

**Integration of the Cognitive-Behavioural Model and Theory of Planned Behaviour  
in the Understanding of the Process of Changing Thinking Patterns: Exploring  
Mechanisms of Change in a Depression Prevention Workshop**

**Kristina Louise Bradley**

**A thesis submitted to the Faculty of Graduate and Postdoctoral Studies in partial  
fulfillment of the requirements for the PhD degree in Clinical Psychology**

**School of Psychology  
Faculty of Social Sciences  
University of Ottawa**

**© Kristina Louise Bradley, Ottawa, Canada, 2016**

**Abstract**

Despite the growing need for depression prevention programming for university students, few programs exist and those that do are too resource-intensive for broad dissemination. Furthermore, limited research has been conducted on mechanisms of change in CBT-based prevention programs and similar research conducted on CBT for depression demonstrates mixed findings. Therefore, there is a need to incorporate a formal model of health-behaviour change in prevention (and intervention) programs to clarify mechanisms of change and improve outcomes, such as the theory of planned behaviour (TPB). This series of studies developed and tested a formal CBT-TPB “hybrid” model to predict intention to change thinking patterns and a brief depression prevention program for university students and to examine the program’s potential to change the hypothesized constructs in the hybrid model. Results indicated support for the hybrid model, in that TPB factors predict intention to change thinking patterns. In addition, across an open and randomized control trial, my “Start Making a Change” intervention promotes change in TPB factors, as well as improvement in relevant CBT and well-being outcomes. The implication of this work is that brief, easy-to-disseminate, programs, based on a formal model of change, can effectively, at least in the short term, target and change important risk factors for depression onset in university students.

**Table of Contents**

Abstract.....	ii
General Introduction.....	1
Study 1.....	24
Study 2.....	75
Study 3.....	112
General Discussion.....	169
References (General Introduction and Discussion).....	181
Appendix A.....	194
Appendix B.....	201

## **General Introduction**

### **The Context: University Students as a Population At-Risk for Depressive Symptoms**

University students are at high risk to develop symptoms of distress and depression, especially those who feel the greatest academic burden (Adlaf, Gliksman, Demers, & Newton-Taylor, 2001; Mikolajczyk et al., 2008). Rates of depressive disorders in university samples around the world range from 13-22% and up to 44.3% of undergraduate students with sub-syndromal symptoms experience negative effects on their academic performance due to these symptoms (Eisenberg, Gollust, Golberstein, & Hefner, 2007; Steptoe, Tsuda, Tanaka, & Wardle, 2007). The impact of depressive symptoms on university performance is widespread; it can lead to fewer job opportunities, difficulties in building social support networks (as the students attend fewer social events), and it puts university students at a greater risk to commit suicide (Eisenberg et al., 2007).

Cognitive Behaviour Therapy (CBT) is an effective treatment to address depressive symptoms; however, there are insufficient practitioners to cater to the needs of students on university campuses (Cuijpers, et al., 2013; Voekler, 2003). Thus, there is a need for the development of brief, cost-efficient (i.e., is effective and requires few resources to implement), and effective depression prevention programs. There are many examples of CBT-based depression prevention programs (mostly for adolescents, but a few for university students), but most successful programs could be characterized as time- and resource-intensive (Cuijpers, van Straten, Smit, Mihalopoulos, & Beekman, 2008). The largest effect sizes are found for programs that have 8 or more 60-90 minute sessions, focus on adolescents rather than children, are selective or indicated rather than

universal, are delivered by clinicians/program creators rather than paraprofessionals and have greater portions of high-risk adolescents, females, and older adolescents (Jané-Llopis, 2003; Stice, Shaw, Bohon, Marti, & Rohde, 2009). Unfortunately, these programs often display small effect sizes post-intervention ( $d = 0.24$ ) and dissipate further at follow-up ( $d = 0.10$ ; Merry & Spence, 2007; Stice, et al., 2009).

There are various explanations for the small effect sizes in depression prevention program studies. An important consideration is the *target* of the intervention. Horowitz and Garber (2006) keenly observed that most depression prevention programs target the *reduction of depressive symptoms*, rather than the actual prevention of depressive episode onset, which is arguably more important for prevention programs. In prevention populations, oftentimes there are low base rates of depressive symptoms; thus, it is difficult to detect changes in symptoms (Coie, et al., 1993). Complementing this line of thinking, more appropriate targets for prevention programs may be *risk factors* for the onset of first depressive episodes, such as negative biases in cognitive processing (to be encompassed under the term “negative thinking;” discussed in depth below). Such risk factors likely have a higher base rate than depressive symptoms themselves. Although the literature does not specify the severity or frequency of negative thinking “necessary” to trigger the onset of depression, prospective longitudinal studies indicate that negative thinking predicts increasing depressive symptoms and episode onset (Yan, Kong, He, McWhinnie, Yao, & Xiao, 2015). Currently, the model of prevention studies more closely resembles a treatment study model, where the goal is to reduce symptoms. Not surprisingly then, prevention programs also closely resemble full CBT treatment protocols for depression with the accompanying myriad of interventions: relaxation,

behavioural activation, cognitive restructuring, etc. (Horowitz & Garber, 2006). A selection of these techniques may be sufficient to reduce depression risk

This model of “throwing everything in, including the kitchen sink,” makes it extremely difficult to understand mechanisms of change in prevention programs. Sutton (2007) criticized the prevention literature for its lack of focus on mechanism research to allow us to better understand *how* prevention programs stop the onset of depression. A greater understanding of mechanisms of change would allow prevention researchers to develop briefer, more focused, interventions using the fewest active ingredients necessary to promote longer-lasting and more substantial prevention effects (Sutton, 2007).

Furthermore, using this copy-and-paste approach from CBT treatment programs to prevention may not be appropriate, because those at risk for depression differ from those experiencing an active depressive episode (Mezulis, Shibley Hyde, & Abramson, 2006; Taylor & Ingram, 1999). Mechanisms of change in prevention may differ from such mechanisms in treatment studies. In addition, although Beck has outlined a distinct theoretical mechanism of change in CBT, there is mixed support for this model in the literature (Beck & Dozois, 2011; Garratt, Ingram, Rand, & Sawalani, 2007). Given this lack of a clearly established mechanism of change in CBT intervention studies and that prevention populations likely have fundamentally different needs (Mezulis, Shibley Hyde, & Abramson, 2006; Taylor & Ingram, 1999), there is a need to develop and test novel mechanism of change models specifically for depression prevention programs.

### **Goals of the Current Research**

Therefore, this line of research aimed to accomplish two goals: one theoretical and one applied or clinical. The theoretical goal was to develop a greater understanding of the mechanism of change in CBT-based prevention programs (that *may* potentially generalize to other prevention programs) in the following ways. First, I applied a formal model of behaviour change, the theory of planned behaviour (to be discussed below; Ajzen, 1991), to improve our understanding of the mechanism of change in a CBT depression prevention program to change thinking patterns. Second, I will be focusing on a target skill in CBT (restructuring cognitions) and using of the theory of planned behaviour to further elucidate how this cognitive change strategy works in a prevention context. Third, I will explore the relationships among TPB and CBT-related variables, as well as the ability to manipulate both variables within one intervention, which will be necessary to establish prior to mechanism of change studies. The applied goal is to develop a brief depression prevention program that can be facilitated by paraprofessionals and that targets one key mechanism (thinking patterns).

### **The Interplay Between Mechanisms of *Onset* and *Change* in Depression and the Integration of a Formal Model of Health-Behaviour Change**

**The mechanisms of depression onset: Choosing an appropriate target for prevention.** Individuals at risk for depression likely differ from their clinically depressed counterparts in terms of psychological processes and needs for intervention. Thus, targets traditionally associated with depression treatment, i.e., symptom reduction, may not be appropriate. One way to select more appropriate targets to assess as mechanisms of

change in prevention would be to select targets that are known precursors to the onset of *first* depressive episodes (Beck, 2008).

Prominent depression theorists, such as Beck (2008) and Abramson and Alloy (Hopelessness Theory; Abramson, Metalsky, & Alloy, 1989), proposed variations of a cognitive diathesis-stress model of first depressive episode onset. Those at risk for depression will possess certain cognitive processing diatheses or vulnerabilities that become activated when at-risk persons experience significant and/or chronic stressors, which can then trigger their first major depressive episode. As CBT is based on Beck's model (1963, 2008), I will focus on cognitive diatheses as defined by Beck.

According to the Beck model (1963), individuals at risk for depression (or currently experiencing depression) experience negative cognitions in response to external stimuli or events. The content of these cognitions is frequently a distortion of reality, in terms of being an interpretation that is irrelevant to the actual situation and disproportionately self-disparaging. These thoughts often take the form of unrealistic interpretations of the self (as unable to cope, under-skilled, not living up to expectations), others (as being uncaring) and the future (as hopeless and overwhelming; Beck, 1963). Eventually depressed individuals' thought patterns are reduced to a small set of idiosyncratic ideas or rules and these individuals would apply these ideas repeatedly across many situations. These "rules" coalesce into a "schema" or an established cognitive structure or organization of attitude that depressed individuals use to respond to a range of stressors using a limited set of distorted perceptions or ideas (Beck, 1964).

Most of the research on the cognitive diathesis-stress hypothesis for depression onset has focused on children and adolescents who have at least one parent with a history

of depression (considered to be a major risk factor), but have yet to experience their own first depressive episode. Such studies have examined the interactional relationship between many types of negative thinking (self-reported dysfunctional attitude and measures of implicit cognitive biases) and the experience of stress (self/parent-reported negative life events and cortisol measures) and their prediction of depressive symptoms and the onset of depressive disorders. Findings for the diathesis-stress hypothesis have been mixed in that some studies demonstrate this relationship uniquely among children and adolescents of depressed parents, even when controlling for their current depressive symptom levels (Seeds & Dozois, 2010; Hayden, et al., 2014; Yan, Kong, He, McWhinnie, Yao, & Xiao, 2015); whereas, others have shown that the relationship between cognitive diatheses and stress in the prediction of depression onset varies depending on the sex of the adolescent and whether or not it is reported by a parent or the adolescent (Mackrell, Johnson, Dozois, & Hayden, 2013). These mixed findings are likely related to the diversity of methods used to assess cognitive diatheses and stress across studies. Despite the inconsistent findings, these studies suggest that cognitive biases are a risk factor for depression; however, to be a suitable target for prevention, the presence of cognitive biases must be clearly demonstrated in high-risk (HR) groups, particularly, in this case, undergraduates.

Numerous studies have demonstrated an important phenomenon in populations uniquely at risk for depression. For instance, in a study by Taylor and Ingram (1999), HR children (having parental depression history) were compared to low risk children (LR; no family history) on their propensity to endorse more positive or negative self-descriptors, as assessed by the Self-Referent Encoding Task (SRET). A greater propensity to endorse

negative self-describing words faster (by pressing a button when the word flashes on the screen) is proposed to be indicative of having a negative schema about oneself. The opposite is true for a bias towards quicker endorsement of positive self-descriptors. HR and LR children demonstrated equal endorsement of positive and negative self-descriptors. However, in a negative mood prime condition, HR children endorse half as many positive words as LR children experiencing the same mood prime, *and* HR and LR children in the neutral prime condition. The authors concluded that perhaps the *loss* of positive self-image, as opposed to an increase in negative self-image, when experiencing negative mood states (possibly triggered by stressors), is a mechanism of first depressive episode onset (Taylor & Ingram, 1999). Variants of this paradigm have been replicated in children, adolescents and university students, such as selective attention to negative faces over positive ones in adolescents, reduced positive schematic processing in preschoolers, increased implicit (but not explicit) dysfunctional attitudes, and greater integration of negative schema content and looser integration of positive schema content (assessed using the Psychological Distancing Task) in university students (Hayden, Klein, Durbin, & Olino, 2006; Joorman, Talbot, & Gotlib, 2007; Rawal, Collishaw, Thapar, & Rice, 2013; Seeds & Dozois, 2010). In addition, negative cognitive biases have also been found to mediate the relationship between parent-related risk factors and depression onset in university students (Alloy et al., 2012; Mezulis, Shibley Hyde, & Abramson, 2006).

Lastly, although not germane to the above discussion because this research describes mechanisms of depression *relapse*, not *onset*, similar differences in cognitive response to mood primes have been found among never depressed (LR) individuals, currently depressed individuals, and remitters (HR). When under a neutral prime,

remitters demonstrate similarly low rates of depressive symptoms and cognitive biases as never depressed individuals, but resemble clinically depressed individuals *only* when a negative mood is induced (Wang, Halvorsen, Eisemann, & Waterloo, 2010; Ingram & Ritter, 2000; Ladouceur, Dahl, Williamson, Birmaher, Ryan, & Casey, 2005; Oostrom et al., 2013; Vrijzen, Becker, Arias-Vásquez, van Dijk, Speckens, & Oostrom, 2014). The plethora of research above clearly indicates that some forms of cognitive bias, be they excessively negative or insufficiently positive, implicit or explicit, are important precursors to first episode onset and thus, would be an appropriate target for a depression prevention program.

**Cognitive mechanism of change research in CBT: Lessons for prevention research.** Unfortunately, limited mechanism of change studies have been conducted on prevention programs (Sutton, 2007). One prevention study in university students supported pessimistic explanatory style (a form of negative cognitive bias) as a mediating factor in depressive symptom reduction and prevention of first episode onset, which supports targeting cognitive biases in a prevention program (Seligman, Schulman, & Tryon, 2007). Given the limitations of generalizability from one study, I will now turn to the wider literature on cognitive mechanism of change research in CBT.

CBT protocols contain a series of skills that patients with depression can learn to alter their problematic thinking patterns (cognitive restructuring, schema change techniques; Beck & Dozois, 2011). It has been proposed that it is via the reduction of negative cognitive biases that a depressive episode remits (Beck & Dozois, 2011). However, findings of CBT randomized control trials do not consistently support this hypothesized mechanism of change (Garratt, Ingram, Rand, & Sawalani, 2007; Webb,

Auerbach, & DeRubeis, 2012). There are several studies that support this process of change. In a trial of group CBT for depression, negative automatic thoughts had a steeper reduction in the first four weeks of treatment then plateaued. However, dysfunctional attitudes were unchanged until weeks 4 – 8 of treatment. Both indicators of negative cognitions predicted outcomes by session 12 (Kwon & Oei, 2003). In individual CBT, negative automatic thoughts mediated the relationship between the reductions in dysfunctional attitudes and subsequent depressive symptom reduction (Furlong & Oei, 2002). The positive correlations between reductions in negative automatic thinking and post-treatment symptom reductions have been replicated independently in numerous other studies (Christopher, Jacob, Neuhaus, Nearly, & Fiola, 2009; Tang, DeRubeis, Beberman, & Pham, 2005).

In contrast, some studies have found that the participants in CBT trials experience significant reductions in symptoms prior to engagement in thought-change strategies and in interventions where cognitive-restructuring is not introduced (i.e., Behavioural Activation; Jacobson, et al., 1996; Strunk, Brotman, & DeRubeis, 2010; Tang, et al., 2005). Other studies have found cognitive change to predict depression remission in other non-CBT therapies, such as pharmacotherapy (Fournier, DeRubeis, Hollon, Gallop, Shelton, & Amsterdam, 2013). In fact, some studies have demonstrated that the cognitive change is stronger for those who receive antidepressant medication versus those who receive CBT (Quilty, McBride, & Bagby, 2008).

Furthermore, as demonstrated in mechanism of onset research, the evidence is mixed in terms of the relative importance of negative versus *positive* cognitive processes. In one trial, the modification of *positive*, but not negative, schema predicted symptom

remission (Dozois, et al., 2009). Another trial's results suggested that CBT acts to strengthen positive schematic content *and* destabilize negative content and *both* processes are essential to remission (Quilty, Dozois, Lobo, Ravindran, & Bagby, 2014). Thus, it may prove beneficial to examine negative and positive cognitive processes as potential targets for depression prevention to augment intervention effects.

Kazdin (2007), in his review and critique of the study of mechanisms in psychotherapy literature, called on researchers to examine the role of more foundational psychological processes in psychotherapeutic outcomes: learning theory, behaviour change theories, and motivation. In support of this proposal, many other factors have been documented to influence symptom remission. For instance, the patients who endorse the CBT conceptualization of depression are more optimistic about CBT outcomes, have greater willingness to learn CBT skills, feel responsible for change, have a sense of self-efficacy to learn and use CBT skills and complete more homework outside of session have demonstrated improved outcomes (Detweiler & Whisman, 1999; Dozois, et al., 2014; German, Lorenzo-Luaces, & DeRubeis, 2014; Kwon & Oei, 2003; Renaud, Russell, & Myhr, 2014; Strunk, et al., 2010). Such outcomes suggest that we could garner a greater understanding of the CBT mechanism of change, in treatment and prevention, if we combined the CBT conceptualization of change with a health-behaviour change theory that explains readiness for skill-uptake, self-efficacy, and optimism about treatment.

