38					
<b>Physiological</b>					
sCort T2 nmol/l log	0.24 (.28)	0.22 (0.21)	0.19	.664	.003
sCort T3 nmol/l log	0.47 (.37)	0.38 (0.34)	0.81	.372	.011

*Note.* SPIN = Social Phobia Inventory; SUDS = Subjective Units of Distress Scale; sCort = salivary cortisol; nmol/l = nanomoles per litre; M = mean; SD = standard deviation.

<sup>a</sup>These variables had *n* = 38 participants in the non-affirmed group as one participant did not provide a pre-SUDS score.

<sup>b</sup>For these variables, the covariate was significant at *p* < .05

Given the subjective nature of the eye contact and warmth ratings, it was possible an effect of condition occurred for some raters and was masked by creating an average of the five coders' ratings. For exploratory purposes only, this possibility was tested with *t*-test comparisons of condition for each coder. No benefit of engaging in self-affirming writing was

found in any individual coder's results ( $t$  scores ranged from 0.13 to 1.20,  $p$  values from .896 to .235, Cohen's  $d$  effect sizes from 0.03 to 0.29).

**Analysis of Coherence in Threat System Response.** Because self-affirming writing had no effect, conditions were collapsed when considering whether the three types of outcomes variables measured during this phase—experiential, behavioral, and physiological—responded in concert to the stress of the TSST. An examination of the Pearson's  $r$  correlations among these variables showed outcome variables within each response type had higher congruent validity than did outcome variables across the three response types.

Among the three facets of the threat response systems, the four self-report experiential variables (i.e., pre-TSST anxiety, post-TSST anxiety, Speech Stress and Math Stress) all had positive correlations with each other of generally moderate strength ( $r = .27$  to  $.50$ ). The exception was the correlation of post-TSST anxiety with Math Stress, which showed a weak correlation that did not reach significance ( $r = .20$ ). The behavioral variables were mixed in their correlations with each other. Eye contact and warmth ratings, both subjective behavioral variables, were strongly positively correlated ( $r = .64$ ). The number of recommended speech elements included, speech length, and number of correct math responses, all objective behavioral variables, showed no significant correlations ( $r = -.08$  to  $.02$ ). The subjective and objective measures of behavior also did not, in general, show any significant correlations with each other. The exception was the number of speech elements, an objective behavioral measure, which was moderately correlated with coder rated eye contact ( $r = .32$ ) and warmth ( $r = .27$ ), both subjective ratings. In fact, length of speech and number of correct math responses, both objective behavioral variables, were not significantly correlated with each other nor with any other behavior variables. Concerning the physiologic facet of the threat response system, with

sCort the only physiological measure, there was no correlation of measures within this facet to examine.

Across the threat response system, an examination of correlations suggests experiential, behavioral, and physiological facets of the system tell different stories. Out of a possible 20 correlations between the experiential and the behavioral variables, only four were statistically significant. This study's data showed a moderate positive correlation between participants' level of anxiety before engaging in the TSST and the number of the recommended speech elements they remembered to include ( $r = .26$ ). Math Stress evaluated before engaging in the TSST and the SUDS rating given after, were moderately negatively correlated with the number of correct math responses ( $r = -.44$  and  $-.29$  respectively). Finally, Math Stress was moderately positively correlated with the coders average Warmth rating ( $r = .30$ ). Showing the disconnect between the physiological responses and the experiential and behavioral responses in this study's data, the one significant correlation out of 18 was in a direction opposite to what might have been expected: a positive correlation between T2 sCort and the number of correct math responses ( $r = .24$ ). See Table 6 for correlations among all social stress phase variables.

Table 6

*Pearson r Correlations between Experiential, Behavioral, and Physiologic Social Stress Phase Outcome Variables*

Outcome Variable	Threat response system											
	Experiential			Behavioral						Physiologic		
	2	3	4	5	6	7	8	9	10	11	12	
1. SUDS pre	.27*	.50**	.27*	.26*	.07	-.13	-.10	.05	.02	.18	.13	
2. SUDS post		.34**	.20	.20	-.01	-.29*	-.06	.12	-.06	-.22	-.13	
3. S. stress			.31**	.10	-.16	-.03	-.06	-.09	.02	.07	.01	
4. M. stress				.16	-.01	-.44*	.12	.30*	-.13	-.13	-.22	
5. S. elements					-.06	.02	.32**	.27*	.08	.10	.00	
6. S. length						-.08	-.02	.00	-.01	.02	.09	
7. M. correct							.15	.04	.10	.24*	.09	
8. Eye contact								.64**	.11	.06	-.01	
9. Warmth									-.02	.06	.00	
10. sCort T1										.49**	.22	
11. sCort T2											.60**	

*Note.* SUDS = Subjective Units of Distress Scale; S. Stress = Speech Stress Appraisal; M. Stress = Math Stress Appraisal; S. Elements = Speech Number of Elements; S. Length = Speech Length; M. Correct = Correct Math Responses; sCort = salivary cortisol.

\*  $p < .05$ . \*\*  $p < .01$ .

**Tests of Hypothesis 2.** One month after the affirmation manipulation, a different picture of the impact of self-affirmation emerged, suggesting it did have an effect. Analysis of covariance (ANCOVA), controlling for baseline SPIN, was used to compare the change in levels of social distress, avoidance, and social behavior from baseline to one-month follow-up between affirmed and non-affirmed participants. Unstandardized residualized scores were used for all change score analyses so as to eliminate the correlation of baseline scores with one-month follow-up scores. These residuals were created by regressing the follow-up phase scores on the baseline phase scores. Individuals in the self-affirmed condition, relative to those in the non-



affirmed condition, reported a larger decrease in distress associated with typical social behaviors of university students one month after engaging in self-affirming writing, when compared with their baseline levels reported approximately two to three weeks before the affirmation writing task. This decrease ( $M = -2.9$ ) is significantly different,  $F(1, 72) = 7.91, p = .006, d = 0.77$ , 95% CI of  $M_{diff}$  [-8.05, -1.37], than the increase in distress reported by non-affirmed individuals ( $M = 2.7$ ). Affirmed individuals also reported an increased engagement ( $M = 3.14$ ) in these behaviors over this same six to seven week period whereas non-affirmed individuals reported reduced engagement ( $M = -2.9$ ), a difference that is statistically significant,  $F(1, 72) = 4.09, p = .054, d = 0.54$ , 95% CI of  $M_{diff}$  [0.08, 10.70]. Finally, although having nearly identical avoidance of social behavior ratings at baseline, at one-month follow-up affirmed individuals reported less avoidance than six to seven weeks earlier ( $M = -2.07$ ) whereas non-affirmed individuals reported greater avoidance ( $M = 1.91$ ), a difference approaching significance,  $F(1, 72) = 3.46, p = .067, d = 0.44$ , 95% CI of  $M$  [-6.62, 0.23]. (See Figure 5).

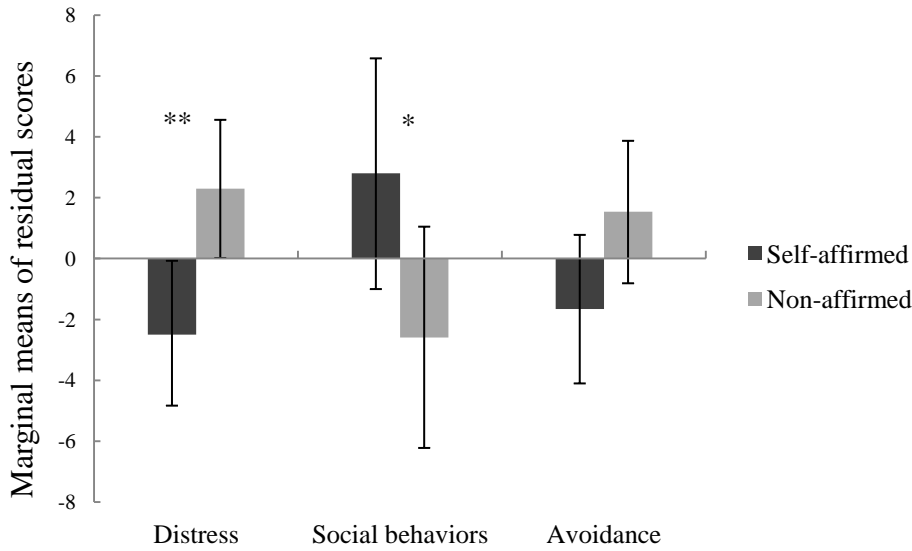


Figure 5. A comparison of residual change scores for distress ratings, behavior frequencies, and avoidance ratings, by condition, of the Kutcher Generalized Anxiety Disorder Scale for Adolescents (modified) -- behavior section, controlling for base level SPIN. Vertical bars represent 95% confidence intervals.

\* =  $p < .05$ . \*\* =  $p < .01$ .

Closer examination of the frequency of engagement in the 20 social behaviors that comprised the Mod. K-GSADS-A Beh revealed a different pattern of change between conditions. Comparing simple difference scores in the frequency of the 20 social behaviors in the month of September with the month of November, individuals who self-affirmed reported a mean increase in 15 behaviors and a mean decrease in five. In contrast, those in the non-affirmed condition reported a slight mean increase in only one behavior, no change in four, and a mean decrease in 15. Of interest, the difference between conditions on two behaviors crossed the threshold of significance. Using ANCOVA to compare the residual change scores, controlling for baseline SPINSqrt, those who affirmed were significantly more likely to speak to a stranger,  $F(1, 72) = 5.35, p = .024, d = 0.43, 95\% \text{ CI of } M [0.04, 0.50]$  and to speak to a store clerk, coffee shop employee, or other retail person  $F(1, 72) = 4.34, p = .041, d = 0.49, 95\% \text{ CI of } M [0.02, 0.79]$ .

(See Appendix P for complete list of means, standard deviations, and comparison of residual change scores by condition for each of the 20 scale items.)

The results of analyzing the change in SPIN data, using repeated measures ANCOVA with residual change scores, complemented the Mod. K-GSADS-A Beh. analyses in terms of direction of change of the two conditions. Examining the change in overall SPIN scale scores, affirmed individuals reported a reduction in social anxiety from the fourth week of the fall term to the thirteenth week, whereas non-affirmed individuals showed essentially no change over the same time frame. This difference between conditions ( $M = -3.1$ ) did not reach statistical significance,  $F(1,73) = 2.05$ ,  $p = .157$ ,  $d = 0.33$ , 95% CI of  $M_{diff}$  [-7.53, 1.24].

However, when comparing the effect of condition on the changes in the fear and avoidance subscales of the SPIN, the results are similar to what was found in the analysis of the distress and avoidance scales of the Mod. K-GSADS-A Beh. In the fear subscale, just as with the distress rating of the Mod. K-GSADS-A Beh., there was a significant effect of condition with a moderate effect size,  $F(1, 73) = 4.58$ ,  $p = .036$ ,  $d = 0.50$ , 95% CI of  $M_{diff}$  [-3.77, -0.13], such that affirmed individuals showed a reduction and non-affirmed showed a slight increase in fear. Examining the effect of condition on change in the avoidance subscale, affirmed individuals reported a decrease in avoidance measured by the SPIN but, similar to the avoidance measured by the Mod. K-GSADS-A Beh, this decrease was not significantly different,  $F(1, 73) = 1.58$ ,  $p = .213$ ,  $d = 0.29$ , 95% CI of  $M_{diff}$  [-3.32, 0.75], from the slight decrease reported by non-affirmed individuals ( $M = 1.29$ ). Finally, there was no significant difference,  $F(1,73) = 1.58$ ,  $p = .213$ ,  $d = 0.29$ , 95% CI of  $M_{diff}$  [-1.95, 0.44], between the reduction for those who were affirmed and the slight increase those who were not affirmed in being bothered by somatic symptoms of anxiety. (See Figure 6).

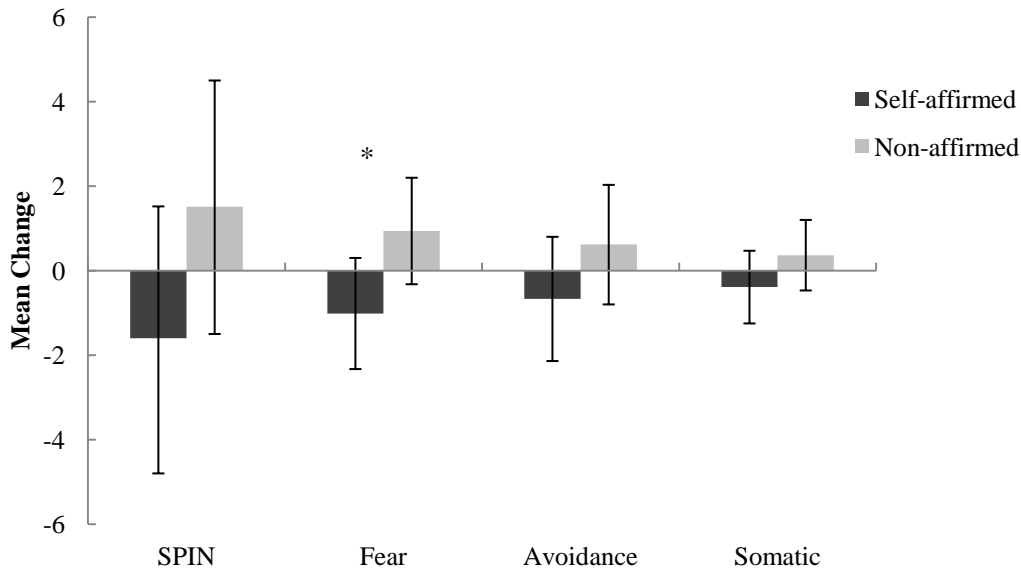


Figure 6. A comparison of residual change scores, by condition, of SPIN and of the SPIN subscales. Error bars represent 95% confidence intervals. \* =  $p < .05$ .

**Exploratory analyses.** Participants' initial level of social anxiety did not moderate the effect of affirmation condition on participants' sCort response to the social stress task.

Moderation was tested with regression using residuals for the change in sCort (T2 and T3 sCort regressed on T1). There was no evidence of a significant moderating effect of initial anxiety levels on the T1 to T2 sCort change,  $\beta = 0.04$ ,  $t(70) = 1.43$ ,  $p = .184$ , 95% CI [-0.02, 0.09] or on the T1 to T3 sCort change,  $\beta = 0.04$ ,  $t(70) = 0.93$ ,  $p = .356$ , 95% [-0.05, 0.13].

There was also no evidence that change in level of construal, as measured by the BIF, mediated the effect of self-affirmation on the outcome variables of the social stress phase or on the change from baseline to one-month follow-up on the SPIN and the Mod. K-GSADS-A Beh measures. All testing for mediation effects was done using PROCESS software (Hayes, 2013) with 5000 resamples. Residual change scores used in the analyses were created by regressing follow-up phase scores on baseline phase scores. See Table 7 for a summary of the indirect

effect of condition through level of construal on social stress and one-month follow-up phase variables.

Table 7

*Indirect Effect of Condition (Self-affirmed, Non-affirmed) through Level of Construal on Social Stress Phase Variables and Residual Change Scores*

Measure	Bootstrap <sup>a</sup>	
	Indirect effect of condition (SE)	95% CI
Social stress phase		
SUDS pre	-.18 (.65)	[-2.38, 0.57]
SUDS post	.16 (.86)	[-0.85, 2.94]
Speech stress appraisal	.0003 (.04)	[-0.08, 0.09]
Math stress appraisal	.01 (.05)	[-0.05, 0.19]
Speech number of elements	.01 (.04)	[-0.04, 0.15]
Speech length	.24 (.99)	[-1.24, 3.31]
Correct math responses	-.02 (.15)	[-0.58, 0.15]
Eye contact rating	-.06 (.56)	[-1.85, 0.61]
Warmth rating	.01 (.47)	[-0.79, 1.25]
sCort T2 nmol/l log	.00 (.03)	[-0.01, 0.03]
sCort T3 nmol/l log	-.00 (.01)	[-0.03, 0.02]
Residual change scores from baseline to follow-up		
SPIN	-.02 (.27)	[-0.82, 0.40]
Fear subscale	.002 (.09)	[-0.19, 0.22]
Anxiety subscale	-.02 (.16)	[-0.48, 0.22]
Somatic subscale	.0009 (.07)	[-0.16, 0.14]
Mod. K-GSADS-A Beh. distress	-.05 (.26)	[-1.00, 0.25]
Mod. K-GSADS-A Beh. avoidance	-.07 (.31)	[-1.07, 0.34]
Mod. K-GSADS-A Beh. frequency	-.01 (.33)	[-0.61, 0.84]

*Note.* PROCESS (Hayes, 2013), a bootstrapping computational model with baseline SPIN included as a covariate, was used for these analyses. SPIN = Social Phobia Inventory, Mod. K-GSADS-A Beh.= Modified Kutcher Generalized Anxiety Disorder Scale for Adolescents -- behavior section.

<sup>a</sup> Bootstrap results are based on 5000 bootstrap samples.

There was also no evidence, using ANOVA and controlling for baseline SPIN scores, that engaging in self-affirming writing had an effect on changes in level of construal. This held true whether comparing conditions on the mean residual change in level of construal from baseline to immediately following the affirmation writing task ( $M_{diff} = 0.18$ ),  $F(1,72) = 0.08$ ,  $p = .776$ ,  $d = 0.04$ , 95% CI of  $M_{diff}$  [-1.09, 1.46] or from baseline to one-month follow-up ( $M_{diff} = 0.49$ ),  $F(1,72) = 0.35$ ,  $p = .559$ ,  $d = 0.11$ , 95% CI of  $M_{diff}$  [-1.17, 2.15].

