

Self-Control and Engagement with Self-Help for Social Anxiety

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### **Abstract**

Cognitive behavioural treatment (CBT) has been shown to be efficacious for social anxiety disorder. Nevertheless, not all participants improve. Evidence suggests the self-control is a malleable ability with potential for practical applications in treatment. The aim of the current study is to examine a role for self-control in treatment and the impact of a brief self-control intervention on engagement with a self-help CBT exercise for social anxiety. 31 undergraduate participants, who volunteered on the basis that they would like to decrease their social anxiety, were randomly allocated to receive either a brief self-control intervention addressing sleep, diet or exercise or to monitor their behaviour in relation to similar activities over a two week-period. All participants were then provided with a chapter from a self-help book for social anxiety describing cognitive challenging of unhelpful thoughts. Participants reported how often they engaged with the exercise. Self-control was not correlated with increased engagement and the self-control intervention did not increase self-control or improve engagement with the self-help exercise. The findings suggest that self-control is not associated with CBT treatment via the mechanisms examined in the current study.

### **Personal Declaration**

The current work has not been submitted for a higher degree to any other university or institution. I have indicated the sources of my information within the text. I declare that to the best of my knowledge the original works included in the current thesis are my own. Ethics Committee approval was obtained for the current study (reference number 5201500079)

A handwritten signature in black ink, appearing to read 'JB Watson'.

Jessie Burns Watson

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## Self-Control and Engagement with Self-Help for Social Anxiety

### 1.1 Scope of research

Self-control is defined as the ability to alter impulses, thoughts, and behaviour towards consistently valued goals (Duckworth, Gendler, & Gross, 2014). It has been shown to be a useful ability that can be improved with training (Denson, Capper, Oaten, Friese, & Schofield, 2011; Gailliot & Baumeister, 2007; Oaten & Cheng, 2006, 2007). The current paper is concerned with examining possible practical applications for self-control in treatment. In longitudinal studies, high scores on measures of self-control have been found to be predictive of better mental and physical health, stronger relationships, and higher income (Mischel et al., 2011; Moffitt et al., 2011; Tangney, Baumeister, & Boone, 2004). Training in self-control has been shown to have generalised effects across a person's cognitive and behavioural repertoire and has been associated with improved scores on measures of self-control such as task persistence and aggression when provoked. Participants also self-reported improved diet, exercise, financial management and improved emotional regulation after self-control training (Denson et al., 2011; Gailliot, Plant, Butz, & Baumeister, 2007; Oaten & Cheng, 2006). While Strayhorn (2002) hypothesised about the importance of self-control in treatment and Simons, Lustman, Wetzel, and Murphy (1985) found an association between self-control and treatment outcome. There is a paucity of research that explores the role of self-control in treatment.

Self-control may be especially important for Cognitive Behavioural Therapy (CBT) for Social Anxiety Disorder (SAD). For example, during CBT for SAD participants are asked to seek experience with social situations that provoke anxiety, situations which people with SAD typically avoid (Goldin et al., 2012). Participants are also required to alter habitual patterns of thought, engaging in exercises which challenge thought patterns that are responsible for promoting anxiety. Participants are required to use their self-control to engage

with these CBT exercises, altering the impulse to avoid treatment challenges. The more frequently treatment participants apply self-control and engage with the CBT exercises, the better the treatment outcome is likely to be (Kazantzis, Whittington, & Dattilio, 2010; Mausbach, Moore, Roesch, Cardenas, & Patterson, 2010).

The current research will examine whether individual differences in self-control are related to engagement with CBT for SAD. In addition, building on research that has shown that self-control can be improved with training (Denson et al., 2011; Gailliot & Baumeister, 2007; Oaten & Cheng, 2006, 2007), the current research also examines whether a self-control training intervention can increase self-control and engagement with CBT for SAD. The introduction to the current research will begin by describing the specific focus for the current research into self-control: SAD, CBT, and treatment engagement. Then, the introduction will explore how self-control may affect engagement with CBT and will use current models and empirical findings about self-control to guide development of a self-control intervention.

## **1.2 SAD and the effectiveness of CBT**

SAD is defined as a fear of social and performance situations due to an expectation that one will be negatively evaluated (American Psychiatric Association, 2013). People with SAD avoid more lifestyle, relationship, and career opportunities than people with normative levels of social anxiety (De Castella et al., 2015) and have a significantly reduced quality of life (Heimberg, 2002). Social anxiety occurs across a spectrum, increasing in the severity of the symptoms experienced and the impact on functioning from normative levels of social anxiety to SAD (Rapee & Heimberg, 1997). CBT has been shown to effectively reduce anxiety across the spectrum (Heimberg, 2002). Meta-analyses of CBT show that CBT generates consistent improvements in people with SAD across numerous samples and that those improvements are maintained long term (Butler, Chapman, Forman, & Beck, 2006;

Hofmann & Smits, 2008; Wersebe, Sijbrandij, & Cuijpers, 2013). CBT has also been shown to be effective in the form of bibliotherapy (self-help treatment with the assistance of a book) (Carlbring, Furmark, Steczko, Ekselius, & Andersson, 2006; Rapee, Abbott, Baillie, & Gaston, 2007).

Regardless of the relative success of CBT, the treatment still requires improvement. While most people who receive CBT for SAD reduce their social anxiety, many do not reduce anxiety to the levels of anxiety found in a normative sample (Otto et al., 2000; Rapee et al., 2007). Quality of life is significantly improved by the treatment but participants also rarely reach the quality of life scores of those from a normative sample (Heimberg, 2002). For example, in a study by (Rapee et al., 2007), while there was a significant decrease in social anxiety severity from pre- to post-treatment, there was still a significant majority of participants (around 80%) who met diagnostic criteria after treatment. CBT researchers are constantly striving to improve the treatment process. To this end, modifiable factors associated with treatment outcome are important.

### **1.3 CBT and engagement**

One of the factors examined in research aimed at improving treatment outcome is engagement with treatment exercises. Engaging in therapy exercises outside the therapy sessions, or homework, is a hallmark of CBT (Kazantzis et al., 2010). Homework allows the participant the chance to challenge their anxiety provoking cognitions, habituate to the anxiety provoking stimuli, practice using CBT skills for managing the anxiety, and assists the participant in generalising the skills to the relevant areas in their life (Goldin et al., 2012). Evidence for the association between engagement (operationalised as homework compliance) and treatment outcome comes from two large meta-analyses that demonstrated a small to

medium effect of engagement on treatment outcome such that more engagement is associated with improved outcome (Kazantzis et al., 2010; Mausbach et al., 2010).

An area in which engagement and its relationship with treatment outcome is particularly important is self-help treatment delivery formats, where treatment is delivered either via the internet or via a self-help book (bibliotherapy) without the guidance of a therapist. It might be speculated that self-help will only improve outcomes if the client engages with the exercises contained in the self-help materials. Two studies have examined the efficacy of self-help CBT for SAD via bibliotherapy. Rapee et al. (2007) conducted a randomised controlled trial examining the efficacy of pure self-help and therapist-augmented self-help compared to a wait-list control group. They found that fewer participants met diagnostic criteria in the self-help conditions than in the wait-list control group at post-treatment. Further, Rapee et al. (2007) found that the number of chapters read in the self-help book (engagement) was positively associated with improvement in social anxiety severity. Similarly, Furmark et al. (2009) examined the efficacy of unguided CBT self-help (either via the internet or via bibliotherapy) for SAD and found that both the internet based program and bibliotherapy were significantly superior to wait-list control on change in measures of social anxiety. Again, there was a significant (albeit modest) relationship between engagement (operationalised as the number of self-help modules completed) and change scores on the social anxiety measures at post-treatment. Thus, it appears that enhancing engagement in CBT for SAD has the potential to improve treatment outcomes whether the treatment is delivered by a therapist or in a self-help format.

#### **1.4 Self-control, SAD, and CBT engagement**

Engagement with treatment activities demands time, mental effort, and, in cases like CBT for SAD, engagement requires participants to regularly challenge habitual thought

patterns and seek out anxiety provoking situations (Heimberg, 2002). During CBT for SAD participants are encouraged to feel anxiety, to endure through situations people with SAD are known to systematically avoid (De Castella et al., 2015). Engaging with CBT for people with SAD is likely to be challenging and effortful, so much so that treatment participants will often use subtle ways to avoid the feared situation (such as distracting themselves) during exposure exercises (Heimberg, 2002). Factors which assist people to engage regardless of these difficulties are likely to be beneficial to treatment.

By definition, people who have high levels of self-control will be able to avoid immediate more salient temptations (that is, the temptation to avoid anxiety provoking situations or avoid changing thought patterns) in favour of reaching the more distal (and therefore less salient) but more consistently valued goal (that is, reducing social anxiety in the longer term) (Duckworth et al., 2014; Inzlicht & Schmeichel, 2012). This thesis will examine whether self-control is related to engagement with CBT exercises and, further, whether improving self-control can enhance engagement. The following sections of this paper will explore existing research on self-control. The current models of self-control suggest that self-control has limitations which could theoretically influence engagement, that those limitations can be improved with training, and that there are numerous methods for manipulating self-control. Each model or set of empirical findings will be explained in detail, followed by their implications for the current research and development of a self-control intervention.

### **1.5 The Strength Model of Self-Control**

A prominent model of self-control is the Strength Model of Self-Control (Baumeister, Bratslavsky, Muraven, & Tice, 1998). The model states that self-control uses a limited resource that can be temporarily exhausted by use. Reduction in self-controlled behaviour after an act of self-control is commonly referred to as *ego-depletion*. The type of limited

resource responsible for ego-depletion and how this resource interacts with self-control is still being debated. One argument is that the limited resource is glucose and our body has a preference for conserving it and hence will put limits on energy expensive cognitions required for self-control (Gailliot, Baumeister, et al., 2007). However subsequent studies have provided substantial evidence which refutes a direct relationship between self-control and glucose (Beedie and Lane, 2012; Kurzban, 2009; Molden et al., 2012). While the mechanism behind ego-depletion is still a contentious issue the occurrence of ego-depletion has been demonstrated. A consistent finding is that there is a reduction in self-controlled behaviour that occurs directly after an initial act of self-control. This pattern has been shown using a wide range of behaviours: controlled eating, altering outward expressions of emotions, altering automated behaviours, sexual responses, persistence at a difficult task, the expression of pro-infidelity attitudes, and anti-social responding (Baumeister et al., 1998; Eli J Finkel & Campbell, 2001; Eli J. Finkel, DeWall, Slotter, Oaten, & Foshee, 2009; Gailliot & Baumeister, 2007; Gailliot, Baumeister, et al., 2007; Vohs et al., 2014)

A typical study demonstrating ego-depletion involves a sequence of self-controlled acts. In one common design participants in the experimental group are asked to behave in a way that requires self-control, and then all participants are tested on a secondary task that also requires self-control. The experimental group's performance is then compared to a control group (who did not have to apply self-control previously). For example, in the seminal study by (Baumeister et al., 1998) all participants fasted and then only the participants in the experimental group were asked to avoid eating cookies that were placed in front of them. All participants were then asked to solve an impossible task. The time that the experimental group persisted with the task was compared to two control groups: people who were allowed to eat the cookies and others who had no food placed in front of them (but still fasted). Time spent on the impossible task was not significantly different for participants who did not resist

temptation (those who ate the cookies and those in the no food condition), but the participants who had to resist the cookies spent a significantly smaller amount of time on the impossible task than those in the control groups. The occurrence of ego depletion has been demonstrated by a large body of research spanning nearly two decades supporting the idea that self-control can be temporarily exhausted by use, see Hagger, Wood, Stiff, and Chatzisarantis (2010) for a review.

The Strength Model of Self-Control (Baumeister, Bratslavsky, Muraven, & Tice, 1998) also hypothesises that self-control is relatively stable; that a person's typical pattern of ego-depletion, (that is, how sensitive people are to ego-depletion, which will result in a tendency to behave in a more or less self-controlled manner) can stay relatively constant across their lifespan. The stability of self-control is supported by research findings. Large scale longitudinal studies have found that scores on measures of self-control at the age of 3 and 4 can predict measures of self-control once participants reach adolescence and adulthood (Eigsti et al., 2006; Mischel et al., 2011; Moffitt et al., 2011). However some research does suggest susceptibility to ego-depletion is not as stable as once suggested. One example of such a study showed that a person's susceptibility to ego-depletion can be reduced with a situational variable: motivation to engage self-control (Muraven & Slessareva, 2003). Participants in the study who were given motivation, showed reduced susceptibility to ego-depletion. Another key premise of the Strength Model of Self-Control is that self-control is like physical strength; while it is relatively stable, it can be improved with training. The Strength Model of Self-Control does not explain why training reduces susceptibility to ego-depletion other than to allude to a similarity to strength training (suggesting that the more you use mental physiology for self-control, the more the physiology will change to accommodate that action). It is a limitation of the Strength Model of Self-Control that sometimes it appears to be more of a metaphor than a working model.