**The use of a health-behaviour change model to increase understanding of mechanisms of change.** Some authors are beginning to turn to theories of broader cognitive change to explain these phenomena mentioned above (Warmerdam, van

Straten, Jongasma, Twisk, & Cuijpers, 2010). The theory of planned behaviour (TPB; Ajzen & Madden, 1985) is a health-behaviour change theory that encompasses the components mentioned above and has successfully explained the uptake of a wide variety of health behaviours, including psychological service use (Armitage & Connor, 2001; Mo & Mak, 2009, Schomerus, Matschinger, & Angermeyer, 2009). Incorporation of TPB can augment our understanding of mechanisms of change in CBT-based prevention programming in the following ways: It is a formal model of health-behaviour change that explains how cognitive processes influence behaviour, it is a well-established model of health-behaviour change (Armitage & Connor, 2001), and thinking patterns are behaviours that are amenable to change (Dozois, et al., 2014)

***The theory of planned behaviour and the prediction of health-behaviour change.*** The theory of planned behavior (Ajzen, 1991) is a cognitive or information-processing approach that postulates that behaviour change is predicted by intention to change. Intention is shaped by three categories of cognitive antecedents: attitude, subjective norms, and perceived behaviour control (Ajzen, 1991). This cognitive approach assumes that a person can think rationally about a behaviour to be performed and that the behaviour is under volitional control (Fishbein & Ajzen, 2011).

***The power of TPB to predict general health-behaviour change.*** The predictive power of the theory of planned behaviour has been demonstrated across many health behaviours (physical activity, dieting, smoking cessation, condom use, etc.) in several meta-analyses (Armitage & Connor, 2001; McEachan, et al., 2011; Ravis & Sheeran, 2003). Consistently, one achieves significant prediction of intention from TPB antecedents (39 – 44.3% of the variance in intention; Armitage & Connor, 2001;

McEachan, et al., 2011; Rivas & Sheeran, 2003). The theory of planned behaviour works best when behaviours are studied over a shorter interval (weeks instead of months) and in university student populations – ideal for university-based, brief prevention programs (McEachan, et al., 2011). None of these meta-analyses included studies on psychotherapy, seeking psychological services, or participation in prevention; however, some research has recently emerged to suggest that the theory of planned behaviour is a useful framework for understanding behaviours related to psychological services seeking.

*The power of TPB to predict psychological service use.* Skogstad, Deane, and Spicer (2006) published a study where TPB was used to understand the social determinants of seeking psychological services for suicidality and emotional problems in the New Zealand prison system. Attitude, subjective norms, and perceived behaviour control significantly predicted 44 and 43% of the variance in intention to seek psychological services for suicidality and emotional problems, respectively, which is comparable to meta-analytic results in studies of other health behaviours (Skogstad, et al., 2006). Attitude was the strongest predictor of intention to seek help for emotional problems and subjective norms was the strongest predictor of intention to seek help for suicidality.

The theory of planned behaviour has also been applied in diverse cultural contexts to psychological service seeking in the general population in Ireland, Germany, and China. Schomerus, Matschinger, and Angermeyer (2009) demonstrated that among non-depressed Germans, the theory of planned behaviour constructs predicted 42% of the variance in intention to seek psychological services. Prediction rose to 50% of the variance in a depressed sub-sample (Schomerus, et al., 2009). Attitude was the strongest

predictor of intention, followed by subjective norms, and then perceived behaviour control. Hyland and colleagues (2012) found comparable results in at-risk Irish government workers, with theory of planned behaviour constructs predicting 50% of the variance in intention to seek help for a mental health problem. In contrast, perceived behaviour control was the greatest predictor of intention, followed by subjective norms, then attitude (Hyland, McLaughlin, Boduszek, & Prentice, 2012). The theory performed best in a sample of Chinese adults, with 57% of the variance in intention explained (Mo & Mak, 2009). However, subjective norms played a more central role in this sample, both as a direct predictor of intention and a mediator between intention and the other antecedents. The authors attribute this finding to greater emphasis on collectivism found in the Chinese culture (Mo & Mak, 2009). Ajzen (2011) indicated that the predictive strength of the antecedents will vary by both the target behaviour and by the cultural context of the sample; thus the variability in predictive strength of the antecedents is to be expected. Overall, the strength of the theory of planned behaviour to predict psychological service use is comparable, if not stronger in some contexts, to previous meta-analyses of other health behaviours.

***Components of the theory of planned behaviour.***

*Attitude.* The first antecedent of intention is attitude, which is an evaluation of benefits and costs of performing a behaviour. It is composed of two sub-constructs: behavioural beliefs, the belief that performance of the behaviour could produce favorable or unfavorable outcomes; and outcome evaluation, the perceived likelihood of these favorable or unfavorable outcomes (Ajzen, 1991). When forming an attitude towards a behaviour, a person will consider things like the perceived consequences (behavioural

beliefs) and the expected experiences (outcome evaluation) associated with performing that behaviour. In the context of increasing intention to change negative thinking, having a positive attitude towards this behaviour would require a person to believe that using thought-change strategies (cognitive restructuring) would produce favorable outcomes (prevent depression) and this favorable outcome is likely to occur.

The theory of planned behaviour is an expectancy-value model – it hypothesizes that “attitude develops reasonably from the beliefs people hold about the object of the attitude” (Ajzen, 1991, p. 191). They assign certain attributes to the behaviour (good, worthwhile, painful, or too costly) that have a positive or a negative value and these beliefs automatically influence the attitude to be positive or negative. We are more likely to do behaviours if we assign positive attributes or beliefs to them and vice versa.

Attitude has been shown to be a strong predictor of the intention to perform a behaviour in several meta-analyses. Armitage and Connor (2001) found a multiple correlation of 0.49 between attitude and intention to perform a variety of health behaviours, which is considered to be a medium to large effect size (Cohen, 1992). In a more recent meta-analysis collapsed across multiple health behaviours, McEachan and colleagues (2011) found attitude to be a statistically significantly stronger predictor of intention than subjective norms or perceived behaviour control, with a beta of 0.35. It also correlates significantly with subjective norms ( $B = 0.44$ ) and perceived behaviour control ( $B = 0.45$ ; McEachan, et al., 2011).

*Subjective Norms.* In contrast to attitude, which focuses on the individual’s opinions about a behaviour, the original conceptualization of subjective norms described an individual’s beliefs about the opinions of important others about the behaviour (Ajzen,

1991). This construct also had two sub-constructs: normative beliefs, which described an individual's beliefs about the opinions of important others (friends, family, teachers, or health professionals) on the value of performing a given behaviour; and the motivation to comply, which pertained to how important it was to a person to act in a way consistent with those normative beliefs. Continuing with the negative thinking example, to increase the intention to change negative thinking, a person must believe that important others (family, friends, doctors) would support their practicing techniques to reduce negative thinking (cognitive restructuring, thinking positive thoughts) to prevent depression and they would need to be motivated to act in accordance with those normative beliefs (i.e., want social approval).

Researchers have uncovered several problems with subjective norms as it was originally conceptualized. In Armitage and Connor's (2001) meta-analysis, it was found that subjective norms have the weakest association with intention of the three proposed antecedents with a multiple  $R$  of 0.34. This may be related to issues around measurement, as subjective norms are often only measured with a single item and multi-item measures perform significantly better. (multiple  $R$  of 0.28 vs. 0.38, respectively; Armitage & Connor, 2001). In addition, Fishbein and Ajzen (2011, p. 147) note that motivation to comply has proven to be "a particularly problematic construct" due to both measurement issues (use of single-item measures) and the confound of how noticeable the behaviour would be to others when determining motivation to comply. For example, if you can seek mental health services privately, you may not care about social opinion. On the other hand, this "weakest link" phenomenon is not universal. In adolescent samples, subjective

norms have been shown to be the greatest predictor of intention to perform behaviours (McEachan et al., 2011).

To address these issues, Sheeran and colleagues began a research program into the role of descriptive norms in predicting intention. They re-conceptualized subjective norms as injunctive norms, “what significant others think the person *ought* to do” or perceived social pressure (Rivis & Sheeran, 2003, p. 219). This was contrasted with descriptive norms, which is a person’s perception of what important others do *themselves*. For example, an injunctive norm would be, “My friends think I should try thought-change strategies to prevent depression.” A descriptive norm would be, “My friends use thought-change strategies to prevent depression.” The addition of descriptive norms has been shown meta-analytically to increase the prediction of intention by 5%, even after controlling for other the variables in the model. It correlates with the other antecedents of the theory of planned behaviour and has been found to be the strongest predictor of intention after attitude with a multiple *R* of 0.44 (after controlling for attitude, subjective norms and perceived behaviour control). This construct has significantly more predictive power in child and undergraduate samples (Rivis & Sheeran, 2003).

*Perceived Behaviour Control.* Perceived behaviour control describes how much an individual believes that the behaviour is under his or her control (Ajzen & Madden, 1985). Perceived behaviour control has two sub-constructs – control beliefs, how much a person believes he or she possesses certain traits or resources to facilitate a behaviour; and perceived power, a person’s belief about the likelihood that he or she can perform this behaviour (Godin, Gagné, & Sheeran, 2004). For example, a person will have greater intention to change negative thinking if he or she thinks he or she possesses sufficient

skill, knowledge, emotional strength, etc., to use thought-change strategies and that possessing these resources increases one's ability to change thinking patterns.

Ajzen (2011) noted that perceived behaviour control is very similar to Bandura's self-efficacy construct. In fact, he postulated that they were part of the same latent construct (Ajzen, 2011). Bandura (1982, p. 122) defined self-efficacy as, "judgments of how well one can execute courses of action required to deal with prospective situations." This relates closely to perceived behaviour control, which includes a participant's sense of whether or not performing said behaviour would be difficult and how able he or she thinks he or she is to perform the behaviour (Ajzen, 1991).

Perceived behaviour control is the second strongest predictor of intention with a multiple  $R$  of 0.43 (Armitage & Connor, 2001). It is also significantly correlated with actual behaviour performance with a multiple  $R$  of 0.37 (compared to the behaviour-intention correlation of 0.47; Armitage & Connor, 2001). Fishbein and Ajzen (2011) hypothesized that when a behaviour is completely under the control of a person, intention should be sufficient to predict behaviour, but as actual control declines perceived behaviour control may play an increasingly important role in predicting behaviour, both directly and mediated by intention. McEachan and colleagues (2011) demonstrated in a meta-analysis that perceived behaviour control is a significant *direct* predictor of behaviour, with a beta of 0.31 (compared to a beta of 0.57 for intention).

*Intention.* According to the theory of planned behaviour (Ajzen, 1991), attitude, subjective norms, and perceived behaviour control are the antecedents or the predictors of intention to perform a behaviour. Intention is the motivational component, the desire or willingness to try or execute a particular behaviour (Ajzen, 1991). It also encompasses a

person's readiness to try a behaviour (Fishbein & Ajzen, 2011). In the context of the negative thinking example, those with strong intention have plans, willingness, and a desire to try thought-change strategies in the near future. Intention (generally) is the strongest predictor of actual behaviour performance (meta-analytic multiple  $R$  of 0.47; Armitage & Connor, 2001; McEachan et al., 2011).

*Other important factors: Affect and past behaviour.* Recently, researchers have queried the role of affect and past behaviour in increasing the predictive power of the theory of planned behaviour. Affect is of particular interest to the proposed work because of its relevance to depression treatment and prevention. Anhedonia or a lack of pleasure or interest frequently coincides with depression and may undermine one's intentions to engage in thought-change strategies, in a treatment or prevention context (American Psychiatric Association, 2013). Furthermore, depressive symptom severity is a significant predictor of seeking psychology services (Collins, Westra, Dozois, & Burns, 2004). Therefore, affect may play an important role in the successful uptake of CBT activities, but affect does not have a clear role in the theory of planned behaviour. Ajzen (2011) explained that affect would indirectly influence intention by influencing a person's TPB antecedents, which in turn influence intention.

Another important predictor of future behaviour is past behaviour. For instance, positive experience with mental health services predicts future help-seeking (Jaycox, et al., 2006). Past behaviour has been shown to predict an additional 5% of the variance in behaviour, after controlling for attitude, subjective norms, perceived behaviour control, and intention (McEachan, et al., 2011). Ajzen (2011) has acknowledged the role of past behaviour in health-behaviour uptake, but argued that it was irrelevant to TPB. TPB

describes the process of making a conscious and rational decision to try a behaviour; whereas, past behaviour is indicative of habit formation, which is automatic, not conscious. Once a behaviour becomes a habit, a conscious decision is no longer needed to motivate the behaviour (once exercise becomes routine; Fishbein & Ajzen, 2011).

*The intervention and theoretical complementarity of CBT and TPB.* The intervention research on TPB suggests that the manipulation of TPB constructs can have important effects on health-behaviour uptake. In a meta-analysis of various health-behaviour change studies, it was found that change in TPB antecedents promoted significant improvements in both intention ( $d = 0.66$ ) and behaviour-uptake ( $d = 0.36$ ; Webb & Sheeran, 2006). Intention and behaviour were highly correlated, indicating the interventions that improve intention will also improve behaviour. Similar effects were found in a TPB study of psychotherapy attendance (Sheeran, Harris, & Epton, 2014). The TPB interventions with the greatest impact were brief interventions facilitated by paraprofessionals (not clinicians) that promoted perceived behaviour control. Group and individual formats demonstrated equal efficacy (Webb & Sheeran, 2006). The TPB-based interventions also demonstrated superiority over the interventions based on other health-behaviour change models (social-cognitive theory, health belief model; Webb & Sheeran, 2006). Certain techniques within the interventions, which significantly overlap with CBT, improved the effect size: psychoeducation about outcomes, planning and practice of skills, monitoring, and homework exercises (Webb & Sheeran, 2006).

The TPB provides a clear framework for understanding the role of beliefs and intention in behaviour performance. A greater understanding of the intention people have towards performing the necessary tasks in CBT (such as cognitive restructuring) may

shed light on the conditions necessary to maximize the success of CBT interventions (both treatment and prevention). Several merits of combining these theories have been discussed. First, the cognitive antecedents or beliefs in TPB (attitude, etc.) are similar to the salient automatic thoughts in CBT in that they are both surface-level cognitions that are amenable to change by intervention, either TPB or CBT-based (Hobbis & Sutton, 2005). TPB theory and intervention studies had not elucidated a theory for how the cognitive antecedents change. CBT has a clear theoretical mechanism of change, but it has been difficult to demonstrate clearly this theorized path of change in the research (Hobbis & Sutton, 2005; Garratt, et al., 2007). Finally, there is considerable overlap in the techniques used in TPB and CBT interventions (Michie, 2005; Webb & Sheeran, 2006). These areas of overlap support a call to researchers to begin exploring the integration of CBT and TPB models in determining health-behaviour change outcomes from both a theoretical and intervention standpoint (Hobbis & Sutton, 2005; Baranowski, 2005). Such a “hybrid” model may help us improve our understanding of mechanisms of change in CBT-based prevention programs.

**The proposed model of mechanism of change in negative thinking patterns:**  
**An integration of the CBT model and TPB.** The current proposed model utilizes the TPB to better understand the process of targeting negative and positive thinking (Figure 1). The classic cognitive-behavioural model suggests that depressive symptoms, or depressive disorder risk, are reduced via the learning of CBT strategies that target negative thinking (cognitive restructuring) and reduce the strength and prevalence of negative thinking and, subsequently, depressive symptoms. The TPB states that to change a health behaviour (i.e., reduce negative thinking or increase positive thinking), one must

have the intentions to perform the necessary acts to change this behaviour (learn thought-change techniques). Individuals will have the intention to change thinking patterns if a) they believe such techniques would help them change their thinking patterns and thus their depressive symptoms (attitude), b) that others would support them learning such techniques and would use these techniques themselves if they had detrimental thoughts (subjective norms), c) and that they have the capacity to learn and use the thought-change strategies (perceived behaviour control).