The level of construal did change, however, as the term progressed, showing a consistent move from abstract to concrete thinking, from mid-October, to early November, to the final week of term. As there was no effect of condition on level of construal, conditions were collapsed for this analysis. An analysis of variance (with a Greenhouse-Geisser correction as the data violated the assumption of sphericity) revealed this decline in BIF scores to be statistically significant,  $F(1.84, 136.22) = 55.78$ ,  $p < .001$ , with a large effect size,  $d = 0.76$ . Contrast analysis showed the decline in BIF scores from baseline to social stress phase ( $M_{diff} = 1.44$ ) and from social stress phase to one-month follow-up ( $M_{diff} = 2.31$ ) to be statistically significant,  $F(1, 74) = 20.68$ ,  $p < .001$ ,  $d_{pooled\ variance} = 0.39$ , 95% CI of  $M_{diff}$  [0.66, 2.22] and  $F(1, 74) = 44.34$ ,  $p < .001$ ,  $d_{pooled\ variance} = 0.54$ , 95% CI of  $M_{diff}$  [1.46, 3.16] respectively. Participants moved from choosing an abstract construal of behavior 75% of the time in the fifth week of term, to choosing the abstract construal 55% of the time during the last week of term. (See Figure 7). This large effect of time is further explored in Study 2, discussed later in this paper.

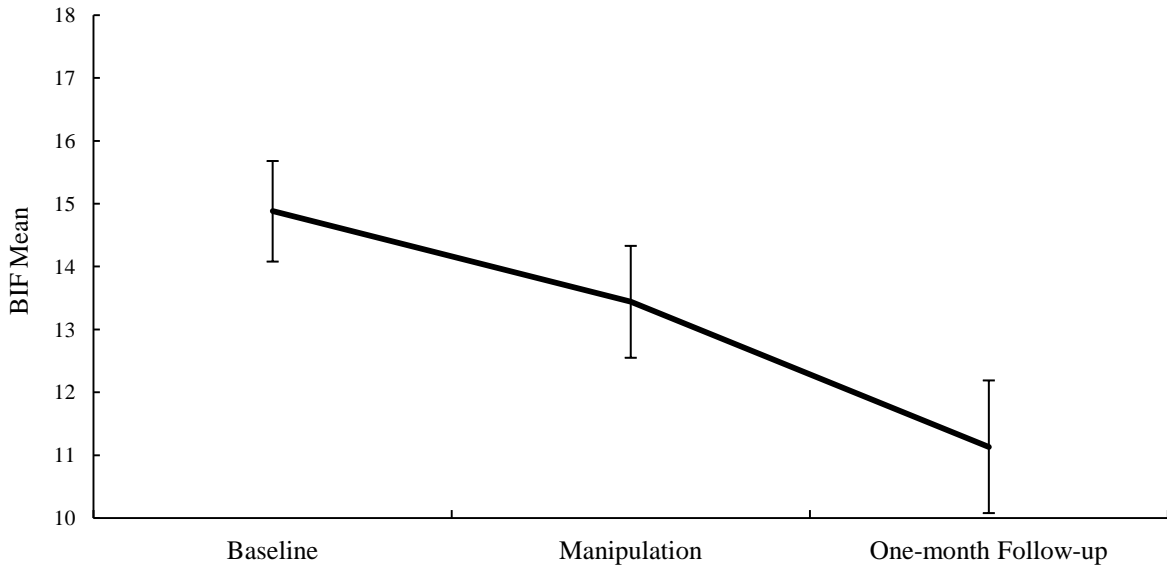


Figure 7. Mean level of construal at each study phase, Study 1. BIF = Behavioral Identification Form. Error bars = 95% confidence intervals.

**Discussion**

This discussion will focus only on those aspects of Study 1 that led to undertaking Study 2. The General Discussion located at the end of Study 2 will address the overall significance of the combined results of Study 1 and Study 2.

Study 1 was designed, in part, to explore the hypothesis that the mechanism through which self-affirmation has its effect, if any, would be through a shift in level of construal from more concrete to more abstract. Based on the research by Schmeichel and Vohs (2009), it was thought self-affirmation would lead to a more abstract level of construal and this shift would mediate the impact of self-affirmation on the outcome variables. However, results from Study 1 did not support a mediating role of level of construal, nor was there evidence of self-affirmation moving participants to a more abstract view of behavior. What the data did show was a strong and steady downward trend from an abstract to a more concrete level of construal as the study progressed. A consistent downward trend in construal scores has not, to my knowledge,

previously been reported in the literature. This downward trend in level of construal, and what this might mean for research which includes level of construal, was explored in Study 2.

Secondly, an analysis of Study 1 data showed a future benefit of self-affirmation but did not show an immediate benefit. In discussing this difference, the question arose as to whether the amount of threat generated by the TSST may have been overwhelming for socially anxious students and prevented the opportunity to see an immediate effect of affirmation. As noted earlier in this paper, for self-affirmation to result in benefit there must be some risk of threat leading to defensive responding with a subsequent negative impact on behavior. Creating this threat was the rationale for the inclusion of the socially stressful TSST in Study 1. It was hypothesized that engaging in the TSST would be perceived as a threat for those with high social anxiety and self-affirmation would then be shown to attenuate the negative outcomes of that threat. However, it seemed possible that, for socially anxious university students, simply living with social anxiety and attending university may provide enough of a threat context for self-affirmation to have had a beneficial effect. That is, for socially anxious students, engaging in self-affirming writing without the study induced social stress of the TSST might have been enough to result in the benefits found at follow-up in Study 1. This idea was also explored in Study 2.

### **Study 2**

Although self-affirmation has been found to be beneficial in a wide variety of domains with many different populations (see Cohen & Sherman, 2014; Sherman, 2013), not all populations have benefitted (D. C. Jessop, Sparks, Buckland, Harris, & Churchill, 2014; Kost-Smith et al., 2012). In fact, with some populations in certain circumstances,



self-affirmation has had a negative impact on performance: although minority students in supportive classrooms benefited from self-affirmation, female students in the same setting did less well (Dee, 2015); inactive students were more persuaded by an activity message following self-affirmation but moderately active students became less persuaded (Good, Harris, Jessop, & Abraham, 2015); being affirmed through valuing relationship led to an increase in sexual prejudice (Lehmiller, Law, & Tormala, 2010); self-affirming with a value related to the threatened domain can maintain or even exacerbate the threat (McCrea & Hirt, 2011); and, self-affirming can result in an increase in confirmation bias in some circumstances (Munro & Stansbury, 2009). Study 1 was designed, in part, to contribute to understanding who self-affirmation tends to benefit and how self-affirmation works. It focused specifically on a university student population with high levels of social anxiety. When considering the results of Study 1, it was decided to better understand the results, a follow-up study would be helpful. Study 2 was designed to answer narrowly targeted aspects of the following two questions: what might explain the shift to a more concrete level of construal observed; and, was the TSST necessary to potentiate the follow-up benefits of self-affirmation that were observed?

One possible explanation for the shift to more concrete construal observed in Study 1 derives from psychological distancing theory which posits individuals will have an abstract construal of something that will happen in the future and a concrete construal of that same event or experience if it is going to happen now (Trope & Liberman, 2010; Wakslak & Trope, 2009).

Applying this theory to Study 1, when the baseline phase in Study 1 took place, early in the term, students may have been thinking abstractly about their courses, focused on the personal interest they have in a topic, the value the topic has for their future goals, and other more abstract perspectives on the course, thereby creating psychological distance and abstract construals.

When the one-month follow-up data was collected, during the last week of classes, there was little temporal distance (one of the four types of distance that comprise psychological distance; (Trope & Liberman, 2010) left before final exams and grades. According to psychological distance theory, this shortening of time would be associated with a shift to a concrete level of construal with a focus on details such as planning to be sure the needed studying took place and required papers submitted, and, possibly, an awareness of just what mark is needed to obtain one's desired final grade -- or simply to avoid failing. That is, it is possible as the term advanced over the course of Study 1, the very concrete final grades that were looming became more proximal and salient to students while the more abstract value of their courses shifted to a less prominent place in their consciousness. If this were the case, it would be expected that construal levels would shift back to a more abstract level early in the winter term when final grades would then, once again, be somewhat in the distance.

It is important to note psychological distancing theory does not posit that abstract thinking is better than concrete thinking. In fact, it appears the ability to flexibly choose between the two ways of thinking, depending on the task at hand, may be the most beneficial (Sherman et al., 2013). Therefore, as the end of term approaches, becoming more concrete in one's thinking may not only be expected but desired.

A competing hypothesis is that it is not simply the progression of term that led to the shift to more concrete thinking but, rather, an increase in stress levels over the course of the term. Stress is known to be prevalent in university students (Dyson & Renk, 2006; Macgeorge, Samter, & Gillihan, 2005; Wong, Cheung, Chan, Ma, & Wa Tang, 2006) and a desire for academic achievement is one source of that stress (Bayram & Bilgel, 2008; Beiter et al., 2015; Crocker & Luhtanen, 2003). It has been noted that for at least some individuals, the perception one has

fallen far short of expectations is associated with a shift to concrete thinking and a focus on details (Baumeister, 1990). It may be the participants in Study 1 felt increasing stress over the course of the term and it was this change in stress that was driving the downward shift in level of construal and not the progression of term. A measure of stress was included in Study 2 in order to test this hypothesis.

The question regarding the necessity of the TSST addresses whether the longer term benefits of self-affirmation, found in Study 1, can be obtained in the absence of a significant social stressor at the time of the affirmation manipulation. That is, might there have been sufficient threat in the day-to-day demands of university life such that for the high social anxiety participants of Study 1, the study-induced social threat experience was not necessary to reveal the benefits of self-affirmation? Similarly, was the combination of informing participants of the importance of becoming more socially active in reducing social anxiety along with the provision of low or no-cost social activities occurring on campus or in the surrounding city also necessary to see benefits from self-affirmation writing? Study 2 examined whether the increase in frequency of engagement in social activities and the reduced distress and fear associated with social behavior would occur even if the self-affirmation writing task took place without engaging in the TSST and without the psychoeducation regarding the relationship between social engagement, avoidance of that engagement, and social anxiety.

To provide support for a conclusion that any benefits reported by those with high social anxiety in Study 2 would be the result of self-affirmation mitigating the negative effects of day-to-day social stress, participants with low to moderate levels of social anxiety were also included in Study 2. Given the research discussed earlier in this paper, showing that self-affirmation reveals a benefit only when there is threat, it was expected that engaging in self-affirmation

would not show a benefit for participants with low to moderate levels of social anxiety. A finding that level of social anxiety moderated the benefit of self-affirmation would be taken as evidence that the negative impact of day-to-day social threat experienced by those with high social anxiety was being mitigated by self-affirmation.

### **Hypotheses**

1. Level of construal was expected to replicate the decline seen in Study 1 in abstract construals over the course of the fall term and then, early in the winter term, show a return to a level of construal similar to that reported early in the fall term.
2. It was expected that engaging in self-affirming writing, without a particular lab-induced social threat or psychoeducation emphasizing the importance of engaging in avoided activities in order to reduce social anxiety, would result in benefit one-month later similar to that seen in Study 1.
3. It was expected that engaging in self-affirmation would not show any benefit for participants with low to moderate levels of social anxiety.

### **Exploratory Analyses**

1. Will stress increase over the course of the term?
2. Will this increase in stress predict a shift to more concrete in level of construal?

### **Method**

**Participants.** All students registered in Introduction to Psychology at the University of Manitoba were invited to participate in a screening which included a screen for SAD. Of the 2077 students screened and who provided complete useable data, 48 % ( $n = 1050$ ) scored 23 or higher on the SPIN, the same cut-off as used in Study 1. Consistent with Study 1, students who scored at, or above, 23 were considered to have high social anxiety. Those who scored below 23

were considered to have low to moderate (L/M) social anxiety. High social anxiety ( $n = 300$ ; 70% female; mean age 18.9, age range 15 - 38) and L/M social anxiety ( $n = 300$ ; 58%; mean age 19.2, age range 16 - 66) students were randomly selected and sent email invitations to participate. Random selection was accomplished by entering the mass screening ID number of each high social anxiety (L/M social anxiety) in an Excel sheet so that each participant had a corresponding number from 1 to 1050 for the high social anxiety (1 to 1027 for the L/M social anxiety). A randomizer (<http://www.randomizer.org/form.htm>) was used to select 300 numbers from 1 to 1050 for the high social anxiety (1 to 1027 for the L/M social anxiety). The mass screening ID associated with each of the randomly selected numbers was used to identify the participant to be invited to participate in the study. Complete baseline phase data was provided by 157 high social anxiety and 158 L/M social anxiety participants, affirmation phase data by 127 high social anxiety and 122 L/M social anxiety, one-month follow-up data by 102 high social anxiety and 87 L/M social anxiety, and winter term follow-up data by 20 high social anxiety and 24 L/M social anxiety. All participants were given partial course credit in return for their participation. See Figure 8 for the flow of participants through Study 2.

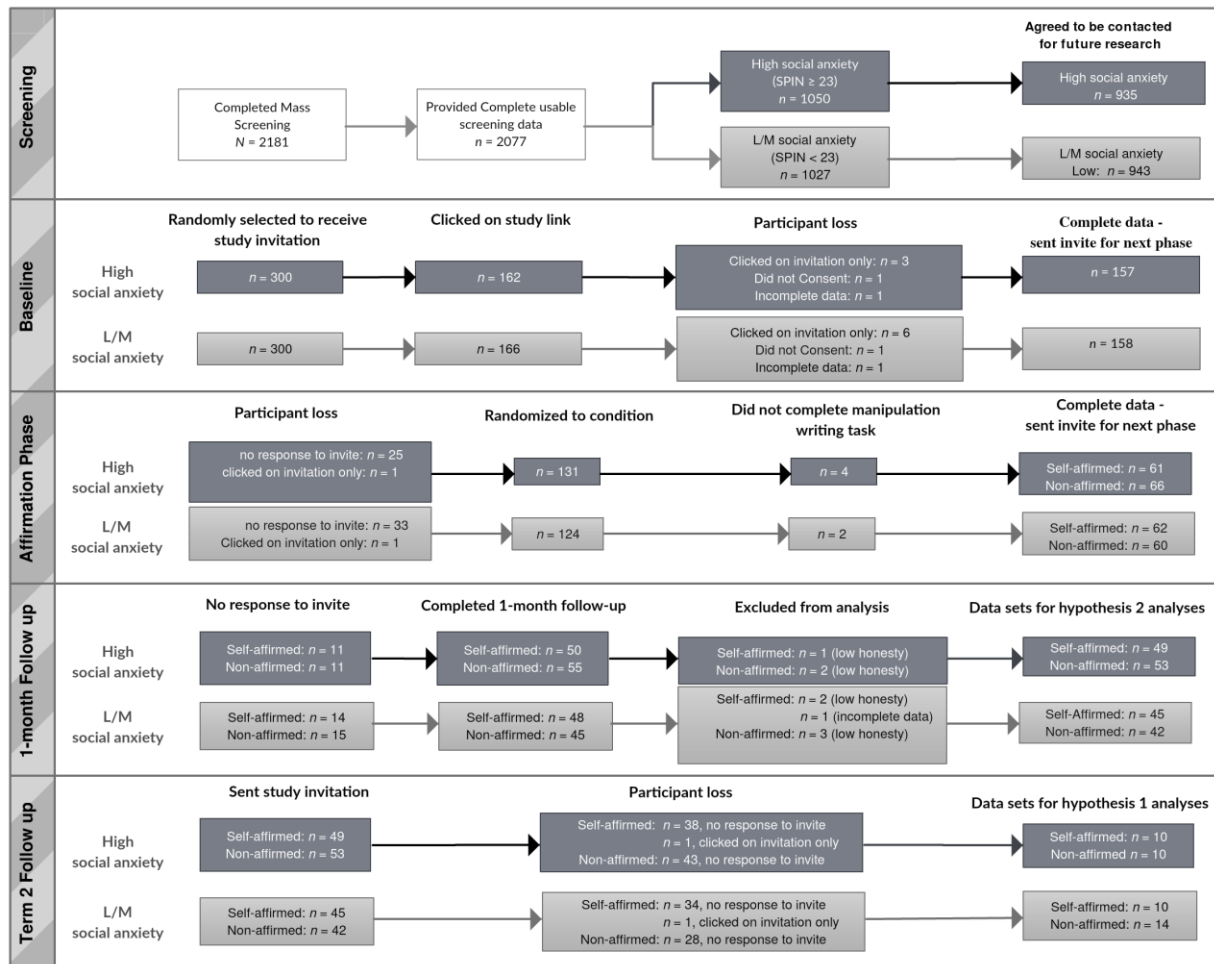


Figure 8. Participant flow, Study 2, from initial screening through to analyses. The condition of the participants who did not complete the affirmation writing task was unknown. It was only through the completion of the writing task that the researcher was able to know to which condition they had been assigned. SPIN = Social Phobia Inventory

**General.** All aspects of the study were approved by the Psychology/Sociology Research Ethics Board at the University of Manitoba. There were five different phases for Study 2 (the same four as Study 1 plus the winter term follow-up). The social stress phase of Study 1 was renamed the affirmation phase as there is no social stress component to this phase in Study 2. The procedures, including any measures and interventions not part of Study 1, are described separately below for each of the five phases. For those phases where participation was invited

via email (phases two through five), the email invitation contained a link to the study for that phase. Clicking on this link first took participants to the consent page of that particular phase (see Appendix Q for consent forms for each phase). Clicking on the "I consent" button at the end of the consent form signified consent and took participants to the each phase's study measures. All online components of Study 2 were created and administered using the online survey creation tool Qualtrics ([www.qualtrics.com](http://www.qualtrics.com)). See Table 8 for a summary of procedure.

Table 8

*Summary of Procedure, All Phases - Study 2*

Phase	Measures, manipulations, interventions	Mode	Time frame
Mass screening	SPIN	In class completion	Sept 11 - 25, 2014
Baseline	K-GSADS-A (mod.) BIF (baseline) DASS Demographics Validity	Individually, on-line using Qualtrics	Oct 17 - 29, 2014
Affirmation	Values questionnaire Writing task Manipulation check BIF (experimental)	Individually, on-line using Qualtrics	Nov 1- 9, 2014
Follow-up	SPIN BIF (follow-up) K-GSADS-A DASS	Individually, on-line using Qualtrics	Dec 1 - 5, 2014
Debrief	Debrief - final	Emailed	Jan 7, 2015
Winter term	BIF K-GSADS-A DASS Demographics Validity	Individually, on-line using Qualtrics	Feb 4 - 15, 2015

*Note:* SPIN = Social Phobia Inventory, K-GSADS-A (mod.) = Kutcher Generalized Social Anxiety Disorder Scale for Adolescents (modified), BIF = Behavior Identification Form, DASS = Depression, Anxiety, Stress Scale.