While the Strength Model of Self-Control does not explain how training improves self-control, the model's predictions appear to be correct; that is, there is evidence that supports the training effect on self-control. Findings from studies using self-control training interventions, suggests that training can have a significant effect on self-control, reducing the level of ego-depletion participants experience after acts of self-control. While diverse training behaviours have been used in self-control intervention studies, consistent with the Strength Model of Self-Control, the common element to all the training programs is the request to use as much effort as possible on the self-control training tasks, suggesting it is the consistent self-control effort which improves self-control. For example, Oaten and Cheng (2006) tested the effects of self-control training (an exercise program) on self-control performance in a visual tracking task. The self-control training required participants to engage with an exercise program for four weeks. Before and after self-control training, participants' self-control was tested using a visual tracking task where participants had to continuously watch three objects that moved around a computer screen and identify their positions at the end of the task. In order to successfully track the objects, participants had to resist the urge to look at a humorous video playing on the same screen and focus on the object. Thus, in order to perform well on the visual tracking task, participants needed to engage self-control; that is, they had to alter their impulses to view the distracting video and focus on the task at hand. After the self-control training (the exercise program) period participants showed significant improvement on the visual tracking task compared to a control group. Participants also reported significant improvements in self-control in relation to consumption of cigarettes, alcohol and junk food, financial regulation, losing their temper, study behaviour, and daily chores suggesting the self-control improvement generalised across the person's behaviours. Oaten and Cheng (2006, 2007) replicated their findings using different training behaviours such as financial management and study behaviour. Thus, there



is support for the idea that training self-control using one task, can improve self-control on a number of other tasks.

Change in self-control (facilitated by training) can occur relatively quickly. Studies have found a significant improvement in self-control after two weeks of training (Denson et al., 2011; Gailliot, Plant, et al., 2007). In the Gailliot, Plant, et al. (2007) study, experimental group participants were asked to control their habitual way of speaking for two weeks. After the two week period the experimental group completed a significantly larger number of anagrams after a self-control fatigue task (a written thought suppression task, where people were forced to avoid thinking in stereotypes) than they had two weeks prior. The control group showed the same pattern of fatigue as they had two weeks earlier. Similarly, in a study by Denson et al. (2011), participants in the experimental group used their non-dominant hand for two weeks. After the two week period participants showed a significant reduction in aggressive responses to provocation.

Taken together, research based on the Strength Model of Self-Control has shown that self-control can suffer from ego-depletion and that susceptibility to ego-depletion can be reduced with training. Additionally the research suggests that consistent effort directed towards self-control can improve scores on measures of self-control. The research has also shown that training in self-control can have a positive effect on a wide range of behaviours, and that trained improvements in self-control can generalise across a person's behavioural repertoire.

Relevant to the current research, ego-depletion may be a limiting factor for engagement with treatment where engagement is effortful and requires self-control. That is, once people have used their self-control to engage with treatment (or to engage with other activities which require self-control), they may experience ego-depletion which could act to

reduce their future engagement with treatment. Additionally, the success of the interventions suggests that a self-control intervention could improve self-control. Furthermore evidence of self-control training generalisation suggests that improvements in self-control could generalise to engagement with self-help, even if the self-control training behaviour is widely different to the engagement exercise. Thus, preparation for CBT in a self-control training program need not be related to the CBT exercises. Additionally the findings support the Strength Model of Self-Control's assertions that it is the consistent application of effort into self-control that improves self-control. The type of self-control training behaviour is seen as arbitrary. The model does not make recommendations in regards to the types of behaviours people should use to train their self-control. However, other the self-control findings recommend some behavioural factors which could be useful targets for self-control effort. These findings will be explored in the next section.

### **1.6 Factors that are important for self-control**

According to National Health and Medical Research Council [NHMRC] (2013), a healthy diet involves eating habits which avoid large peaks or troughs in glucose levels, but instead provide a consistent supply of energy sourced from a large variety of fruit, vegetables, protein, and low processed grains. Evidence suggests diets of this description, more specifically the steady supply of energy, could facilitate more consistent self-control (Benton, Maconie, & Williams, 2007; Kaplan, Greenwood, Winocur, & Wolever, 2000). The types of executive function that are required for self-controlled behaviour have been evidenced to require a steady supply of energy (Kaplan et al., 2000; Mahoney, Taylor, Kanarek, & Samuel, 2005; Papanikolaou, Palmer, Binns, Jenkins, & Greenwood, 2006), and self-controlled behaviour has been shown to be impaired when participants' glucose levels are predicted to drop (based on the glycaemic index of the food participants had consumed) (Benton et al., 2007). Healthy diets with a strong emphasis of low glycaemic index foods (which supply a

slow and steady amount of energy) could be important when attempting to improve self-control.

Another factor known to increase self-control is exercise. For example, in the study by Oaten and Cheng (2006) previously sedentary participants who engaged with an exercise program showed improved performance on a self-control task and self-reported improved self-control in relation to other behaviours such as decreased impulse spending, overspending, watching television instead of study, spending time with friends instead of study and procrastination, keeping commitments, doing their chores in a timely fashion, and emotional regulation. There are well-known limitations associated with self-report and hence some caution should be used in interpreting the self-reported findings in Oaten and Cheng's (2006) research. However the self-control visual tracking task (described in detail on page 8) utilised does provide some objective evidence of an improvement in self-control which supports the participant's self-reports. In the study by Hillman et al. (2006), participants engaged with a task which required participants to respond to one small aspect of a visual display and ignore other stimuli. In order to do well on the task participants had to use self-control and suppress their response to the other stimuli which could distract and encourage incorrect answers. Participants of all ages who were physically active performed better on the task. Another study found that an aerobic exercise intervention significantly improved participants performance on a frontal lobe task which required self-control (Colcombe et al., 2004), while the control group (who only engaged with a stretching and toning routine) showed no significant improvement in performance.

Sleep is another important factor associated with self-control. Sleep deprivation has been associated with a range of self-control issues such as reduced emotional control (Gruber & Cassoff, 2014; Yoo, Gujar, Hu, Jolesz, & Walker, 2007), reduced executive inhibitory control (Rossa, Smith, Allan, & Sullivan, 2014), attention disturbances (Alfarra, Fins, Chayo,

& Tartar, 2015), and difficulty controlling intrusive thoughts (Schubert & Coles, 2014). A study by Britton et al. (2010) used a sleep intervention to assist adolescents in their recovery from substance abuse. They found that after the intervention, increased sleep duration was associated with reduced distress, relapse, and other substance abuse related issues. While some of these studies lack strong statistical power they are corroborated by other more powerful studies such as a large study of Finnish adolescents that found that poor sleep (defined as less than 7 hours a night) was associated with delinquency even after controlling for a range of psychopathic and demographic factors (Backman et al., 2015). That sleep is associated with self-control is not surprising in light of neurological studies that have found sleep deprivation results in a loss of functional connectivity in the frontal lobe, an area shown to be important for self-controlled behaviour (Verweij et al., 2014).

The Strength Model of Self-Control and corroborating evidence suggests that regular effortful behaviour can improve self-control <sup>1</sup>(Baumeister et al., 1998; Denson et al., 2011; Oaten & Cheng, 2006, 2007). If participants have difficulties in maintaining healthy habits in regards to the above mentioned factors they may show reduced self-control compared to people who regulate these behaviours well. Applying effortful self-control to regulating one of these factors (which ever factor the participant has the most trouble with) may be useful for producing an efficacious improvement in self-control. If participants already have good sleeping, eating, and exercise habits, the habits may still be improved but it is expected to have less of an effect on self-control. For example, if someone regularly gets over 7 hours of sleep every night, it is not expected that sleeping more will improve their self-control

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<sup>1</sup> Regular effort in self-control is only one way to improve self-control. Strategic self-control is another method which has been utilised successfully and which has been correlated with trait self-control. Strategic self-control involves a person creating habits and using strategies which assist them to avoid temptation all together. This is discussed further in section 1.8. (See also De Ridder, Lensvelt-Mulders, Finkenauer, Stok & Baumeister, 2012; Hofmann et al., 2011)

(Backman et al., 2015). Hence, allowing the participants to choose the most problematic behaviour may be an important feature of an effective self-control training intervention.

### **1.7 The Process Model of Ego Depletion**

In the Process Model of Ego Depletion, Inzlicht and Schmeichel (2012) propose that once a person has engaged in an act of self-control, a shift occurs in motivation and attention. After self-controlled acts, people become more motivated to seek immediate gratification and less motivated to activate self-control. Additionally, the model proposes that after self-control acts, attention shifts to cues that signal immediate gratification, and away from the conflict immediate gratification may have with long term goals. Inzlicht and Schmeichel (2012) postulate that it is these cognitive changes which create ego depletion, rather than the simple exhaustion of a limited resource.

There is evidence that motivation is an important factor in self-controlled behaviour; that is, sufficient motivation can eliminate ego-depletion. In a study by Muraven and Slessareva (2003) participants were given a speaking task where they were either allowed to speak freely (no ego-depletion condition) or where they were asked to speak but not to say “um” or “er” (ego-depletion condition). Then participants were given a difficult task to practice (rolling a ball around a maze while avoiding holes where the ball could fall through) and were told they could practice with the task for as long as they wanted and after practice they would be tested on their performance. Some participants were either told that practice with the impossible task would improve performance during the test phase (motivation condition) and others were told that the task was so hard that practice would make no difference to performance during the test. Ego-depleted participants who were told that practice would not improve their performance on the next task persisted with practice for significantly shorter periods of time than any of the other three groups (ego-depletion and

motivation; no ego-depletion and motivation; and no ego-depletion with no motivation).

Additionally ego-depletion only influenced the duration participants persisted at the difficult task when no motivation was provided; when motivated, participants in the ego-depleted group and no ego-depletion group did equally well.

Inzlicht and Gutsell (2007) found neurological evidence which supports the proposal by Inzlicht and Schmeichel (2012) that ego-depletion is associated with attention. The researchers made EEG recordings of participant's brain activity using an electrode cap. Initially participants either suppressed their emotional responses to a sad video (ego-depletion condition) or watched the sad video carefully (control condition). Following the video, all participants engaged with a stoop task. In the stroop task (Stroop, 1935) the words *red* and *green* flashed on the screen, the words were coloured either red or green. In the congruent items the colour and meaning of the word matched, in incongruent tasks they did not. Participants were requested to report the visual colour of word only (not the semantic meaning). People naturally respond to the meaning of a word before its visual appearance and hence, on incongruent trials would have to suppress the urge to report the semantic meaning in order to provide the correct response. As expected, participants who were in the ego-depletion condition performed less well on the stroop task. Interestingly the pattern of ego-depletion was correlated with reduced activity in the anterior cingulate cortex, part of the brain associated with attending to *self-control conflicts* (defined as recognising when an impulse conflicts with an overarching goal) (Botvinick, Braver, Barch, Carter, & Cohen, 2001). The study suggests that ego-depletion may occur as a result of changes in attention where people stop attending to whether their desired behaviours (temptation) conflict with their self-control goals. Other studies suggest that this attention deficit can be changed, that self-control can be improved by regularly directing participant's attention to whether their behaviour conformed with or diverges from their self-control goals - (Oettingen, 2012).

The Process Model of Ego Depletion provides important and interesting insights into the cognitions involved in ego-depletion and it represents progress in the self-control literature. The model and supporting evidence provide insight which suggests useful methods for manipulating self-control. The findings suggests that self-control behaviours will be more successful when there are intervention factors that motivate the participants and that direct participants' attention back to whether their behaviour conflicts with planned self-control goals. This information was used when designing the self-control intervention in the current study.

### **1.8 The Process Model of Self-Control**

The Process Model of Self-Control<sup>2</sup> Duckworth et al. (2014) addresses areas of self-control that are neglected by the previously mentioned models and assist in providing a more complete understanding of the self-control concept. The main premise of the Process Model of Self-Control is that self-control is a long sequential process with five stages and that, if people use effective strategies at each stage, they can behave in a self-controlled manner more easily, they state that if people use good strategies to avoid or reduce the effect of temptation, they can avoid ego-depletion all together. Duckworth et al. (2014) acknowledge that self-control is often executed in a way where people mentally resist the temptation at the moment of temptation with a felt sense of effort, as described by the Strength Model of Self-Control and Process Model of Ego-Depletion. However, they maintain that some types of self-control occur dispassionately in the form of strategic behaviour before a person is faced with temptation. Duckworth and associate's (2014) ideas are similar to concepts proposed by De Ridder, Lensvelt-Mulders, Finkenauer, & Baumeister (2012) and Hofmann, Baumeister,

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<sup>2</sup> The model by Duckworth et al. (2014) is aimed at children. However the studies that she uses to substantiate her claims are often executed using adult populations. Additionally in the studies where children are the participants, the findings she mentions were often replicated in adult populations. Hence it appears that the model is applicable to adults as well.