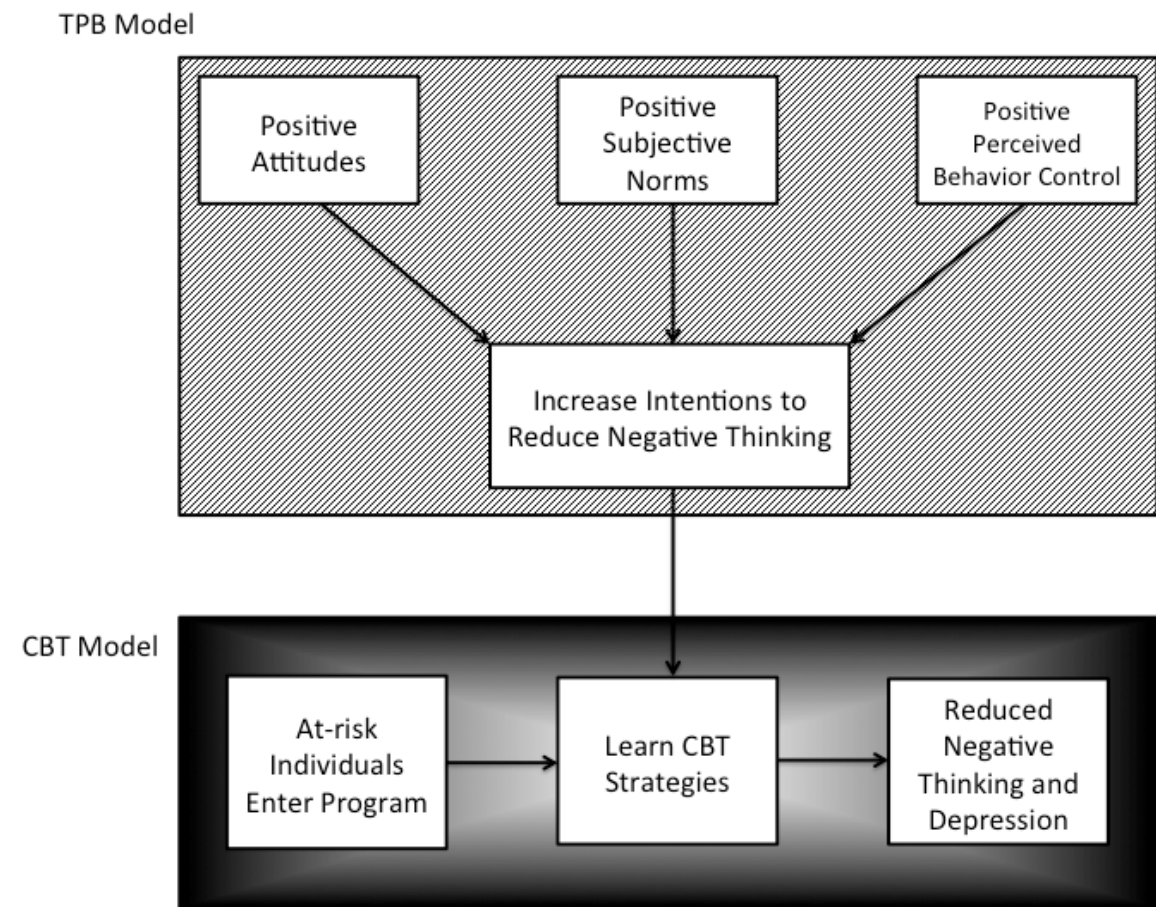


Figure 1. The proposed health behaviour change process model of engaging in CBT strategies to reduce negative thinking patterns. This model would also apply to increasing positive thinking.

**To Prevent or to Promote: Choosing a Framework for Early Intervention**

The TPB can help us understand the decision process to engage in thought-change strategies; however, as noted above, we must also decide whether or not it is best to target negative thinking, positive thinking, or both, as they both influence depressive episode onset. An emphasis on negative thinking would support the use of traditional clinical psychopathology paradigms to develop interventions and prevention programs. Conversely, an emphasis on the promotion of positive thinking and mental well-being is more consistent with a positive psychology paradigm and its associated techniques. Currently, both depression prevention programs and mental health promotion programs have been shown to have similarly small, but helpful effects on depressive symptoms and the prevention of mental illness (see Merry & Spence, 2007, and Durlak, et al., 2011, for review). Thus, to further develop our understanding of the mechanisms of change in order to build the least resource-intensive programs, with the largest effects, it would be useful to compare my CBT-TPB hybrid model's influence on negative versus positive thinking patterns and associated traditional clinical (depressive symptoms, negative automatic thinking) and well-being outcomes (positive affect, life satisfaction, positive automatic thinking).

**Summary and Purpose of this Research**

In sum, university students are at increased risk for the onset of depressive symptoms and disorders. Maladaptive thinking patterns are clearly related to depression phenomena and a central target for treatment in CBT protocols, a well-established treatment for depressive disorders. However, it is unclear whether or not the change in thinking patterns is the true mechanism of change in CBT. Our knowledge of the active

mechanisms in depression prevention programs is in its infancy. Despite these shortcomings, it is essential to address the need for psychological supports in university settings by use of brief, low-cost programs that can be easily disseminated. Also, we need programs that have a clear mechanism for motivating students to engage in activities related to improving their mental health guided by established behaviour change theories, such as TPB.

Therefore, I developed a program of research that addresses 1) the theoretical issues of supplementing the CBT theory with TPB constructs to improve our understanding of the mechanism of change in CBT interventions in prevention (with potential generalizability to treatment) and 2) the practical applied issue of developing an effective, targeted depression prevention/mental health promotion program that is brief and cost-effective for easy dissemination. Study 1 was an exploratory survey study, which aimed to pilot a measure of the TPB for increasing positive thinking and examine the relationships between TPB and CBT constructs. Study 2 was a feasibility trial of the workshop I co-developed with Dr. Santor, which aimed to test out the procedures of the workshop and provide preliminary evidence of the workshop's abilities to increase TPB antecedents and intention to improve thinking patterns. Study 3 was a randomized control trial, comparing students who participated in the workshop to students in a waitlist control condition. Study 3 aimed to test a modified version of the TPB questionnaire (comparing positive versus negative thinking) and to provide evidence of the workshop's ability to improve TPB antecedents, intention to change thinking, and clinical and well-being outcomes.

## Study 1

### **The Re-examination of the Cognitive Mechanism of Change Hypothesis in Cognitive Behaviour Therapy-Based Depression Prevention: The Role of Theory of Planned Behaviour Constructs**

**Abstract.** Cognitive behaviour therapy theorists hypothesize a cognitive mechanism of change model in depressive symptom improvement, but results of CBT mechanism trials have been mixed. The mechanism research in CBT-based prevention programs is in its infancy. Studies demonstrating motivational mediators suggest that using a health-behaviour change theory, such as the theory of planned behaviour, may help improve our understanding of mechanisms of change in CBT and related prevention programs. The participants were 406 undergraduate students who completed an online survey for course credit. Results indicated that the final version of the theory of planned behaviour (TPB) questionnaire targeting “increasing positive thinking” demonstrated adequate internal consistency reliability. An exploratory factor analysis demonstrated the hypothesized 4-factor structure: attitude, subjective norms, perceived behaviour control, and intention and was supported by a confirmatory factor analysis, where the measurement model demonstrated adequate model fit. Regression analyses indicate that the TPB antecedents (attitude and subjective norms) model more strongly predicted intention than the symptom severity model. The final hybrid structural equation model, where symptoms indirectly predict intention via TPB antecedents, demonstrated strong model fit and explained 56.0% of the variance in intention. These findings indicate the importance of expanding the cognitive mechanism of change model in CBT-based programs to incorporate motivational factors.

## **The Re-examination of the Cognitive Mechanism of Change Hypothesis in Cognitive Behaviour Therapy-Based Depression Prevention: The Role of Theory of Planned Behaviour Constructs**

### **Introduction**

Major Depressive Disorder (MDD) is a pervasive, harmful, and persistent illness. University students are considered to be a high-risk group to develop depressive disorders because of increasing academic and financial burdens (Adlaf, Gliksman, Demers, & Newton-Taylor, 2001; Mikolajczyk et al., 2008). Approximately 44% of students experience sub-syndromal symptoms that significantly affect their academic performance and one third to one half of those students will develop MDD (Eisenberg, Gollust, Golberstein, & Hefner, 2007; Steptoe, Tsuda, Tanaka, & Wardle, 2007). Given the chronic and cyclic nature of depression, it is important to prevent disorder onset and negative sequelae, such as academic failure and dropout, reduced employment prospects and limited social networks (Eisenberg, et al., 2007; Monroe & Harkness, 2005).

Fortunately, there are various efficacious and effective treatments for depression, such as Cognitive Behavioural Therapy (CBT; Beck & Dozois, 2011; Cuijpers, et al., 2013). Unfortunately, there are limited mental health resources on university campuses and few professionals trained in CBT (Cuijpers, et al., 2013); thus, there are not enough evidence-based supports for students who struggle with depression (Voekler, 2003). Clearly, there is a need for depression prevention programs that are brief, cost-effective, and that can be facilitated by trained paraprofessionals, in order to support students in times of stress and prevent their need for more intensive treatment. Few depression prevention programs have been developed specifically for university students and those

that exist are both resource- and time-intensive (Seligman, Schulman, & Tryon, 2007). To make matters worse, most depression prevention programs have demonstrated small effects ( $d = 0.24$ ) that dissipate by the time of follow-up ( $d = 0.10$ ; Merry & Spence, 2007).

Sutton (2007) proposed that a major limitation of prevention research, that likely affects the effect of these interventions, is the lack of mechanism of change research. Such research would help elucidate *how* programs work to prevent depression onset (Sutton, 2007). An understanding of the mechanisms of change will allow us to pick the fewest “active ingredients” or specific techniques necessary to maximize change and, therefore, improve participant outcomes. In addition, this approach would aid the development of shorter, less resource-intensive programs. Therefore, prior to developing yet another depression prevention program, it would be helpful to create and test a formal model of health-behaviour change specific to changing targets relating to depression prevention.

Most depression prevention programs are based on Beck’s CBT for depression and, thus, include many interventions found in full CBT protocols (i.e., behaviour activation, relaxation, cognitive restructuring, etc.; Horowitz & Garber, 2006). Use of various theoretically diverse interventions also muddies the mechanism of change research. Which technique promotes change? There are few mechanisms of change studies in CBT-based depression prevention programs (Seligman, Schulman, & Tryon, 2007); therefore, we must glean clues about the mechanisms of change in CBT-based depression prevention programs from studies of mechanisms of change in CBT for depressive disorders. That said, there are some important theoretical problems with

“upstream extension” of treatment programs to prevention programs, as I will return to later.

According to Beck’s hypothesized model of CBT for depression (Beck, Rush, Shaw, & Emery, 1979), therapeutic interventions target negative automatic thinking and dysfunctional attitudes in order to produce changes in depressive symptoms. Negative automatic thoughts (i.e., surface level cognitive distortions) are targeted and reduced earlier in treatment, followed by the treatment of dysfunctional attitudes, or deeper level cognitions, using schema-change techniques. Thus, altering biased cognitive processes is considered to be the mechanism of change in CBT for depression.

There are several studies that support this process of change. In a trial of group CBT for depression, negative automatic thoughts had a steeper reduction in the first four weeks of treatment, and then plateaued. However, dysfunctional attitudes were unchanged until weeks 4 – 8 of treatment. Both indicators of negative cognitions predicted outcomes by session 12 (Kwon & Oei, 2003). In individual CBT, negative automatic thoughts mediated the relationship between reductions in dysfunctional attitudes and subsequent depressive symptom reduction (Furlong & Oei, 2002). The positive correlations between reductions in negative automatic thinking and post-treatment symptom reductions have been replicated independently in numerous other studies (Christopher, Jacob, NeuHaus, Nearly, & Fiola, 2009; Tang, DeRubeis, Beberman, & Pham, 2005). In addition, support has been found for CBT in altering positive cognitive processes. For instance, compared to pharmacotherapy, CBT has been found to improve positive schema content, in addition to destabilizing the integrity of

negative schematic structures (Dozois, et al., 2009; Quilty, Dozois, Lobo, Ravindran, & Bagby, 2014).

Contrary to these findings, other authors challenge the specificity of cognitive change to CBT. Garratt and colleagues (2007) concluded from their review that changes in cognition do not consistently occur in CBT studies. Furthermore, cognitive change has been associated with symptom change in non-CBT treatments, such as pharmacotherapy (Fournier, DeRubeis, Hollon, Gallop, Shelton, & Amsterdam, 2013; Quilty, McBride, & Bagby, 2008). In fact, some studies have demonstrated that the relationship between symptom reduction and reductions in dysfunctional attitudes is stronger for those who receive antidepressant medication versus those who receive CBT (Quilty, et al., 2008). Furthermore, in CBT trials, there is documentation of a “sudden gains” phenomenon, where patients’ symptoms decrease dramatically within the first four sessions and those who experience this sudden drop have improved outcomes post-treatment over those who do not (Kwon & Oei, 2003; Strunk, Brotman, & DeRubeis, 2010; Tang, et al., 2005). Ilardi and Craighead (1999) argued that since “sudden gains” do not coincide with cognitive skills acquisition (which usually does not occur until later in treatment), cognitive change cannot be the mechanism of symptom change in CBT. In addition, based on the results of their randomized control trial comparing behaviour activation to standard CBT, where both treatments were equally effective, Jacobson and colleagues (1996) concluded that behavioural techniques are sufficient to improve symptoms for depressed patients. The inconclusive findings of these studies provide a context to explore other phenomena that may clarify the mechanism of change in CBT and thus, improve CBT outcomes.

The lack of a clearly established mechanism of change in CBT is one of several reasons why simply “copying-and-pasting” treatment interventions may not be the best method of depression prevention program development. As mentioned above, the incorporation of various, theoretically diverse, techniques makes it difficult to clarify mechanisms of change. A final, and arguably, essential issue to consider is that the *target* of intervention *should* differ between depression prevention and depression treatment! Horowitz and Garber (2006) have criticized the depression prevention literature for focusing on “symptom reduction” as an outcome for *prevention*. Prevention programs should prevent the *onset* of major depressive episodes and, thus intervention targets should promote the reduction in risk factors for depression onset, not depressive symptom reduction (Horowitz & Garber, 2006; Sutton, 2007). In addition, depression prevention program studies likely have small effects because of low base rates of depressive symptoms in study populations (Coie, et al., 1993). The risk factors for depression likely have higher base rates in the general population and are more amenable to change, making it “easier” to detect changes brought on by prevention programs. Therefore, to choose a target risk factor for change in a formal mechanism of change model for depression prevention, one must understand mechanisms of *onset* of depressive disorders.

Briefly, Beck (1963, 2008) proposed a cognitive diathesis-stress model of first depressive episode onset. I will focus on Beck’s model because it is the theory upon which CBT (and CBT-based prevention) is based. Individuals at-risk for depression (due to parental depression history, for example) possess certain cognitive vulnerabilities that may cause them to react in a disproportionately negative or self-disparaging manner to

chronic and/or significant stressors (Beck, 1963, 2008). Most studies of the diathesis-stress hypothesis have focused on children or adolescents of parents with a history of depression, but have not experienced a first episode. These offspring were considered to be at risk to develop depressive disorders. The findings of these studies frequently demonstrate that various forms of cognitive vulnerability, stressors, and cognitive vulnerability x stressor interactions, significantly predict depressive episode onset prospectively (Seeds & Dozois, 2010; Hayden, et al., 2014; Yan, Kong, He, McWhinnie, Yao, & Xiao, 2015). There are some exceptions that found no relationships among cognitive vulnerability, stress, and depression onset (Mackrell, Johnson, Dozois, & Hayden, 2013). Compared to low-risk children, adolescents, and university students, high-risk individuals display a unique cognitive profile, where levels of vulnerability are similar to low-risk individuals until a negative mood is induced. Once primed, negative cognitive processes escalate and protective positive cognitive processes dissipate to such a degree that the cognitive profiles of high-risk individuals resemble those of individuals currently suffering with major depressive disorder (Alloy et al., 2012; Hayden, Klein, Durbin, & Olino, 2006; Joorman, Talbot, & Gotlib, 2007; Mezulis, Shibley Hyde, & Abramson, 2006; Rawal, Collishaw, Thapar, & Rice, 2013; Seeds & Dozois, 2010; Taylor & Ingram, 1999). The current evidence supports the use of cognitive vulnerability factors as an appropriate target for depression prevention, as well as a target behaviour for change in a mechanism of change model.