**Screening.** The same procedure as in Study 1 was followed. The Social Phobia Inventory (Connor et al., 2000), described in Study 1, was administered at this time. An analysis of Study 2 SPIN data obtained showed internal consistency was excellent ( $\alpha = .91$  at baseline,  $\alpha = .94$  at one-month follow-up) for the scale as a whole. Internal consistency was reasonably good for the fear, avoidance, and somatic subscales of the SPIN ( $\alpha = .80, .82,$  and  $.69$  respectively at baseline and  $.83, .84,$  and  $.75$  respectively at one-month follow-up).

**Baseline phase.** This phase took place entirely online, two to four weeks after the screening phase. Participants were sent an email invitation inviting them to participate in this phase of the study and informing them of the next two phases. Similar to Study 1, participants who chose to participate completed the following measures: BIF (Vallacher & Wegner, 1989), modified K-GSADS-A Behaviour (Brooks & Kutcher, 2004), demographic questions and validity checks (please see the Method section of Study 1 for descriptions of these measures). The Cronbach's alpha was  $.73$  for the baseline phase BIF data,  $.71$  for the affirmation phase BIF data, and  $.75$  for the one-month follow-up BIF data. The Mod. K-GSADS-A Beh. distress and avoidance ratings, together, had excellent internal consistency ( $\alpha = .94$  at baseline and  $.95$  at follow-up). Looking at the distress and avoidance components of the scale separately, both showed good internal consistency. The distress ratings had a Cronbach's alpha of  $.89$  at baseline and  $.90$  at follow-up and the avoidance ratings had an alpha of  $.89$  at baseline and of  $.91$  at one-month follow-up.

In this phase, participants also completed The Depression Anxiety Stress Scales-21 (DASS-21; Antony, Bieling, Cox, Enns, & Swinson, 1998; Lovibond & Lovibond, 1995). The DASS-21 was not included in Study 1. The DASS-21 is a 21-item version of the DASS with seven items each measuring depression (e.g., I felt I wasn't worth much as a person), anxiety



(e.g., I felt I was close to panic), and tension-stress (e.g., I found it difficult to relax). In this study, the tension-stress subscale of the DASS was the measure of interest. Items were rated using a 4-point Likert scale ranging from 0 (*did not apply to me at all*) to 3 (*applied to me very much, or most of the time*) in relation to the previous week. The DASS-21 has been found to be a reliable and valid measure of depression, anxiety, and tension-stress (Antony et al., 1998). In the present study, the tension-stress subscale of the DASS-21 had good internal consistency with a Cronbach's alpha scores of .82 at baseline and of .85 at one-month follow-up.

**Affirmation Phase.** Participants who provided complete baseline data received an email invitation to participate in the affirmation phase. In this phase, participants completed the values questionnaire, were randomly assigned to either the self-affirming or non-affirming writing task, and completed the BIF a second time (all components described in Study 1). Unlike Study 1 where the affirmation writing was completed in-lab as part of the social stress phase, the affirmation phase of Study 2, which included the affirmation writing, was entirely web-based. Participants were free to complete the affirmation phase at their own convenience, on a computer of their choosing, within a five- to nine-day period. A second invitation email was sent to any participants who had yet to complete the survey when there were 48 hours left to participate. As Study 2 did not include the in-person lab component of Study 1, this phase did not include the sCort measurements, the TSST, the SAD psychoeducation and psychoeducation regarding the importance of engaging in avoided activities in order to become more comfortable in social situations, or the self-report stress and anxiety ratings that were part of Study 1.

**Follow-Up Phase.** Participants who completed the affirmation phase were sent an email invite to participate in the follow-up phase. Similar to Study 1, this phase was entirely online and took place the last week of the fall term, approximately four weeks after the completion of

the affirmation phase. Participants were asked to complete the SPIN, BIF, K-GSADS-A Behaviour, DASS-21, and validity check questions, already described. Approximately two weeks later, all participants were emailed what was described as a final and complete debrief (Appendix R). Participants were not informed there would be a winter term follow-up phase and believed they had completed all phases of the study when they received this debrief.

**Winter term follow-up.** Participants who provided complete and reliable data in the previous four phases (high social anxiety: self-affirmed  $n = 49$ , non-affirmed  $n = 53$ ; L/M social anxiety: self-affirmed  $n = 45$ , non-affirmed  $n = 42$ ) were sent email invites, during the fifth week of winter term, informing them they were eligible to participate in a new study based on their responses to the screening in Phase 1. Participants were not explicitly informed this new study was connected with the three phases of the study in which they had participated two months earlier in the previous term. This email also included the link to the winter term follow-up survey which included the BIF, the K-GSADS-A Behaviour, the DASS-21, and validity check questions described earlier. The 20 items comprising this fourth administration of the BIF were selected from those that had only been seen once before and were not in the most recent BIF administration, which was part of the follow-up phase in the fall term.

## Results

**Determination of sample for analysis.** There were 198 participants who participated up to, and including, the one-month follow-up phase of Study 2. Of these, eight were removed for low levels of self-reported honesty, at either baseline or at one-month follow-up, and one was removed for missing data during the affirmation phase. This left a final data set of 189 individuals for the fall term analysis. Of these 189 individuals, 44 participated in the winter term data collection. See Figure 8 for the flow of participants through the study.

The participants in the final data set closely resembled, with regards to age and being Canadian-born, the pool of participants who were eligible to participate. A comparison of the follow-up data set with the eligible data set showed no significant difference in mean age,  $F(1, 2052) = 0.38, p = .729, d = 0.03$ , the ratio of Canadian-born to non-Canadian born,  $\chi^2(1) = 2.83, p = .093, \phi = .037$ , or initial SPIN scores  $t(1932) = 0.77, p = .440, d = 0.06$ . However, the difference in male/female composition of the follow-up data set compared with the eligible data set was statistically significant,  $\chi^2(1) = 21.91, p < .001, \phi = .103$ . With regards to the winter term data set, the participants were not significantly different from the eligible data set with regards to sex,  $\chi^2 = 3.01, p = .083, \phi = .040$  the ratio of Canadian-born to non-Canadian born,  $\chi^2 = 1.50, p = .220, \phi = .028$ , and SPIN scores  $t(1787) = 0.78, p = .437, d = 0.12$ . However, the mean age of the winter term data set was one year older than the mean age of the eligible data set, a difference that was significant,  $t(2008) = 2.32, p = .02, d = 0.36$ . See Table 9 for age, sex, Canadian-born status, and SPIN details of the three data sets.

Table 9

*Demographics of the Eligible, Follow-up, and Winter Term Data Sets*

Demographic	Descriptor	Data sets		
		Eligible	Follow-up	Winter term
<i>n</i>		2077	189	44
Age (mean)		19 <sub>a</sub>	19	20 <sub>a</sub>
Sex	% Female	62 <sub>b</sub>	79 <sub>b</sub>	75
Born in Canada	% Yes	72	78	64
SPIN (mean)		23.75	24.45	22.11

*Note.* Items in each row with matching subscripts differ significantly. SPIN = Social Phobia Inventory

**Data preparation.** Prior to analysis, all scales were examined for accuracy of data entry, missing values, and for any violations of assumptions of *t*-test and multivariate analysis. Participants were divided into high social anxiety ( $SPIN \geq 23$ ) and low/medium (L/M) social anxiety ( $SPIN < 23$ ) groups in all phases for this examination of data and measures and were further divided into self-affirmed and non-affirmed groups in the affirmation phase and the one-month follow-up phase.

There were no missing data on any measures for the participants in the final data sets used for analysis. However, three measures were found to be significantly skewed. SPIN in the high social anxiety group was significantly skewed at baseline but not at one-month follow-up. SPIN was not skewed at either time in the L/M social anxiety group. Because only one of the four SPIN measures was skewed, a decision was made not to normalize its distribution through transformation to facilitate interpretation of findings. The DASS-Stress scale was significantly skewed at baseline in the L/M social anxiety group but not for the high social anxiety group. As the change in DASS-Stress was examined as a possible mediator using PROCESS, a bootstrapping technique not reliant on the normality of distributions, the distribution of this scale was not normalized through transformation. Finally, the BIF baseline score in the high social anxiety group was skewed. However, as no other BIF scores were skewed and as it was the change in BIF scores that was of interest, the distribution of BIF baseline scores in the high social anxiety group was not normalized through transformation.

**Randomization Check.** Mean and standard deviations for the baseline measures, divided into self-affirmed and non-affirmed subgroups within the high and L/M social anxiety groups, are found in Table 10. For both groups, independent *t*-test analyses showed no statistical difference between the mean scores of those randomly assigned to the self-affirmed condition

and those assigned to the non-affirmed condition on any of the baseline measures ( $t$  scores ranged 0.05 to 1.86,  $p$  values from .963 to .065,  $d$  values from 0.01 to 0.37). (See Table 10).

Table 10

*Means (Standard Deviations) of Baseline Measures by SPIN Group and Condition*

Measure	L/M social anxiety		High social anxiety	
	Self-affirmed	Non-affirmed	Self-affirmed	Non-affirmed
SPIN	13.76(6.39)	14.00(5.59)	33.57(8.26)	33.38(8.18)
SPINSqRt	3.55(1.08)	3.64(0.87)	5.75(0.69)	5.74(0.68)
Mod. K-GSADS-A Beh. distress	16.67(7.00)	18.02(8.08)	26.86(9.30)	28.34(8.16)
Mod. K-GSADS-A Beh. avoidance	16.64(9.16)	16.86(8.60)	26.55(9.91)	27.60(8.01)
Mod. K-GSADS-A Beh. frequency	43.42(15.49)	42.79(15.29)	39.14(12.28)	35.02(10.00)
BIF	15.07(2.59)	15.10(3.12)	14.39(3.85)	14.62(2.98)
DASS- Stress subscale	5.04(3.62)	5.76(4.43)	7.65(5.08)	7.11(4.02)

*Note:* L/M = Low/Moderate, SPIN = Social Phobia Inventory, SPINSqRt = SPIN square root transformation, Mod. K-GSADS-A Beh. = modified Kutcher Generalized Social Anxiety Disorder Scale for Adolescents -- Behaviour section, BIF = Behavior Identification Form, DASS = Depression, Anxiety, Stress Scale.

**Manipulation Checks.** A comparison of the affirmation manipulation check scores of the self-affirmed and non-affirmed conditions showed the self-affirmation writing manipulation worked as intended. High social anxiety self-affirmed individuals reported a focus on personal values and awareness of valued aspects of the self ( $M = 20.41$ ) that was higher than high social anxiety non-affirmed individuals, ( $M = 18.04$ ),  $t(100) = 3.0$ ,  $p = .003$ ,  $d = 0.59$ , 95% CI of  $M_{diff}$  [0.80, 3.94]. L/M social anxiety self-affirmed individuals also had higher scores ( $M = 22.07$ ) on the manipulation check than L/M social anxiety non-affirmed individuals ( $M = 18.17$ ),  $t(85) = 5.08$ ,  $p < .001$ ,  $d = 1.11$ , 95% CI of  $M_{diff}$  [2.40, 5.43], equal variances not assumed.

**Tests of Hypotheses.** Consistent with Hypothesis 1 and replicating the findings in Study 1, the level of construal shifted from abstract to more concrete thinking as the study progressed through the fall term. Specifically, the level of abstract construal declined from early in the term ( $M = 14.77$ ) to the end of term ( $M = 10.50$ ), before exam period. A repeated measures ANOVA (with a Greenhouse-Geisser correction as the data violated the assumption of sphericity) showed this shift in BIF scores to be statistically significant with about half of the variance in the scores predicted by the passage of time,  $F(1.84, 343.01) = 167.81, p < .001, \eta^2_{\text{partial}} = 0.47, 95\% \text{ CI of } M_{\text{diff T1-T3}} [3.75, 4.80]$ .

I then tested whether it was temporal distance from the end of term that was the cause of this shift to concrete by comparing the level of construal five to six weeks into the winter term ( $M = 15.9$ ) with the baseline levels collected six to seven weeks into the fall term ( $M = 15.6$ ) for those participants who provided data at all four data collection points. As expected, the baseline and winter term means were almost identical. ANOVA analysis confirmed there was no significant difference between them,  $F(1, 43) = .52, p = .47, \eta^2_{\text{partial}} = 0.01, 95\% \text{ CI of } M_{\text{diff T1-T4}} [-1.21, 0.57]$ . (See Figure 9).

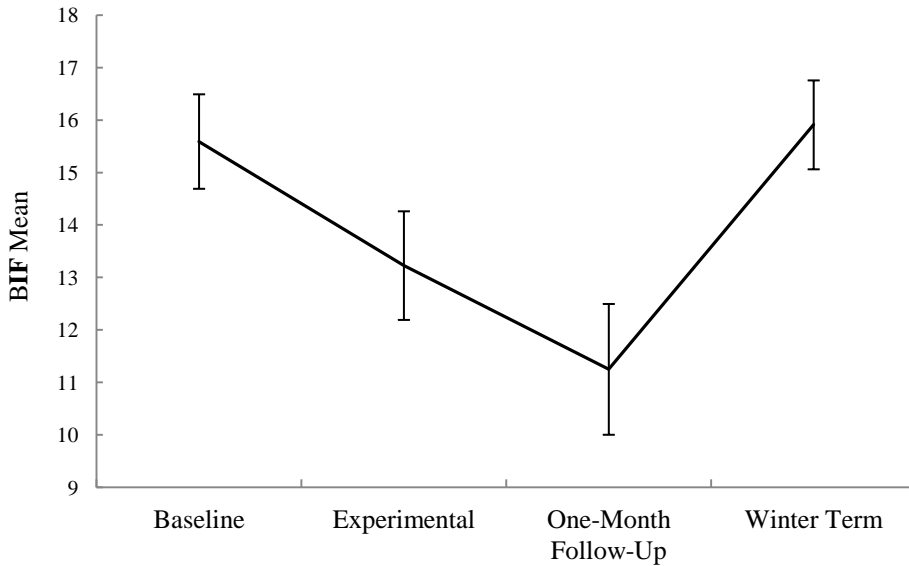


Figure 9. Mean level of construal for participants (n = 44) who completed all phases of Study 2. Error bars = 95% confidence intervals. BIF = Behavioral Identification Form.

To address Hypothesis 2, that engaging in self-affirmation would result in benefit in the absence of study-induced social stress, self-affirmed and non-affirmed participants were compared separately in the high and L/M social anxiety groups. To create a measure of change, one-month follow-up data were regressed on baseline data. The resulting residuals represent change from baseline to follow-up and have the desirable property of being uncorrelated with baseline scores. The effect of affirmation condition was analyzed by comparing the mean residuals of self-affirmed and non-affirmed participants using a separate *t*-tests for the high and L/M social anxiety groups. Contrary to expectations, there was no evidence of positive benefit for self-affirmed versus non-affirmed high social anxiety participants on change from baseline to one-month follow-up on participants' mod. K-GSADS-A Beh. distress and avoidance ratings, the frequency counts, SPIN score, or SPIN subscale scores (*t* scores ranged from 0.06 to 1.82, *p* = .951 to .072). Supporting Hypothesis 3, there was no effect of condition on the change scores on

all of these measures for those in the L/M social anxiety group ( $t$  scores ranged from 0.15 to 0.62,  $p = .882$  to  $.533$ ). (See Table 11).

Table 11

*Mean (Standard Deviation), 95% Confidence Interval, and Cohen's  $d$  of Difference between Residual Scores of Self-Affirmed and Non-Affirmed L/M and High Social Anxiety Participants*

Measure	Self-affirmed	Non-affirmed	95% CI	$d$
	$M(SD)$	$M(SD)$		
L/M social anxiety group				
SPIN	-0.04 (6.35)	0.63 (7.16)	[-3.55, 2.21]	0.09
SPIN -fear	-0.15 (2.70)	0.08 (2.77)	[-1.39, 0.94]	0.09
SPIN - avoidance	-0.27 (3.33)	0.04 (3.80)	[-1.83, 1.21]	0.09
SPIN - somatic	-0.37 (1.71)	-0.22 (1.74)	[-0.88, 0.59]	0.09
Mod. K-GSADS-A Beh. distress	-1.73 (6.34)	-1.47 (5.09)	[-2.72, 2.20]	0.05
Mod. K-GSADS-A Beh. avoidance	-1.33 (5.89)	-1.12 (7.00)	[-2.96, 2.54]	0.03
Mod. K-GSADS-A Beh. frequency	1.99 (12.17)	3.50 (9.91)	[-6.25, 3.25]	0.14
High social anxiety group				
SPIN	0.19 (8.50)	-0.64 (8.22)	[-2.45, 4.12]	0.10
SPIN -fear	0.06 (3.25)	0.02 (3.38)	[-1.26, 1.34]	0.01
SPIN - avoidance	0.58 (3.87)	-0.34 (3.82)	[-0.60, 2.43]	0.24
SPIN - somatic	0.20 (3.03)	0.30 (2.45)	[-1.17, 0.99]	0.04
Mod. K-GSADS-A Beh. distress	1.90 (8.45)	0.87 (7.34)	[-2.07, 4.14]	0.13
Mod. K-GSADS-A Beh. avoidance	2.18 (7.06)	0.01 (6.35)	[-0.47, 4.80]	0.32
Mod. K-GSADS-A Beh. frequency	-0.66 (9.45)	-3.86 (8.29)	[-0.29, 6.68]	0.36

*Note:* Positive (negative) values mean the score has decreased (increased) from baseline to one-month follow-up. L/M = Low/moderate, SPIN = Social Phobia Inventory, Mod. K-GSADS-A Behaviour = modified Kutcher Generalized Social Anxiety Disorder Scale for Adolescents -- Behaviour section, BIF = Behavior Identification Form.