Förster, & Vohs (2012) and follows a niche of self-control research which focuses less on resistance of temptation and more on the strategies which people use to reduce temptation in their lives.

The first stage of self-control, *situation selection*, is the most distal to the temptation. At this stage in the self-control process self-control strategies involve avoiding situations where temptations (which conflict with long term goals) are present. For example, if a person is trying to save money but has an interest in cars that makes the purchase of car related consumables difficult to resist, they may avoid places where such temptations are placed in front of them, such as auto-part stores or websites. By avoiding these triggers they are less tempted and the person may never feel a need to resist. This could avoid ego-depletion completely while still facilitating self-control. By being selective about the situations, and therefore cognitive cues, that surround them, a person can make self-controlled behaviour more likely. A limitation of this strategy is that it is difficult to implement when people have little choice about where they are situated.

The second stage involves *situational modification*. During this stage, self-control involves changing things about the situation to make the temptation less attractive or self-control more strongly associated with present cues. Duckworth et al. (2014) suggest one highly successful situational modification strategy, pre-committing to a goal. Pre-commitments represented by implementation intention strategies (where a person picks a goal and an inevitable cue to enact that behaviour) can make self-controlled behaviour significantly more likely (Gollwitzer, 1999; Schwartz et al., 2014). A meta-analysis of 94 independent studies found that implementation intentions had a large to medium positive effect on goal achievement ( $d = .65$ ) (Gollwitzer & Sheeran, 2006). Another situational modification recommended by Duckworth et al. (2014) is to pair the self-control behaviour with reward. Duckworth et al. (2014) suggest that the types of reward most effective are



those that are self-administered (for example, self-praise or ticking an item off a list of things to do). The importance of reward is supported by a systematic review of the self-control literature by Strayhorn (2002) as well as more recent studies which examined pairing behaviours with reward (Casey, 2015; Inzlicht, Schmeichel, & Macrae, 2014).

The Process Model of Self-Control concurs with the Process Model of Ego-depletion by placing importance on attentional focus in the next stage in the process, *attentional deployment*. At this stage, self-control facilitation involves thinking about the temptation in a way that makes it less tempting and thinks about the long term goals in a way that make the long term goal more salient and appealing. By choosing to think about long term goals regularly people can increase the frequency with which they execute self-controlled behaviours aimed at facilitating such goals (Kavanagh, Andrade, & May, 2005). Duckworth et al. (2014) recommend self-monitoring in relation to pre-committed goals to facilitate goal salience. There is evidence to support this recommendation. Self-monitoring has been associated with increased dental hygiene practices (Suresh, Jones, Newton, & Asimakopoulou, 2012), more successful weight reduction (Baker & Kirschenbaum, 1993; Lynch & Bisogni, 2012), improved academic habits, grade point average, and goal achievement in people diagnosed with ADHD (Scheithauer & Kelley, 2014). Oettingen (2012) also presents significant support for self-monitoring in their review of goal pursuit and self-regulation. However they highlight the importance of pre-commitment in the form of *established* realistic goals, stating that if a person does not have pre-committed, realistic goals they will receive less benefit from monitoring. Theoretically it is logical that established goals are an important element of self-monitoring. Self-monitoring encourages self-control by highlighting differences between current behaviour and goal behaviour (Bandura, 1991). If there is no goal to compare with, the mechanism is disabled.

The final stage is *response modulation*, when the person avoids the temptation by force of will and is the part of self-control most completely described by the Strength Model of Self-Control. Once the temptation is in front of the person and the person is focused on the temptation, a person will have to rely on effortful self-control. Here, Duckworth et al. (2014) concur with the Strength Model of Self-Control, suggesting that self-control “strength” training can be useful for improving performance at this final stage.

Relevant to the current paper, the Process Model of Self-Control predicts that people who use good strategies during the self-control process will be more likely to execute good self-control and engage well with treatment. Findings related to the model presented in Duckworth et al. (2014) suggest that implementation intentions may be useful in a self-control intervention; that is having participants plan realistic self-control training goals and cues to enact the goals. This may help participants to engage more with the self-control intervention as well as give them practice with a useful self-control strategy. The evidence cited by Duckworth et al. (2014) also suggest it is important for participants to monitor their behaviour specifically in relation to realistic pre-selected goals as this will make the self-control goals more salient during the intervention. The Process Model of Self-Control also complements the Strength Model of Self-Control, suggesting that training effortful self-control (where a person resists a temptation with strength of will) can be useful during the final phase of self-control.

### **1.9 Summary of the models**

Together the self-control models present a substantial practical understanding of self-control which could be useful for developing a strong self-control intervention. The findings suggest self-control can be effortful, and that when it is effortful it occurs in a limited fashion. The limiting factor associated with ego depletion is still unclear. Importantly, the evidence

also suggests that self-control can be trained. The Process model of Ego-Depletion provides an account of the types of cognitive experiences associated with ego-depletion, such as shifts in attention and motivation that favour immediately gratifying behaviours. It also cites evidence that suggests a relationship between self-control and attention and motivation where both attention and motivation have been shown to influence self-control. The Process Model of Self-control suggests that if a person activates self-control supporting behaviours and thought processes before being faced with temptation (such as implementation intentions and self-monitoring) they can reduce the requirement for effortful ego-depleting self-control. The Process Model of Self-control also supports the Strength Model of Self-Control in stating that when faced with unavoidable temptation, self-control can be effortful, suffer from ego-depletion, and can be improved with training.

### **1.10 A self-control intervention based on the self-control literature**

A short two-week intervention which involves regular effortful self-controlled behaviour may improve self-control in a generalised fashion which may influence engagement with self-help (Denson et al., 2011; Gailliot, Plant, et al., 2007). Findings in the self-control literature highlight diet, exercise, and sleep as useful behavioural options towards which participants could aim their self-control efforts. Evidence for the Process Model of Self-Control indicates that implementation intentions could be a useful element of a self-control intervention (Gollwitzer, 1999). Hence, once the participants have chosen the behaviour they would like to change, setting some realistic goals for the effortful self-controlled behaviour as well as cues to the behaviour could improve the efficacy of the intervention (Gollwitzer, 1999; Schwartz et al., 2014). The Process Model of Ego-Depletion and the Process Model of Self-Control suggests intervention factors which encourage participants to regularly examine whether their behaviour aligns with their pre-committed, realistic long term intervention goals. Getting participants to regularly attend to their set goals

can be achieved by requesting that participants self-monitor and make daily reports on their goal directed behaviour. Daily reports on goal related behaviour can also focus attention on the internal rewards associated with achieving their goal as the report provides the participants the opportunity to acknowledge their achievement and attend to their success, Duckworth et al. (2014) predicts this will also improve self-controlled behaviour. The use of implementation intention and monitoring strategies during the self-control training could encourage more engagement with the self-control intervention as well as give the participants experience with useful self-control strategies. Participants in the experimental group will be encouraged to use the strategies to engage with the self-help exercise after the self-control training.

The current intervention is different to those included in previous studies as it includes a number of self-control intervention strategies, rather than examining and validating one focussed technique. The aim of the current research is not to prove the efficacy of one individual technique (the strategies were chosen because they had been previously empirically validated), but to create a strong manipulation of self-control so as to examine how changes in self-control influence engagement. Hence, the self-control findings were combined to create a comprehensive self-control intervention which utilises the breadth of current understanding and test it for practical applications.

### **1.11 Summary and aim of the study**

SAD is a debilitating disorder, which is treated with relative success using CBT (Heimberg, 2002). While CBT for SAD is effective (Butler et al., 2006), treatment outcomes could be improved (Otto et al., 2000). One possible way of improving outcomes could be via increasing engagement since participants who engage more are shown to have better outcomes (Kazantzis et al., 2010; Mausbach et al., 2010; Rapee et al., 2007). Engagement

with CBT for SAD is difficult due to the requirement for participants to face their fear, either in exposure exercises or by challenging negative habitual thoughts about social situations (De Castella et al., 2015; Heimberg, 2002). The current research was aimed, firstly, at examining whether self-control was related to engagement with treatment (specifically, a self-help CBT exercise for SAD). It was predicted that high scores on self-control measures would be associated with increased engagement with the self-help exercise. Secondly, based on research that has shown that self-control can be improved with training, the current research was aimed at examining whether training participants in self-control prior to self-help CBT exercises for SAD would increase self-control and improve engagement. Participants were randomly allocated to either receive training in self-control of diet, sleep, or exercise (experimental group) or to monitor behaviour (control group) for a two-week period prior to being given a chapter from a self-help CBT book for SAD. It was predicted that participants in the self-control training condition would increase their scores on self-control measures more than participants in the control group. It was also hypothesised that participants in the experimental group would engage with the self-help exercise more frequently than those in the control group.

## **2 Method**

### **2.1 Participants**

31 students from Macquarie University volunteered to participate in the study. 4 participants withdrew from the study after the first face-to-face session. 27 participants completed the study (22 female; age:  $M = 22$ ,  $SD = 8.80$ ). The sample consisted of first year psychology students who participated for course credit. The majority of participants studied full-time (77%). No participants worked full-time. There was an even distribution across other employment status options (part-time 33%, casual 33%, and unemployed 33%). The

highest level of education for the majority of participants was the high school certificate (74%); the second highest level was a bachelor degree (15%). Random assignment using a random number generator placed 17 (16 female; age:  $M = 20.70$ ,  $s = 5.87$ ) participants in the experimental group and 10 (6 female; age:  $M = 23.41$ ,  $s = 10.18$ ) in the control group.

Participants were recruited using a poster placed on notice boards around Macquarie University, a post on research participation Facebook pages, and a research participation web site that advertised research participation for credit for first year psychology students (Appendix A). All advertisements for the study encouraged participants to participate if they felt some amount of social anxiety and were told they would be given an exercise that has been evidenced to reduce social anxiety. Participants were excluded from the study if they were under 18 or if they were non-English speaking.

## **2.2 Research Design**

The study was a between groups (an experimental and a control group) design. Participants were randomly allocated to the experimental (self-control training) or control (monitoring) condition by using a random number generator to generate a random sequence of zeros and ones corresponding to each condition respectively. A series of 60 random numbers were produced to be assigned to each participant in order as they signed up for the study. The success of the random number generator was then evaluated, checking that an equal number of participants were assigned to each group. The dependent variable of interest was the number of times participants engaged with the self-help exercise. The total participation period was four weeks: a two week self-control training phase and a two week period of engagement with self-help for CBT phase. Participants attended two face-to-face sessions at which they completed relevant measures. At the first face-to-face session participants in the experimental condition were given self-control training intervention

instructions while participants in the control condition were given instruction to monitor their behaviour. A second face-to-face session occurred after the self-control training phase. At the second session all participants received a chapter from a self-help book for social anxiety that describes a method for challenging unhelpful thinking (Rapee, 1998). For the following two weeks, all participants monitored their engagement with the exercise. At the conclusion, participants completed a final online survey.

### 2.3 Materials

See Appendix A for recruitment communications, Appendix B for scales, Appendix C for the information and consent form, and Appendix D for the CBT self-help chapter from *Overcoming Shyness* by Rapee (1998).

*Measure of engagement.* During the self-help phase (the final two weeks), all participants answered two daily questions via text message or online survey. The first question asked participants if they had re-read any of the chapter they had received (answered with a ‘yes’ or ‘no’ response); the second question asked them how many times they had engaged with the self-help exercise since they had last reported (participants replied with a number). Engagement scores were calculated as the total number of times the participants reported that they had engaged with the self-help exercise.

#### *Self-Control Measures*

A behavioural test and self-report scale were used to measure self-control.

*Behavioural test of self-control (BSC).* The behavioural test follows a procedure used in Muraven, Tice, and Baumeister (1998) to test self-control. Participants were given a self-control task (gripping hand grippers for as long as they can) followed by another self-control task (a thought suppression task) followed by a repeat of the initial self-control task (gripping hand grippers for as long as they can). Theoretically the thought suppression task requires

self-control but does not require physical strength and so the participants continue to fatigue their self-control while their physical strength is restored, hence poor performance on the second gripping task will reflect ego-depletion (and therefore self-control) but not fatigue of physical strength. Other measures of behavioural self-control have been used in the past, such as resistance of sugary foods (Imhoff, Schmidt, & Gerstenberg, 2014) or the visual tracking task described by Oaten and Cheng (2006). The current behavioural measure was chosen because it had been previously validated (Baumeister et al., 1998; Muraven et al., 1998) and it was the more practical measure in regards to available materials, time limitations and ethical requirements compared to other measures.