Given the mixed and inconclusive findings around CBT cognitive mechanisms of change, it would be helpful to supplement this model with other established models of change to clarify our understanding of the mechanisms of change in CBT-based

prevention programs. Kazdin (2007), in his review and critique of the study of mechanisms in psychotherapy literature, called on researchers to examine the role of more fundamental psychological processes in psychotherapeutic outcomes (learning theory, behaviour change theories, and motivation). Such a criticism could also be extended to the prevention program literature. Several lines of research also point towards expanding our conceptualization of the cognitive variables that facilitate change in CBT. For instance, the patients who have higher expectancy of good outcomes experience greater symptom reduction compared to those who have low expectancy (Ebert, Gollwitzer, Riper, Cuijpers, Baumeister, & Berking, 2013). Greater expectations may also motivate patients to work harder in and outside of session. The patients who complete homework outside of CBT sessions demonstrated three times more symptom reduction than non-completers (Detweiler & Whisman, 1999). Similarly, the patients who accept the CBT conceptualization more readily also have greater homework compliance (Addis & Jacobson, 2000), and, in turn, their expectations are validated by the successes they experience from doing homework (Fennell & Teasdale, 1987). Furthermore, the patients who facilitate the therapist efforts to teach CBT techniques in session (bring more examples to work on in therapy, willingness to try new techniques) experience greater symptom reduction (Strunk, et al., 2010). Finally, several studies point to the role of self-efficacy in CBT outcome studies. For instance, experiencing a greater sense of self-efficacy or control predicts fewer cases of relapse, post-CBT intervention. (Dozois, et al., 2014; Quilty, et al., 2014). The “sudden gains” phenomenon in CBT has been demonstrated to be related to problem-solving activities (German, Lorenzo-Luaces, & DeRubeis, 2014). Similarly, the schemas related to self-control have been shown to

change over the course of CBT (Dozois, et al., 2014). In addition, the patients who expect positive outcomes from doing CBT and feel capable and responsible for these outcomes demonstrate greater reductions in depressive symptoms post-intervention (Renaud, Russell, & Myhr, 2014). Because motivational, acceptance, willingness and self-efficacy factors have been found to play a role in CBT outcomes for depression, the application of health-behaviour change theories that include the above-mentioned factors may be useful to improve our conceptualization of the mechanism of change in CBT for depression. The theory of planned behaviour (TPB; Ajzen & Madden, 1985) is a health behaviour change theory that encompasses the components mentioned above and has successfully explained the uptake of a wide variety of health behaviours, including psychological service use (Armitage & Connor, 2001; Mo & Mak, 2009, Schomerus, Matschinger, & Angermeyer, 2009, Skogstad, Deane, & Spicer, 2006).

There are several additional benefits to adopting the theory of planned behavior (TPB) in our efforts to understand how negative thinking can change in CBT interventions. First, TPB is a formal model that outlines how certain cognitions can lead to behaviour change. Second, it is an established model of behaviour change in a wide variety of health arenas. In fact, the TPB constructs have been shown to predict 42-57% of the variance in psychological service uptake of various forms across diverse samples, which is similar to its predictive power of uptake of other health behaviours (Armitage & Connor, 2001; Hyland, McLaughlin, Boduszek, & Prentice, 2012; Mo & Mak, 2009, Schomerus, Matschinger, & Angermeyer, 2009; Sheeran, Harris, & Epton, 2014; Skogstad, Deane, & Spicer, 2006) Third, negative automatic thinking (and related biases of cognitive processing) is a behaviour that can be changed, as demonstrated in some

CBT studies (Kwon & Oei, 2003). Fourth, the cognitive antecedents or beliefs in TPB (attitudes, etc.) are similar to the salient automatic thoughts in CBT in that they are both surface-level cognitions that are amenable to change by intervention, either TPB or CBT-based (Hobbis & Sutton, 2005). Finally, considerable overlap has been demonstrated between content of skills taught in TPB-based interventions and CBT-based interventions (Hobbis & Sutton, 2005; Michie, 2005). These areas of overlap support a call to researchers to begin exploring the integration of the CBT and TPB models in determining health behaviour change outcomes from both a theoretical and intervention standpoint (Hobbis & Sutton, 2005; Baranowski, 2005).

The theory of planned behavior (Ajzen, 1991) is a theory of behaviour change that can be used to help us understand the mechanisms by which people uptake the necessary tasks to change their thinking patterns in the context of CBT or related prevention programs. This theory is a cognitive or information-processing approach which postulates that in order to perform a particular behaviour, one must have the intention to perform that behaviour and this intention is influenced by three categories of cognitive antecedents: attitude, subjective norms, and perceived behaviour control (Ajzen, 1991). The construct of attitude encompasses beliefs around whether or not the performance of the behaviour could produce favorable outcomes and the perceived likelihood of these outcomes (Ajzen, 1991). The construct of subjective norms describes an individual's beliefs about the opinions of important others about the target behaviour, i.e., "Do those important to me think this is a good idea?" and "How important is it to me to act as I think *they* think I should act?" (Ajzen, 1991). Perceived behaviour control refers to a person's beliefs that they have the ability to do this behaviour and is closely tied to the

concept of self-efficacy (Ajzen, 2011). Finally, intention is the motivational component, the desire or willingness to try or execute a particular behaviour (Ajzen, 1991). It also encompasses a person's readiness to try a behaviour (Fishbein & Ajzen, 2011). In the context of the behavioural target of the uptake of cognitive change strategies to prevent depression (learning to increase positive, helpful thoughts), the greatest uptake of the target behaviour will occur if the individual believes that using these strategies will likely help prevent depressive symptoms (attitude), if important others believe using these strategies will help and that the individual is motivated to follow these normative beliefs (subjective norms), and finally if the individual believes he is able to learn the necessary skills to implement these strategies (perceived behaviour control). Those with favorable attitude, subjective norms, and perceived behaviour control will have greater intention to try these cognitive change strategies and intention is the strongest predictor of actual health behaviour change (Armitage & Connor, 2001).

A criticism of the theory of planned behaviour was that affective variables (emotion, psychological symptoms, cognitive styles, etc.) were not clearly accounted for in the model; however, Ajzen (2011) explained that the role of affect is a distal one. Affect indirectly influences intention by influencing a person's beliefs and subsequent attitude, subjective norms, and perceived behaviour control, which in turn influence intention (Ajzen, 2011). In contrast, an alternative model of willingness to engage in psychotherapeutic interventions of various kinds is what we will refer to in this article as the "symptom severity model." Numerous studies indicate that symptom severity is one of the greatest predictors of seeking psychological services (see Collins, Westra, Dozois, & Burns, 2004, for review). In the context of depressive symptoms, severity and

motivation have a unique relationship. One of the central diagnostic criteria of a major depressive episode is anhedonia, a lack of pleasure or interest in engaging in activities (American Psychiatric Association, 2013). The potential presence of anhedonia in at-risk individuals could easily undermine a facilitator's efforts to engage a depressed individual in CBT activities, such as in session exercises and homework, which, as shown above, are also related to CBT outcomes (and likely prevention outcomes). Therefore, severe depressive symptoms, such as low mood and anhedonia, may likely motivate someone to seek prevention supports or psychological services, but may demotivate someone when the time comes to engage in the psychotherapeutic "work," such as learning and practicing cognitive change skills in CBT-based programs. Therefore, the current work will compare a TPB model of predicting intention to "increase positive thinking" to a symptom severity model of intention. Finally, a hybrid model will be explored, where affective variables (depressive symptoms, positive affect, and negative automatic thinking) will function as distal factors predicting TPB antecedents (attitude, subjective norms, and perceived behaviour control), which predict intention directly. The authors chose "increasing positive thoughts" as the target behaviour because it was thought to be more intuitive for participants. Participants were made aware that "positive thoughts" were defined consistently with Persons and colleagues' (2001) definition of "functional thoughts" (i.e., thoughts that are fair to the individual and helpful to generate solutions to problems) when completing the theory of planned behaviour questionnaire. Thus this behaviour target is consistent with targeting and restructuring negative automatic thoughts and related processes, a typical goal in CBT treatment and prevention protocols (Beck, et al., 1979; Horowitz & Garber, 2006).

**The purpose of the research.**

The purpose of this research was to conduct an exploratory survey study to extend the use of the theory of planned behaviour from predicting intention to seek psychological services to predicting intention to increase positive thinking (i.e., engage in cognitive change strategies consistent with CBT-based treatment and prevention protocols; Beck, et al., 1979; Horowitz & Garber, 2006). We also aimed to compare the TPB model to the more traditional “symptom severity model” of intention to engage in psychotherapeutic intervention. Finally, we aimed to explore a “hybrid model” (see Figure 1) where intention is distally predicted by affect-related variables (depression, positive affect, and negative automatic thoughts) through TPB antecedents (attitude, subjective norms, perceived behaviour control), which directly predict intention. This study also allowed us an opportunity to pilot and perform psychometric analyses on our newly-constructed theory of planned behaviour questionnaire.

**Hypotheses.**

- 1) The final version of theory of planned behaviour questionnaire will demonstrate adequate psychometric properties in that each sub-scale (attitude, subjective norms, perceived behaviour control, intention) will map onto its own factor for a total of 4 factors, each sub-scale will have acceptable internal consistency reliability, and the measurement model of this questionnaire will be a good fit for the data.
- 2) The theory of planned behaviour antecedents (attitude, subjective norms, and perceived behaviour control) will predict intentions, in that as antecedents

- increase (indicating more positive attitude, subjective norms, and perceived behaviour control) so too will intentions.
- 3) The psychological symptom variables (increased depression and negative automatic thoughts, as well as decreased positive affect) will predict intentions (Collins, Westra, Dozois, & Burns, 2004).
  - 4) The prediction of intentions will improve when the previous two models are combined, i.e., in a hierarchical regression model, with TPB antecedents in step 1 and psychological symptom variables in step 2.
  - 5) The hybrid model of intention directly predicted by TPB antecedents and indirectly predicted by affect-related variables will provide a good fit for the data.

## Methods

The ethical approval for this project was provided by the University of Ottawa Research Ethics Board.

**Participants.** The participants for this study were 406 undergraduate students who completed an online survey for course credit. The majority of participants were female ( $n = 314$  or 77.3%) and the age of the participants ranged from 16 – 47 years old ( $M = 19.5$ ,  $SD = 3.7$ ). Most participants were within their first four years of study (97.9%) and a substantial portion of these participants were in their first year of study (71.8%). The participants reported a variety of maternal languages, but most participants reported English as their first language (70.4%), followed by French (16.3%).

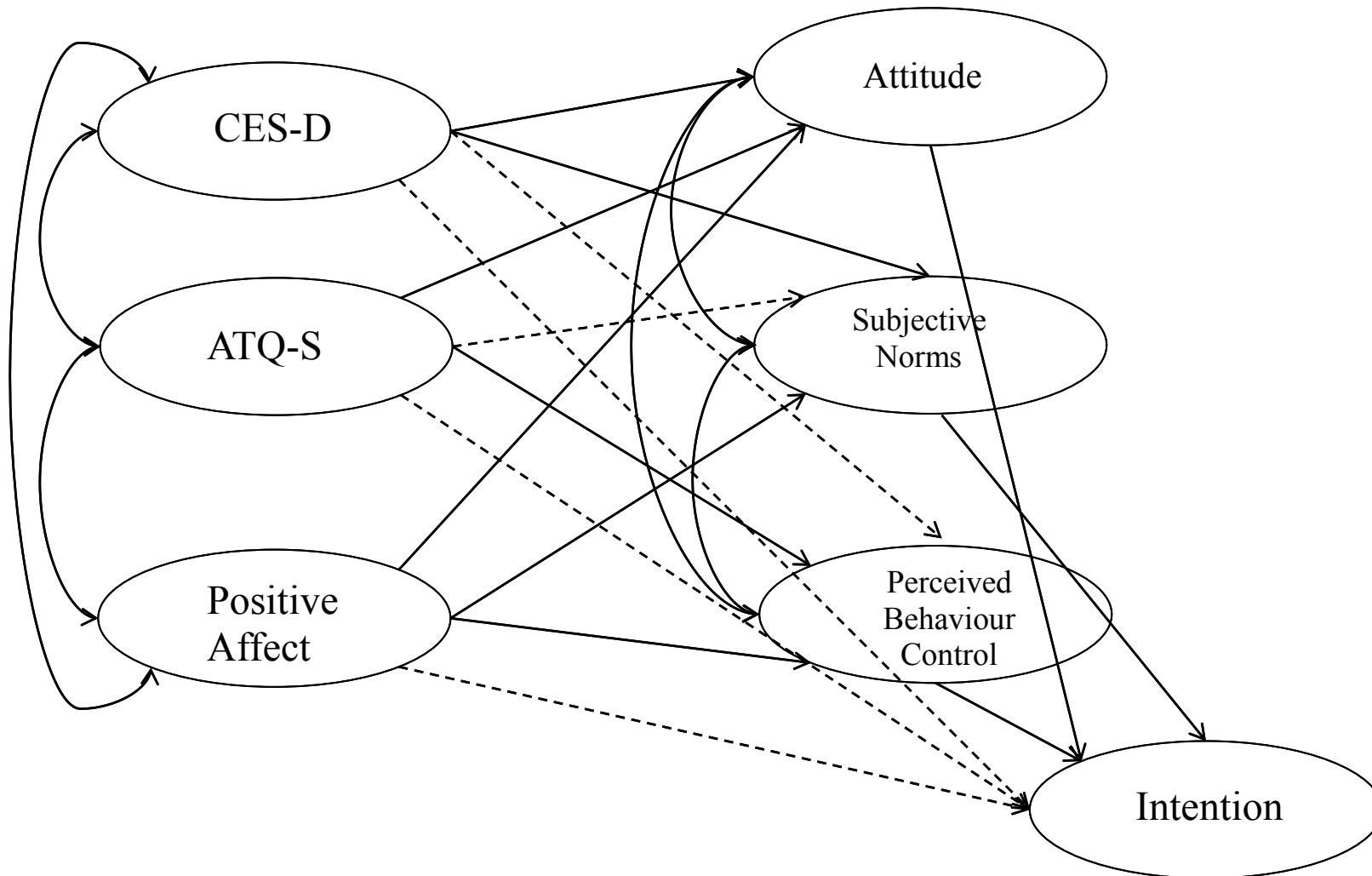


Figure 1. The “Hybrid” model of intention to increase positive thinking. “CES-D” = depressive symptoms; “ATQ-S” = negative automatic thoughts. Solid arrows indicate predicted direct effects. Dashed arrows indicate predicted indirect effects.

**Procedure.** The participants completed the questionnaires online, which took approximately 45 minutes to complete. The participants had to complete the survey in one sitting.

**Measures.**

*The theory of planned behaviour questionnaire (TPBQ; Bradley & Santor, 2011).* The TPBQ was developed based on Ajzen's (2006) guidelines. Initially, we created a 15-item, 7-point Likert-type scale questionnaire that assesses the TPB constructs of attitudes (4 items), subjective norms (5 items), perceived behaviour control (3 items), and intentions about increasing positive thinking (3 items). Greater scores indicate increasingly positive antecedents and intentions. The psychometrics and questionnaire structure were assessed as part of this study. See Appendix A for the final version of this questionnaire.

*Short automatic thoughts questionnaire (Netemeyer et al., 2002, ATQ-S).* The ATQ-S is an 8-item, Likert-type scale questionnaire used to assess the frequency of negative automatic thoughts. It is based on the Automatic Thoughts Questionnaire (ATQ; Hollon & Kendall, 1980), which is a 30-item, 5-option Likert-type scale questionnaire with higher scores indicating greater severity of negative automatic thoughts. The original ATQ shows highly satisfactory internal consistency reliability with a Cronbach's alpha of 0.96 and a split-half reliability of 0.97. It shows adequate convergent validity with depression measures ( $r$ 's from 0.45 to 0.70). The ATQ-S also has strong psychometric properties, with an internal consistency reliability of 0.92, which is comparable to the original version and also demonstrated adequate convergent and

discriminant validity with anxiety, stress, and life satisfaction measures (Netemeyer et al., 2002). In the current study, the ATQ-S was highly internally consistent,  $\alpha = 0.92$ .

***Positive and negative affect scale-child (PANAS-C; Laurent, Potter, & Catanzaro, 1999).*** Negative and positive affect were measured using the PANAS-C, which is a 30-item, 5-option Likert-type scale questionnaire with sub-scales that measure positive and negative affect (15 items each). We chose this measure because it was normed on participants up to 18 years of age and most of our target population (first-year university students) are 17-18 years old (Laurent, Joiner, & Catanzaro, 2011). It was also shorter than the full PANAS (60 items), which reduced the participants' burden. The PANAS-C shows satisfactory internal consistency on both sub-scales (positive affect  $\alpha = 0.87$ , negative affect  $\alpha = 0.92$ ; Hughes & Kendall, 2009). The internal consistency was strong for the current study as well; the alphas for positive and negative affect were both 0.90 and 0.90. Adequate convergent and discriminant validity have also been shown between the PANAS-C and measures of depression and anxiety (Hughes & Kendall, 2009).