**Exploratory Analyses.** Study 2 was also designed to test a competing explanation of the shift to concrete thinking observed over the course of Study 1, namely that the shift was the result of an increase in stress over the course of term. A repeated measures ANOVA comparing



the mean levels of stress from baseline ( $M = 6.46$ ) through to one-month follow-up ( $M = 6.66$ ) showed there was no significant increase in stress,  $F(1, 188) = 0.46$ ,  $p = .500$ ,  $\eta^2_{\text{partial}} = .002$ , 95% CI of  $M_{\text{diff T1-T3}}$  [-0.39, 0.79]. However, although stress did not increase significantly over the course of term, increase in stress was correlated with a shift to more abstract construals for those with high anxiety,  $r = -.22$ ,  $p = .025$ ,  $d = -0.45$ , 95% CI [-.37, -.06]. Due to this correlation, I tested whether it was the change in stress, even though small and non-significant, and not the passage of time that was in fact predicting the change in level of construal. Using regression with level of construal as the outcome, and with time and change in stress entered as predictors, time continued to significantly predict level of construal scores. The inclusion of stress in the equation as a predictor did not significantly improve the fit of the regression equation. (See Table 12).

Table 12

*Predictors of Change in Level of Construal*

	Change in level of construal		
	B	95% CI	$\Delta R^2$
Model 1			.293
Time	-2.30***	[-2.80, -1.80]	
Model 2			.002
Time	-2.30***	[-2.80, -1.81]	
DASS - Stress	-0.05	[-0.06, 0.15]	

*Note.* DASS = Depression, Anxiety, and Stress Scale.

\*\*\*  $p < .001$

**Discussion**

Mirroring the results of Study 1, level of construal showed a strong shift to more concrete responding as Study 2 progressed from the baseline phase, which took place early in the fall term, through to the follow-up phase, which took place at the end of term just prior to the

period of final exams. Consistent with psychological distance theory (Trope & Liberman, 2010), construal levels in the early part of winter term had returned to the more abstract levels of the early part of the fall term. Just as in Study 1, the effect sizes of these shifts were very large.

The supposition it was an increase in stress over the course of the term that was driving this shift and not the change in the temporal proximity of final exams was not supported. Including stress as a predictor did not account for significant variance in the shift in level of construal to more concrete. In fact, levels of stress changed only minimally over the course of the term. Although stress was significantly predictive of construal levels, an outcome consistent with literature that has discussed a relationship between a perception that one has failed to attain expectations and concrete thinking (Baumeister, 1990), change in stress did not significantly alter the effect of time on levels of construal.

Contrary to expectations, for participants with high levels of social anxiety, engaging in self-affirmation did not prove to be beneficial in terms of change from baseline to follow-up on variables important for amelioration of the dysfunction related to SAD. These include fear, anxiety, and avoidance related to social behaviors, as well as engagement in those behaviors. Consistent with expectations, self-affirmation did not lead to any benefit for those with L/M levels of social anxiety. These outcomes suggest one or more components of the lab-based components of Study 1, that were not part of Study 2, may have been necessary for there to be a benefit of self-affirmation. A likelihood of experiencing social threat on a day-to-day basis was not sufficient. It is also quite possible there was an insufficient number of participants in Study 2 to detect a difference. An examination of the residual change scores for the high social anxiety group shows most of the changes were in the direction predicted by self-affirmation theory. Several of the effect sizes of the differences in change scored were small to moderate ( $d = 0.24$

to 0.36) with those who self-affirmed showing a trend toward a benefit. The exception was in the behavior frequency outcome variable which favored those who did not self-affirm. In the L/M SAD group, the effects sizes were very low ( $d \leq 0.14$ ), which suggests that even with a larger number of participants no benefit of self-affirmation would be evident for this group. Replication of this study with a larger number of participants and with conditions which vary as to whether they include study-induced social stress, SAD psychoeducation, both, or neither, is necessary to clarify just what is needed for university students with high social anxiety to experience a reduction in social anxiety related dysfunction, through self-affirmation.

### **General Discussion**

Study 1 showed engaging in self-affirming writing can be beneficial for socially anxious students faced with social stress but perhaps not immediately. Engaging in self-affirming writing at the time of the socially stressful situation did not have a protective effect, at least not with regards to the outcome variables that were part of Study 1. However, it seems self-affirming had some kind of differential effect, the results of which were apparent in the data one month later. Self-affirmed participants reported greater involvement in social behaviors, both when compared with their own baselines, and when compared with those who did not self-affirm who, in fact, reported a reduction in social behavior engagement. Self-affirmed individuals also reported a reduction in their fear of social situations and their avoidance of these situations, a change that did not happen for those who did not self-affirm. Of note, these differences showed up one month later in spite of a small difference between the two groups on the self-affirmation manipulation check, a difference of just two points on a 20-point possible range. Given the recursive nature of self-affirmation that has been found in some studies (Sherman et al., 2013; Stinson et al., 2011), it would be informative in future studies to follow participants for a longer

period of time, not only to see if the benefits hold but also to see if they grow larger. As noted by Cohen and Sherman (2014) "better performance may affirm the self, leading to still better performance, further affirming the self, and so on, as improvement maintains or even builds in itself".

Just how did this benefit of self-affirmation occur? At least in these studies, it was not through a move to a more abstract way of construing one's experiences as has been posited by other researchers (Schmeichel & Vohs, 2009; Wakslak & Trope, 2009). In fact, there was a very clear march to more concrete thinking over the course of the term, in both Study 1 and 2. It may be level of construal was not operating at all as a mechanism by which self-affirmation has its effect. Or, it may be the shift to concrete that is part of the progression of term was just too strong an effect for self-affirmation to have an impact. The finding in Study 2 that construal levels in the sixth week of winter term reverted to the abstract baseline levels found at around the sixth and seventh week of fall term, does suggest a strong time-of-term effect. Change in level of stress was ruled out as a possible explanation of the term effect when analysis found no correlation between the change in stress over term and the change in level of construal. Psychological distance theory (Trope & Liberman, 2000, 2010) suggests that as the end of term approaches, it is beneficial to become more concrete as one focuses on the very concrete demands of the end of term. Running the same study design at a different time in the term, or outside of the term entirely, would be needed to more clearly rule out level of construal as a mediator of the effects of self-affirmation. Including questions designed to assess students' focus on the abstract or the concrete in relation to their coursework would help to clarify the relationship between the time-of-term and level of construal observed in these studies.

A competing explanation of the mechanism of self-affirmation which was not considered

in the current research is one recently put forth by Critcher and Dunning (2015). They suggest that self-affirmation gives the individual a wider perspective on themselves so that the threat at hand becomes a small piece of a larger self-concept pie. They note an individual's self-concept is comprised of many different parts, a small subset of which is salient at any given moment. This salient subset is called the "working self-concept" (Markus & Wurf, 1987). In this model, a threat to one particular part of the working self-concept leads to that part comprising an overly large proportion of the whole, thereby distorting the importance of that one part. Critcher and Dunning showed self-affirmation did, in fact, result in participants maintaining a broader working self-concept than that seen in those who were not affirmed. Although participants who engaged in self-affirmation still continued to experience threat, it represented a relatively small piece of their broader working self-concept pie instead of being perceived as the whole (or nearly the whole) pie.

What is suggested by the present research is that some combination of study-induced social threat and/or SAD psychoeducation is necessary to obtain a benefit of self-affirmation. Study 2, which did not include these two components of Study 1, found no benefit of engaging in self-affirming writing, for either high or L/M social anxiety participants. It is not surprising that there was no benefit for the L/M social anxiety as the general consensus in the self-affirmation literature is that self-affirmation can only reduce the negative impact of a threatening situation; it does not improve the performance of those who are not experiencing a sense of threat (Armitage, 2012; Jaremka et al., 2011; Martens et al., 2006). There was no study-induced social threat in Study 2 so those in the L/M social anxiety condition presumably had no "cost" of self-threat to reduce through self-affirming writing. For the high social anxiety group, although there was no study-induced social threat, it was hypothesized that this group, because of their

endorsement of high levels of social anxiety symptoms, would be experiencing the threat of social situations on a near daily basis in the university environment. Therefore, one might have expected a benefit for this group in Study 2, even without study-induced social threat. This was not the case. There was no significant benefit of self-affirmation on engagement in feared social activities or the distress and avoidance related to those activities. It is possible that Study 2 was underpowered to find an effect. A comparison of residual change scores for those with high social anxiety showed the expected pattern of benefit for those who self-affirmed compared with those who did not on almost all the one-month follow-up measures. Several of the differences, while not reaching significance, did have small to medium effect sizes. It could be that repeating this study with a larger number of participants would show a benefit of self-affirmation for those with high social anxiety, even without study-induced social threat or SAD psychoeducation.

When considering the study-induced social threat and the SAD psychoeducation, although there is consensus in the literature threat must exist for self-affirmation to have a benefit, it is not always the case that the threat must occur at the time of self-affirmation. Some studies examining self-affirmation in academic settings have found a benefit of self-affirmation in the face of a general sense of threat. For example, in a study by Cohen and colleagues (2006), although the self-affirmation intervention was administered to seventh grade students at the start of the school year when the threat of evaluation was expected to be high, there was no particular threat induction that formed a part of the study. Similarly, Miyake and colleagues (2010) had university students in a physics course engage in self-affirming writing in the first week of term and then in the fourth week, with no particular threat induction. Rather it was hypothesized that engaging in self-affirmation would be protective for females who may perceive a general threat in the risk they may confirm the stereotype "females are not good at physics". It could be the

psychoeducation piece of the in-person lab component of Study 1, not the study-induced social threat, was key to the one-month follow-up benefit of self-affirming. That is, perhaps what self-affirmation did was allow for learning to occur.

There is research which shows that worrying about confirming your worst fears when engaging in a self-threatening activity can impair the ability to learn from the current experience (Heidrich & Chiviakowsky, 2015; Rydell, Rydell, & Boucher, 2010) and this may be at least partially due to a reduction of working memory capacity (Beilock, Rydell, & McConnell, 2007; Ganley & Vasilyeva, 2014; Schmader & Johns, 2003). One study has found self-affirmation appeared to result in effective use of working memory toward the goals of participants (Logel & Cohen, 2012). Extrapolating from this, it is possible that in the present research, engaging in self-affirmation allowed those with high social anxiety to have sufficient mental capacity to recognize they had survived the TSST and to take in the psychoeducation information on how to reduce their social anxiety. They would then have had this information at their disposal to use in new situations. The psychoeducation component of Study 1 included drawing attention to the fact that all participants had just engaged in a task designed to elicit a stress response in everyone and, difficult though it was, they had survived it. As well, it emphasized that the only way to become more comfortable with currently feared social tasks is to engage in those tasks.

It was not possible to test, with the data available in the present research, whether one or both of the social stress and psychoeducation components of Study 1 are necessary to reveal the benefit of self-affirmation. Study 2 results suggest at least one of these two components is necessary. Future studies in this area might include questions, at the one-month follow-up, about what participants remember about the psychoeducation material, whether they made choices to engage in more social behaviors, and how they feel about their participation in the socially

stressful TSST. Also, the design could be varied so that some participants with high social anxiety complete the TSST and others do not, to test if the self-affirmation has to be temporally tightly connected to the threat in order for it to be of benefit. As well, some measurement of working memory would be necessary to examine whether the ability to continue to learn, even when experiencing threat, is at least part of the explanation for the benefits of self-affirmation.

As to the coherence of the emotional threat response system, this study provides further evidence the three facets of the system—the physiological, experiential, and behavioral—do not, in fact, respond in concert. There was little evidence of coherence between the three facets. Out of a possible 20 correlations between the experiential and the behavioral facets, only four were significant. Examining the relationships between the physiological facet, represented by salivary cortisol, and the other two, there was only one significant relationship with an experiential variable and none with a behavioral variable. There was evidence of greater coherence within each of the three facets of the emotional threat response system than between the facets. The strongest coherence was within the experiential facet; five out of six correlations among the self-report variables measured were in the moderate range. Within the behavioral facet, out of 10 correlations among behavioral variables, two were moderate and one was strong. The strong correlation was between the eye contact and warmth ratings of the five coders. As there was only one physiological variable in this study, salivary cortisol, there was no within-facet coherence to analyze. These results are consistent with other emotional coherence research (Campbell & Ehlert, 2012; Mauss et al., 2005) and indicate that researchers examining emotional response to threat may wish to include more than one facet of this system in order to obtain a clearer picture of the impact of a particular intervention or manipulation.

The high percentage of students who met the criteria of a SPIN score  $\geq 23$  was not



expected: 47% of those screened in Study 1 and nearly 50% of those screened in study 2. In fact, given the incidence of SAD in the general population, and the literature which suggests that those with SAD are less likely to attend post-secondary institutions, it was originally thought that it might be difficult to obtain sufficient numbers who met the cut-off criteria selected for this study, a cut-off at the high end of the subclinical range of SPIN scores. The similarity of the percentages meeting criteria in two different years, suggest the high percentages are an accurate representation of self-report social anxiety symptomology among University of Manitoba Introduction to Psychology students. When considering what might explain such high self-report levels of social anxiety, there are some characteristics of the University of Manitoba in general, and of the Introductory Psychology course in particular, which may explain at least some of the high rates.

The University of Manitoba, as a publicly funded university and the largest in the province, has a clear mandate to be broadly accessible. This could have the effect of making attending the University of Manitoba feel more welcoming and less competitively threatening than attending other universities, resulting in students with social anxiety being more likely to attend. As well, because of high undergraduate enrolment—25,443 in the fall term of 2016 (“Data for Undergraduate Program Review,” n.d.)—the University of Manitoba tends to have large class sizes, making it easy to be anonymous within many classes. The Introduction to Psychology course has a particularly high enrolment with multiple sections each year—2266 students enrolled in the fall of 2016 over 12 sections (“Aurora,” n.d.). The evaluation format of this course does not require presentations and is predominately multiple choice. It is possible this format is particularly appealing to those with social anxiety, leading to an over-representation of those with anxiety in the Introduction to Psychology course when compared

with the general student body. It is also possible the content itself of the course itself, including sections on anxiety, coupled with the anonymity of the large class sizes and evaluation format is appealing to those with social anxiety who may be wanting to learn more about the anxiety they are experiencing.

These explanations do not appear to be enough, however, to explain why nearly half of over 2000 students in the Introductory to Psychology classes met a high sub-clinical cut-off on the social anxiety screening measure used in this study. There is evidence that SAD is under diagnosed (Dalrymple, 2012) which means that prevalence rates may be underestimating the incidence of SAD. For example, a diagnosis of SAD was nine times more likely when depressed patients were assessed with a semi-structured compared with an unstructured clinical interview (Zimmerman & Chelminski, 2003). Given the fear of embarrassment and consequent avoidance that characterizes SAD, it is perhaps not surprising to learn that individuals with SAD are less likely to admit to it (Olfson et al., 2000) which may also contribute to under diagnosis. Also, due to the early onset nature of SAD, individuals may see their social avoidance as a trait and not as a disorder that could be treated (Rapee, 1995).

It is also possible that the SPIN overestimates the incidence of SAD, at least within a university population. That is, in spite of excellent psychometric properties of the SPIN, including when tested with another Canadian university student population (Radomsky et al., 2006), is there something about the university experience and the items of the SPIN that might lead to an overestimation of clinically significant social anxiety?

In an examination of social anxiety here at the U of M, (Stewart & Mandrusiak, 2007) found that 42% of 119 Introduction to Psychology students who volunteered to be part of the study had a SPIN score  $\geq 19$ , a cut-off that includes both the sub-clinical and clinical range of the

SPIN. A slightly higher 49.1% of 59 students who presented at the student counseling centre on campus had SPIN scores  $\geq 19$ . These rates are similar to that found in the present study. Stewart and Mandrusiak posited a combination of environmental and developmental factors to explain the high rates. They suggested that the university experience is characterized by frequent evaluation, either through presentations or testing; interactions with individuals, such as professors and administrators, who have varying degrees of authority in relation to students; and, having to interact with unknown individuals either through residence living, required group work, or other typically interactive facets of university life. These aspects of university life all may serve to increase the likelihood of a student responding in the affirmative to items in the SPIN such as: "I avoid speaking to anyone in authority", "Being criticized scares me a lot", "I avoid having to give speeches", or "Being embarrassed or looking stupid are among my worst fears". Coupled with this, Stewart and Mandrusiak suggest that the early adult years, the age range which encompasses the majority of undergraduates, is a period of learning to manage the anxiety that accompanies the identity development, formation of intimate relationships, and other existential concerns common during this stage of life. It may be that with a university population, the SPIN is capturing social anxiety that is part of the university experience for many students but not necessarily indicative of disorder. Providing some evidence in this regard, a study of Brazilian university students (Baptista et al., 2012) found that, although 21% ranked as positive for SAD when screened with the mini-SPIN (a three-item version of the SPIN), a lower 11.6% were found to meet criteria with diagnostic screening.

### **Limitations**

The design of the present study investigated the effects of self-affirmation on Introduction to Psychology university students with high social anxiety. This is an important

population to study, given the negative impact that the fear of evaluation and avoidance of social engagement that characterize social anxiety can have on student's academic success and their subsequent functioning outside of the university setting. At the same time, it is recognized the benefit of self-affirmation in a population of post-secondary students who have high social anxiety found in Study 1 will not necessarily generalize to other populations with similar levels of self-report social anxiety or to individuals with a diagnosis of SAD. As well, a longer follow-up period, perhaps of a year or more, would be needed to know if the benefit of self-affirmation found in Study 1 maintained over time or, even, increased.

There were a number of challenges in this research associated with measuring salivary cortisol making it difficult to draw any firm conclusions regarding the effect, if any, of self-affirmation on cortisol response when faced with a socially stressful task. The sCort measurements, although taken at roughly the same temporal time for all participants, did not occur at the same point in the protocol for all participants. The second measurement occurred between the speech and mental math tasks for some participants, after their math task for others, and before their speech tasks for others. This variation, as to exactly when in the TSST protocol sCort was measured, was largely a result of having no set time for the affirmation writing task which preceded the TSST. It is unclear just what effect this variation might have had on cortisol levels.

Baseline cortisol in this research was considered to be a participant's level in the saliva samples taken shortly after they had arrived for the social stress phase. There are TSST and cortisol research designs that include a lengthy acclimatization period before baseline sCort sampling. For example, the TSST-G design of von Dawans and colleagues (2011) included a preparatory resting phase of 50 minutes, Petrowski, Herold, Joraschky, Wittchen, and

Kirschbaum (2010) had one of 25 minutes, while LeMoult, Arditte, D'Avanzato, and Joormann (2013) began with a 10-minute calming video. Time constraints did not allow for this type of resting phase in the design of Study 1. As well, it is unclear just what impact this resting phase would have on the high social anxiety participants of Study 1, who may have found it increased their stress rather than calmed them. Lovallo, Farag, and Vincent (2010) suggest baseline sCort data should be collected on a day not associated with the study, in order to provide greater control over individual differences.