Participants were given hand strengthening grippers and an object (a plastic rectangular cube). They were directed to squeeze the grippers, using their dominant hand, so they held the object between the gripper handles. The participants were directed to squeeze the grippers, holding up the object for as long as they could; resisting the urge to let go of the grippers. The researcher timed how long the participant held the object up, stopping timing once the object fell. Then all participants were given a thought suppression task from Wegner, Schneider, Carter, and White (1987). During the thought suppression task, the participants were asked to avoid thinking of a white bear. They were told if they thought of a white bear they had to mark the paper and then immediately try not to think of a white bear again. The researcher timed the thought suppression task and told the participants they could stop the exercise after 5 minutes. After the thought suppression task, participants repeated the hand-grip exercise. The behavioural self-control score was based on evidence of ego-depletion. This was calculated by subtracting the time taken for the object to drop on the repeat of the hand-grip exercise from the time taken for the object to drop on the initial hand-grip exercise. Positive scores indicate ego-depletion and therefore reduced behavioural self-control.



*Self-control items from International Personality Item Pool Values in Action Scale (SC) (Appendix B) (Goldberg et al., 2006).* The 11 self-control items from the International Personality Item Pool Values in Action Scale (IPIP VAS) were used to measure participants' perceived self-control. The IPIP VAS is designed as a public domain alternative to Values in Action Scale (Peterson & Seligman, 2004) and as such scores on the IPIP VAS strongly correlate with scores on Peterson and Seligman's Values in Action Scale (VAS) (Goldberg et al., 2006). Participants rated how accurate statements (e.g., "I give in to my urges") were for them on a 5 point Likert scale (0 – *very inaccurate*, 4 – *extremely accurate*). It has been demonstrated to be a reliable measure ( $\alpha = .75$ ) (Goldberg et al., 2006). This scale was chosen above other available self-control scales because the scale is a public domain version of a well validated commonly used measure which has been adapted to various nationalities and populations (Park & Peterson, 2006; Park, Peterson, & Seligman, 2006; Peterson, Ruch, Beermann, Park, & Seligman, 2007; Ruch et al., 2010), future researchers will be able to freely access the scale and use it to make equitable comparisons with the current research. In the current study the internal consistency was good ( $\alpha = .840$ ).

#### *Additional measures*

The following measures were included as they were relevant to the research question and may provide additional insight; they could be used to examine validity; and/or so they could be controlled for if required (if scores on the measures differed between groups or the variable was correlated with the dependent variable). They were also included to examine differences between those who completed or withdrew from participation"

#### *Social Anxiety Measures*

*The Social Phobia Scale 6 (SPS-6) and Social Interaction Scale 6 (SAIS-6) (Appendix B) (Peters, Sunderland, Andrews, Rapee, & Mattick, 2012).* These self-report scales are short

forms of the Social Interaction Anxiety Scale (SIAS) and Social Phobia Scale (SPS) (Mattick & Clarke, 1998). The SIAS-6 contains six items that assess severity of social anxiety during social interaction (e.g., “I have difficulty talking with other people”). The SPS-6 contains six items that assess severity of social anxiety in situations where a person may be watched (e.g., “I can feel conspicuous standing in a line”). Respondents state how much they identify with statements on a 5 point Likert scale (0 - *not at all characteristic of me* to 4 – *extremely characteristic or true of me*). The SPS-6 and SIAS-6 were chosen because they burden participants less than other large scale options (Le Blanc et al., 2014) and there is evidence for their better validity relative to other scales (Carleton et al., 2014). The convergent validity of the SPS-6 and SIAS-6 with the original SPS and SIAS scale is very good (Peters et al., 2012). In the current study the internal consistency of SIAS was good ( $\alpha = .773$ ), the internal consistency of SPS was also good ( $\alpha = .886$ ). This measure was included as a potential control factor and to examine differences between those who completed or withdrew from participation.

*Conscientiousness items from International Personality Item Pool version of NEO Personality Inventory (CS) (Goldberg et al., 2006).* Conscientiousness was measured by items from the International Personality Item Pool representation of the Costa and McCrae (1992) NEO Personality Inventory (IPIP NEO PI-R) (Appendix B). It is a 10 item (e.g., “I am always prepared”) self-report scale measuring trait levels of conscientiousness as described by the Five Factor Model (Costa & MacCrae, 1992). Participants rate each item using a 5 point Likert scale to indicate how accurate each statement is of them (0 - *very inaccurate* to 4 – *very accurate*). Conscientiousness is a strongly correlated but separate factor to self-control (Tangney et al., 2004) which can be used to examine construct validity of the measures of self-control used in the current study. This scale was chosen above other available conscientiousness scales because as with the self-control scale, it was a public domain measure

of a previously validated well-known scale (Costa & McCrae, 1992; Piedmont, 2013). The internal consistency has been reported as  $\alpha=.81$  (Goldberg et al., 2006). In the present study internal consistency was good ( $\alpha = .938$ ). This measure was included to examine the validity of self-control measures.

*Psychological Grit (Appendix B) (Duckworth, Peterson, Matthews, & Kelly, 2007) .*

The 12 Item psychological Grit scale was used to measure participants' perseverance and passion for long-term goals (Duckworth et al., 2007). An example of an item includes "I have achieved a goal that took years of work". Participants respond to the scale on a 5 point Likert scale to indicate how much they identify with each statement (0 – *very much like me* to 4 – *not like me at all*). Grit is correlated with self-control (Duckworth & Gross, 2014) and can be used to examine construct validity of the included measures of self-control. The scale has demonstrated predictive and constructive validity and has been reported as having a Cronbach alpha of .85 (Duckworth et al., 2007). In the present study internal reliability was good ( $\alpha = .839$ ). This measure was included to examine the validity of self-control measures.

*The General Self-Efficacy Scale (SES) (Appendix B) (Schwarzer & Jerusalem, 1995).*

This 11-item scale was used to assess the participant's global self-efficacy. Participants rated how much they identified with the statements (e.g., "I am confident that I could deal efficiently with unexpected events") on a 4 point Likert scale (1- *hardly true of me* to 4 – *exactly true of me*). The Cronbach's alpha of the scale is consistently reported as between .76 and .90, with most alpha's sitting above .80 (Schwarzer & Jerusalem, 1995). The scale was chosen because it displayed good construct validity and reliability (Schwarzer & Jerusalem, 1995). In the present study internal consistency was good ( $\alpha = .886$ ). This measure was included as a potential control factor and to examine differences between those who completed or withdrew from participation.

*The Anxiety Change Expectancy Scale (ACES) (Appendix B) (Dozois & Westra, 2005).* The 20 item (e.g., “There is no solution to my anxiety problems”) scale was used to assess participants’ expectation that they can change their anxiety. Participants indicate how much they agree with the statements on a Likert scale (0 - *strongly disagree* to 4 - *strongly agree*). The scale was used because it has demonstrated good convergent and divergent construct validity and shows excellent internal reliability ( $\alpha = .92$ ) (Dozois & Westra, 2005). In the present study internal consistency was good ( $\alpha = .890$ ). This measure was included as a potential control factor and to examine differences between those who completed or withdrew from participation.

*The Importance and Confidence Scale (ICS) (Appendix B) (Buckner & Schmidt, 2009).* The 2 item self-report measure was used to assess participants’ level of motivation in relation to changing their anxiety. It was adapted from the importance and confidence rulers in Miller and Rollnick (2012). Participants indicated how important it was for them to change and how confident they were that they could change on a 10 point scale (1 – *not very important/confident* to 10 - *extremely important/confident*). Evidence of convergent and divergent validity has been demonstrated by (Buckner & Schmidt, 2009; Demmel & Nicolai, 2009). This measure was included as a potential control factor and to examine differences between those who completed or withdrew from participation.

*Confidence in Treatment Scale (CTS) (Appendix B)(Deville & Borkovec, 2000).* The three item scale was used to measure participants’ opinions of the self-help exercise; specifically, whether they believed the exercise would be of use to them. The first item asked the participants to rate how logical they thought the exercise was on a 10-point scale (1 - *not logical at all* to 10 - *extremely logical*). The second item asked the participants to rate how confident they were that the self-help exercise would assist them to reduce their anxiety on a 10-point scale (1- *not confident at all* to 10 - *extremely confident*). The third item asked the

participants to rate how confident they would be in recommending the exercise to a friend on a 10-point scale (1- *not confident at all* to 10 - *extremely confident*). Devilly and Borkovec (2000) report good internal consistency ( $\alpha > .81$ ) and good test-retest reliability for the scale. In the present study internal consistency was good ( $\alpha = .849$ ). This measure was included as a potential control factor and to examine differences between those who completed or withdrew from participation.

### *Manipulation Check*

*Daily survey during the self-control phase: control group.* In order to assess whether participants in the control group were regulating their behaviour in a way that was similar to the experimental group, participants answered two daily questions via text message or online survey during the self-control training phase. First they were asked whether they had set any goals yesterday in regards to their diet, exercise or sleep. Then they were asked to rate how successful they were in achieving those goals on a scale from 1 (*did nothing related to the goal*) to 10 (*achieved everything they had set out to achieve*). They were then asked how difficult it was for them to achieve those goals, on a scale from 1 (*not difficult at all*) to 10 (*extremely difficult*).

*Daily survey during the self-control phase: experimental group.* In order to assess whether participants in the experimental group were complying with the experimental instructions, participants answered two daily questions via a text message or online survey during the self-control training phase. First they were asked to rate how successful they were in achieving their goals on a scale from 1 (*did nothing related to the goal*) to 10 (*achieved everything they had set out to achieve*). They were then asked how difficult it was for them to achieve those goals, on a scale from 1 (*not difficult at all*) to 10 (*extremely difficult*).

*Expectancy for increased engagement (EIE).* Participants in the experimental condition were asked how much they believed the goal related behaviour they were addressing in the self-control training phase (diet, exercise, or sleep) would influence their engagement with the self-help CBT exercise for SAD and participants in the control group were asked how much they believed monitoring their behaviour during the self-control training phase would influence their engagement with the self-help CBT exercise for SAD. Participants rated their expectations on a scale from 0 (*not at all*) to 10 (*it will definitely influence it*).

## **2.4 Procedure**

The procedures were approved by the Macquarie University Human Research Ethics Committee. Participants provided written consent prior to participation. Data collection occurred via individual face-to-face sessions and via an online survey platform (Qualtrics, 2005).

*Face-to-face session one.* Participants completed the hand-grip and thought suppression task (detailed under self-control measures in the materials section on page 24-25) and provided demographic details and completed self-report measures on a computer using the online survey (SPS-6 and SIAS-6, SES, SC, CS, and Grit). Participants were given directions regarding their behaviour over the next two weeks (self-control training phase) consistent with their random allocation to either the experimental or control group.

The participants in the experimental condition were asked to create difficult but achievable goals in relation to one of three main areas of behaviour: diet, sleep, and exercise. Though participants were asked to set tasks with a uniform difficulty level (maximum effort within what they knew was achievable), participants were allowed to choose their own goals as the Strength Model of Self-Control and supporting evidence suggest that it is regular

effort, rather than a specific task that is evidenced to increase self-control (Baumeister, Bratslavsky, Muraven, & Tice, 1998; Denson et al., 2011; Gailliot, Plant, et al., 2007) and Self-Determination Theory suggests that participants will have more success adhering to the self-control intervention if they choose their own goals (Deci & Ryan, 2011). To encourage situational modification, as recommended by Duckworth et al. (2014), the participants were asked to create implementation intentions in regards to these goals, where inevitable cues (e.g., when they woke up in the morning) are linked with a plan to engage with the self-controlled behaviour. Additionally, as recommended by Duckworth et al. (2014) and Ryan and Deci (2000), to assist in highlighting the internal reward associated with goal attainment as well as to increase the salience of the self-control training goals, the participants were told that they would report on their progress in relation to these goals daily via a brief on-line survey delivered via Qualtrics (2005) (the link for which was sent via text message). The following instructions were given to experimental group participants:

“Studies suggest that self-control may positively influence how people engage with a self-help exercise. They also suggest a person’s self-control can be improved in a short period of time with training. I am going to help you plan two weeks of self-control training and we will examine how that training influences your engagement with a self-help exercise. You will be able to choose from three areas of behaviour known to influence self-control, diet, exercise and sleep. You will plan your own goals, with a bit of guidance from me”

Participants then planned their self-control goals and were told about self-control strategies in dialog with the researcher. Once participants finished planning their self-control intervention goals, they were given the following directions:

“We want you to exert as much effort as possible and attempt to practice your self-control, if the goals do not require effort make the goal a little bit harder, it is partially the effort that will train the generalised skill of self-control that could be useful in many other areas of your life”.