***Center for epidemiologic studies depression scale (CES-D; Radloff, 1977).*** The CES-D is a measure of current depressive symptomology over the previous two weeks. It is a 20-item, Likert-type scale questionnaire that was designed to assess depressive symptoms in non-clinical populations. It has been validated for use in numerous university student samples (Yao, Fang, Zhu, & Zuroff, 2009). The CES-D has demonstrated highly satisfactory internal consistency (alphas ranging from 0.85 - 0.90) and split-half reliabilities ( $r$ 's = 0.76 - 0.85; Radloff, 1977). Convergent validity has been established with significant, positive correlations with negative automatic thoughts ( $r =$

0.79), dysfunctional attitudes ( $r = 0.36$ ) and other measures of depressive symptoms (Yao, Fang, Zhu, & Zuroff, 2009). The internal consistency for the current study was  $\alpha = 0.86$ .

#### **Data analysis plan.**

*The psychometric analyses and factor structure of the TPBQ.* Given that this was our first pilot of the TPBQ, we performed analyses to assess various properties of this measure in order to develop a final version of the questionnaire suitable to address our hypothesized structured model and for use in future studies. First, we computed Cronbach's alphas to assess the internal consistency reliability of the sub-scales designed to measure attitude, subjective norms, perceived behaviour control, and intention using all 15 items. We also conducted an exploratory factor analysis to determine what latent constructs were derived from the measured variables and compared these latent factors to our proposed sub-scales. The items from the TPBQ were removed if, upon reflection, they did not have sufficient face validity, severely compromised internal consistency of the sub-scale, and did not load sufficiently high (0.40 at minimum) onto a factor that was consistent with the theory of planned behaviour. That said, the items were allowed to cross-load because the TPB antecedents are considered to be theoretically interrelated (see Figure 1); however, to remain an item for a particular sub-scale, the item had to load most strongly onto that factor. The items were removed one at a time and the analyses were re-run until we arrived at the final, most theoretically valid and internally consistent sub-scales. The items were removed prior to hypothesis testing to reduce researcher bias. Once the final items of the TPBQ were selected, we re-computed Cronbach's alphas for our proposed sub-scales and conducted a confirmatory factor analysis in AMOS 21.0 to

assess the fit of the measurement model to our data. The model fit was assessed using the following fit indices: Chi-squared difference test (non-significance signifies good model fit; Bentler, 1995), goodness-of-fit index (GFI; values above 0.90 signify adequate model fit, above 0.95 indicates excellent fit; Tanaka & Huba, 1989), comparative fit index (CFI; values above 0.90 signify adequate model fit, above 0.95 indicates excellent fit; Bentler, 1988), root mean square error of approximation (RMSEA; values below 0.10 indicate adequate fit, values below 0.05 signify excellent fit; Browne & Cudeck, 1993), and standardized root mean square residual (SRMR; values below 0.10 indicate adequate fit, values below 0.05 signify excellent fit; Hu & Bentler, 1999).

***Hypothesized model testing.*** We computed correlations of TPB antecedents, intention, and symptom severity variables (CES-D, ATQ-S, PANAS positive affect) to examine the relationships among the symptom variables and TPB variables. We then performed two simultaneous regressions to assess the prediction of intention to increase positive thinking. The first regression examined the prediction of intention from the TPB antecedents (attitude, subjective norms, and perceived behaviour control). The second regression assessed the prediction of intention from the symptom variables. We compared the magnitude of the  $R^2$  values of these regressions using a  $t$ -test for comparing paired correlations to assess if one model better predicted intention than the other. We followed this with a hierarchical regression, where we examined the incremental improvement of prediction by combining the TPB and symptom models.

Finally, we computed a structural model in AMOS 21.0 to determine if the TPB factors mediated the relationship between symptom severity and intentions to engage in the CBT strategy of increasing positive thinking. This is consistent with Ajzen's

conceptualization of the role of affect and general cognition variables as distal factors that influence intention indirectly through their influence on attitude, subjective norms and perceived behaviour control. To maintain as many degrees of freedom as possible, we created parcels for CES-D, ATQ-S, and positive affect. These parcels were created by separating the items into three groups. The items were randomly assigned to each parcel after assuring that items that typically load on the same factors were distributed evenly across the different factors. The model fit was assessed using the SRMR, GFI, CFI, RMSEA, and Chi-squared difference tests.

## Results

### The determination of final version of TPBQ.

The initial computations of Cronbach's alphas indicated that both attitude and intention had strong internal consistency reliability (see Table 1 for details). The internal consistency of subjective norms and perceived behaviour control was less than adequate. Upon removal of two items from the subjective norms sub-scale and one from perceived behaviour control, internal consistencies were substantially improved.

Table 1

*The Psychometric Properties of TPBQ (Original and Final Versions)*

Sub-Scale	Original Number of Items	Original Scale Range	Original $\alpha$	Final Number of Items	Final Scale Range	Final $\alpha$
Attitude	4	4 - 28	0.91	4	4 - 28	0.91
Subjective norms	5	5 - 35	0.55	3	3 - 21	0.75
Perceived behaviour control	3	3 - 21	0.51	2	2 - 14	0.81
Intention	3	3 - 21	0.90	3	3 - 21	0.90

We performed principal axis factoring with varimax rotation. The factor loadings from the original 15-item version of the TPBQ and the final 12-item version are presented in Table 2. Four factors with eigenvalues over or approaching 1 were extracted from the original version of the TPBQ and these factors explained 60% of the variance. Most items loaded on to hypothesized factors of attitude, intention, subjective norms, and perceived behaviour control (respectively). Items that loaded onto unexpected factors (perceived behaviour control item 3 with intention items) were not theoretically consistent with other items. They also compromised the internal consistency of their respective hypothesized scales. Over three iterations, 3 items were dropped (2 from subjective norms and 1 from perceived behaviour control). In the final 12-item version of the TPBQ, 4 factors were extracted that explained 70% of the variance. The fourth factor, “perceived behaviour control,” had an eigenvalue just below 1 (0.93), but we deemed it worthy of maintaining in the solution because perceived behaviour control is an important construct in the theory of planned behaviour and because the screeplot suggested it was appropriate. Also, the eigenvalue cut-off of 1 is considered to be somewhat arbitrary in some statistical circles (Preacher & MacCallum, 2003). Preacher and MacCallum (2003) argued that factors with eigenvalues under 1 are appropriate to maintain in the solution in instances where it makes theoretical sense.

Table 2

*Factor Loadings for the Exploratory Factor Analysis with Varimax Rotation of TPBQ (Original and Final Versions)*

Items	Original Version				Final Version			
	Factor 1	Factor 2	Factor 3	Factor 4	Factor 1	Factor 2	Factor 3	Factor 4
Attitude 1	<b>0.78</b>				<b>0.78</b>			
Attitude 2	<b>0.79</b>				<b>0.79</b>			
Attitude 3	<b>0.73</b>				<b>0.74</b>			
Attitude 4	<b>0.71</b>				<b>0.71</b>			
Subjective Norms 1 <sup>a</sup>					--	--	--	--
Subjective Norms 2			<b>0.78</b>				<b>0.67</b>	
Subjective Norms 3			<b>0.75</b>				<b>0.85</b>	
Subjective Norms 4			<b>0.40</b>				<b>0.44</b>	
Subjective Norms 5 <sup>a</sup>				<b>0.40</b>	--	--	--	--
Perceived Behaviour Control 1				<b>0.83</b>				<b>0.82</b>
Perceived Behaviour Control 2				<b>0.81</b>				<b>0.83</b>
Perceived Behaviour Control 3 <sup>a</sup>		<b>0.46</b>			--	--	--	--
Intention 1		<b>0.68</b>				<b>0.67</b>		
Intention 2		<b>0.84</b>				<b>0.82</b>		
Intention 3		<b>0.77</b>				<b>0.81</b>		

*Note.* Bolded items reflected factor loadings that met the criteria for loading sufficiently high enough on the theoretically expected factor/sub-scale (0.40).

<sup>a</sup>Items that were removed from final version.

Finally, we computed a confirmatory factor analysis to determine the model fit to the data. The proposed measurement model (with standardized estimates) can be found in Figure 2. According to various goodness-of-fit statistics, the measurement model demonstrates an adequate to good fit of the data. One exception was the chi-square fit index, which was significant (indication of poor model fit)  $\chi^2_{(48)} = 224.47, p < 0.0001$ ; however, this fit index is vulnerable to inflation in large sample sizes (Bentler, 1995). See

Table 3 for goodness-of-fit statistics. All paths of this model were significant at  $p < 0.01$ , except for the correlations between perceived behaviour control and attitude, and perceived behaviour control and intentions ( $p < 0.01$ ).

Table 3

*Goodness-of-Fit Statistics for the Measurement and Structural Models*

Fit Index	Measurement Model	Structural Model
SRMR	0.06	0.05
CFI	0.94	0.96
GFI	0.92	0.91
RMSEA	0.10 (90% CI 0.08 – 0.11)	0.06 (90% CI 0.05 – 0.07)

**Hypothesis testing.**

*The comparison of TPB versus the symptom severity regression models to predict intention to increase positive thinking.* The Pearson correlations among the TPB and symptom variables can be found in Table 4. The first simultaneous regression was computed to determine the variance of intention explained by the TPB antecedents (attitude, subjective norms, perceived behaviour control). The TPB antecedents significantly predicted 50% of the variance in intention,  $F_{(3, 402)} = 131.75, p < 0.0001$  (see Table 5 for details). Attitude and subjective norms were both significant predictors. Symptom severity also significantly predicted intention,  $F_{(3, 402)} = 4.75, p = 0.003$ , but depressive symptoms was the only significant predictor (see Table 6 for details) and this model only predicted 3.4% of the variance in intention. To statistically compare the magnitude of predictor effects of the two models, a  $t$ -test for comparing paired correlations was conducted. The TPB antecedents model predicted a significantly greater magnitude of the variance of intention than the symptom severity model,  $t_{(1)} = 11.65, p < 0.01$ .

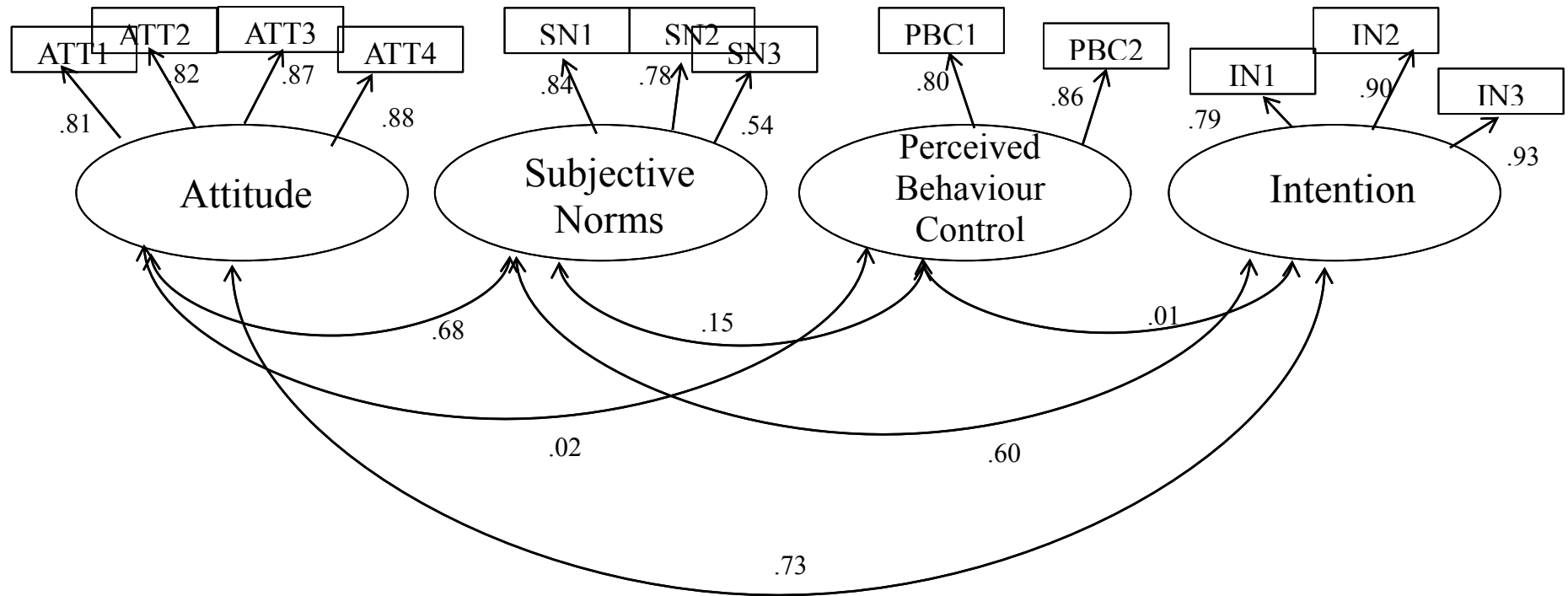


Figure 2. Measurement model of the 12-item TPBQ with standardized estimates. ATT = attitude item 1, 2... etc. SN = subjective norm item 1, 2... etc. PBC = perceived behaviour control item 1, 2. IN = intention item 1, 2...etc.

Table 4

*Correlations among TPB and symptom variables*

Variable	1	2	3	4	5	6	7
1. Attitude	--						
2. Subjective Norms	0.55**	--					
3. Perceived Behaviour Control	0.40	0.15**	--				
4. Intention	0.68**	0.53**	0.11*	--			
5. CES-D	-0.08	0.08	-0.43**	0.01	--		
6. ATQ	-0.18**	0.03	-0.52**	-0.07	0.71**	--	
7. PANAS (Positive Affect)	0.20**	0.11*	0.35**	0.15**	-0.47**	-0.46**	--

\* $p < 0.05$

\*\* $p < 0.01$

Table 5

*Simultaneous regression predicting intention from TPB antecedents*

Variable	$R$	$R^2$	$\beta$	$F/t$	$p$
Model	0.70	0.50	-	131.75	<0.0001
Attitude	--	--	0.55	13.07	<0.0001
Subjective Norm	--	--	0.22	5.50	<0.0001
Perceived Behaviour Control	--	--	0.06	1.61	0.10

Table 6

*Simultaneous regression predicting intention from symptom severity*

Variable	$R$	$R^2$	$\beta$	$F/t$	Sig
Model	0.19	0.03	-	4.75	0.003
CES-D <sup>a</sup>	--	--	0.16	2.22	0.03
ATQ-S <sup>b</sup>	--	--	-0.10	-1.39	0.17
Positive Affect	--	--	0.18	3.15	0.10

<sup>a</sup>CES-D = depressive symptoms

<sup>b</sup>ATQ-S = negative automatic thoughts

Next, a hierarchical regression model was computed to determine if the symptom severity model explained additional variance in intention once the variance explained by the TPB antecedents was accounted for. The results (Table 7) indicated that symptom severity does not predict significant additional variance of intention once the TPB antecedents were accounted for in the model. When the Steps of this model are reversed (i.e., symptom severity variables on Step 1, TPB variables on Step 2), depression is no longer a significant predictor of intention once TPB variables are accounted for (data not shown).