It is possible cortisol sampling ended too soon to get an accurate picture of the impact of self-affirmation. The timing of saliva collection in Study 1 was based on research suggesting cortisol peaks approximately 25 to 30 minutes after it has started to rise and then falls about 25 minutes after that (e.g., Creswell et al., 2005). However, in a review of the TSST and cortisol response, it is noted that cortisol peaks 20 minutes after the stress has ended (Kudielka, Hellhammer, & Kirschbaum, 2007). This means the final saliva sample taken in Study 1 took place when cortisol response would have been peaking. Continuing to sample saliva for another 20 to 25 minutes may have found an effect of self-affirmation on the rate of decline in cortisol levels.

There is also evidence chronic exposure to stress can result in altered diurnal patterns of cortisol, as well as blunted and exaggerated cortisol responses to social stress. A meta-analysis of research examining chronic stress and the response of the HPA system found exposure to chronic stress gives rise to a flattened cortisol response pattern. Compared with the typical diurnal rhythm—high morning levels that decrease throughout the day to lowest levels in the evening—those who reported chronic stress had a lower morning output of cortisol coupled with higher cortisol output throughout the day (Miller et al., 2007). The high social anxiety group in

this research did report higher baseline levels of stress than the L/M social anxiety group. This suggests it is possible that some of the participants in Study 1 may have had an altered cortisol response. Also, when examining response to a social stressor, a number of different clinical conditions including social anxiety have been found to have a blunted cortisol response to the TSST (Beaton et al., 2006; Beaton, Schmidt, Schulkin, & Hall, 2013; Chopra et al., 2009; Epel et al., 2000; Furlan, DeMartinis, Schweizer, Rickels, & Lucki, 2001; Rao, Hammen, Ortiz, Chen, & Poland, 2008). As noted by Foley and Kirschbaum (2010), these and other factors make the prediction of cortisol response to stress, including social stress such as the TSST, a difficult task marked by significant individual variation.

There are many studies showing the effect of self-affirmation is moderated by another variable, for example stress (Creswell et al., 2013), self-esteem (Armitage, 2012; Düring & Jessop, 2015; Jaremka et al., 2011) and self-resources (Creswell et al., 2005). Possible moderating variables were not measured in Study 1. In Study 2, stress was measured. However, given the number of participants, there was insufficient power to test for moderation. The current study also did not allow for an analysis of the effect of word count, if any, on the outcome variables. This is because, although it was thought that the writing instructions for the non-affirming condition would result in similar amounts of writing for the two conditions, they did not. Those in the self-affirmed condition wrote much more than those in the non-affirmed condition with the number of words written highly correlated with condition. Owing to this high correlation, controlling for word count in the analyses would effectively be to control for condition. Given evidence that completing an implicit task, sentence unscrambling, related to one's top value is enough to instantiate self-affirmation (Sherman, Cohen, et al., 2009), the number of words may not be relevant. A non-affirming control writing task that results in a

word count similar to that of the affirming writing task is needed to make this determination.

Finally, the group design of the TSST-G may have impacted the behavioral outcome variables of the social stress phase of Study 1. The creators of the TSST-G design, von Dawans and colleagues (2011), describe a number of possible challenges (p. 521) including an increase in error if individual stress responses interact with the emotional responses of other participants. Given that the population of Study 1 was comprised of those who are high in social anxiety, it is possible at least some of the participants may have been impacted by the emotional response to the speech and math tasks of other participants. It may be with a socially anxious population, an individual social stress task format would be a better design than the group format that was used.

### **Clinical Implications and Future Directions**

For those with high levels of social anxiety, the present research revealed clear benefits from self-affirmation one month later on feelings associated with having social anxiety and on behaviour. The self-affirmation exercise included a very brief writing intervention that increased the salience of a personal value ranked as being of high importance to the individual. Of note, there was no clear directive or encouragement to engage in more activities in the psychoeducation component of the study. Rather, it was simply shared with both self-affirmed and non-affirmed participants that less engagement results in greater social anxiety and increased engagement leads to less social anxiety in the same way that less exercise results in less fitness and more exercise results in greater fitness. Given the importance of engagement in previously avoided activities to treatment success for social anxiety, these results suggest that a very simple and easy to administer self-affirmation exercise may be a useful adjunct to enhance the effectiveness of current treatments. Its utility should be explored further, perhaps with a clinical population including both outpatients and inpatients.

Also useful would be research that examines how self-affirmation might be added to current treatments for social anxiety. One possibility would be to have individuals complete the self-affirmation writing exercise at several points during treatment, in particular just before the session when exposure work is introduced. A challenge in deciding how engaging in self-affirmation could be tested as part of CBT treatment for anxiety in particular is that a hallmark of CBT treatment is its transparency. That is, the CBT clinician is generally transparent about the purpose of any homework assigned as part of treatment (Newman, 2013) and this transparency is seen to be key to enhancing the motivation of the client to engage in the homework (Lynch, 2014). Given the evidence that self-affirmation is less effective if the individual knows they are engaging in it (Sherman, Cohen, et al., 2009), it is not immediately clear how a clinician could have clients engage in self-affirming, without the client knowing the purpose of the writing, and remain true to the tenets of CBT. One possibility is that clinicians may be trained on how to lead their clients to engage in self-affirming reflection verbally in a manner similar to the use of Socratic questioning in a therapy session. Another research direction would be to examine why this drop in efficacy occurs and to see if it can be corrected, thus allowing for transparent use in therapy. It is possible that therapists who are highly successful in motivating their clients to engage in exposure to previously avoided activities are successful, in part, by encouraging their clients to have a broader perspective on themselves including valued aspects of themselves in the course of the therapist-client interactions. That is, they may lead their clients to self-affirm without intending to do so. An analysis of therapist-client interactions would be needed to test this hypothesis.

Research which continues to clarify the mechanisms by which self-affirmation has its effect is needed in order to know with greater precision just how and when it may be helpful for



those with social anxiety and for those who are experiencing threat more generally. This study did not find evidence it was through a shift to more abstract construals, at least not for university students with high social anxiety. One possibility is self-affirmation has its effect by maintaining a larger working self-concept, so that the current threat being experienced is only a part of the working self-concept, not the whole or nearly the whole of it (Critcher & Dunning, 2015). Another possibility is self-affirmation prevents an individual who perceives threat from being consumed with self-management related to that threat, thereby allowing for more effective deployment of working memory and functioning in the moment (e.g., (Ganley & Vasilyeva, 2014; Logel & Cohen, 2012). As noted by Cohen and Sherman (2014), it is likely that there is more than one mechanism, and that the key mechanisms may interact or change depending on the type of threat being faced.

Finally, the negative effects of cortisol on physical and mental wellbeing are many with negative consequences for the individuals, for those in relationship with them, and for society in terms of lost potential and health care costs. Although the current study did not find a benefit of self-affirmation on cortisol response to a socially stressful event, there were a number of confounds that may have masked the benefits. Research which reassessed cortisol response to a stressful event, perhaps with a focus on determining which factors are influencing that response, may provide information useful to designing research to examine the effect of self-affirmation on salivary cortisol more successfully than the current research.

### **Conclusions**

There is a high cost to SAD, both at the clinical and the subclinical level of symptomology. A key component of CBT, a highly recommended treatment for SAD, is the encouragement of individuals to engage in avoided social behaviors. However, motivating

individuals to engage in social behaviors they find threatening is challenging. The current research showed that university students with moderate to high levels of social anxiety, who engaged in self-affirming writing, increased their frequency of engagement in social behaviors typically avoided by those with SAD. Not only did they increase their engagement in these behaviors, but they reported reduced feelings of distress regarding these behaviors, and reduced fear of social interaction in general. These benefits were significant at the individual level (i.e., when viewed as a change from one's own baseline), and at the group level (i.e., when the self-affirmed group was compared to a similar group who engaged in non-affirming writing). This is a promising result that would benefit from replication as well as longer-follow-up to see if the changes hold over time and even increase, as has been found in other self-affirmation research. The results also indicate that engaging in self-affirming writing may facilitate the engagement in avoided activities that typify the exposure-based therapies which are recommended for the treatment of SAD.

Level of construal did not explain the benefit of self-affirmation in this study. What was found was a strong time-of-term effect on level of construal. Students began the fall term with a relatively abstract way of viewing behaviors. Their construal of behaviors became significantly more concrete as the term progressed, reaching a level where they were equally likely to see a behaviour as concrete or abstract by the final week of term. Then, at the beginning of the winter term, construal levels reverted back to the more abstract levels reported at the start of fall term. There was almost no difference between self-affirmed and non-affirmed, or between low-to-moderate and highly socially anxious participants in this pattern of starting the term at a 75% abstract level of construal and ending the term at close to a 50% abstract level. To my knowledge, this relationship between time of term and level of construal has not been previously

reported in the literature. It is possible it is the reality of a concrete final grade coming clearly into focus that is the cause of the shift. The testing of this hypothesis awaits further research.

The present research provides an original contribution to the literature in a number of ways. First, the idea of using self-affirmation as an adjunct to recommended treatments for social anxiety in order to increase engagement in previously avoided social activities was new. Second, this research examined the impact of self-affirmation on all three facets of the threat response system: experiential, behavioral, and physiological. Self-affirmation research in particular, and response to threat research more generally, typically considers one or two of these facets but not all three. Although there were challenges to including all three facets in the present research, doing so provides the opportunity to more fully understand outcomes that are observed in threat response research. Finally, the strong effect of term on level of construal, found in Study 1 and then confirmed in Study 2, has not previously been described in level of construal research.

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## Appendix A

## Consent Forms Study 1

**Study Name:** Reducing Stress Responses - Phase 1**Principal Investigator:** Karen O'Brien, 4th-Year PhD Student, Psychology

204-XXX-XXXX/xxxxxxxx@myumanitoba.ca

**Research Supervisor:** Dr. Ed Johnson, Associate Professor, Psychology

204- XXX-XXXX /xxxxxxxx@ad.umanitoba.ca

**Sponsor:** Department of Psychology, University of Manitoba

This consent form, *a copy of which you may save or print for your records and reference at this time (it will not be available later)*, is only part of the process of informed consent. It should give you the basic idea of what the research is about and what your participation will involve.

Participation is voluntary and declining to participate will have no negative consequences. If you would like more detail about something mentioned here, or information not included here, you should feel free to contact the principal investigator, Karen O'Brien (see above). Please take the time to read this carefully and to understand any accompanying information.

**Purpose of Study:** Karen O'Brien is conducting this study as part of her PhD Thesis, under the supervision of Dr. Johnson. The purpose of this research is to examine how different writing interventions may reduce the stress response (behavioral, experiential and physiological) of individuals when faced with a challenging task. You were selected to participate in this study on the basis of responses you gave to a mass testing survey of Introductory Psychology students earlier in the term. Using your student number, some of your previous answers will be linked to the present research and used to analyze your responses in this experiment. There are three phases in this research. This consent form pertains only to the first phase of the study, Phase 1.

**Procedure:** In this first phase, you will be asked to make judgements about 57 self-related statements regarding your feelings, day-to-day behaviours, and how you describe those behaviours. You will also be asked several basic demographic questions. Please read the instructions carefully before beginning each questionnaire. It should take no longer than 30 minutes to complete these on-line measures.

You have until midnight on Monday, October 21st, to complete this phase. A reminder email will be sent to you when there are 16 hours left in your participation window of time if you have not yet completed this phase of the study.

**Voluntary Participation:** Your participation in this study is completely voluntary. Although you may omit responses to any items you do not wish to answer and you will still receive two (2) research credits, it would be most helpful to our research if you respond to all statements.

If you choose to discontinue participation at any point, an email will be sent to you, inviting you to respond to a question regarding why you have chosen to discontinue. This question will be anonymous, will not affect your credit for participation in any way, and your response is completely voluntary.

**Confidentiality:** All answers will be kept completely confidential so please respond as honestly as possible. Any information you provide will be stored on the encrypted and password protected site Qualtrics and on password-protected computers, contained in locked offices, affiliated with Dr Johnson's lab. Only the PI, her supervisor, and other authorized lab personnel (e.g., research assistants) will have access to your data. Once all data for this research project has been collected (Phases 1, 2, and 3) and research credits assigned, a code will be assigned to your data and all identifying information stripped from the data and deleted. This will render the data completely anonymous. We estimate we will do this by 01/14. At this point, the data will not be kept under lock and key any further and may be shared with other members of the research team as well as other investigators. This anonymous data will be stored in paper form for up to 5 years post-publication of the results, and for an indefinite period in electronic form. Results from this study will be included in Karen O'Brien's PhD thesis. It may also be disseminated through presentations at scholarly conferences and through publication in academic journals. *At no time will individual responses be reported.*

The University of Manitoba may look at your research records to see that the research is being done in a safe and proper way.

**Risks and discomforts:** There are no expected risks for participation in this study, beyond those that might be expected during the course of everyday life.

**Benefit:** There may or may not be direct benefit to you from participating in this study. We hope that the information learned from all three phases of this research project will contribute to creating an intervention to lessen the negative effects of social phobia during social interactions.

**Feedback and Study Results:** Once data collection for the entire study, Phases 1, 2, and 3, is complete (estimated to be early 12/13) you will be emailed a written debriefing that will describe the psychological interest of the research in more detail. You may also contact Karen (see above) for a verbal debrief at that time. The results of this study should be available by 05/14. If you would like to receive a summary of the research results, please follow the link at the end of this on-line study. This link will redirect you to a site where you can provide your name and contact information in a file which will be kept completely separate from your experimental data.

**Questions:** If you have any questions about this research, feel free to email or phone Karen O'Brien (see above). This research has been approved by the Psychology/Sociology Research Ethics Board at the University of Manitoba. If you have any concerns or complaints about this

project you may contact the Human Ethics Secretariat at 204-474-7122, or by e-mail at Margaret\_Bowman@umanitoba.ca.

**Statement of Consent:** By clicking “Yes, I consent” (at the bottom of this page) you indicate that you have understood to your satisfaction the information regarding participation in the research project and agree to participate as a subject. In no way does this waive your legal rights nor release the researchers, sponsors, or involved institutions from their legal and professional responsibilities. You are free to withdraw from the study at any time, and /or refrain from answering any questions you prefer to omit, without prejudice or consequence. If you wish to withdraw, simply close the browser window at any time. Your continued participation should be as informed as your initial consent, so you should feel free to ask for clarification or new information throughout your participation .

*We strongly encourage you to save or print a copy of this consent form now for your records, as it will not be available later.*



**Study Name:** Chatham - Reducing Stress Responses - Phase 2

**Principal Investigator:** Karen O'Brien, 4th-Year PhD Student, Psychology  
204- XXX-XXXX/xxxxxxxx @cc.umanitoba.ca

**Research Supervisor:** Dr. Ed Johnson, Associate Professor, Psychology  
204- XXX-XXXX/xxxxxxxx @ad.umanitoba.ca

**Sponsor:** None

This consent form, a copy of which will be left with you for your records and reference, is only part of the process of informed consent. It should give you the basic idea of what the research is about and what your participation will involve. Participation is voluntary and declining to participate will have no negative consequences. If you would like more detail about something mentioned here, or information not included here, you should feel free to ask. Please take the time to read this carefully and to understand any accompanying information.

**Purpose of this study:** Karen O'Brien is conducting this study as her PhD Thesis, under the supervision of Dr. Johnson. The purpose of this research is to examine how different writing interventions may reduce the stress response (behavioral, experiential and physiological) of individuals when faced with a challenging task. Some of your previous answers from the mass testing and Phase 1 will be linked to the present research and used to analyze your responses in this experiment. *Note: There is a third phase to this study which will take place on-line, approximately one month from now. Those who complete Phase 2 will receive an email with information about how to participate in Phase 3.*

**Procedures:** If you agree to participate in this phase, you will first be asked to complete a 20-item measure, which asks you to choose the best description of a number of behaviours, as well as a 10 minute writing task. *Note:* There will also be a few personal health information questions about things such as medications and hormonal contraceptive use as these are variables that may affect the data. Steps that will be taken to maintain the confidentiality of this information is described below in this consent form. Next will be a speaking task, which will involve giving a very brief speech on a randomly selected topic, followed by a mental arithmetic task. You will be asked to rate any feelings of stress you may experience before and after the social stress tasks. As well, we will collect salivary cortisol samples from each participant. This is done by simply swabbing the inside of the mouth with something that is similar to a Q-tip and then placing this back in its own container. This will be followed by some education about this study and stress responses. All together, your participation in this phase should take approximately 60 to 90 minutes.

**Risks and discomforts:** Participants will likely find engaging in the speaking and mental arithmetic tasks unpleasant but we do not expect these effects to be long lasting. Time will be taken to provide education about stress responses as well as methods of coping with any stress experienced. As well, in case you experience ongoing distress, you will be given contact

information for free psychological services available at the University of Manitoba and in the City of Winnipeg.

**Benefit:** There may or may not be direct benefit to you from participating in this study. We hope that the information learned in this research project will contribute to creating an intervention to lessen the negative effects of social phobia during social interactions.

**Voluntary Participation:** Your participation in this study is completely voluntary. Should you choose to withdraw from the study at any point or feel that you would rather leave some question(s) unanswered, you may do so without any penalty, you will still receive three (3) research participation credits. As well, you will have the opportunity to enter your name in a draw to win a 5th generation iPod touch or one of 8 \$20 gift certificates to the coffee shop of your choice or the U of M bookstore. There will be the opportunity to enter the draw at the end of Phase 2 and again at the end of Phase 3.

If you choose to discontinue participation at any point, an email will be sent to you, inviting you to respond to a question regarding why you have chosen to discontinue. This question will be anonymous, will not affect your credit for participation in any way, and your response is completely voluntary.

**Feedback:** You will be given the option of an on-line debrief or a verbal debrief at the end of this Phase of the study. Once data collection for the entire research project, Phases 1 - 3, is complete (estimated to be early 12/13) you will be emailed a written debriefing that will describe the psychological interest of the research in more detail. You may also contact Karen (see above) for a verbal debrief at that time.