At the end of the session participants completed the expectancy for increased engagement measure.

In the control group participants were instructed to monitor their behaviour for the first two weeks using Qualtrics (2005). They were told that the survey measured factors that were expected to influence their engagement with self-control. They were told that they would be sent a link to a survey every day for the two weeks so they could report on their behaviour. At the end of the session participants completed the expectancy for increased engagement measure.

*Face-to-face session two.* Participants completed the behavioural test of self-control and self-report scales (SPS-6 and SIAS-6, SES, CS, SC, GRIT, ACES, and ICS) via a computer using Qualtrics (2005). After completing the measures, all participants were given a copy of the third chapter of *Overcoming Shyness* (Rapee, 1998) (Appendix D) and exercise sheets to fill in at their leisure. The exercise was designed to help people challenge their unhelpful thinking. This book has been shown to be efficacious in the treatment of SAD (Rapee et al., 2007). All participants were given the following instructions:

“This chapter details an exercise evidenced to be useful in reducing social anxiety. We encourage you to read it as soon as possible, and to engage with the exercise as much as possible. Research suggests that the more you engage with the exercise the more likely your social discomfort to be reduced.”



Participants were told they would be sent daily text messages that will ask them questions in relation to engaging with the exercise. Participants in the experimental condition were encouraged to use the self-control strategies they had been taught. They were told to read the chapter when they got home and to set goals in regards to how often they would like to engage. They were also told that they could use the daily report survey provided to them as a tool to monitor their engagement.

*Self-help engagement phase.* For the two weeks following the second face-to-face session, all participants were sent daily text messages which asked participants if they had read the book. Once participants replied they had read the book they were sent a questionnaire containing a scale that assessed their opinion of the exercise (CTS). Following their response to the CTS survey participants received a daily text with a link to a survey which asked them about their daily engagement with the self-help exercise.

*Final survey.* At the end of the self-help engagement phase, participants were sent a text with a link to the final survey, which contained the SPS-6 and SIAS-6 and the SC.

### **3 Results**

Firstly the data was examined to establish sample characteristics, bivariate relationships, check univariate assumptions and randomisation success, examine initial variation between the control and experimental group, and to check for differences between those who completed the study and those who did not. T-tests and Chi-square tests were used to examine differences between conditions (to evaluate randomisation success) as well as differences between participants who completed and withdrew. As no control variables correlated with self-help engagement the relationship between self-control and engagement with the self-help CBT exercise for SAD was examined using a univariate General Linear Model (GLM) procedure.. To establish whether self-control was altered by the self-control

intervention, a repeated measures GLM procedure was used. The only variable that was significantly different between the experimental and control groups was gender, which had no significant influence on the dependent variable,  $t(25) = .669, p = .509$ . Hence an independent groups t-test was used to examine if self-help engagement was different between groups. All analyses were conducted using the Statistical Package for the Social Sciences (SPSS) version 20.0. A Type One error rate of 0.05 was adopted for all analyses and the reported probabilities are two-tailed.

### 3.1 Sample Characteristics

31 undergraduate psychology students at Macquarie University participated in the study. Of the 31 that attended the first session, 27 completed the study. There were 17 participants in the experimental group and 10 in the control group. Sample characteristics are presented in Table 1. Independent t-tests found there were no significant differences between the control and experimental group at baseline on: age  $t(25) = .767, p = .450$ , social anxiety: SIAS  $t(25) = .452, p = .655$ , SPS  $t(25) = .578, p = .569$ , SES  $t(25) = .790, p = .437$ , conscientiousness (CS)  $t(25) = .1427, p = .166$ , GRIT  $t(25) = .477, p = .638$ , or self-control (SC)  $t(25) = .168, p = .868$ . Chi-squared tests showed that there were more men in the control ( $n = 4$ ) than in the experimental condition ( $n = 1$ )  $\chi^2(1, N = 27) = 4.857, p = .047$ . There were no differences between the experimental and control group on highest education level  $\chi^2(3, N = 27) = 3.629, p = .304$ , employment status  $\chi^2(2, N = 27) = 0.318, p = .853$ , study load (full-time/part time)  $\chi^2(1, N = 27) = 1.373, p = .363$ . There also no significant differences between groups on items measured later: the three confidence in treatment items (CTS1, CTS2, and CTS3)  $t(16) = .343, p = .736$ ,  $t(16) = 1.165, p = .261$  and  $t(15) = .499, p = .625$ , the belief that monitoring or self-control training will alter self-help engagement  $t(18) = .632, p = .535$ , importance of anxiety change (ICS1)  $t(25) = .594, p = .558$ , confidence in personal

ability to change anxiety (ICS2)  $t(25) = .816, p = .422$ , and the expectancy for anxiety scale (ACES)  $t(25) = .252, p = .803$ .

Independent t-tests found there were no significant differences between those who completed and those who withdrew at baseline on: age  $t(29) = .538, p = .595$ , social anxiety: SIAS  $t(29) = .561, p = .579$ , SPS  $t(29) = .391, p = .698$ , self-efficacy (SES)  $t(29) = .492, p = .627$ , conscientiousness (CS)  $t(29) = .363, p = .720$ , GRIT  $t(29) = .350, p = .729$ , or self-control (SC)  $t(29) = .106, p = .916$ . Chi-squared tests found that there were no differences at baseline between those who completed and those who withdrew on group assignment  $\chi^2(1, N = 31) = 0.247, p = .619$ , highest education level  $\chi^2(3, N = 31) = 0.669, p = .880$ , employment status  $\chi^2(2, N = 31) = 2.971, p = .226$ , study load (full-time/part time)  $\chi^2(1, N = 31) = 0.015, p = .901$ , or gender  $\chi^2(1, N = 31) = 0.883, p = .347$ . Table 1 presents descriptive statistics for the sample at each time point.

Table 1. Descriptive information

Variable		Control Cohort ( <i>n</i> = 10) Mean (SD)	Experimental Cohort ( <i>n</i> = 17) Mean (SD)	Total ( <i>n</i> = 27 ) Mean (SD)
Time one				
	BSC	18.90 (46.71)	-2.41 (81.54)	5.48 (70.41)
	Age	20.70 (5.87)	23.41 (10.18)	22.41 (8.80)
	SES	25.30 (4.32)	27.00 (5.92)	26.37 (5.36)
	EIE	7.00 (1.22)	6.27 (2.46)	6.45 (2.21)
	SIAS	12.90 (4.70)	12.06 (4.66)	12.37 (4.60)
	SPS	11.70 (7.44)	13.24 (6.19)	12.67 (6.58)
	CS	27.40 (5.80)	32.82 (11.10)	30.81 (9.73)
	SC	32.10 (5.67)	32.71 (10.45)	32.48 (8.86)
	Grit	36.00 (6.50)	37.59 (9.24)	37.00 (8.23)
Time two				
	BSC	17.00 (30.45)	34.18 (76.24)	27.81 (63.00)
	Age	27.80 (3.97)	29.53 (4.87)	28.89 (4.56)
	ICS1	8.10 (2.02)	7.59 (2.24)	7.78 (2.14)
	ICS2	6.90 (2.13)	6.12 (2.55)	6.41 (2.39)
	SIAS	9.90 (4.28)	10.59 (5.91)	10.33 (5.28)
	SPS	9.50 (6.04)	12.25 (6.66)	11.19 (6.45)
	CS	26.90 (5.63)	33.35 (8.71)	30.96 (8.23)
	SC	31.20 (5.45)	34.53 (7.71)	33.30 (7.04)
	Grit	35.50 (7.17)	36.18 (7.38)	35.93 (7.17)
	ACES	67.60 (5.38)	66.35 (15.00)	66.81 (12.20)
Time three				
	CTS1	6.80 (1.79)	7.23 (2.55)	7.11 (2.32)
	CTS2	7.00 (1.22)	5.69 (2.36)	6.06 (2.15)
	CTS3	7.50 (1.00)	6.85 (2.51)	7.00 (2.24)
Time four				
	SIAS	7.38 (5.95)	7.25 (3.52)	7.30 (4.50)
	SPS	6.00 (7.30)	8.83 (5.44)	7.70 (6.23)
	SC	34 (5.48)	35.50 (9.49)	35.10 (7.97)

Note. BSC = Behavioural test of self-control; SES = The General Self-Efficacy Scale; EIE= expectancy of increased engagement; SAIS-6 = Social Interaction Scale 6; SPS-6 = The Social Phobia Scale 6; CS = Conscientiousness items from International Personality Item Pool version of NEO Personality Inventory; SC = Self-control items from International Personality Item Pool Values in Action Scale; ICS = The Importance and Confidence Scale; ACES = The Anxiety Change Expectancy Scale; CTS = Confidence in Treatment Scale; Engage = no. times engaged with self-help activity

### 3.2 Univariate assumptions

Normality of the variables was examined using Shapiro-Wilk test and Q-Q plots. Age, engagement, and anxiety change expectancy scale (ACES) were positively skewed. The Expectancy of increased engagement (EIE) and the importance and confidence in anxiety change items (ICS1, ICS2) were negatively skewed. All other variables were normally distributed. Transformation was explored to make variables more appropriate for analysis. Reflection was used to change direction of negatively skewed variables and log10 was used to improve skew. The transformation was not successful for some variables that were used to examine randomisation success: age (Shapiro-Wilk:  $p < 0.001$ ), confidence in anxiety change (ICS2) (Shapiro-Wilk:  $p = .019$ ), and the importance of anxiety change (ICS1) (Shapiro-Wilk:  $p = .019$ ). However, the p-values from the t-test used in randomisation analysis (of these skewed variables) was never close to 0.05 and t-tests are robust to non-normality hence it is likely the results are reliable. The transformations for self-help engagement (Shapiro-Wilk:  $p = .505$ ) and expectancy of increased engagement (EIE) (Shapiro-Wilk:  $p = .162$ ) were successful. The results of analyses were unchanged by the transformed variables hence the non-transformed variables were used to make the data more interpretable. There were two outliers for the dependent variable engagement. However the 5% trimmed mean suggested that the outliers did not have a strong impact on the mean so they were retained.

### 3.3 Bivariate relationships

Scores on the first and second application of each scale mostly showed very strong correlations ( $r's > .8$ ,  $p's > .01$ ). The only exception to this trend was behavioural self-control (BSC): behavioural self-control at time one had a slightly reduced strong relationship with behavioural self-control at time two ( $r = .413$ ,  $p < .05$ ). As expected, measures of the similar concepts conscientiousness (CS), grit, and the self-report measure of self-control (SC)

showed strong to very strong correlations with each other. The behavioural measure of self-control (BSC) did not correlate with the self-report measure of self-control (SC), conscientiousness (CS), and grit. Bivariate scatter plots were examined and no unusual characteristic were found in the relationships between variables. None of the independent variables or covariates correlated significantly with the dependent variable. Table 2 displays the correlations between key variables.

Table 2. Bivariate correlations

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.	20.	21.	22.	23.	24.
1. BSC(1)	-																							
2. BSC(2)	.413*	-																						
3. SES(1)	-.132	.216	-																					
4. SES(2)	-.080	.449*	.894**	-																				
5. CS(1)	-.250	-.094	.545**	.418*	-																			
6. CS(2)	-.254	-.026	.626**	.574**	.874**	-																		
7. SC(1)	-.184	.126	.611**	.569**	.720**	.732**	-																	
8. SC(2)	-.103	.186	.584**	.532**	.564**	.741**	.848**	-																
9. SC(3)	.016	.111	.598**	.548*	.638**	.689**	.857**	.827**	-															
10. Grit(1)	-.175	.080	.670**	.628**	.643**	.773**	.813**	.786**	.579**	-														
11. Grit(2)	-.067	.150	.517**	.552**	.493**	.684**	.693**	.705**	.505*	.832**	-													
12. SAIS-6(1)	.006	-.223	-.238	-.271	-.125	-.283	-.334	-.413*	-.317	-.402*	-.566**	-												
13. SAIS-6(2)	.136	-.178	-.153	-.251	.110	.008	-.208	-.188	-.295	-.110	-.304	.768**	-											
14. SAIS-6(3)	-.068	-.429	-.259	-.481*	-.027	-.245	-.348	-.411	-.467*	-.355	-.367	.737**	.721**	-										
15. SPS(1)	-.032	-.103	-.143	-.112	-.125	-.272	-.168	-.238	-.241	-.321	-.393*	.571**	.207	.593**	-									
16. SPS(2)	-.042	-.074	-.188	-.203	-.065	-.269	-.261	-.320	-.182	-.467*	-.473*	.664**	.478*	.491*	.660**	-								
17. SPS(3)	-.043	.198	-.123	-.070	-.257	-.399	-.308	-.324	-.276	-.447*	-.384	.523*	.242	.488*	.750**	.798**	-							
18. ICS-1	.067	-.010	-.092	-.092	-.027	-.092	-.006	.013	-.031	-.157	.069	-.483*	-.424*	-.105	-.085	-.027	.004	-						
19. ICS-2	-.091	.132	.370	.422*	.023	.160	.234	.310	.159	.490**	.483*	-.540**	-.412*	-.618**	-.423*	-.567**	-.417	.087	-					
20. ACES	.122	.343	.503**	.489**	.154	.242	.446*	.425*	.381	.517**	.494**	-.609**	-.391*	-.514*	-.515**	-.644**	-.357	.140	.700**	-				
21. CTS-1	-.123	.275	-.182	-.041	.008	-.215	-.072	-.300	-.376	-.073	-.474*	.296	.174	-.037	.296	.173	.157	-.371	-.281	-.278	-			
22. CTS-2	.015	.232	.146	.064	.173	.053	.313	.208	.086	.339	-.078	.181	.267	-.114	-.176	-.069	-.041	-.390	.112	.168	.551*	-		
23. CTS-3	-.236	-.043	-.140	-.159	-.155	-.198	-.139	-.178	-.377	.054	-.348	.364	.309	.220	-.022	-.062	.104	-.557*	.004	-.118	.683**	.735**	-	
24. Engage	-.014	-.070	.267	.269	.346	.273	.375	.277	.238	.240	.103	-.100	-.087	-.291	-.113	-.210	-.385	-.080	.258	.285	.160	.224	.069	-