Table 7

*Hierarchical regression predicting intention from TPB antecedents and symptom severity*

Variable	R	R <sup>2</sup>	R <sup>2</sup> Change	β	F/t	Sig	Sig change
Step 1	0.704	0.496	--	--	131.754	<0.0001	--
Attitude	--	--	--	0.554	13.067	<0.0001	--
Subjective Norms	--	--	--	0.217	5.054	<0.0001	--
Perceived Behaviour Control	--	--	--	0.059	1.631	0.104	--
Step 2	0.706	0.498	0.002	--	65.913	<0.0001	0.660
CES-D	--	--	--	0.038	-0.273	0.469	--
ATQ-S	--	--	--	-0.015	0.725	0.785	--
Positive Affect	--	--	--	0.049	1.162	0.246	--

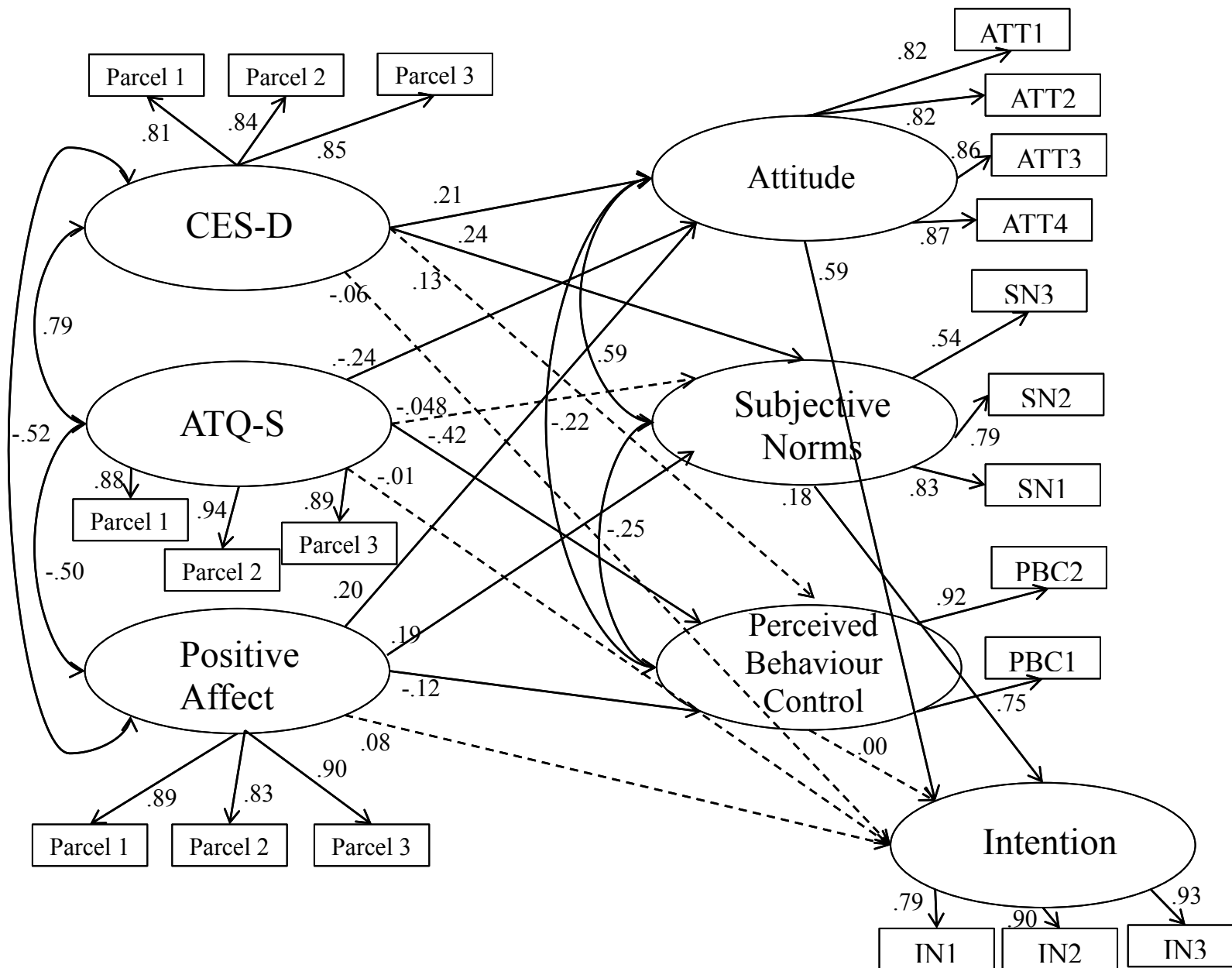
***Structural model of the TPB and symptom variables in the prediction of intention.*** Ajzen (2011) postulated that TPB antecedents predict intention directly, but that variables related to affect (for example, positive affect, depressive symptoms, and a tendency towards negative automatic thinking, in the case of this study) would affect intention indirectly through their influence on the TPB antecedents. Thus the hypothesized structural model was designed to test Ajzen’s hypothesis. The hypothesized

model is that increased CES-D, ATQ-S and positive affect will significantly predict attitude, subjective norms, and perceived behaviour control and these TPB antecedents will in turn significantly and positively predict intention (see Figure 3 for structural model).

*Model estimation.* The hypothesized model, by most goodness-of-fit indices, was a good fit for the data. The chi-square goodness-of-fit test indicated less than adequate fit,  $\chi^2_{(168)} = 419.71, p < 0.0001$ , but this index of fit is highly influenced by large sample sizes (Bentler, 1995). The other fit indices (see Table 2 under “Structural Model”) demonstrated adequate to good fit. Because this was our hypothesized model and it had good fit, no modifications were undertaken. The overall model explained 56.0% in intention to increase positive thinking. The structural model with the standardized path coefficients of the variables is shown in Figure 3.

*Direct effects.* Not surprisingly, the symptom variables were significantly inter-correlated. In addition, the TPB antecedents were also significantly inter-correlated. Attitude and subjective norms significantly predicted intention, but perceived behaviour control did not. The path coefficients from CES-D to attitude and subjective norms are significant, but the path to perceived behaviour control is not. The path coefficients from ATQ-S to attitude and perceived behaviour control are significant, but the path to subjective norms is not. For positive affect, all path coefficients to TPB antecedents are significant. No direct path from symptom variables (CES-D, ATQ-S, and positive affect) to intention was significant (see Figure 3 for details).

*Indirect effects.* The indirect effect of CES-D on intention is marginally significant (0.168,  $p = 0.09$ , 95% CI = -0.012 – 0.329), as was the indirect effect of ATQ-S on intention (-0.152,  $p = 0.093$ , 95% CI = -0.329 – 0.017).



*Figure 3.* The structural model of the prediction of intention from symptom severity via TPB antecedents (“Hybrid Model”. The solid arrows indicate significant relationships at  $p < 0.05$  and dotted arrows indicate non-significant relationships. “Parcel” 1, 2, or 3 represents a grouping of items of the associated questionnaire (3-5 items per group). “CES-D” = depressive symptoms; “ATQ-S” = negative automatic thoughts. The solid arrows indicate significant paths at  $p < 0.05$ . The dashed arrows indicate non-significant paths.

Finally, positive affect has a significant indirect effect on intention (0.152,  $p = 0.075$ , 95% CI = 0.041 – 0.257). The direct paths of CES-D, ATQ-S, and positive affect to intention are non-significant, which suggests full mediation by TPB antecedent variables (Baron & Kenny, 1986).

## **Discussion**

The purpose of this study was to improve our understanding of the conceptualization of the cognitive mechanism of change in CBT-based depression prevention programs in three ways: 1) to systematically incorporate other key factors in CBT outcomes (homework completion, willingness to try new strategies, acceptance of CBT modality; Addis & Jacobson, 2000; Detweiler & Whisman, 1999; Renaud, Russell, & Myhr, 2014) using a well-established health-behaviour change model, the theory of planned behaviour (TPB); 2) to focus on a specific aspect of CBT-based prevention programs, changing thinking patterns, defined in this study as “increasing positive thinking,” as a true test of intentions to engage in strategies directly related to the traditionally proposed mechanism of change in CBT (cognition); and 3) to test a theoretical model that connects motivational and symptom factors in willingness to “increase positive thinking” (i.e., comparison of TPB and symptom severity models and exploration of a “hybrid model”).

Prior to model testing, it was important to establish the psychometric properties of our theory of planned behaviour measure. As questionnaire needs change for each target health behaviour, a set of guidelines exists for constructing theory of planned behaviour questionnaires, rather than a standard questionnaire (Ajzen, 2006); thus, extensive psychometric testing was conducted. The final version of this questionnaire demonstrated

adequate to excellent internal consistency (subscale alphas ranging from 0.75 – 0.91), which is consistent with TPB measures that focus more broadly on aspects of psychological service use (Mo & Mak, 2009; Schomerus, Matschinger, & Angermeyer, 2009). The final questionnaire demonstrated strong face validity (i.e., comparable stem questions to other TPB questionnaires, items tapping into several theoretical constructs; Ajzen, 2006) and convergent validity, in that the TPB antecedents significantly correlated with intention (see Table 4). Finally, this is the first study known to the authors to examine and publish the factor structure of their questionnaire and a measurement model (Figure 2). Our exploratory factor analyses revealed a 4-factor solution consistent with the four TPB constructs (attitude, subjective norm, perceived behaviour control and intention) and explained a significant portion of the variance. This exploratory analysis was confirmed by a strong model fit of the measurement model. Thus, we concluded that the final version of our TPB questionnaire was adequate for model testing.

As an antecedent to future prevention research to determine the role of TPB variables in CBT-based depression prevention program outcomes, it was necessary to determine if TPB variables were predictive of willingness to engage in CBT-related activities. Consistent with the findings on predicting intention to engage in psychological service seeking, we found that TPB antecedents significantly predicted the intention to “increase positive thinking.” Furthermore, this model predicted a similar proportion of variance to studies of intention to seek psychological services, as well as other health behaviours (Armitage & Connor, 2001; Hyland, McLaughlin, Boduszek, & Prentice, 2012; Mo & Mak, 2009, Schomerus, Matschinger, & Angermeyer, 2009; Sheeran, Harris, & Epton, 2014; Skogstad, Deane, & Spicer, 2006). The greatest significant predictor of

intention was attitude, followed by subjective norms. Perceived behaviour control was not a significant predictor of intention. Meta-analyses of TPB studies of intention to engage in various health behaviours demonstrated that attitude is usually the strongest predictor of intention, with a large effect size (Armitage & Connor, 2001; McEachan, et al., 2011). Several studies of intention to seek psychological services also found attitude and subjective norms to be the most important factors (Schomerus, Matschinger, & Angermeyer, 2009; Skogstad, Deane, & Spicer, 2006); however, other studies demonstrated perceived behaviour control to be the most significant factor (Hyland, et al., 2012). Ajzen (2011) explained that the strength of predictors is expected to vary depending on the target health behaviour. Similarly, sample characteristics have been found to influence the relative predictive strength of TPB antecedents (McEachan, et al., 2011).

The lack of predictive power of perceived behaviour control may be explained by theoretical and/or measurement factors. Ajzen (1985) noted that the role of perceived behaviour control will diminish as volitional control increases. As changing thinking may be perceived as completely under one's control (in the context of the TPB model where actions are "rational" and emotions are not accounted for), because it is a mental process, it may not even be considered as an issue to those who wish to cope with depressive symptoms by changing their thinking patterns (Fishbein & Ajzen, 2011). Similarly, perceived behaviour control has been hypothesized to be less important in more internalized behaviours, such as cognitive change (Ajzen, 2011). This is reflected more broadly in the depression literature in that some depressed individuals perceive this disorder as a "weakness" or "flaw of personal character" that one should be able to cope

with on one's own (Dubrow, Lovko, & Kausch, 1990), regardless of whether or not they are actually effectively coping with their mental illness. Alternatively, the meta-analyses of TPB measures have found that the subscales with only one or two measures (usually subjective norms) perform more poorly in the prediction of intention than multi-item subscales (Armitage & Connor, 2001). In this study, one item of the perceived behaviour control subscale performed poorly in psychometric analyses, reducing the final version of the subscale to two items. These two items may simply not adequately capture the construct of perceived behaviour control. As will be seen in Study 3, we incorporated a revised subscale of perceived behaviour control. Future studies will be needed to determine if perceived behaviour control is truly a non-significant predictor of intention or if it would be a significant predictor with improved measurement.

The significant prediction of intention to increase positive thinking by attitude and subjective norms is consistent with conceptually-related predictors of CBT outcomes that likely also relate to prevention. For instance, the patients who accept the CBT conceptualization of depressive symptoms and who expect positive outcomes from participation in CBT demonstrate greater engagement in CBT homework (for instance, daily thought records to correct cognitive distortions) and improved outcomes post-intervention (Addis & Jacobson, 2000; Renaud, Russell, & Myhr, 2014). The positive expectations and acceptance of the treatment modality are examples of positive attitude towards CBT. Conversely, those who perceive psychological services as stigmatizing often delay treatment (Golberstein, Eisenberg, & Gollust, 2008). Even if they enter a prevention program or treatment, the participants who fear stigmatization will likely want to hide all signs of intervention and thus be unwilling to be "caught" practicing these

skills outside of session. In a similar vein, it has been found that preference for depression treatment, either pharmacotherapy or psychotherapy, is strongly predicted by the perception of social support for that intervention (Bradley, McGrath, Brannen, & Bagnell, 2010). No such studies have been conducted in the prevention literature. Therefore, the intention to engage in CBT-based techniques, for example, increasing positive thoughts, will likely be improved when the participant believes that the skill will be helpful (attitude) and that important others will support this engagement in this skill (subjective norms).

Perceived behaviour control is conceptually related to self-efficacy and sense of mastery, which predict CBT outcomes (Dozois, et al., 2014; Quilty, et al., 2014; Renaud, Russell, & Myhr, 2014). However, in this study, perceived behaviour control was not related to intention. This may be related to study methodology in that this is a survey study where the clients do not have to try skills to increase positive thinking. In both our feasibility trial and our randomized control trial of a brief CBT-TPB intervention, perceived behaviour control was changed by the intervention and predicted intention to increase positive thinking (Study 2 - Bradley, Santor, & Oram, 2015; Study 3 - Bradley, Santor, & Oram, 2015).

Consistent with previous research, increasing depressive symptoms significantly predicts intention in this study (see Collins, Westra, Dozois, & Burns, 2004, for review). Other studies have linked depressive symptom severity to general psychological treatment preferences and outcomes (Bradley, et al., 2010; Cooper, et al., 2003; Gum, et al., 2006). Negative automatic thinking and positive affect, the other components of our symptom severity model were non-significant predictors. Furthermore, once TPB

antecedents were accounted for, depression was no longer a significant predictor. There may be several study characteristics that influenced this finding. First, this was a university, non-clinical sample. For example, mean depressive symptoms for this sample was just at the cut-off for significant symptoms according to the CES-D (Radloff, 1977). Therefore, depression may simply not be severe enough for symptoms to influence intention. Similarly, the mean positive affect was near ceiling. On the other hand, mean negative automatic thinking scores were in the moderate range of severity. Increased negative automatic thinking was associated with reduced attitude scores (see Table 4). Perhaps a general propensity to think negatively influences one's attitude about engaging in CBT-based skills in prevention programs, for example increasing positive thinking. Negative thinking styles are also associated with hopelessness, which may be linked to negative expectations about program strategies resulting in lower willingness to try them (Kazdin, 1990). Other symptom severity variables demonstrate significant relationships with TPB antecedent variables, but not intention. These findings, plus the distal role of affect factors postulated by Ajzen (2011), supported the exploration of our hypothesized "Hybrid model."

In our postulated "hybrid model," we applied Ajzen's (2011) hypothesis that the affect-related variables would be distally/indirectly related to intention through attitude, subjective norms, and perceived behaviour control to the target behaviour of increasing positive thinking. This structural "hybrid" model demonstrated a strong fit to the data and explained 56.0% of the variance in intention to increase positive thinking. Furthermore, the direct paths between depression, negative automatic thoughts, and positive affect (affect-related variables) and intention were non-significant, but the indirect paths

through TPB antecedents (attitude and subjective norms, in particular) were significant at the  $p < 0.05$  level. These findings suggest that experiencing low mood and negative thinking will influence one's beliefs and perceptions of important others' beliefs about the effectiveness of changing thinking patterns to cope with these symptoms, which subsequently increases one's intention to engage in the target behaviour of "increasing positive thoughts." Although not measured in this study, it can be hypothesized that increased intention will predict increased engagement in this target behaviour, as intention is a strong predictor of behaviour (Armitage & Connor, 2001).

If these findings could be replicated in CBT-based prevention program and treatment studies, it may help us understand the inconsistent findings in CBT cognitive mechanism studies (Garratt, et al., 2007). Perhaps a moderated mediation mechanism of change hypothesis for CBT would be more appropriate in that change in cognitive processes *does* predict depressive symptom reduction, but *only* in those patients who are motivated to engage in the necessary thought-change strategies. This motivation, in turn, is influenced by the patients' attitudes, subjective norms, and perceived behaviour control. The evidence across CBT trials indicates various factors related to TPB antecedents that influence CBT outcomes and engagement in psychotherapy in general: homework compliance (intention), expectancy of positive outcomes (attitude), stigma and support from important others (subjective norms), and sense of self-efficacy in using CBT skills (perceived behaviour control; Bradley, et al., 2010; Detweiler & Whisman, 1999; Ebert, et al., 2013; Renaud, Russell, & Myhr, 2014). Furthermore, the incorporation of motivational interviewing into CBT trials and the positive outcomes of these trials also lends support to the notion that motivational factors may influence

cognitive mechanisms of change in CBT (Arkowitz & Westra, 2004; Westra & Dozois, 2006). CBT prevention and intervention trials that include TPB measures will help to replicate the findings of this study and provide a complete test of this modified cognitive mechanism of change hypothesis.