**Confidentiality:** Your responses in this study will remain confidential. Any information you provide will be stored on the encrypted and password protected site Qualtrics and on password-protected computers, contained in locked offices, affiliated with Dr Johnson's lab. Only the PI, her supervisor, and other authorized lab personnel (e.g., research assistants) will have access to your data. Once all data for this research project has been collected (Phases 1, 2, and 3) and research credits assigned, a code will be assigned to your data and all identifying information stripped from the data and deleted. This will render the data completely anonymous. We estimate we will do this by 01/14. At this point, the data will not be kept under lock and key any further and may be shared with other members of the research team as well as other investigators. This anonymous data will be stored in paper form for up to 5 years post-publication of the results, and for an indefinite period in electronic form. Results from this study will be included in Karen O'Brien's PhD thesis. It may also be disseminated through presentations at scholarly conferences and through publication in academic journals. *At no time will individual responses be reported.*

The University of Manitoba may look at your research records to see that the research is being done in a safe and proper way.

**Questions:** If you have any questions about this research, feel free to email or phone Karen O'Brien (see above). This research has been approved by the Psychology/Sociology Research

Ethics Board at the University of Manitoba. If you have any concerns or complaints about this project you may contact the Human Ethics Secretariat at 204-474-7122, or by e-mail at Margaret\_Bowman@umanitoba.ca.

**Statement of Consent:** By clicking “Yes, I consent” (at the bottom of this page) you indicate that you have understood to your satisfaction the information regarding participation in the research project and agree to participate as a subject. In no way does this waive your legal rights nor release the researchers, sponsors, or involved institutions from their legal and professional responsibilities. You are free to withdraw from the study at any time, and /or refrain from answering any questions you prefer to omit, without prejudice or consequence. If you wish to withdraw, simply close the browser window at any time. Your continued participation should be as informed as your initial consent, so you should feel free to ask for clarification or new information throughout your participation .

If you do not wish to participate in this study now, please close your web browser. Thank you for considering participating.

< Yes, I consent > (proceed to survey)

<No, I do not consent> (exit)

**Study Name:** Reducing Stress Responses - Phase 3

**Principal Investigator:** Karen O'Brien, 4th-Year PhD Student, Psychology  
204- XXX-XXXX/xxxxxxxx @cc.umanitoba.ca

**Research Supervisor:** Dr. Ed Johnson, Associate Professor, Psychology  
204- XXX-XXXX/xxxxxxxx @ad.umanitoba.ca

**Sponsor:** None

This consent form, *a copy of which you may save or print for your records and reference at this time (it will not be available later)*, is only part of the process of informed consent. It should give you the basic idea of what the research is about and what your participation will involve. Participation is voluntary and declining to participate will have no negative consequences. If you would like more detail about something mentioned here, or information not included here, you should feel free to contact principal investigator, Karen O'Brien (see above). Please take the time to read this carefully and to understand any accompanying information.

**Purpose of Study:** Karen O'Brien is conducting this study as part of her PhD Thesis, under the supervision of Dr. Johnson. The purpose of this research is to examine how different writing interventions may reduce the stress response (behavioral, experiential and physiological) of individuals when faced with a challenging task. You are eligible to participate in this phase of the study because you completed Phase 2. Your responses in this phase will be linked to your responses in Phase 1 and 2 as well as the mass testing.

**Procedure:** In this final phase of the study, you will be asked to make judgements about 57 self-related statements regarding your feelings, day-to-day behaviours, and how you describe those behaviours. You will also be asked about your feelings about and participation in various social interactions over the last month. Please read the instructions carefully before beginning each questionnaire. It should take no longer than 45 minutes to complete this final phase of the study.

You have 48 hours in which to complete this phase. A reminder email will be sent to you when there are 16 hours left in your participation window of time if you have not yet completed this phase of the study.

**Voluntary Participation:** Your participation in this study is completely voluntary. Although you may omit responses to any items you do not wish to answer and you will still receive two (2) research credits, it would be most helpful to our research if you respond to all statements. As well, you will have the opportunity to enter your name into a draw to win one of ten (10) \$40 gift certificates for your choice of Second Cup, Starbucks, Tim Horton's, or the U of M Bookstore.

If you choose to discontinue participation at any point, an email will be sent to you, inviting you to respond to a question regarding why you have chosen to discontinue. This question will be anonymous, will not affect your credit for participation in any way, and your response is completely voluntary.

**Confidentiality:** All answers will be kept completely confidential so please respond as honestly as possible. Any information you provide will be stored on the encrypted and password protected site Qualtrics and on password-protected computers, contained in locked offices, affiliated with Dr Johnson's lab. Only the PI, her supervisor, and other authorized lab personnel (e.g., research assistants) will have access to your data. Once all data for this research project has been collected (Phases 1, 2, and 3) and research credits assigned, a code will be assigned to your data and all identifying information stripped from the data and deleted. This will render the data completely anonymous. We estimate we will do this by 01/14. At this point, the data will not be kept under lock and key any further and may be shared with other members of the research team as well as other investigators. This anonymous data will be stored in paper form for up to 5 years post-publication of the results, and for an indefinite period in electronic form. Results from this study will be included in Karen O'Brien's PhD thesis. It may also be disseminated through presentations at scholarly conferences and through publication in academic journals. *At no time will individual responses be reported.*

The University of Manitoba may look at your research records to see that the research is being done in a safe and proper way.

**Risks and discomforts:** There are no expected risks for participation in this phase of the study, beyond those that might be expected during the course of everyday life.

**Benefit:** There may or may not be direct benefit to you from participating in this study. We hope that the information learned in this research project will contribute to creating an intervention to lessen the negative effects of social phobia during social interactions.

**Feedback and Study Results:** Once data collection for the entire study, Phases 1, 2, and 3, is complete (estimated to be early 12/13) you will be emailed a written debriefing that will describe the psychological interest of the research in more detail. You may also contact Karen (see above) for a verbal debrief at that time. The results of this study should be available by 05/14. If you would like to receive a summary of the research results, please follow the link at the end of this on-line study. This link will redirect you to a site where you can provide your name and contact information in a file which will be kept completely separate from your experimental data.

**Questions:** If you have any questions about this research, feel free to email or phone Karen O'Brien (see above). This research has been approved by the Psychology/Sociology Research Ethics Board at the University of Manitoba. If you have any concerns or complaints about this project you may contact the Human Ethics Secretariat at 204-474-7122, or by e-mail at Margaret\_Bowman@umanitoba.ca.

**Statement of Consent:** By clicking "Yes, I consent" (at the bottom of this page) you indicate that you have understood to your satisfaction the information regarding participation in the research project and agree to participate as a subject. In no way does this waive your legal rights nor release the researchers, sponsors, or involved institutions from their legal and professional responsibilities. You are free to withdraw from the study at any time, and /or refrain from

answering any questions you prefer to omit, without prejudice or consequence. If you wish to withdraw, simply close the browser window at any time. Your continued participation should be as informed as your initial consent, so you should feel free to ask for clarification or new information throughout your participation .

*We strongly encourage you to save or print a copy of this consent form now for your records, as it will not be available later.*

If you do not wish to participate in this study now, please close your web browser. You may return to participate at a later date and time (remember, you have 48 hours to complete this study from the date and time of your appointment). Thank you for considering participating.

< Yes, I consent > (proceed to survey)

<No, I do not consent> (exit)

## Appendix B

## Invite to participate -- Baseline, Study 1

Dear ,

You are receiving this email, inviting you to participate in this research, on the basis of responses you gave to a mass testing survey of Introductory Psychology students earlier in the term. Students who agreed to be contacted and provided a phone number may also receive a phone call inviting participation in this research project.

The purpose of this research is to examine how different writing interventions may reduce the stress response (behavioral, experiential and physiological) of individuals when faced with a challenging task. Karen O'Brien is conducting this study as part of her PhD thesis, under the supervision of Dr. Johnson. This research project has 3 phases and is worth 7 research credits in total.

In this phase, conducted entirely on-line, you will be asked to make judgements about 57 self-related statements regarding your feelings, day-to-day behaviours, and how you describe those behaviours. You will also be asked several basic demographic questions. It should take 20 to 40 minutes to complete this phase of the research project.

You will have until midnight on Monday, October 21st to complete this phase. A reminder email will be sent to you when there are 16 hours left in your participation window of time if you have not yet completed this phase of the research.

This phase of the research project, Phase 1, is worth two (2) participation credits. Those who complete Phase 1 will be eligible to participate in Phases 2 and 3, worth an additional five (5) participation credits. Phase 2 will take place 3 to 4 weeks from now, is an in-person lab-based phase, and will be worth three (3) credits. Phase 3 will take place around the end of November, is completely on-line like this first Phase, and will be worth two (2) credits. Those who participate in Phase 2 and 3 will also have a chance to enter their name in a draw for a chance to win an iPod Touch 5th generation or one of 8 \$20 gift certificates to your favorite coffee shop or the U of M bookstore.

Phase 1 must be completed by Midnight on Monday, October 21st. To participate in Phase 1 of this research study, please click on the following link:

Follow this link to the Survey:

[\\${1://SurveyLink?d=Chatham%201}](#)

Or copy and paste the URL below into your internet browser:

[\\${1://SurveyURL}](#)

This link is uniquely tied to this survey and your email address. Please do not forward this message.

When you click on the survey link, you will be taken to the consent and description page of the survey.

If you have any questions, *please contact Karen O'Brien at the email or phone number listed below.*

Sincerely,

Principal Investigator: Karen O'Brien, 4th-Year PhD Student, Psychology  
204- XXX-XXXX/xxxxxxxx @myumanitoba.ca

Research Supervisor: Dr. Ed Johnson, Associate Professor, Psychology  
204-474 XXX-XXXX/xxxxxxxx @ad.umanitoba.ca

Thanks for your participation!

If you do not want to participate further in research from qualtrics, follow the link to opt out of future emails:

[\\${1://OptOutLink?d=Click here to unsubscribe}](#)



## Appendix C

## Demographic Questions

Age:

Sex: \_\_\_ Female \_\_\_ Male

Year in university: \_\_\_ first; \_\_\_ second; \_\_\_ third; \_\_\_ fourth or higher;

First language: \_\_\_ English \_\_\_ French \_\_\_ Other

If English is not first language: How many years have you: \_\_\_ spoken English \_\_\_ read English

Ethnicity: Please select the *one* ethnicity that best fits you:

\_\_\_ Aboriginal/First Nations

\_\_\_ Arab/West Asian (e.g., Armenian, Egyptian, Iranian, Lebanese, Moroccan)

\_\_\_ Black (African)

\_\_\_ Chinese

\_\_\_ Filipino

\_\_\_ Japanese

\_\_\_ Korean

\_\_\_ Latin American

\_\_\_ Metis

\_\_\_ South Asian (e.g., East Indian, Pakistani, Punjabi, Sri Lankan)

\_\_\_ South East Asian (e.g., Cambodian, Indonesian, Laotian, Vietnamese)

\_\_\_ White/European (e.g., English, French, Scottish, Irish)

\_\_\_ Other

## Appendix D

## Validity Check

1. Please rate how *honest* you were while completing the study:

1	2	3	4	5
Not at all	not very	somewhat	very	completely

2. Please rate how *attentive* you were while completing the study:

1	2	3	4	5
Not at all	not very	somewhat	very	completely

## Appendix E

## Social Stress Phase Invite

Dear :

Thank you for participating in Phase 1 of **Chatham - Reducing Stress Responses**

Because of your participation in Phase 1, you are eligible to participate in Phases 2 and 3, worth 5 credits in total. **To obtain all 5 credits, you must participate in Phase 2 (worth 3 credits), which takes place in person in a lab in Duff Roblin (described below) as well as Phase 3 (worth 2 credits), which is an on-line survey and will take place approximately one month after Phase 2.** As well, you will have the opportunity to enter your name in a draw to win a **5th generation iPod touch or one of 8 \$20 gift certificates** to the coffee shop of your choice or the U of M bookstore. There will be the opportunity to enter the draw at the end of Phase 2 and again at the end of Phase 3.

The purpose of this research is to examine how different writing interventions may reduce the stress response (behavioral, experiential and physiological) of individuals when faced with a challenging task. Karen O'Brien is conducting this study as part of her PhD thesis, under the supervision of Dr. Johnson.

This **2nd phase** of this study is an **in-person phase** and will take about an hour to an hour and a half (**60 to 90 minutes**). It is done in groups of up to 4 participants at a time (the exact number depends on how many people sign up for any given time-slot). The first part will include reviewing the consent form followed by completing several self-report measures as well as completing a 10 minute writing task. This will all be done on computer. The second part is a task which includes both a speaking component and a skill component (mental arithmetic). The third and final part will include a couple of self-rating questions and some education about stress responses. As well, salivary cortisol samples will be collected from each participant at three (3) points during this phase of the study. This is done by simply swabbing the inside of the mouth with something that is similar to a Q-tip and then placing this back in its own container.

All in person appointments will take place between October 29, 2013 and November 9, 2013. ***If you think you might want to participate***, click on the link below. ***If you choose a time slot***, the researcher will then register you on the psyc participant pool in your chosen time slot.

[\\${1://SurveyLink?d=Chatham%202}](#)

Or copy and paste the URL below into your internet browser:

[\\${1://SurveyURL}](#)

If you have any difficulties or questions, please contact Karen O'Brien at the email or phone number listed below.

Sincerely,

**Principal Investigator:** Karen O'Brien, 4th-Year PhD Student, Psychology  
204- XXX-XXXX/xxxxxxxx @cc.umanitoba.ca

**Research Supervisor:** Dr. Ed Johnson, Associate Professor, Psychology  
204- XXX-XXXX/xxxxxxxx @ad.umanitoba.ca

Thanks for your participation!

Follow the link to opt out of future emails:  
\${1://OptOutLink?d=Click here to unsubscribe}

## Appendix F

## Interim Partial Debrief - Reducing Stress Responses

(Principal Researcher: Karen O'Brien; Research Supervisor: Dr. Edward Johnson)

Thank you for your participation in the Reducing Stress Responses study. The following is a partial description of the rationale and design of this research project. A final debrief will be available when all data collection (including Phase 3) is complete -- estimated to be in early December.

The primary aim of the Reducing Stress Responses study is to examine the effect of an intervention on the negative effects of social stress for those who report some level of social phobia. Behavioral, physiological and experiential outcomes are being examined. There are also some measures included to help explain the mechanism by which the intervention being tested might be operating.

This study has three phases. Introductory Psychology students who reported a moderate and above level of social anxiety symptoms on the mass testing that occurred at the start of the year were invited to participate in the study. I think Karen explained this to you just now when talking about what behaviours increase social anxiety and what behaviours can reduce it? Phase 1 took place on-line using Qualtrics and involved a number of self-report measures. Phase 2, the phase in which you have just participated, involved the social stress task and the experimental manipulation. Phase 3, which will take place in about 4 weeks, includes a number of follow-up self-report measures. It will take place on-line, again using Qualtrics. Those of you who signed

up to participate in Phase 3 will receive your email link at the end of November/beginning of December and will have 5 days to complete it.

We want to thank you sincerely for your participation in our study. If you have any further questions, please contact Karen O'Brien at 204-XXX-XXXX or xxxxxxx@cc.umanitoba.ca. We will send you a complete debrief of the rationale and design of this research project once all data is collected (estimated to be early December). We expect to have a summary of the results of this study to send to participants by May of 2014.

## Appendix G

## Outline for Verbal SAD Psychoeducation

First, a list of mental health resources. This is something we provide whenever a study is done that may be causing lingering feelings of anxiety or distress.

**Because some of the responses** you gave on the mass testing were consistent with individuals who have some degree of social phobia or social anxiety, part of this study is to provide a bit of education about social anxiety:

Background information on social phobia/social anxiety:

Social anxiety is different for everyone, but there are features that are common amongst the people who experience significant levels of it. If you experience many of the items on this list then you may be experiencing high levels of social anxiety. Not all of them will apply to all people who are finding social situations difficult.

- Feeling very self-conscious in some or most normal social situations.
- Constantly worrying about what others think of you.
- Having a tendency to look back over social situations and ruminate about things you think you did wrong, and then feeling anxious or embarrassed about them.
- Having strong fears about opening up to people and expressing your personality to them.
- Finding it uncomfortable to make eye-contact with people.
- Avoiding a lot of social situations and people in general.

- Finding it difficult to speak to people in positions of authority.
- Feeling very self-conscious about eating, drinking or writing in front of other people.

Exposure to feared situations as effective treatment:

- "**Exposure** therapy is defined as any treatment that encourages the systematic confrontation of feared stimuli, which can be external (eg, feared objects, activities, situations) or internal (eg, feared thoughts, physical sensations). The aim of exposure therapy is to reduce the person's fearful reaction to the stimulus." (Kaplan & Tolin, 2011)
- Although **exposure is not easy** for most people with social phobia, over time the uncomfortable feelings will become less -- this is a fundamental reality of exposure to feared or avoided situations. -- and a reality of **avoiding** the situations is that social phobia or social anxiety is very likely to **get worse**. (example of exercise and muscles)
- **Important to avoid safety behaviour** -- ie. to not only "show up" but be active participants, to say something, look people in the eye -- *you have to **be present and actually engage in the interaction so new learning can take place***

**Trier Social Stress Test is a HARD test – for everyone. Designed to be that way!**

-Please don't talk to others about the test because it can invalidate the results – I have asked a lot of you and don't want to have bad data because of talking.... After Nov 11, feel free to talk!



## Appendix H

## Mental Health Resources Handout

- ◎ **Free University of Manitoba and community-based mental health resources:**
  - University of Manitoba Student Counseling and Career Centre: 204-474-8592
  - University of Manitoba Psychological Service Centre: 204-474-9222
  - Klinik 24-hour Crisis line: 204-786-8686
  - Klinik Community Drop in Counselling: (Call the drop in line, 204-784-4067, or check their website, <http://www.klinik.mb.ca/dropin.htm>, to confirm current hours)
    - ◎ Central/Downtown  
545 Broadway, R3C 0W3  
(Klinik on Broadway)  
Mondays & Wednesdays Noon – 7:00 p.m.  
Tuesdays, Fridays & Saturdays Noon – 4:00 p.m.
    - ◎ Transcona/River East/Elmwood  
845 Regent Avenue West, R2C 3A9  
(Access Transcona)  
One block west of Plesis Road  
Tuesdays Noon – 7:00 p.m.
  - Ka Ni Kanichihk: 455 McDermot Avenue, Winnipeg, MB R3A 0B5
    - Various supports and services for first Nations & Métis people
    - Call (204) 953-5820 for enquiries.