Note. \* =  $p < 0.05$ ; \*\* =  $p < 0.01$ ; (1) = Time 1, (2) = Time 2, (3) = Time 3. BSC = Behavioural test of self-control; SES = The General Self-Efficacy Scale; CS = Conscientiousness items from International Personality Item Pool version of NEO Personality Inventory; SC = Self-control items from International Personality Item Pool Values in Action Scale; SAIS-6 = Social Interaction Scale 6; SPS-6 = The Social Phobia Scale 6; ICS = The Importance and Confidence Scale; ACES = The Anxiety Change Expectancy Scale; CTS = Confidence in Treatment Scale; Engage = no. times engaged with self-help activity

### 3.4 Reliability and validity of measures

Self-efficacy (SES), self-control (SC), grit, and conscientiousness (CS) showed very strong correlations between scores on the same scale at different times (see Table 2), suggesting good test-retest reliability for the measures. The behavioural measure of self-control showed a slightly reduced but strong correlation between times. The self-control (SC), conscientiousness (CS), and grit scores correlated as expected. The behavioural measure of self-control (BSC), did not correlate with the self-reported measure of self-control (SC) (time one:  $r = -.205$ ,  $p = .314$ ; time two:  $r = .194$ ,  $p = .342$ ), conscientiousness (CS) (time one:  $r = -.249$ ,  $p = .220$ ; time two:  $r = -.020$ ,  $p = .922$ ), or grit (time one:  $r = -.175$ ,  $p = .393$ ; time two:  $r = .145$ ,  $p = .480$ ). Furthermore the behavioural measure of self-control (BSC) did not behave as expected. At the first on campus session, participants did not hold the grippers significantly longer before than after the thought suppression task  $t(26) = .405$ ,  $p = .689$ , though participants did hold the gripper for a significantly longer period of time before than after the thought suppression task at the second on campus session  $t(26) = 2.294$ ,  $p < .05$ . Thus, it appears that the hand grip task was not a valid measure of ego depletion in this study and thus, the behavioural measure of self-control was not used in further analyses.

### 3.5 Manipulation checks

Compliance with self-control training was examined by analysing the daily reports from participants. Experimental participants' reports of goal related behaviour was compared to that of the control participants. Participants in the experimental group had goals that they worked towards every day. The control group participants had goals 60% of the days during the two week period. Participants in the experimental group met 80% of their self-control goals 38% of the time on average. Participants in the control group met 80% of their goals



10% of the time (when they had goals). An independent t-test showed that participants in the experimental group were significantly more successful at achieving their goals than were participants in the control group  $t(24) = 4.047, p < .001$ . The average difficulty of achieved goals (goals with participant rated success scores of 7 out of 10 or higher) in the experimental group was 4.61 (out of 10) ( $SD = 2.41$ ). The average difficulty of goals achieved was 4.91 (out of 10) in the control group ( $SD = 1.82$ ). Goal related behaviour does appear to be significantly different in the experimental group compared to the control group. When participants in the experimental group did not achieve their goals they rated the difficulty of the task as higher ( $M = 6.57, SD = 2.05$ ). When participants in the control group did not achieve their goals they also rated the difficulty of the task as higher ( $M = 6.58, SD = 1.82$ ).

### **3.6 Changes in social anxiety**

There was a significant reduction in social anxiety scores from time two to time three on the SIAS,  $t(19) = 3.486, p < .01$  and SPS  $t(19) = 3.789, p < .01$ . A repeated measures GLM found that there was no significant difference between the experimental and control groups on change in social anxiety score ( $F(2) = .130, p = .879$ ).

### **3.7 Hypothesis testing**

The univariate GLM procedure revealed that there was no significant association between self-control and engagement with self-help in this sample  $\beta = .432 (F(1, 25) = 2.084, p = .161)$ . The observed power for that analysis was .284. In a repeated measures GLM there was no significant difference in change in self-control scores between groups ( $F(1) = 2.189, p = .151$ ). The experimental group did not improve their self-control more than those in the control group. The observed power for that analysis was .296. There was also no significant difference on self-help engagement between the experimental group ( $M = 8.35, SD = 8.25$ ) and

the control group ( $M = 9$ ,  $SD = 15.03$ ),  $t(25) = .145$ ,  $p = .886$ . Cohen's effect size ( $d = 0.0582$ ) was very small.

## 4 Discussion

### 4.1 Summary of findings

The aim of the current study was to examine the relationship between self-control and engagement in a self-help CBT exercise for SAD. Engagement is an important factor in CBT, known to improve treatment outcome (Kazantzis et al., 2010). If high scores on self-reported self-control are associated with increased treatment engagement, then self-control may be an important factor that should be examined in the treatment context. If self-control can be manipulated and such manipulations generalise to increased engagement then including a self-control intervention in CBT for SAD could indirectly improve treatment outcome. Firstly, to examine if self-control is related to engagement with self-help, a univariate GLM was used to examine if self-reported self-control could predict engagement with a self-help exercise. It was predicted that high scores on self-control measures would be associated with increased engagement with self-control. This hypothesis was not supported. The lack of association between scores on measures of self-control and engagement indicates that self-control may not be an important factor for engagement with the thought-challenging exercise utilised in the current study.

Secondly, to examine if a self-control intervention could improve self-control and self-help engagement, the experimental group applied regular self-control effort to achieve goals and practiced self-control strategies. The hypothesis that a self-control intervention would increase self-control and increase engagement with a self-help exercise was not supported. Despite the findings that participants in the self-control training group regulated their behaviour significantly more in relation to goals than participants in the behaviour

monitoring group, participants in the self-control training group did not improve on the self-report measure of self-control and did not engage with the self-help exercise more often than the control group. The failure of the intervention to change self-control scores contradicts the pattern of findings in previous self-control studies. The discussion will now turn to possible explanations for the lack of support for the hypotheses.

#### **4.2 Self-control was not associated with engagement**

An explanation for the lack of support for the first hypothesis, that high scores on self-control measures will be associated with increased engagement with self-control, may lie in the power of the study to detect the effect. However the p-value from the GLM analysis (which tested the association between self-reported self-control and engagement) was far from significant. While further studies may be required to substantiate the non-significant relationship between self-control and engagement with the self-help exercise, the findings suggest that self-control has, at best, a very weak impact on engagement with the type of self-help exercise included in the current study. While previous findings suggest that self-control generalises across a person's experience, influencing many effortful behaviours (Denson et al., 2011; Muraven, Baumeister, & Tice, 1999; Oaten & Cheng, 2006, 2007), no previous research has examined a direct link between treatment engagement and self-control. Hence, the current finding of a lack of association between self-control and self-help engagement do not necessarily contradict previous self-control research, rather they suggest that the findings of past research, which establish self-control as a useful skill for effortful behaviour, may not generalise to engagement with treatment exercises of this nature.

A previous study did find a positive correlation between improved CBT outcome and self-control (Simons et al., 1985). The conflicting results could be due to differences in the treatments included in the two studies (the treatment in the current study was limited to one

exercise while the other treatment was more comprehensive) or due to the treatments being for different disorders (Simons and associates examined depression). However, analysis of measurements used in the two studies may suggest a confounding factor in the study by Simons and associates (1985) that may not have been present in the current study. Simons and associates measured self-control using Rosenbaum's Self-Control Schedule (1980). The schedule includes items that assess self-controlled cognitions (e.g., "in order to overcome bad feelings that accompany failure, I often tell myself that it is not so catastrophic and that I can do something about it") (Rosenbaum, 1980). Recognising and challenging catastrophic thoughts is common element of CBT (Rapee, 1998), thus, the correlation between self-control and outcome may have been confounded by the similarity between the measurement of outcome and the measurement of self-control in the Simons et al. study. A strength of the self-report measure of self-control utilised in the current study is that it exclusively contains items which have a behavioural focus; it does not examine cognitions and thereby may have avoided potential confounding with a cognitive therapy.

It is important to note that the current study did not include a range of CBT exercises. The relationship between self-control and the more challenging types of CBT exercises (e.g., exposure to anxiety-provoking situations) was not examined and self-control may be most relevant to such exercises. For ethical reasons the exercise included in the current study was one that would represent a challenge but that would not be so challenging that there was potential for harm. It is unknown what level of task difficulty requires self-control. Perhaps the self-control effort required to challenge negative thoughts is not enough for the differences between people in self-control to have an effect on engagement.

#### **4.3 Self-control was not altered by the self-control intervention**

The lack of difference between the experimental and control group on engagement in the self-help exercise may be explained by the fact that self-control did not appear to be altered by the self-control intervention. Although there were significant differences between the experimental and control group on their goal-related behaviour during the self-control training phase, suggesting that participants were often complying with the instructions of the self-control intervention, the training in self-control did not generalise to an increase in engagement with the self-help exercise. Previous studies have found that encouraging participants to engage consistent effort in self-control and use self-control strategies increase self-control (Denson et al., 2011; Muraven et al., 1999; Oaten & Cheng, 2007). Differences between the current study and such studies may be responsible for the contradictory findings. Some methodological differences between the current and previous studies, as well as patterns in participation, may suggest reasons for the contradiction with previous findings.

One difference between the current research and previous studies is the freedom of choice allowed to participants in regards to planning their own self-control goals. Participants were asked to engage the same amount of effort in achieving their self-control goals but they were allowed to plan their own goals. According to the Strength Model of Self-Control (Baumeister et al., 1998), it is the consistent effort in self-controlled behaviour which improves self-control. Empirical evidence provides support for this theory across a wide range of behaviours (Denson et al., 2011; Gailliot & Baumeister, 2007; Muraven et al., 1999; Oaten & Cheng, 2006, 2007). However, it is possible that the behaviour does matter. One of the previous studies included a random allocation of participants to several self-control training conditions (Muraven et al., 1999). While two (keeping a food diary and maintaining good posture) self-control training behaviours induced the predicted increase in self-control behaviour, one behaviour (consistently improving mood) did not. While negative findings such as that are rare in the literature, it does provide evidence that some self-controlled

behaviours may not facilitate self-control improvement. Diet, exercise, and sleep behaviours were chosen because they have been previously validated as self-control training behaviours (Benton et al., 2007; Britton et al., 2010; Muraven et al., 1999; Oaten & Cheng, 2006).

However, there were individual differences in the types of goals participants selected relative to those three behaviours in the current study. For example, participants who selected to change their exercise habits could select the duration of their exercise sessions rather than being given specific directions. Thus, selected behaviours may have deviated too far from the important elements of the precise interventions in other studies and diluted the effect of self-control training.

Perhaps an advantage of the self-control interventions in previous studies is the nature of the self-control training behaviour utilised. That is, in previous studies participants were asked to execute self-controlled behaviour that was likely to be unfamiliar, such as using non-dominant hand between the hours of 8am and 6pm (Denson et al., 2011) or to change their habitual way of speaking (Gailliot, Plant, et al., 2007). Hence the behaviour selected added to the participants' self-controlled behavioural load. As indicated by the control group in the current study (who had goals 60% of the time), people may have goals on a more regular basis than expected. Perhaps the self-control training goals in the current study may not have added enough to the participants' self-control load to create a training effect.