### **Implications**

The CBT-TPB hybrid model explored in this study has the potential to help us understand the discrepancies among cognitive mechanism studies of CBT. It would suggest that motivational factors, as defined here by the theory of planned behaviour, may determine if cognitive strategies promote cognitive change, which in turn causes depressive symptom reduction. Because we used an established and well-understood health-behaviour change model, we also have clear targets where clinicians can intervene to improve motivation and thus treatment outcomes. According to this study, efforts to improve attitudes about the effectiveness of CBT-based depression prevention and treatment programs for depression (extend discussion of efficacy evidence for thought-change strategies with participants) and perceptions that important others support strategy learning and practice (incorporate spouses to support practice of cognitive-change skills at home) could improve treatment outcomes for patients. Finally, this model could be applied to engagement in other CBT activities (behaviour activation) or other psychotherapeutic processes across various treatment modalities. The engagement in each therapeutic activity may be predicted by a unique constellation of TPB factors, which could point to ways of intervening that could improve treatment and prevention program engagement and outcomes.

### **Limitations and Future Directions**

There are several important limitations to consider when interpreting the findings of this study. First, we constructed a new measure of the theory of planned behaviour to measure our constructs of interest. This measure is the foundation of model-testing for this study. Despite the fact that the final measure had good psychometric properties, replication of these exploratory findings will be needed to provide greater support for use of this measure and the hypothesized hybrid model. Some modifications may also be necessary to improve the measurement of perceived behaviour control (increase number of items) and properly test its role in intention to increase positive thinking. In addition, the criterion variable of the hypothesized model (i.e. intention) was measured in the context of the TPB questionnaire, which may influence the lack of significant relationships between intention and symptom variables.

Second, and related, the target behaviour for the TPB measure in this study was “increasing positive thinking.” Although positive cognitive processes have been shown to be related to CBT outcomes and the target behaviour was defined in a consistent manner to traditional definitions of cognitive targets in depression treatment, the participants may still have misunderstood the target behaviour this study aimed to test (Persons, et al., 2001; Quilty, et al., 2014). In our RCT study, we have expanded the TPB measure to compare “increasing positive thinking” and “reducing negative thinking” to rule out this concern (Study 3 – Bradley, Santor, & Oram, 2015).

Third, this study employed survey methodology. A proper test of whether or not TPB improves our understanding of the cognitive mechanism of change in CBT-based prevention outcomes requires testing the “hybrid model” in a prevention study. However,

given the financial and resource cost of RCTs and the pilot work necessary to assess and modify the TPB questionnaire, we concluded that a survey study was an appropriate first step.

Finally, this study was conducted with a non-clinical, university student sample. Thus, generalizability may be limited to the general population or clinical samples. However, it has been shown that university students experience greater depressive symptoms than same-age peers (Adlaf, Gliksman, Demers, & Newton-Taylor, 2001). In recent years, it has also been shown that university students are accessing psychological services at increased rates (Voekler, 2003). Therefore, university students are an important population to study in terms of engagement in prevention and treatment outcomes.

### **Conclusions**

This pilot study provides support for the incorporation of the theory of planned behaviour into a CBT cognitive mechanism of change model (Ajzen, 1991), particularly in the context of prevention. Findings from this study suggest that intentionality/motivation, and factors that influence it, may bridge the gap of understanding between the experience of psychological risk factors for depression and the engagement in strategies to help prevent depression onset. Greater understanding of this model could point to interventions that will improve CBT-based prevention and treatment outcomes for those at-risk for depression onset, as well as those currently suffering from depressive disorders.

### References

- Addis, M. E., & Jacobson, N. S. (2000). A closer look at the treatment rationale and homework compliance in cognitive-behavioral therapy for depression. *Cognitive Therapy and Research, 24*(3), 313–326. doi: 10.1023/A:1005563304265
- Adlaf, E. M., Gliksman, L., Demers, A., & Newton-Taylor, B. (2001). The prevalence of elevated psychological distress among canadian undergraduates: Findings from the 1998 Canadian campus survey. *Journal of American College Health, 50*(2), 67–72. doi: 10.1080/07448480109596009
- Ajzen, I. (2006). TPB measurement: Conceptual and methodological considerations. 2006-01-30[2011-05-15]. Retrieved from <http://www.People.Umass.Edu/aizen/pdf/tpb.Measurement.Pdf>. on June 25, 2013.
- Ajzen, Icek. (1985). From intentions to action: A theory of planned behavior. In J. Kuhl & J. Beckmann (Eds.), *Action Control* (pp. 11-39). Springer Berlin Heidelberg: Berlin.
- Ajzen, Icek. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes, 50*(2), 179–211. doi:10.1016/0749-5978(91)90020-T
- Ajzen, Icek. (2011). The theory of planned behaviour: Reactions and reflections. *Psychology & Health, 26*(9), 1113–1127. doi: 10.1080/08870446.2011.613995
- Alloy, L. B., Black, S. K., Young, M. E., Goldstein, K. E., Shapero, B. G., Stange, J. P., ... Abramson, L. Y. (2012). Cognitive vulnerabilities and depression versus other psychopathology symptoms and diagnoses in early adolescence. *Journal of Clinical Child & Adolescent Psychology, 41*(5), 539–560. doi: 10.1080/15374416.2012.703123

- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Arlington, VA: American Psychiatric Publishing.
- Arkowitz, H., & Westra, H. A. (2004). Integrating motivational interviewing and cognitive behavioral therapy in the treatment of depression and anxiety. *Journal of Cognitive Psychotherapy, 18*(4), 337-350. doi: 10.1891/jcop.18.4.337.63998
- Armitage, C. J., & Conner, M. (2001). Efficacy of the theory of planned behaviour: A meta-analytic review. *British Journal of Social Psychology, 40*(4), 471–499. doi:10.1348/014466601164939
- Baron, R. M., & Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of personality and social psychology, 51*(6), 1173. doi: 10.1037/0022-3514.51.6.1173
- Beck, A. T. (1963). Thinking and depression: I. idiosyncratic content and cognitive distortions. *Archives of General Psychiatry, 9*(4), 324-333. doi:10.1001/archpsyc.1963.01720160014002
- Beck, A. T. (2008). The evolution of the cognitive model of depression and its neurobiological correlates. *The American Journal of Psychiatry, 165*(8), 969–977. doi:10.1176/appi.ajp.2008.08050721
- Beck, A. T., & Dozois, D. J. A. (2011). Cognitive therapy: Current status and future directions. *Annual Review of Medicine, 62*(1), 397–409. doi: 10.1146/annurev-med-052209-100032
- Beck, A. T. Rush, J.A., Shaw, B.F., & Emery, G. (1979). *Cognitive Therapy of Depression*. New York: Guilford Press.

- Bentler, P.M. (1995). *EQS: Structural Equations Program Manual*. Encino, CA: Multivariate Software Inc.
- Bentler, P.M. (1998). Comparative fit indexes in structural models. *Psychological Bulletin*, *107*, 238 – 246. doi: 10.1037/0033-2909.107.2.238
- Bradley, K.L., McGrath, P.J., Brannen, C.L., & Bagnell, A.L. (2010). Adolescents' attitudes and opinions about depression treatment. *Community Mental Health Journal*, *46*, 242 – 251. doi: 10.1007/s10597-009-9224-5
- Browne, M.W., & Cudeck, R. (1993). Alternative ways of assessing model fit. In K.A. Bollen and J.S. Long (Eds.), *Testing Structural Models*. Newbury Park, CA: Sage Publications.
- Christopher, M. S., Jacob, K. L., Neuhaus, E. C., Neary, T. J., & Fiola, L. A. (2009). Cognitive and behavioral changes related to symptom improvement among patients with a mood disorder receiving intensive cognitive-behavioral therapy. *Journal of Psychiatric Practice*, *15*(2), 95–102. doi: 10.1097/01.pra.0000348362.11548.5f
- Coie, J. D., Watt, N. F., West, S. G., Hawkins, J. D., Asarnow, J. R., Markman, H. J., ... & Long, B. (1993). The science of prevention: a conceptual framework and some directions for a national research program. *American Psychologist*, *48*(10), 1013-1022. doi: 10.1037/0003-066X.48.10.1013
- Collins, K.A., Westra, H.A., Dozois, D.J.A., & Burns, D.D. (2004). Gaps in accessing treatment for anxiety and depression: Challenges for the delivery of care. *Clinical Psychology Review*, *24*, 583 – 616. doi: 10.1016/j.cpr.2004.06.001
- Cooper, L., Gonzales, J., Gallo, J., Rost, K., Meredith, L., Rubenstein, L., et al. (2003). The acceptability of treatment for depression among African-American, Hispanic,

- and white primary care patients. *Medical Care*, 41(4), 479–489.
- Cuijpers, P., Berking, M., Andersson, G., Quigley, L., Kleiboer, A., & Dobson, K. S. (2013). A meta-analysis of cognitive-behavioural therapy for adult depression, alone and in comparison with other treatments. *Canadian Journal of Psychiatry. Revue Canadienne de Psychiatrie*, 58(7), 376–85.
- Deitweiler, J.B., & Whisman, M.A. (1999). The role of homework assignments in cognitive therapy for depression: potential methods for enhancing adherence. *Clinical Psychology: Science and Practice*, 6(3), 267-282. doi: 10.1093/clipsy.6.3.267
- Dozois, D. J. A., J., Bieling, P. J., Patelis-Siotis, I., Hoar, L., Chudzik, S., McCabe, K., & Westra, H. A. (2009). Changes in self-schema structure in cognitive therapy for major depressive disorder: A randomized clinical trial. *Journal of Consulting and Clinical Psychology*, 77(6), 1078–1088. doi: 10.1037/a0016886
- Dubrow, E. F., Lovko, K. R., & Kausch, D. F. (1990). Demographic differences in adolescents' health concerns and perceptions of helping agents. *Journal of Clinical Child Psychology*, 19, 44 – 54. Retrieved from <http://journalseek.net/cgi-bin/journalseek/journalsearch.cgi?field=issn&query=0047-228X>
- Ebert, D. D., Gollwitzer, M., Riper, H., Cuijpers, P., Baumeister, H., & Berking, M. (2013). For whom does it work? Moderators of outcome on the effect of a transdiagnostic internet-based maintenance treatment after inpatient psychotherapy: randomized controlled trial. *Journal of Medical Internet Research*, 15(10), e191. doi: 10.2196/jmir.2511

- Fennell, M., & Teasdale, J. (1987). Cognitive therapy for depression: Individual differences and the process of change. *Cognitive Therapy and Research*, *11*(2), 253-271. doi:10.1007/BF01183269
- Ferrari, A.J., Charlson, F.J., Norman, R.E., Patten, S.B., Freedman, G., et al. (2013). Burden of depressive disorders by country, sex, age, and year: Findings from the global burden of disease study 2010. *PLoS Med* *10*(11), e1001547. doi: 10.1371/journal.pmed.1001547
- Fishbein, M., & Ajzen, I. (2011). *Predicting and Changing Behavior*. USA: Taylor & Francis.
- Fournier, J. C., DeRubeis, R. J., Hollon, S. D., Gallop, R., Shelton, R. C., & Amsterdam, J. D. (2013). Differential change in specific depressive symptoms during antidepressant medication or cognitive therapy. *Behaviour Research and Therapy*, *51*(7), 392–398. doi: 10.1016/j.brat.2013.03.010
- Furlong, M., & Oei, T. P. S. (2002). Changes to automatic thoughts and dysfunctional attitudes in group CBT for depression. *Behavioural and Cognitive Psychotherapy*, *30*(03), 351-360. doi:10.1017/S1352465802003107
- Garratt, G., Ingram, R. E., Rand, K. L., & Sawalani, G. (2007). Cognitive processes in cognitive therapy: Evaluation of the mechanisms of change in the treatment of depression. *Clinical Psychology: Science and Practice*, *14*(3), 224–239. doi: 10.1111/j.1468-2850.2007.00081.x
- German, R. E., Lorenzo-Luaces, L., & DeRubeis, R. J. (2014). Patient's attributions about symptom improvement in CBT for depression: Development of a rating system and an initial test of validity. *International Journal of Cognitive Therapy*,

7(3), 272–286. doi: 10.1521/ijct.2014.7.3.272

Golberstein, E., Eisenberg, D., & Gollust, S. E. (2008). Perceived stigma and mental health care seeking. *Psychiatric Services, 59*(4), 392-399. doi:

Gum, A. M., Are´an, P. A., Hunkeler, E., Tanq, L., et al. (2006). Depression treatment preferences in older primary care patients. *The Gerontologist, 46*(1), 14–22.

Hayden, E. P., Hankin, B. L., Mackrell, S. V. M., Sheikh, H. I., Jordan, P. L., Dozois, D.

J. A., ... Badanes, L. S. (2014). Parental depression and child cognitive vulnerability predict children’s cortisol reactivity. *Development and*

*Psychopathology, 26*(Special Issue 4pt2), 1445–1460. doi:

10.1017/S0954579414001138

Hayden, E. P., Klein, D. N., Durbin, C. E., & Olino, T. M. (2006). Positive emotionality

at age 3 predicts cognitive styles in 7-year-old children. *Development and*

*Psychopathology, null*(02), 409–423. doi: 10.1017/S0954579406060226

Hollon, S.D., & Kendall, P.C. (1980). Cognitive self-statements in depression:

Development of an automatic thoughts questionnaire. *Cognitive Therapy and*

*Research, 4*, 383 – 395. doi: 10.1007/BF01178214

Horowitz, J.L., & Garber, J. (2006). The prevention of depressive symptoms in children

and adolescents: A meta-analytic review. *Journal of Consulting and Clinical*

*Psychology, 74*(3), 486-503. doi:10.1037/0022-006X.74.3.401

Hu, L., & Bentler, P.M. (1999). Cutoff criteria for fit indexes in covariance structure

analysis: Conventional criteria versus new alternatives. *Structural Equation*

*Modeling, 6*, 1 – 55. doi: 10.1080/10705519909540118

Hyland, P. E., McLaughlin, C. G., Boduszek, D., & Prentice, G. R. (2012). Intentions to

- participate in counselling among front-line, at-risk Irish government employees:  
An application of the theory of planned behaviour. *British Journal of Guidance & Counselling*, 40(3), 279–299. doi:10.1080/03069885.2012.681769
- Ilardi, S., & Craighead, E. W. (1999). Commentary. Rapid early response, cognitive modification, and nonspecific factors in cognitive behavior therapy for depression: A reply to Tang and DeRubeis. *Clinical Psychology: Science and Practice*, 6(3), 295–299. doi: 10.1093/clipsy.6.3.295
- Jacobson, N. S., Dobson, K. S., Truax, P. A., Addis, M. E., Koerner, K., Gollan, J. K., ... Prince, S. E. (1996). A component analysis of cognitive-behavioral treatment for depression. *Journal of Consulting and Clinical Psychology*, 64(2), 295–304. doi: 10.1037/0022-006X.64.2.295
- Joormann, J., Talbot, L., & Gotlib, I. H. (2007). Biased processing of emotional information in girls at risk for depression. *Journal of Abnormal Psychology*, 116(1), 135–143. doi: 10.1037/0021-843X.116.1.135
- Kazdin, A. E. (1990). Evaluation of the Automatic Thoughts Questionnaire: Negative cognitive processes and depression among children. *Psychological Assessment: A Journal of Consulting and Clinical Psychology*, 2(1), 73. doi: 10.1037/1040-3590.2.1.73
- Kazdin, A. E. (2007). Mediators and mechanisms of change in psychotherapy research. *Annual Review of Clinical Psychology*, 3(1), 1–27. doi: 10.1146/annurev.clinpsy.3.022806.091432
- Kwon, S., & Oei, T.P.S. (2003). Cognitive change processes in a group cognitive behavior therapy of depression. *Journal of Behavior Therapy and Experimental*