## Appendix I

Salivary Cortisol Analysis Protocol, Arbor Assays, [www.ArborAssays.com](http://www.ArborAssays.com)

## Assay Protocol

1. Use the plate layout sheet on the back page to aid in proper sample and standard identification. If you are using the 1 by 8 well strip plate version of the kit, K003-H1 or -H5, determine the number of wells to be used and return unused wells to foil pouch with desiccant. Seal the ziploc plate bag and store at 4°C.
2. Pipet 50 µL of samples or standards into wells in the plate.
3. Pipet 75 µL of Assay Buffer into the non-specific binding (NSB) wells.
4. Pipet 50 µL of Assay Buffer into wells to act as maximum binding wells (Bo or 0 pg/mL).
5. Add 25 µL of the DetectX® Cortisol Conjugate to each well using a repeater pipet.
6. Add 25 µL of the DetectX® Cortisol Antibody to each well, **except the NSB wells**, using a repeater pipet.
7. Gently tap the sides of the plate to ensure adequate mixing of the reagents. Cover the plate with the plate sealer and shake at room temperature for 1 hour.
8. Aspirate the plate and wash each well 4 times with 300 µL wash buffer. Tap the plate dry on clean absorbent towels.
9. Add 100 µL of the TMB Substrate to each well, using a repeater pipet.
10. Incubate the plate at room temperature for 30 minutes without shaking.
11. Add 50 µL of the Stop Solution to each well, using a repeater pipet.
12. Read the optical density generated from each well in a plate reader capable of reading at 450 nm.
13. Use the plate reader's built-in 4PLC software capabilities to calculate cortisol concentration for each sample.

## Calculation of Results

Average the duplicate OD readings for each standard and sample. Create a standard curve by reducing the data using the 4PLC fitting routine on the plate reader, after subtracting the mean OD's for the NSB. The sample concentrations obtained, calculated from the %B/B0 curve, should be multiplied by the dilution factor to obtain neat sample values.

## Appendix J

## Self-Affirmation Related Measures

## Values questionnaire - Part 1 (Allport et al., 1960)

Below is a list of characteristics and values, some of which may be important to you, some of which may be unimportant. Please rank these values and qualities in order of their importance, from 1 to 11 (1 = most important item, 11 = least important item).

e.g. Relations with friends/family, sense of humor, creativity, social skills, and romantic values

*NOTE:* Order of values will be randomized for each participant

## Self-Affirmation Manipulation Check

Self-affirmation (rated on the scale that follows the 5 questions):

1. This exercise made me think about positive aspects of myself.
2. This exercise made me focus my attention on who I am.
3. This exercise made me aware of things I value about myself.
4. This exercise made me think about things personally important to me.
5. This exercise made me think about my values.

Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1	2	3	4	5

## Appendix K

Stress Appraisal (taken from (Blascovich & Tomaka, 1996))

1. How stressful *do you expect* the speech task to be?
2. How threatening *do you expect* the speech task to be?
3. How difficult *do you expect* the speech task to be?
4. How stressful *do you expect* the mental arithmetic tasks to be?
5. How threatening *do you expect* the mental arithmetic task to be?
6. How difficult *do you expect* the mental arithmetic task to be?

All items were rated on the following 7-point Likert Scale:

Not at all      1      2      3      4      5      6      7      Very

## Appendix L

## Trier Social Stress Test Tasks (Speech Evaluator 1)

*[Researcher will direct the participants to their spots and give the brief summary of the tasks. Once researcher leaves the room, your job will start! Please try to remain neutral. You don't need to be cold but you must try to be consistent with all participants -- a respectful but somewhat detached attitude is optimal.]*

1. To let each person know when it is their turn to go (each person has up to 2 minutes)  
***Ok. We will start with the speeches. I will ask each person to speak by number, from 1 to 4, in random order. You will each be given 2 minutes for your speech. Let's begin. Would person #\_\_\_ please begin their speech (DO NOT SAY NAMES).*** (followed by person # \_\_\_\_, etc, according to the order for each time slot)
2. If they stop talking, to let them know they still have \_\_\_\_ amount of time left. Once they have not spoken for about 20 seconds, or he or she says they are done, thank that participant and go onto the next. ***Thank you for your effort. Now will person # \_\_ please give their speech.***
3. Note whether or not the three requested items were included in the speech, the length of time the participant spoke, and any other comments you think relevant.
4. 2ND CORTISOL TEST (should be done approximately 30 minutes after first one -- RA may interrupt the speech task if need be).
5. The mental arithmetic task: ***Now we will move on to the mental arithmetic task. Again, the order will be random. We will give you your starting number, a different one for each of you. Please count backwards by 16 from the number we give you, for 90 seconds. Please go a quickly as you can. Would person #1 please begin counting down by 16 from \_\_\_\_\_*** (look at sheet to see starting number).
6. If someone makes a mistake, let them know they have made a mistake and ask them to start over. Record the number they have reached.
7. When finished: ***Thank you for your participation. We know how hard this task can be. We greatly appreciate your participation!***

8. Invite researcher back in to collect participants.
9. Go to P232 for the "in-person" social debrief (script provided)-- have snacks and beverages ready

Trier Social Stress Test (Speech Evaluator 2)

Sheets for each time slot will be provided with the random ordering of participants for that time slot already entered. Participants line up from 1 to 4, left to right, in the room.

1. Rate each person for eye contact (using a visual analogue scale)
2. Rate each person for warmth and approachability (using a visual analogue scale)

Speech Evaluator 2 will be the timer.

Speech: Up to 2 minutes for each person. If there is **20 sec** with no speech, or the person says he or she is finished, thank that participant and go on to the next.

Mental Arithmetic: 90 sec per person

Appendix M

Visual Analogue Scales

(these were printed with 8.5 x 11 paper in landscape orientation)

**WARMTH**

#1 Name:

COLD AND AWKWARD

WARM AND FRIENDLY

---

#2 Name:

COLD AND AWKWARD

WARM AND FRIENDLY

---

#3 Name:

COLD AND AWKWARD

WARM AND FRIENDLY

---

#4 Name:

COLD AND AWKWARD

WARM AND FRIENDLY

---

**EYE CONTACT**

#1 Name:

NONE

EXCELLENT

---

#2 Name:

NONE

EXCELLENT

---

#3 Name:

NONE

EXCELLENT

---

#4 Name:

NONE

EXCELLENT

---

## Appendix N

## Rating Instructions for Coders

(verbally given to each coder by researcher)

1. Rate each person for eye contact (using a visual analogue scale) – i.e., your personal sense of the eye contact being:
  1. Comfortable for you as the viewer, typical so that you would not notice it, that is, nothing made you uncomfortable about the eye contact (ample/excellent end of scale)
  2. Terrible, non-existent so not even clear to whom they are speaking or it feels uncomfortable for you (none/inadequate end of scale) or
  3. Somewhere in the middle.
  
2. Rate each person for warmth and approachability (using a visual analogue scale) – your personal sense of the person’s manner being:
  1. Comfortable and approachable, someone you might consider getting to know better or have coffee with (warm/personable end of the scale),
  2. Very awkward so that it is uncomfortable for you. For example, their mannerisms might make you think twice about getting to know them better or even want to avoid interacting with them (cold/distant end of the scale) or,
  3. Somewhere in the middle.



## Appendix O

Reducing Stress Responses - Final Debrief

(Principal Researcher: Karen O'Brien; Research Supervisor: Dr. Edward Johnson)

Thank you for your participation in the Reducing Stress Responses study. The following is a description of the rationale and design of this research project.

The primary aim of the Reducing Stress Responses study is to examine whether self-affirming writing will lessen the negative effects of social stress on those who report some level of social phobia. In particular, the hope is that self-affirming writing will lessen the avoidance of social interaction that is typical of those who have social phobia. This is important because one of the keys to treating social phobia is to engage in social interactions. Something that makes that social interaction less distressing would be helpful.

Previous research suggests that self-affirming writing reduces the threat in otherwise psychologically self-threatening situations. Engaging in self-affirming writing has been found to reduce worry about social rejection, defensive responding to health information, and to result in sustained improvement in social behaviour of insecure individuals. Research has also provided some evidence that the effect of self-affirmation is carried, at least in part, by moving individuals to a more abstract, values-based way of perceiving themselves.

The Reducing Stress Responses study is designed to test the ability of self-affirming writing to a) reduce the negative impact of the threat experienced by university students who reported moderate or high levels of symptoms associated with social phobia when faced with a socially stressful task and b) to increase the degree of social interaction for these students. The socially stressful task included both speech and mental arithmetic components in order to tap into

both the social and performance fears of generalized social phobia. Behavioral outcomes include observer ratings of participant warmth and eye contact during the social stress task, ability to self-regulate measured by whether recommended details are included in the speech and by the number reached on the mental math task, and whether in-person or on-line debriefing was chosen. Participants' preference for describing behaviours in an abstract or concrete manner (called "level of construal") was also measured several times during the study to see if this level of construal is what is carrying the effect of self-affirming writing.

Although the behavioral outcomes were directly relevant for evaluating treatment effects, a number of other outcomes were also measured in order to more fully understand the effects of self-affirmation. To examine if self-affirmation had any effect on participants' perceptions of the risk of social engagement, expected levels of stress and avoidance will be compared. Salivary cortisol levels were measured to see if self-affirmation will have any effect on this physiological response, both in terms of how high it rose and how long it took to start to decline to normal. As well, in order to examine if self-affirmation will have a positive behavioral benefit one-month later for those with social phobia, follow-up self-reports of level of social engagement were collected.

This study had three phases. Introductory Psychology students who reported a moderate and above frequency of social phobia symptoms on the mass testing that occurred at the start of the year were invited to participate in the study. Phase 1 took place on-line using Qualtrics. It involved completing a number of self-report measures in order to a) establish the baseline levels of anxiety about, and engagement in, a variety of types of social interaction, b) participants' preference for abstract or concrete descriptions of behaviours, and c) collect demographic and mental health treatment information about participants. In Phase 2 (about 4 weeks later), there

were two groups, those who engaged in self-affirming writing and those who engaged in non-affirming writing. This Phase included on-line self-report measures of stress and anxiety, salivary cortisol measures, the social stress task (which included the speech and mental arithmetic), and psycho-education about Social Phobia. Phase 3 (about 4 weeks later) included a number of self-report measures, collected on-line using Qualtrics. This Phase was included to be able to examine whether the self-affirming writing had any effect on participants' social interaction experiences outside of the lab in the month following the intervention.

We want to thank you sincerely for your participation in our study. If you have any further questions, please contact Karen O'Brien at 204- XXX-XXXX or xxxxxxxx@cc.umanitoba.ca. We expect to have a summary of the results of this study to send to participants by 05/14.

## Appendix P

*Mean (and Standard Deviation) of Change in Residuals from Baseline to One-Month Follow-Up for the Kutcher Generalized Social Anxiety Disorder Scale for Adolescents-Modified Behaviour Items*

Item	Condition		<i>F</i>	<i>p</i>
	Self-affirmed	Non-affirmed		
Initiating conversation with a member of the opposite sex	2.49 (1.30)	2.60 (1.22)	0.25	.619
Attending a party or other social gathering with people you don't know very well	1.28 (0.41)	1.38 (0.44)	1.04	.310
Speaking up, answering questions in class	1.61 (0.66)	1.59 (0.60)	0.01	.910
Speaking up, participating in class discussions	1.63 (0.43)	1.62 (0.53)	0.07	.799
Presenting in front of a small group or in a classroom setting	1.23 (0.35)	1.30 (0.67)	0.08	.778
Speaking to a store clerk, coffee shop employee, etc.	3.92 (0.85)	4.31 (0.79)	4.339	.041
Asking a stranger for directions	1.32 (0.12)	1.37 (0.19)	1.83	.180
Changing in a common locker room	1.43 (0.65)	1.47 (0.69)	0.08	.775
Using a public toilet facility	4.10 (1.28)	4.37 (1.38)	0.92	.342
Phoning to ask for information or to speak with someone you don't know very well	2.01 (0.60)	2.17 (0.68)	2.05	.157
Entering a classroom or social group once the class or activity is already underway	1.91 (0.60)	2.00 (0.73)	0.82	.367
Initiating conversation with strangers	1.92 (0.40)	2.13 (0.57)	5.35	.024
Speaking with professors/instructors in your classes	1.83 (0.61)	1.98 (0.82)	0.78	.382
Speaking with other authority figures (e.g. Department Head, police officers, physician)	1.61 (0.30)	1.66 (0.43)	0.16	.689
Eating in public	4.12 (1.09)	4.12 (1.12)	0.03	.866
Going to a party alone	1.07 (0.08)	1.07 (0.04)	0.07	.791
Asking someone for a date	1.38 (0.86)	1.24 (0.36)	0.64	.425
Making eye contact with friends	4.78 (1.02)	4.54 (1.30)	0.96	.331
Making eye contact with acquaintances or strangers (e.g. coffee shop employee or classmates)	3.58 (1.23)	3.90 (1.23)	2.07	.154
Sharing your own ideas, opinions, thoughts, and preferences when in a group	2.63 (1.01)	2.83 (0.99)	0.90	.347

## Appendix Q

## Consent Forms Study 2

**Study Name:** Reducing Stress Responses - Phase 1**Principal Investigator:** Karen O'Brien, 5th-Year PhD Student, Psychology

204- XXX-XXXX/xxxxxxxx @myumanitoba.ca

**Research Supervisor:** Dr. Ed Johnson, Associate Professor, Psychology

204- XXX-XXXX/xxxxxxxx @ad.umanitoba.ca

**Sponsor:** Department of Psychology, University of Manitoba

This consent form, *a copy of which you may save or print for your records and reference at this time (it will not be available later)*, is only part of the process of informed consent. It should give you the basic idea of what the research is about and what your participation will involve.

Participation is voluntary and declining to participate will have no negative consequences. If you would like more detail about something mentioned here, or information not included here, you should feel free to contact the principal investigator, Karen O'Brien (see above). Please take the time to read this carefully and to understand any accompanying information.

**Purpose of Study:** Karen O'Brien is conducting this study as part of her PhD Thesis, under the supervision of Dr. Johnson. The purpose of this research is to examine how different writing interventions may reduce the stress response of individuals. You were selected to participate in this study on the basis of responses you gave to a mass testing survey of Introductory Psychology students earlier in the term. Using your email address, some of your previous answers will be linked to the present research and used to analyze your responses in this experiment. There are three phases in this research. This consent form pertains only to the first phase of the study, Phase 1.

**Procedure:** In this first phase, you will be asked to make judgements about 78 self-related statements regarding your feelings, day-to-day behaviours, and how you describe those behaviours. You will also be asked several basic demographic questions. Please read the instructions carefully before beginning each questionnaire. It should take 20 to 40 minutes to complete these on-line measures.

**You have until midnight on Wednesday, October 29th, to complete this phase.** A reminder email will be sent to you when there are 16 hours left in your participation window of time if you have not yet completed this phase of the study.

**Voluntary Participation:** Your participation in this study is completely voluntary. Although you may omit responses to any items you do not wish to answer and you will still receive two (2) research credits, it would be most helpful to our research if you respond to all statements.

**Confidentiality:** All answers will be kept completely confidential so please respond as honestly as possible. Any information you provide will be stored on the encrypted and password protected site Qualtrics and on password-protected computers, contained in locked offices, affiliated with Dr Johnson's lab. Only the PI, her supervisor, and other authorized lab personnel (e.g., research assistants) will have access to your data. Once all data for this research project has been collected (Phases 1, 2, and 3) and research credits assigned, a code will be assigned to your data and all identifying information stripped from the data and deleted. This will render the data completely anonymous. We estimate we will do this by 01/15. At this point, the data will not be kept under lock and key any further and may be shared with other members of the research team as well as other investigators. This anonymous data will be stored in paper form for up to 5 years post-publication of the results, and for an indefinite period in electronic form. Results from this study will be included in Karen O'Brien's PhD thesis. It may also be disseminated through presentations at scholarly conferences and through publication in academic journals. *At no time will individual responses be reported.*

The University of Manitoba may look at your research records to see that the research is being done in a safe and proper way.

**Risks and discomforts:** There are no expected risks for participation in this study, beyond those that might be expected during the course of everyday life.

**Benefit:** There may or may not be direct benefit to you from participating in this study. We hope that the information learned in this research project will contribute to creating an intervention to lessen the negative effects of social phobia during social interactions.

**Feedback and Study Results:** Once data collection for the entire study, Phases 1, 2, and 3, is complete (estimated to be early 12/14) you will be emailed a written debriefing that will describe the psychological interest of the research in more detail. You may also contact Karen (see above) for a verbal debrief at that time. The results of this study should be available by 05/15. If you would like to receive a summary of the research results, please follow the link at the end of this on-line study. This link will redirect you to a site where you can provide your name and contact information in a file which will be kept completely separate from your experimental data.

**Questions:** If you have any questions about this research, feel free to email or phone Karen O'Brien (see above). This research has been approved by the Psychology/Sociology Research Ethics Board at the University of Manitoba. If you have any concerns or complaints about this project you may contact the Human Ethics Secretariat at 204-474-7122, or by e-mail at Margaret\_Bowman@umanitoba.ca.

**Statement of Consent:** By clicking "Yes, I consent" (at the bottom of this page) you indicate that you have understood to your satisfaction the information regarding participation in the

research project and agree to participate as a subject. In no way does this waive your legal rights nor release the researchers, sponsors, or involved institutions from their legal and professional responsibilities. You are free to withdraw from the study at any time, and /or refrain from answering any questions you prefer to omit, without prejudice or consequence. If you wish to withdraw, simply close the browser window at any time. Your continued participation should be as informed as your initial consent, so you should feel free to ask for clarification or new information throughout your participation .

*We strongly encourage you to save or print a copy of this consent form now for your records, as it will not be available later.*

If you do not wish to participate in this study right now, please close your web browser. You may return to participate at a later date and time (remember, you have 48 hours to complete this study from the date and time of your appointment). Thank you for considering participating.