The self-control training may have also been ineffective due to the amount of effort utilised at each application of self-control. In previous studies participants were directed to exert as much effort as possible in order to train their self-control (Muraven et al., 1999). In the current study, participants were directed to choose tasks that were difficult yet achievable and that if in practice, achieving the task did not involve strong effort, they should change the goal to increase the difficulty of the task. Nevertheless, the effort engaged by experimental group participants on self-control tasks was not high: the average difficulty of the goals

achieved (rated out of ten) by participants in the experimental group was 4.61 ( $SD = 2.41$ ) a similar average difficulty of goals achieved in the control group 4.91 ( $SD = 1.82$ ). The effort involved in the experimental group's self-control training tasks may have been too easy to successfully train self-control. No definitive statistics have been produced which indicate how much effort is required to train self-control, or how much effort discourages participants from self-control training. The inclusion of effort ratings in the current study may assist in working towards a better understanding of parameters around effective self-control training.

Additional to regular effort in self-control, the intervention was also expected to increase self-control as the participants were taught and had practice with, some self-control techniques: setting implementation intentions and monitoring behaviour (in relation to pre-committed and realistic set goals). Once participants had experience with these strategies during the self-control training, they were encouraged to use the strategies to assist them to engage with the self-help exercise. Teaching people self-monitoring techniques has improved self-controlled behaviour in the past (Oettingen, 2012). Teaching people implementation intentions has been shown to have a significant medium to large positive effect on self-controlled behaviour in previous studies (Gollwitzer & Sheeran, 2006). In the current study, daily self-monitoring reports became markedly less frequent when participants were engaging with the self-help exercise as compared to the self-control training period, indicating that some participants in the experimental group did not fully utilise monitoring as a strategy for engaging with the self-help exercise. No measure was included to examine if participants utilised implementation intentions during the self-help phase of the study. Hence it is difficult to determine if the lack of difference between the experimental and control group (on change in self-control and engagement) was associated with a failure to use the strategy or a failure of the strategy. However, from a practical perspective the findings do suggest that teaching such strategies may not always effectively influence self-control.

#### **4.4 Problems with the behavioural measure of self-control**

The behavioural measure of self-control does not appear to measure self-control as self-control is defined in the literature. Importantly, the ego-depletion score did not correlate with the self-report measure of self-control. The difference between the first and second gripping task at the first on-campus session was not significant. Additionally the ego-depletion score (the number of seconds until the object the participants held dropped in the first gripping trial compared to the number of seconds until the object dropped in the second gripping trial after a thought suppress task) did not show the pattern of correlation with other constructs expected of a self-control measure. Grit and conscientiousness are theoretically related factors that have been empirically associated with self-control scores in previous studies (Duckworth & Gross, 2014; Tangney et al., 2004); however, while grit and conscientiousness correlated with scores on the self-report self-control measure, none of the measures correlated with the behavioural measure of self-control. The results from the current study provide some tentative evidence that challenges the validity of the behavioural measure of self-control. Future research may aim to examine the validity of behavioural measures of self-control such the hand-grip measure.

#### **4.5 Strengths and Limitations of the current study**

A strength of the current study is that it is the first study which has been aimed at linking recent self-control findings with their practical implications for treatment. The study explored one mechanism by which self-control could be associated with treatment, via an association with engagement and examined whether such an association could be used to benefit treatment. Some measurements utilised provided additional strengths in the current study. Participants did their self-monitoring via a daily time-stamped online survey. This method may allow for a more accurate measure of engagement than the paper diaries utilised



in other studies (Muraven et al., 1999; Oaten & Cheng, 2006, 2007) as participants were told the surveys were time-stamped and that it would be obvious if all reporting requirements were fulfilled last minute. Most reports were made regularly, on the day the behaviour they were reporting occurred. The use of a scale which measures self-control from a largely behavioural perspective may be a strength of the current study as the measure was not confounded by an overlap between cognitive skills useful to the self-help exercise and items in the measure which assessed similar cognitions. Another measurement strength of the current research is the evaluation of the behavioural measure of self-control. The inclusion of another self-control measure as well as constructs related to self-control allowed for analysis of the behavioural measure's validity. While in previous studies the behavioural self-control measure has been found to be adequate (Baumeister et al., 1998; Muraven et al., 1998), the current study suggests that the measure does not always behave as a reliable and valid measure.

The small sample size of the current study is an important limitation in the current study. Power analysis of the major statistical procedures utilised, showed that there was a very high probability of making a type two error. However the current study is concerned with the practical implications of self-control and a self-control intervention for treatment. The p-value for the first hypothesis was large. It is possible that a larger sample size would find a significant association between self-control and engagement but the current study provides some evidence that the practical applications of such an association would be negligible; the study demonstrates that the effect size of self-control on engagement is not large enough to overcome the power issues associated with a small sample. The same argument could be made for the analysis which examined the self-control intervention. In order for a self-control intervention to have practical applications in a therapeutic context it would be required to make a clinically significant change in self-control and engagement in

an efficient amount of time. The large p-value suggests that, even if the change in self-control associated with the intervention was found to be significant in a larger sample, the self-control intervention utilised in the current study is unlikely to have a clinically significant influence within a short time frame. Another result of the small sample size was the failure of randomisation. There were 7 more participants in the experimental group than in the control group. While the random number generator provided equal groups in a larger projected sample of 60 participants, the process did not provide an equal number of participants in the smaller than expected sample. Another potential limitation related to the sample is the use of participants who volunteered for course credit. Such participants may have had less motivation to engage with the self-help exercise than a clinical or treatment-seeking sample. This could have created a floor effect in measurement of the level of engagement. An additional limitation of the current study is that no measures were included to examine the utilisation of the implementation intentions strategy during the self-help engagement period. This limits the conclusions which can be drawn in regards to the failure of that aspect of the intervention.

#### **4.6 Recommendations for future studies**

While it was not appropriate to examine in the current research context, it may be useful to examine self-control in the context of a complete CBT program. In such a study examining correlations between self-control scores prior to treatment and CBT outcome may be useful. An important aspect of such a study would be examining self-control in relationship to more difficult treatment exercises (such as exposure to anxiety provoking situations) as it is expected that self-control would have more influence on such behaviours. Another important aspect of such a study may be the use a clinical sample. Studies which used the same social anxiety measure in a clinical sample did show higher levels of social anxiety (Dear, Titov, Schwencke, Andrews, Craske, & McEvoy, 2011; Johnston, Titov,

Andrews, Spence, & Dear, 2011). The participants in the current study may not have been as motivated to change their anxiety as participants from a clinical sample as their anxiety appears less disabling. Alternatively a clinical sample may also have experienced more difficulty in engaging with the exercise. Examining self-control in a clinical sample may be a useful future direction for research in order to further illuminate the moderating effect of social anxiety level on the relationship between self-control and social anxiety.

The measure of self-control utilized is a widely available valid measure. However there are other commonly used valid self-control measures. Notably the Tangney et al. (2004) self-control scale is a commonly used measure which would be useful for comparisons within the self-control research field. Future studies examining self-control in treatment setting may benefit from the additional inclusion of the Tangney et al. (2004) self-control scale for the purpose of examining different facets of self-control and providing material for more accurate comparisons across a larger range of research.

Studies which examine the important elements of self-control training may be useful for developing increased precision and effectiveness in self-control training interventions. Studies which focus on discerning the processes that engender self-control could be useful. For example, in the current study the lack of self-control change provides some evidence that the combination of difficulty and frequency in the training behaviour described in the current study was not effective in manipulating self-control. However further study is required to disentangle effort and frequency more precisely. Future studies that measure the utilisation of implementation intentions once they have been taught may provide more information about whether teaching such techniques results in the technique being integrated with the person's life and utilised in future self-control tasks.

#### **4.7 Conclusions**

The self-control literature provides considerable practical insight into self-controlled behaviour. The current study was concerned with testing one avenue by which this insight could be generalised to a treatment setting. The lack of association between self-control and self-help engagement suggests that self-control is not a factor that influences engagement with CBT thought challenging exercises. Further study may find that self-control is useful to other aspects of CBT treatment. However, for now there appears to be little direct evidence of an association between self-control and self-help CBT. The self-control manipulation was unsuccessful. There is a range of possible reasons the self-control training intervention was not successful, including the freedom of choice in behaviour provided to participants and the potentially low level of effort and frequency of self-control effort. The teaching of self-control strategies also appears to have been ineffective. Future studies could examine self-control in terms of a more complete CBT program and develop understanding around the processes of an effective self-control intervention.

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## **Appendix A: Recruitment Communications**

*Poster placed around the Macquarie University West Ryde Campus and Facebook notice*

Do you feel uncomfortable or anxious in social situations? We are doing a study that examines whether specific behaviours can increase engagement with an exercise shown to be effective for reducing social fear. Participants can go in the draw to win a \$50 book gift voucher. If you would like to contribute to research that has an aim to improve social phobia treatment, are proficient at reading and understanding English, can receive and respond to text messages and would like to learn a skill that could help you to reduce your social discomfort please contact (removed for marking purposes).

*Notice on Student participation website*

Abstract

This study runs for 4 weeks, with two on campus sessions and will examine factors associated with engagement with a self-help exercise evidenced to reduce social discomfort or anxiety.

Description

Do you feel uncomfortable or anxious in social situations? We are doing a study that examines whether specific behaviours can increase engagement with a self-help exercise that has been shown in past research to reduce social anxiety. Participation requires you to attend to two face-to-face sessions with a researcher and to answer some questions daily for four weeks. You will be given 1.5 hours of course credit for participation. If you are proficient at reading and understanding English, and would like to learn a skill that could help you to reduce your social discomfort, you can participate in the research study. Once you have signed-up for the study via SONA, please contact (removed for marking purposes) to arrange a time for the first on-campus session.

**Appendix B Scales***Social Anxiety Scales (SPS-6 and SAIS-6) Peters, et al. (2011)*

All scale items contained an option participants could select if they did not wish to answer the question.

*Instructions:* For each question, please circle a number to indicate the degree to which you feel the statement is characteristic or true of you.

The rating scale is as follows:

	0	1	2	3	4	
	Not at all characteristic or true of me	Slightly characteristic or true of me	Moderately characteristic or true of me	Very characteristic or true of me	Extremely characteristic or true of me	
1.	I have difficulty making eye contact with others	0	1	2	3	4
2.	I find it difficult mixing comfortably with the people I work with	0	1	2	3	4
3.	I tense up if I meet an acquaintance on the street	0	1	2	3	4
4.	I feel tense if I am alone with just one person	0	1	2	3	4
5.	I have difficulty talking with other people	0	1	2	3	4
6.	I find it difficult to disagree with another's point of view	0	1	2	3	4
7.	I get nervous that people are staring at me as I walk down the street	0	1	2	3	4
8.	I worry about shaking or trembling when I'm watched by other people	0	1	2	3	4
9.	I would get tense if I had to sit facing other people on a bus or train	0	1	2	3	4
10.	I worry I might do something to attract the attention of other people	0	1	2	3	4
11.	When in an elevator, I am tense if people look at me	0	1	2	3	4
12.	I can feel conspicuous standing in a line	0	1	2	3	4

*Self-Control items from the International Personality Item Pool Values in Action**Scale.* Goldberg et al. (2006)

All scale items contained an option participants could select if they did not wish to answer the question.

*Instructions:* For each question, please circle a number that best reflects how you feel about the statement right now, the rating scale is as follows:

	<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
	Very Inaccurate	Moderately Inaccurate	Neither Inaccurate nor Accurate	Moderately Accurate	Very Accurate
1. I have no trouble eating healthy foods	0	1	2	3	4
2. I am a highly disciplined person	0	1	2	3	4
3. I forego things that are bad for me in the long run even if they make me feel good in the short run.	0	1	2	3	4
4. I can stay on a diet	0	1	2	3	4
5. I can always say enough is enough	0	1	2	3	4
6. I do not exercise on a regular basis (-)	0	1	2	3	4
7. I can't resist eating candy or cookies if they are around (-)	0	1	2	3	4
8. I am not very good at getting things done (-)	0	1	2	3	4
9. I let myself be taken over by urges to spend or eat too much (-)	0	1	2	3	4
10. I do my tasks only just before they need to be done (-)	0	1	2	3	4
11. I give in to my urges (-)	0	1	2	3	4

*International Personality Item Pool (IPIP) Conscientiousness (Goldberg et al., 2006).*

All scale items contained an option participants could select if they did not wish to answer the question.

*Instructions:* Please rate how true of you the following statements are of you, the rating scale is as follows:

	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
	Very Inaccurate	Moderately Inaccurate	Neither Inaccurate nor Accurate	Moderately Accurate	Very Accurate
1. I am always prepared			1 2	3 4	5
2. I pay attention to details			1 2	3 4	5
3. I get chores done right away			1 2	3 4	5
4. I carry out my plans			1 2	3 4	5
5. I make plans and stick to them			1 2	3 4	5
6. I waste time			1 2	3 4	5
7. I find it difficult to get down to work			1 2	3 4	5
8. I do just enough work to get by			1 2	3 4	5
9. I don't see things through			1 2	3 4	5
10. I shirk my duties			1 2	3 4	5

*Psychological Grit (Duckworth, Peterson, Matthews, & Kelly, 2007).*

All scale items contained an option participants could select if they did not wish to answer the question.