< Yes, I consent > (proceed to survey)

<No, I do not consent> (exit)

**Study Name: Reducing Stress Responses - Phase 2**

**Principal Investigator:** Karen O'Brien, 5th-Year PhD Student, Psychology  
204- XXX-XXXX/xxxxxxxx @myumanitoba.ca

**Research Supervisor:** Dr. Ed Johnson, Associate Professor, Psychology  
204- XXX-XXXX/xxxxxxxx @ad.umanitoba.ca

**Sponsor:** None

This consent form, *a copy of which you may save or print for your records and reference at this time (it will not be available later)*, is only part of the process of informed consent. It should give you the basic idea of what the research is about and what your participation will involve. Participation is voluntary and declining to participate will have no negative consequences. If you would like more detail about something mentioned here, or information not included here, you should feel free to contact the principal investigator, Karen O'Brien (see above). Please take the time to read this carefully and to understand any accompanying information.

**Purpose of this study:** Karen O'Brien is conducting this study as her PhD Thesis, under the supervision of Dr. Johnson. The purpose of this research is to examine how different writing interventions may reduce the stress response (behavioral, experiential and physiological) of individuals when faced with a challenging task. Some of your previous answers from the mass testing and Phase 1 will be linked to the present research and used to analyze your responses in this experiment. *Note: There is a third phase to this study which will take place on-line, approximately one month from now. Those who complete Phase 2 will receive an email with information about how to participate in Phase 3.*

**Procedures:** If you agree to participate in this phase, you will first be asked to complete a 20-item measure, which asks you to choose the best description of a number of behaviours. This will be followed by a 10 to 20 minute writing task as well as by validity check questions. All together, your participation in this phase should take approximately 25 to 35 minutes.

**Risks and discomforts:** There are no expected risks for participation in this study, beyond those that might be expected during the course of everyday life.

**Benefit:** There may or may not be direct benefit to you from participating in this study. We hope that the information learned in this research project will contribute to creating an intervention to lessen the negative effects of social phobia during social interactions.

**Voluntary Participation:** Your participation in this study is completely voluntary. Should you choose to withdraw from the study at any point or feel that you would rather leave some question(s) unanswered, you may do so without any penalty, you will still receive two (2) research participation credits.



If you choose to discontinue participation at any point, an email will be sent to you, inviting you to respond to a question regarding why you have chosen to discontinue. This question will be anonymous, will not affect your credit for participation in any way, and your response is completely voluntary.

**Feedback:** Once data collection for the entire research project, Phases 1 - 3, is complete (estimated to be early 12/14) you will be emailed a written debriefing that will describe the psychological interest of the research in more detail. You may also contact Karen (see above) for a verbal debrief at that time. If you would like to receive a summary of the research results, please follow the link at the end of this on-line study. This link will redirect you to a site where you can provide your name and contact information in a file which will be kept completely separate from your experimental data.

**Confidentiality:** Your responses in this study will remain confidential. Any information you provide will be stored on the encrypted and password protected site Qualtrics and on password-protected computers, contained in locked offices, affiliated with Dr Johnson's lab. Only the PI, her supervisor, and other authorized lab personnel (e.g., research assistants) will have access to your data. Once all data for this research project has been collected (Phases 1, 2, and 3) and research credits assigned, a code will be assigned to your data and all identifying information stripped from the data and deleted. This will render the data completely anonymous. We estimate we will do this by 01/15. At this point, the data will not be kept under lock and key any further and may be shared with other members of the research team as well as other investigators. This anonymous data will be stored in paper form for up to 5 years post-publication of the results, and for an indefinite period in electronic form. Results from this study will be included in Karen O'Brien's PhD thesis. It may also be disseminated through presentations at scholarly conferences and through publication in academic journals. *At no time will individual responses be reported.*

The University of Manitoba may look at your research records to see that the research is being done in a safe and proper way.

**Questions:** If you have any questions about this research, feel free to email or phone Karen O'Brien (see above). This research has been approved by the Psychology/Sociology Research Ethics Board at the University of Manitoba. If you have any concerns or complaints about this project you may contact the Human Ethics Secretariat at 204-474-7122, or by e-mail at [Margaret\\_Bowman@umanitoba.ca](mailto:Margaret_Bowman@umanitoba.ca).

**Statement of Consent:** By clicking "Yes, I consent" (at the bottom of this page) you indicate that you have understood to your satisfaction the information regarding participation in the research project and agree to participate as a subject. In no way does this waive your legal rights nor release the researchers, sponsors, or involved institutions from their legal and professional responsibilities. You are free to withdraw from the study at any time, and /or refrain from answering any questions you prefer to omit, without prejudice or consequence. If you wish to withdraw, simply close the browser window at any time. Your continued participation should be as informed as your initial consent, so you should feel free to ask for clarification or new information throughout your participation .

*We strongly encourage you to save or print a copy of this consent form now for your records, as it will not be available later.*

If you do not wish to participate in this study right now, please close your web browser. You may return to participate at a later date and time (remember, you have 48 hours to complete this study from the date and time of your appointment). Thank you for considering participating.

< Yes, I consent > (proceed to survey)

<No, I do not consent> (exit)

**Study Name:** Reducing Stress Responses - Phase 3

**Principal Investigator:** Karen O'Brien, 5th-Year PhD Student, Psychology  
204- XXX-XXXX/xxxxxxxx @myumanitoba.ca

**Research Supervisor:** Dr. Ed Johnson, Associate Professor, Psychology  
204- XXX-XXXX/xxxxxxxx @ad.umanitoba.ca

**Sponsor:** None

This consent form, *a copy of which you may save or print for your records and reference at this time (it will not be available later)*, is only part of the process of informed consent. It should give you the basic idea of what the research is about and what your participation will involve. Participation is voluntary and declining to participate will have no negative consequences. If you would like more detail about something mentioned here, or information not included here, you should feel free to contact principal investigator, Karen O'Brien (see above). Please take the time to read this carefully and to understand any accompanying information.

**Purpose of Study:** Karen O'Brien is conducting this study as part of her PhD Thesis, under the supervision of Dr. Johnson. The purpose of this research is to examine how different writing interventions may reduce the stress response (behavioral, experiential and physiological) of individuals when faced with a challenging task. You are eligible to participate in this phase of the study because you completed Phase 2. Your responses in this phase will be linked to your responses in Phase 1 and 2 as well as the mass testing.

**Procedure:** In this final phase of the study, you will be asked to make judgements about 78 self-related statements regarding your feelings, day-to-day behaviours, and how you describe those behaviours. Please read the instructions carefully before beginning each questionnaire. It should take 20 to 40 minutes to complete this final phase of the study.

You have 48 hours in which to complete this phase. A reminder email will be sent to you when there are 16 hours left in your participation window of time if you have not yet completed this phase of the study.

**Voluntary Participation:** Your participation in this study is completely voluntary. Although you may omit responses to any items you do not wish to answer and you will still receive two (2) research credits, it would be most helpful to our research if you respond to all statements.

If you choose to discontinue participation at any point, an email will be sent to you, inviting you to respond to a question regarding why you have chosen to discontinue. This question will be anonymous, will not affect your credit for participation in any way, and your response is completely voluntary.

**Confidentiality:** All answers will be kept completely confidential so please respond as honestly as possible. Any information you provide will be stored on the encrypted and password protected

site Qualtrics and on password-protected computers, contained in locked offices, affiliated with Dr Johnson's lab. Only the PI, her supervisor, and other authorized lab personnel (e.g., research assistants) will have access to your data. Once all data for this research project has been collected (Phases 1, 2, and 3) and research credits assigned, a code will be assigned to your data and all identifying information stripped from the data and deleted. This will render the data completely anonymous. We estimate we will do this by 01/15. At this point, the data will not be kept under lock and key any further and may be shared with other members of the research team as well as other investigators. This anonymous data will be stored in paper form for up to 5 years post-publication of the results, and for an indefinite period in electronic form. Results from this study will be included in Karen O'Brien's PhD thesis. It may also be disseminated through presentations at scholarly conferences and through publication in academic journals. *At no time will individual responses be reported.*

The University of Manitoba may look at your research records to see that the research is being done in a safe and proper way.

**Risks and discomforts:** There are no expected risks for participation in this phase of the study, beyond those that might be expected during the course of everyday life.

**Benefit:** There may or may not be direct benefit to you from participating in this study. We hope that the information learned in this research project will contribute to creating an intervention to lessen the negative effects of social phobia during social interactions.

**Feedback and Study Results:** Once data collection for the entire study, Phases 1, 2, and 3, is complete (estimated to be early 12/14) you will be emailed a written debriefing that will describe the psychological interest of the research in more detail. You may also contact Karen (see above) for a verbal debrief at that time. The results of this study should be available by 05/15. If you would like to receive a summary of the research results, please follow the link at the end of this on-line study. This link will redirect you to a site where you can provide your name and contact information in a file which will be kept completely separate from your experimental data.

**Questions:** If you have any questions about this research, feel free to email or phone Karen O'Brien (see above). This research has been approved by the Psychology/Sociology Research Ethics Board at the University of Manitoba. If you have any concerns or complaints about this project you may contact the Human Ethics Secretariat at 204-474-7122, or by e-mail at Margaret\_Bowman@umanitoba.ca.

**Statement of Consent:** By clicking "Yes, I consent" (at the bottom of this page) you indicate that you have understood to your satisfaction the information regarding participation in the research project and agree to participate as a subject. In no way does this waive your legal rights nor release the researchers, sponsors, or involved institutions from their legal and professional responsibilities. You are free to withdraw from the study at any time, and /or refrain from answering any questions you prefer to omit, without prejudice or consequence. If you wish to withdraw, simply close the browser window at any time. Your continued participation should be

as informed as your initial consent, so you should feel free to ask for clarification or new information throughout your participation .

*We strongly encourage you to save or print a copy of this consent form now for your records, as it will not be available later.*

If you do not wish to participate in this study now, please close your web browser. You may return to participate at a later date and time (remember, you have 48 hours to complete this study from the date and time of your appointment). Thank you for considering participating.

< Yes, I consent > (proceed to survey)

<No, I do not consent> (exit)

**Study Name: Deerwood**

**Principal Investigator:** Karen O'Brien, 5th-Year PhD Student, Psychology  
204- XXX-XXXX/xxxxxxxx @myumanitoba.ca

**Research Supervisor:** Dr. Ed Johnson, Associate Professor, Psychology  
204- XXX-XXXX/xxxxxxxx @ad.umanitoba.ca

**Sponsor:** Department of Psychology, University of Manitoba

This consent form, *a copy of which you may save or print for your records and reference at this time (it will not be available later)*, is only part of the process of informed consent. It should give you the basic idea of what the research is about and what your participation will involve.

Participation is voluntary and declining to participate will have no negative consequences. If you would like more detail about something mentioned here, or information not included here, you should feel free to contact the principal investigator, Karen O'Brien (see above). Please take the time to read this carefully and to understand any accompanying information.

**Purpose of Study:** Karen O'Brien is conducting this study as a follow-up part of her PhD Thesis, under the supervision of Dr. Johnson. The purpose of this research is to examine various aspects of the stress response of individuals. You were selected to participate in this study on the basis of responses you gave to a mass testing survey of Introductory Psychology students earlier in the term. Using your email address, some of your previous answers will be linked to the present research and used to analyze your responses in this experiment.

**Procedure:** You will be asked to make judgments about 78 self-related statements regarding your feelings, day-to-day behaviours, and how you describe those behaviours. You will also be asked several basic demographic questions. Please read the instructions carefully before beginning each questionnaire. It should take 20 to 40 minutes to complete these on-line measures.

You have until midnight on Sunday, February 15th, to complete this phase. A reminder email will be sent to you when there are 36 hours left in your participation window of time if you have not yet completed this phase of the study.

**Voluntary Participation:** Your participation in this study is completely voluntary. Although you may omit responses to any items you do not wish to answer and you will still receive two (2) research credits, it would be most helpful to our research if you respond to all statements.

**Confidentiality:** All answers will be kept completely confidential so please respond as honestly as possible. Any information you provide will be stored on the encrypted and password protected site Qualtrics and on password-protected computers, contained in locked offices, affiliated with Dr Johnson's lab. Only the PI, her supervisor, and other authorized lab personnel (e.g., research assistants) will have access to your data. Once all data for this research project has been collected and research credits assigned, a code will be assigned to your data and all identifying information stripped from the data and deleted. This will render the data completely anonymous. We estimate

we will do this by 03/15. At this point, the data will not be kept under lock and key any further and may be shared with other members of the research team as well as other investigators. This anonymous data will be stored in paper form for up to 5 years post-publication of the results, and for an indefinite period in electronic form. Results from this study will be included in Karen O'Brien's PhD thesis. It may also be disseminated through presentations at scholarly conferences and through publication in academic journals. *At no time will individual responses be reported.*

The University of Manitoba may look at your research records to see that the research is being done in a safe and proper way.

**Risks and discomforts:** There are no expected risks for participation in this study, beyond those that might be expected during the course of everyday life.

**Benefit:** There may or may not be direct benefit to you from participating in this study. We hope that the information learned in this research project will contribute to creating an intervention to lessen the negative effects of social phobia during social interactions.

**Feedback and Study Results:** Once data collection is complete (estimated to be mid-February, 2015) you will be emailed a written debriefing that will describe the psychological interest of the research in more detail. You may also contact Karen (see above) for a verbal debrief at that time. The results of this study should be available by 05/15. If you would like to receive a summary of the research results, please follow the link at the end of this on-line study. This link will redirect you to a site where you can provide your name and contact information in a file which will be kept completely separate from your experimental data.

**Questions:** If you have any questions about this research, feel free to email or phone Karen O'Brien (see above). This research has been approved by the Psychology/Sociology Research Ethics Board at the University of Manitoba. If you have any concerns or complaints about this project you may contact the Human Ethics Secretariat at 204-474-7122, or by e-mail at Margaret\_Bowman@umanitoba.ca.

**Statement of Consent:** By clicking “Yes, I consent” (at the bottom of this page) you indicate that you have understood to your satisfaction the information regarding participation in the research project and agree to participate as a subject. In no way does this waive your legal rights nor release the researchers, sponsors, or involved institutions from their legal and professional responsibilities. You are free to withdraw from the study at any time, and /or refrain from answering any questions you prefer to omit, without prejudice or consequence. If you wish to withdraw, simply close the browser window at any time. Your continued participation should be as informed as your initial consent, so you should feel free to ask for clarification or new information throughout your participation .

*We strongly encourage you to save or print a copy of this consent form now for your records, as it will not be available later.*

If you do not wish to participate in this study right now, please close your web browser. You may return to participate at a later date and time (remember, you have until midnight on **Sunday, February 15, 2015** to complete this phase). Thank you for considering participating.

< Yes, I consent > (proceed to survey)

<No, I do not consent> (exit)



## Appendix R

Reducing Stress Responses - Debrief

(Principal Researcher: Karen O'Brien; Research Supervisor: Dr. Edward Johnson)

Thank you for your participation in the Reducing Stress Responses study. Most of the data for this study was collected from September to December, 2013. You participated in a supplementary study that was designed to explain the patterns observed in last fall's data collection.

Below is a description of the rationale and design of the original research project under the heading "**2013 Original Data Collection.**" If you are interested only in the design and rationale of the supplementary study in which you participated, please go immediately to page two under the heading "**2014 Supplementary Data Collection.**"

**2013 Original Data Collection**

The primary aim of the Reducing Stress Responses study is to examine whether self-affirming writing will lessen the negative effects of social stress on those who report some level of social phobia. In particular, the hope is that self-affirming writing will lessen the avoidance of social interaction that is typical of those who have social phobia. This is important because one of the keys to treating social phobia is to engage in social interactions. Something that makes that social interaction less distressing would be helpful.

Previous research suggests that self-affirming writing reduces the threat in otherwise psychologically self-threatening situations. Engaging in self-affirming writing has been found to reduce worry about social rejection, defensive responding to health information, and to result in sustained improvement in social behaviour of insecure individuals. Research has also provided

some evidence that the effect of self-affirmation is carried, at least in part, by moving individuals to a more abstract, values-based way of perceiving themselves.

The Reducing Stress Responses study is designed to test the ability of self-affirming writing to a) reduce the negative impact of the threat experienced by university students who reported moderate or high levels of symptoms associated with social phobia when faced with a socially stressful task and b) to increase the degree of social interaction for these students. The socially stressful task included both speech and mental arithmetic components in order to tap into both the social and performance fears of generalized social phobia. Behavioral outcomes include observer ratings of participant warmth and eye contact during the social stress task, ability to self-regulate measured by whether recommended details are included in the speech and by the number reached on the mental math task, and whether in-person or on-line debriefing was chosen. Participants' preference for describing behaviours in an abstract or concrete manner (called "level of construal") was also measured several times during the study to see if this level of construal is what is carrying the effect of self-affirming writing.

Although the behavioral outcomes were directly relevant for evaluating treatment effects, a number of other outcomes were also measured in order to more fully understand the effects of self-affirmation. To examine if self-affirmation had any effect on participants' perceptions of the risk of social engagement, expected levels of stress and avoidance will be compared. Salivary cortisol levels were measured to see if self-affirmation will have any effect on this physiological response, both in terms of how high it rose and how long it took to start to decline to normal. As well, in order to examine if self-affirmation will have a positive behavioral benefit one-month later for those with social phobia, follow-up self-reports of level of social engagement were collected.

**2014 Supplementary Data Collection (the study in which *you* participated)**

The supplementary study, in which you participated this fall, provided data as to how students' self-perceived anxiety, stress, and level of construal (described above in the 2013 data collection section) varied simply as a result of the passage of time from start to end of the Fall term. All data was collected on-line using Qualtrics. Just as in the original study, during Phase 2 participants were randomly assigned to either a self-affirming or a control writing condition (described above in the 2013 data collection section) in order to test the hypothesis that self-affirming writing would reduce stress and anxiety ratings compared to controls. Level of construal was also tracked over all three phases of the study to examine how it varied as a function of the passage of time.

We thank you sincerely for your participation in our study. If you have any further questions, please contact Karen O'Brien at 204-XXX-XXXX or xxxxxxx@myumanitoba.ca . We expect to have a summary of the results of this study to send to interested participants by 05/15.