*Instructions:* Please rate how true of you the following statements are of you, the rating scale is as follows:

	1	2	3	4	5		
	Not at all characteristic or true of me	Slightly characteristic or true of me	Moderately characteristic or true of me	Very characteristic or true of me	Extremely characteristic or true of me		
1.	I have overcome setbacks to conquer an important challenge.		1	2	3	4	5
2.	New ideas and projects sometimes distract me from previous ones.		1	2	3	4	5
3.	My interests change from year to year.		1	2	3	4	5
4.	Setbacks don't discourage me.		1	2	3	4	5
5.	I have been obsessed with a certain idea or project for a short time but later lost interest.		1	2	3	4	5
6.	I am a hard worker.		1	2	3	4	5
7.	I often set a goal but later choose to pursue a different one.		1	2	3	4	5
8.	I have difficulty maintaining my focus on projects that take more than a few months to complete.		1	2	3	4	5
9.	I finish whatever I begin.		1	2	3	4	5
10.	I have achieved a goal that took years of work.		1	2	3	4	5
11.	I become interested in new pursuits every few months.		1	2	3	4	5
12.	I am diligent.		1	2	3	4	5



*Generalised Self-efficacy Scale (SES) Schwarzer & Jerusalem (1995)*

All scale items contained an option participants could select if they did not wish to answer the question.

*Instructions:* Please rate how true of you the following statements are of you, the rating scale is as follows:

		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
		Slightly characteristic or Not at all true	Moderately characteristic or Hardly true	Very characteristic or Moderately true	Extremely characteristic or Exactly true
1.	I can always manage to solve difficult problems if I try hard enough	1	2	3	4
2.	If someone opposes me, I can find the means and ways to get what I want	1	2	3	4
3.	It is easy for me to stick to my aims and accomplish my goals	1	2	3	4
4.	I am confident that I could deal efficiently with unexpected events	1	2	3	4
5.	Thanks to my resourcefulness, I know how to handle unforeseen situations	1	2	3	4
6.	I can solve most problems if I invest the necessary effort	1	2	3	4
7.	I can remain calm when facing difficulties because I can rely on my coping abilities	1	2	3	4
8.	When I am confronted with a problem, I can usually find several solutions	1	2	3	4
9.	If I am in trouble, I can usually think of a solution	1	2	3	4
10.	I can usually handle whatever comes my way	1	2	3	4

*The Anxiety Change Expectancy Scale (ACES) (Dozois & Westra, 2005).*

All scale items contained an option participants could select if they did not wish to answer the question.

*Instructions:* Please rate how true of you the following statements are of you, the rating scale is as follows:

		1	2	3	4	5		
		Strongly disagree	Disagree	Undecided	Agree	Strongly agree		
1.	I feel pessimistic that my anxiety problems could ever change for the better			1	2	3	4	5
2.	Even though I try, nothing seems to help with my anxiety			1	2	3	4	5
3.	It would be extremely difficult or impossible to solve my problems with anxiety			1	2	3	4	5
4.	I have had some positive experiences with being able to control my anxiety through talking positively to myself			1	2	3	4	5
5.	My problems with anxiety are too severe to benefit from treatment			1	2	3	4	5
6.	Self help methods may help others control their anxiety but they won't work for me			1	2	3	4	5
7.	I don't believe I will ever feel truly relaxed and not worried			1	2	3	4	5
8.	Facing my fears has never helped me to reduce my anxiety			1	2	3	4	5
9.	When I force myself to do something that scares me, often it's not as bad as I thought			1	2	3	4	5
10.	I have had some success in reducing my anxiety			1	2	3	4	5
11.	There is very little anyone could do to help me solve my anxiety problems			1	2	3	4	5

12.	Even when I try to talk positively to myself, it doesn't help my anxiety	1	2	3	4	5
13.	Positive thinking is helpful to me in managing my anxiety	1	2	3	4	5
14.	There is no solution to my anxiety problems	1	2	3	4	5
15.	I am optimistic that my anxiety can change for the better	1	2	3	4	5
16.	I have found that I can reduce my anxiety by telling myself to relax or by using relaxation exercises	1	2	3	4	5
17.	I'll never be able to control my anxiety and worry	1	2	3	4	5
18.	I believe it's quite possible for me to feel less worried and more relaxed	1	2	3	4	5
19.	If I work hard, I can have a positive impact on my problems with anxiety	1	2	3	4	5
20.	There are factors contributing to my anxiety that I can learn to control	1	2	3	4	5

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Motivation to change – Importance and confidence scale

All scale items contained an option participants could select if they did not wish to answer the question.

*Instructions:* Please select the appropriate option to indicate your reply (1=not at all important, 10=Extremely important)

- 
1. How important is it for you to change your social anxiety related behaviours right now? (1=not at all important, 10=Extremely important)
  2. How confident are you that you can change your social anxiety related behaviours? (1=not at all confident, 10=Extremely confident)
-

## Confidence in treatment

All scale items contained an option participants could select if they did not wish to answer the question.

*Instructions:* Please select the dot to indicate your response (1= not logical/confident at all, 10= extremely logical/confident)

2            3            4            5

---

1. How logical did the self help exercise seem to you?
  2. How confident are you that the self help exercise will be successful in reducing social anxiety?
  3. How confident would you be in recommending this self help exercise to a friend who is socially anxious?
-

### **Appendix C Information and consent form**

#### **The impact of self-control on engagement with self help**

You are invited to participate in a study of the impact of self-control in engagement with self-help exercises for social anxiety. The purpose of the study is to examine factors that may affect the amount a person engages in a self-help exercise for reducing social anxiety.

The study is being conducted to meet the requirements for the degree of Masters of Research by Jessie Watson (jessie.watson1@students.mq.edu.au; phone number 0431 070 253) under the supervision of Dr Lorna Peters (Email, Lorna.Peters@mq.edu.au; phone number (02) 9850 6727) from the Department of Psychology at Macquarie University.

If you decide to participate, you will participate in two individual information and testing sessions (spaced two weeks apart) and reply to daily questions for a 4 week period (via SMS or online short survey).

At each information and testing session you will participate in a behavioral measurement task where you will grip a hand strengthening tool for as long as you can, then complete a mental exercise (where you will be asked to avoid thinking of a white bear) and then repeat the gripping exercise. You will also complete a number of questionnaires on a computer that will measure social anxiety, depression, and some personality characteristics (how you typically respond to situations).

You will be randomly allocated either to a group where we will ask you to change or simply monitor your behavior in relation to factors (such as sleep, diet, and exercise) we expect will influence your engagement with the self-help exercise. You will receive a text message from us daily throughout a 2 week period providing you with a link to a short survey

asking about your sleep, diet, or exercise and that you can complete on a smart phone or computer.

After two weeks, you will attend a second testing and information session where you will be asked to repeat the behavioural test and questionnaires from the session and will be given written directions for a self-help exercise for anxiety. You will receive a daily text message for the next two weeks asking about your engagement with the self-help information and exercise. You can respond to the questions with an SMS.

At the end of the experiment, you will complete a short online survey asking about your social anxiety and personality characteristics.

Total participation in activities essential to the study will take approximately 1.5 hours of your time. However you are free to spend more time on the exercises if you wish. First-Year Psychology students will receive 1.5 hours of credit at the end of the last survey. If you complete only part of the study, you will receive partial credit equivalent to the amount of time you participated. Other participants, will be invited, at the end of the last survey, to enter the monthly draw for a \$50 book voucher.

We have designed the study with an aim to minimise discomfort, however it is possible that the self-help exercise could cause you some discomfort as you will be asked to challenge negative thoughts associated with your shyness. If you have any concerns or difficulties during the research please contact Dr Lorna Peters (Lorna.Peters@mq.edu.au; 9850 6727) in the first instance. If you do not want to discuss any concerns with Dr Lorna Peters, you can contact the Macquarie University Counselling Service (for Macquarie University students and staff) on (02) 9850 7497, your local GP, or Lifeline (a 24 hour help line available to anyone experiencing emotional difficulties) on 13 11 14.

Any information or personal details gathered in the course of the study are confidential, except as required by law. No individual will be identified in any publication of the results. Any responses you make to the survey will only be accessible by Jessie Watson and Dr Lorna Peters. A summary of the results of the data can be made available to you on request at the conclusion of the study (Oct 13th 2015) via email to Jessie Watson.

Participation in this study is entirely voluntary: you are not obliged to participate and if you decide to participate, you are free to withdraw at any time without having to give a reason and without consequence.

The ethical aspects of this study have been approved by the Macquarie University Human Research Ethics Committee. If you have any complaints or reservations about any ethical aspect of your participation in this research, you may contact the Committee through the Director, Research Ethics (telephone (02) 9850 7854; email [ethics@mq.edu.au](mailto:ethics@mq.edu.au)). Any complaint you make will be treated in confidence and investigated, and you will be informed of the outcome.



## Appendix D Ethics Approval Letter

Office of the Deputy Vice-Chancellor  
(Research)

Research Office  
Research Hub, Building C5C East  
Macquarie University  
NSW 2109 Australia  
T: +61 (2) 9850 4459  
<http://www.research.mq.edu.au/>  
ABN 90 952 801 237



21 April 2015

Dr Lorna Peters  
Department of Psychology  
Faculty of Human Sciences  
Macquarie University

Dear Dr Peters

**Reference No:** 5201500079

**Title:** *The effect of self-control training on engagement with self-help for social anxiety*

Thank you for submitting the above application for ethical and scientific review. Your application was considered by the Macquarie University Human Research Ethics Committee (HREC (Medical Sciences)) at its meeting on 26 February 2015 at which further information was requested to be reviewed by the Ethics Secretariat.

The requested information was received with correspondence on 31 March 2015.

I am pleased to advise that ethical and scientific approval has been granted for this project to be conducted at:

- Macquarie University

This research meets the requirements set out in the *National Statement on Ethical Conduct in Human Research* (2007 – Updated March 2014) (the *National Statement*).

This letter constitutes ethical and scientific approval only.

### Standard Conditions of Approval:

1. Continuing compliance with the requirements of the *National Statement*, which is available at the following website:

<http://www.nhmrc.gov.au/book/national-statement-ethical-conduct-human-research>

2. This approval is valid for five (5) years, subject to the submission of annual reports. Please submit your reports on the anniversary of the approval for this protocol.

3. All adverse events, including events which might affect the continued ethical and scientific acceptability of the project, must be reported to the HREC within 72 hours.

4. Proposed changes to the protocol must be submitted to the Committee for approval before implementation.

It is the responsibility of the Chief investigator to retain a copy of all documentation related to this project and to forward a copy of this approval letter to all personnel listed on the project.

Should you have any queries regarding your project, please contact the Ethics Secretariat on 9850 4194 or by email [ethics.secretariat@mq.edu.au](mailto:ethics.secretariat@mq.edu.au)

The HREC (Medical Sciences) Terms of Reference and Standard Operating Procedures are available from the Research Office website at:

[http://www.research.mq.edu.au/for/researchers/how\\_to\\_obtain\\_ethics\\_approval/human\\_research\\_ethics](http://www.research.mq.edu.au/for/researchers/how_to_obtain_ethics_approval/human_research_ethics)

The HREC (Medical Sciences) wishes you every success in your research.

Yours sincerely



**Professor Tony Evers**

Chair, Macquarie University Human Research Ethics Committee (Medical Sciences)

This HREC is constituted and operates in accordance with the National Health and Medical Research Council's (NHMRC) *National Statement on Ethical Conduct in Human Research* (2007) and the *CPMP/ICH Note for Guidance on Good Clinical Practice*.

**Details of this approval are as follows:**

**Approval Date:** 20 April 2015

The following documentation has been reviewed and approved by the HREC (Medical Sciences):

Documents reviewed	Version no.	Date
Macquarie University Ethics Application Form	2.3	July 2013
Correspondence from Dr Lorna Peters responding to the issues raised by the HREC (Medical Sciences)		Received 31/3/2015
Recruitment Advertisement (SONA)	1	30/3/2015
Recruitment Poster	1	30/3/2015
Recruitment Notice (Facebook)	1	30/3/2015
MQ Participant Information and Consent Form (PICF) entitled <i>The impact of self control on engagement with self help</i>	1	12/2/2015
Transcript for on-campus sessions		
Participant Questionnaire (Qualtrics)		

**Appendix E Chapter 3 of Overcoming Shyness by Ron Rapee**

(Not included in digital submission)