- Psychiatry*, 34(1), 73-85. doi: 10.1016/S0005-7916(03)00021-1
- McEachan, R. R. C., Conner, M., Taylor, N. J., & Lawton, R. J. (2011). Prospective prediction of health-related behaviours with the theory of planned behaviour: A meta-analysis. *Health Psychology Review*, 5(2), 97–144. doi: 10.1080/17437199.2010.521684
- Mezulis, A. H., Hyde, J. S., & Abramson, L. Y. (2006). The developmental origins of cognitive vulnerability to depression: Temperament, parenting, and negative life events in childhood as contributors to negative cognitive style. *Developmental Psychology*, 42(6), 1012–1025. doi: 10.1037/0012-1649.42.6.1012
- Michie, S. (2005). Is cognitive behaviour therapy effective for changing health behaviours? Commentary on Hobbis and Sutton. *Journal of Health Psychology*, 10(1), 37-43. doi:10.1177/1359105305048553
- Mo, P. K. H., & Mak, W. W. S. (2009). Help-seeking for mental health problems among Chinese: the application and extension of the theory of planned behavior. *Social Psychiatry and Psychiatric Epidemiology*, 44(8), 675–684. doi: 10.1007/s00127-008-0484-0
- Monroe, S.M., & Harkness, K.L. (2005). Life stress, the "kindling" hypothesis, and the recurrence of depression: considerations from a life stress perspective. *Psychological Review*, 112: 417–445. doi: 10.1037/0033-295X.112.2.417
- Netemeyer, R. G., Williamson, D. A., Burton, S., Biswas, D., Jindal, S., Landreth, S., ... & Primeaux, S. (2002). Psychometric properties of shortened versions of the Automatic Thoughts Questionnaire. *Educational and Psychological Measurement*, 62(1), 111-129. doi: 10.1177/0013164402062001008

- Quilty, L. C., Dozois, D. J. A., Lobo, D. S. S., Ravindran, L. N., & Bagby, R. M. (2014). Cognitive structure and processing during cognitive behavioral therapy vs. pharmacotherapy for depression. *International Journal of Cognitive Therapy*, 7(3), 235–250. doi: 10.1521/ijct.2014.7.3.235
- Quilty, L. C., McBride, C., & Bagby, R. M. (2008). Evidence for the cognitive mediational model of cognitive behavioural therapy for depression. *Psychological Medicine*, 38(11), 1531–41. doi:10.1017/S0033291708003772
- Persons, J. B., Davidson, J., & Tompkins, M. A. (2001). *Essential Components of Cognitive-Behavior Therapy for Depression*. USA: American Psychological Association.
- Radloff, L. S. (1977). The CES-D scale a self-report depression scale for research in the general population. *Applied Psychological Measurement*, 1(3), 385-401. doi: 10.1177/014662167700100306
- Rawal, A., Collishaw, S., Thapar, A., & Rice, F. (2013). A direct method of assessing underlying cognitive risk for adolescent depression. *Journal of Abnormal Child Psychology*, 41(8), 1279–1288. doi: 10.1007/s10802-013-9760-x
- Renaud, J., Russell, J. J., & Myhr, G. (2014). Predicting who benefits most from cognitive-behavioral therapy for anxiety and depression. *Journal of Clinical Psychology*, 70(10), 924 – 932. doi: 10.1002/jclp.22099
- Schomerus, G., Matschinger, H., & Angermeyer, M. C. (2009). Attitudes that determine willingness to seek psychiatric help for depression: a representative population survey applying the Theory of Planned Behaviour. (1). *Psychological Medicine*, 39(11), 1855–65. doi:10.1017/S0033291709005832

- Seeds, P. M., & Dozois, D. J. A. (2010). Prospective evaluation of a cognitive vulnerability-stress model for depression: the interaction of schema self-structures and negative life events. *Journal of Clinical Psychology, 66*(12), 1307–1323. doi: 10.1002/jclp.20723
- Seligman, M.E.P., Schulman, P., & Tryon, A.M. (2007). Group prevention of depression and anxiety symptoms. *Behaviour Research and Therapy, 45*(6), 1111-1126. doi:10.1016/j.brat.2006.09.010
- Sheeran, Paschal, Harris, P. R., & Epton, T. (2014). Does heightening risk appraisals change people's intentions and behavior? A meta-analysis of experimental studies. *Psychological Bulletin, 140*(2), 511–543. doi:10.1037/a0033065
- Skogstad, P., Deane, F. P., & Spicer, J. (2006). Social-cognitive determinants of help-seeking for mental health problems among prison inmates. *Criminal Behaviour and Mental Health : CBMH, 16*(1), 43–59. doi:10.1002/cbm.54
- Strunk, D. R., Brotman, M. A., & DeRubeis, R. J. (2010). The process of change in cognitive therapy for depression: Predictors of early inter-session symptom gains. *Behaviour Research and Therapy, 48*(7), 599–606. doi: 10.1037/a0029281
- Tanaka, J.S., & Huba, G.J. (1989). A general coefficient of determination for covariance structure models under arbitrary GLS estimation. *British Journal of Mathematical and Statistical Psychology, 42*, 233 – 239. doi: 10.1111/j.2044-8317.1989.tb00912.x
- Tang, T. Z., DeRubeis, R. J., Beberman, R., & Pham, T. (2005). Cognitive changes, critical sessions, and sudden gains in cognitive-behavioral therapy for depression. *Journal of Consulting and Clinical Psychology, 73*(1), 168–72. doi:10.1037/0022-

006X.73.1.168

- Taylor, L., & Ingram, R. E. (1999). Cognitive reactivity and depressotypic information processing in children of depressed mothers. *Journal of Abnormal Psychology, 108*(2), 202–210. doi: 10.1037/0021-843X.108.2.202
- Voelker, R. (2003). Mounting student depression taxing campus mental health services. *JAMA, 289*(16), 2055-2056. doi:10.1001/jama.289.16.2055
- Westra, H. A., & Dozois, D. J. (2006). Preparing clients for cognitive behavioral therapy: A randomized pilot study of motivational interviewing for anxiety. *Cognitive Therapy and Research, 30*(4), 481-498. doi: 10.1007/s10608-006-9016-y
- Yao, S., Fang, J., Zhu, X., & Zuroff, D. C. (2009). The Depressive Experiences Questionnaire: construct validity and prediction of depressive symptoms in a sample of Chinese undergraduates. *Depression and anxiety, 26*(10), 930-937. doi: 10.1002/da.20465

## Study 2

### **A Feasibility Trial of a Novel Approach to Depression Prevention: Targeting Proximal Risk Factors and Application of a Model of Health-Behaviour Change**

**Abstract.** We aimed to develop and conduct a feasibility trial of a brief intervention to target proximal risk factors (i.e., biases in cognitive processing) to prevent depression, as well as to improve our understanding of the mechanism of change in our prevention program by the incorporation of the theory of planned behaviour. Thirty-seven university students participated in an open, feasibility trial of a brief CBT-based depression prevention program. The participants completed the online questionnaire pre- and post-intervention. Results indicated that the participants experienced pre- to post-intervention improvements in their self-perceived capacity to learn strategies and an increase in positive affect, demonstrating its preliminary effectiveness in reducing risk factors for depression in the short term.

**A Feasibility Trial of a Novel Approach to Depression Prevention: Targeting Proximal Risk Factors and Application of a Model of Health-Behaviour Change**

**Introduction**

University students are prone to symptoms of distress and depression, with those who experience the greatest academic burden and lowest performance being at highest risk (Adlaf, Gliksman, Demers, & Newton-Taylor, 2001; Mikolajczyk et al., 2008). In fact, 44.3% of undergraduates experience mental/emotional difficulties severe enough to affect their academic performance and 13.8% of American undergraduate students meet diagnostic criteria for Major Depressive Disorder (Eisenberg, Gollust, Golberstein, & Hefner, 2007). Depressed university students miss more classes, exams, assignment deadlines and social events and drop more courses than healthy counterparts (Hysenbegasi, Hass, & Rowland, 2005). Despite the established evidence for cognitive behaviour therapy (CBT) to address the needs of students who experience depressive symptoms, resources are insufficient to provide this intensive service. Thus, there is a need for *sustainable* depression prevention programs (Cuijpers, et al., 2013; Voekler, 2003). This article will describe a novel approach to the development and study of a brief depression prevention program that focuses explicitly on one risk factor for depression, cognitive biases, and aims to understand the process of reducing this risk factor by using a model of health-behaviour change.

Many established depression prevention programs, specifically programs designed to prevent *first episode* onset, are based on CBT principles, are provided in small-group formats, and target adolescents (Jané-Llopis, 2003). The few programs that have been developed for university students are mostly modifications of adolescent

protocols and demonstrate similar effectiveness in randomized control trials (Seligman, Schulman, DeRubeis, & Hollon, 1999; Seligman, Schulman, & Tryon, 2007; Vázquez, Torres, Blanco, Díaz, Otero, & Hermida, 2012). These programs should be considered distinct from programs that aim to prevent *relapse* (for instance, Mindfulness-Based Cognitive Therapy; Segal, Williams, & Teasdale, 2013).

The meta-analyses of primary depression prevention programs for children and adolescents have demonstrated short-term effectiveness, but these effects are often small and disappear at follow-up ( $r = 0.10$ ; Stice, Shaw, Bohon, Marti, & Rohde, 2009). Greater effect sizes are found for programs that have 10 or more 60-90 minute sessions, that focus on adolescents (particularly those who are older, female, and high risk) rather than children, that are targeted rather than universal programs, and that are delivered by clinicians rather than paraprofessionals (Jané-Llopis, 2003; Kavanagh, et al., 2009; Stice, et al., 2009). These characteristics are resource-intensive and thus are difficult to implement on university campuses.

Current depression prevention programs more closely resemble full treatment protocols than prevention programs, because they include multiple interventions to reduce depression (i.e., behaviour activation, relaxation, cognitive restructuring, problem-solving, etc.; Horowitz & Garber, 2006). By definition, prevention programs should target risk factors or precursors to disorders in order to stop depression onset, rather than focusing on symptom management (Sutton, 2007). Sutton (2007) suggested that more mechanism research on prevention programs is needed to clarify our understanding of *how* programs prevent depression. This knowledge would help us develop programs with the minimum number of active ingredients necessary to foster larger, more long-lasting

effects. One way to do this would be to target known precursors of onset of *first* depressive episodes (Beck, 2008). To do this, we must understand the mechanism of onset for first episodes of depression.

Prominent depression theorists, for instance, Beck (2008) and Abramson and Alloy (Hopelessness Theory; Abramson, Metalsky, & Alloy, 1989), proposed variations of a cognitive diathesis-stress model of first depressive episode onset. Those who experience certain diatheses, biases in cognitive information processing or negative inferential style, who also experience significant and/or chronic negative life events or stressors, will be at considerable risk to experience their first (and subsequent) depressive episodes. Most diathesis-stress studies have focused on children and adolescents at risk to develop depressive disorders (“risk” is defined for the following studies as having a parent with a history of major depressive disorder, but having *not* experienced a first episode of depression) and examined the power of cognitive biases (including self-reported dysfunctional attitudes and experimental methods of cognitive bias detection), stressful life events/experience of stress (i.e., self-report measures and cortisol measures), and the interaction of cognitive variables and stress to predict onset of depressive symptoms and major depressive episodes.

The findings of studies aiming to examine the diathesis-stress hypothesis have been mixed. For instance, in a study of 7-year-old children, a significant association was found between cortisol levels post a lab-based stress task and positive and negative information-processing (as assessed by the Self-Referent Encoding Task or SRET), but only among children of fathers who had a history of depression (Hayden et al., 2014). Furthermore, this relationship between cognitive vulnerability and stress in HR

participants exists even when controlling for participant depressive symptoms (Seeds & Dozois, 2010). One study found that maladaptive cognitive-emotion regulation strategies partially mediated the relationship between cognitive vulnerability and daily hassles (Yan, Kong, He, McWhinnie, Yao, & Xiao, 2015). However, some studies have found no relationship between cognitive vulnerability factors, for instance negative self-concept (as measured by the SRET), and stress (Mackrell, Johnson, Dozois, & Hayden, 2013). Given the diversity of methods used to measure cognitive vulnerability and stress, it is difficult to determine for certain if the diathesis-stress hypothesis best describes depression onset, but the research to date is promising.

Despite somewhat inconsistent findings in the exact form of cognitive bias that serves as a risk factor for depression (i.e., negative versus positive bias, attention versus processing, explicit versus implicit measures of cognitive bias), it is clear that cognitive biases are still an important category of risk factors to consider targeting in a primary prevention program. To be suitable as a target for primary prevention in university students, this vulnerability factor must be demonstrated to exist prior to *first onset* of depressive episodes in general, and in university students in particular.

Prior to 1999, mixed findings made it difficult to discern if cognitive vulnerabilities existed in HR children. However, a landmark study by Taylor and Ingram (1999) incorporated the use of a negative mood prime into a standard SRET study to clarify whether or not HR children have a bias in terms of endorsing negative words over positive words as self-descriptors, compared to low risk (LR) children. In the neutral prime condition, the HR children reported similar amounts of positive words, but more negative words, than the LR children. In the negative mood prime condition, the HR

children endorsed half as many positive words as the children in all other groups (Taylor & Ingram, 1999). The authors suggested that it may be the *loss* of positive self-image (i.e., an inactive or less-active positive schema related to the self), rather than an increase in negative self-image, induced by negative mood states, that is the mechanism of first episode onset (Taylor & Ingram, 1999).

Since this study, many others have used this paradigm and found “risky” cognitive profiles in HR children after a negative mood prime is introduced. HR adolescents selectively attend to negative faces over positive faces (Joorman, Talbot, & Gotlib, 2007) and decreased positive schematic processing in HR preschoolers (Hayden, Klein, Durbin, & Olino, 2006). A prospective study by Rawal and colleagues (2013) also indicated that implicit tests of dysfunctional attitudes (SRET) correctly distinguished the currently and remitted depressed adolescents from the never-depressed adolescents (the entire sample was HR in terms of having at least one depressed parent), whereas, self-reported dysfunctional attitudes did not. In addition, implicit dysfunctional attitudes also predicted depressive symptoms longitudinally (Rawal, Collishaw, Thapar, & Rice, 2013). Furthermore, negative cognitive styles have been found to mediate the relationship between negative parenting factors (parental inferential feedback style, maternal anger expression), which could be considered stressors, and onset of first depressive episodes in children and university students (Alloy et al., 2012; Mezulis, Shibley Hyde, & Abramson, 2006). Similarly, using the Psychological Distance Scaling Task, Seeds and Dozois (2010) found that more tightly interconnected negative schema content and more loosely interconnected positive schema content predicted greater depressive symptoms in university students. Finally, although not central to this discussion because they help to

explain mechanism of depression *relapse* rather than *first episode onset*, studies that compare adults (and adolescents) who were never depressed, are currently depressed, and depression remitters contain similar findings to those discussed above. The remitters have similar (sub-clinical) levels of depression to the never-depressed individuals, but similar cognitive vulnerability profiles to the currently-depressed individuals when a negative mood is induced (Wang, Halvorsen, Eisemann, & Waterloo, 2010; Ingram & Ritter, 2000; Ladouceur, Dahl, Williamson, Birmaher, Ryan, & Casey, 2005; Oostrom et al., 2013; Vrijnsen, Becker, Arias-Vásquez, van Dijk, Speckens, & Oostrom, 2014). Preliminary evidence also suggests that this phenomenon is unique to depression in adults, and to internalizing disorders more broadly in children (Timbremont & Braet, 2004; Ladouceur, et al., 2005).

Numerous reviews of the depression risk literature conclude that various aspects of cognitive bias are implicated in depression onset and relapse, be it explicit or implicit forms of dysfunctional attitudes, positive or negative biases in attention, etc. (De Raedt & Koster, 2010). Although ongoing research will be needed to clearly elucidate which cognitive biases are most responsible for depression onset, at this point there is still enough evidence to suggest that cognitive biases are an appropriate target for modification in programs aiming to prevent the onset of first major depressive episode.

The programs that target one risk factor would provide one clearly identified mechanism of change to test. Furthermore, it may be easier to detect changes in proximal risk factors of depression, rather than depression itself, because cognitive biases are more prevalent in the population than depression and may be more malleable by skills acquisition. CBT specifically targets the acquisition of cognitive change skills and

cognitive change (dysfunctional attitudes, surface cognitions, schema structures) is the proposed mechanism by which depression remits (Beck & Dozois, 2011); however, the mechanism of change studies of CBT randomized control trials (RCTs) show mixed support for this mechanism (Garratt, Ingram, Rand, & Sawalani, 2007; Webb, Auerbach, & DeRubeis, 2012). For instance, some CBT trials demonstrate the expected cognitive change (reduction in negative automatic thoughts) preceding depressive symptom reduction (Coie, et al., 1993; Kwon & Oei, 2003). Decreased negative automatic thinking has also been found to predict depressive symptom reduction in inpatient populations (Christopher, Jacob, Neuhas, Neary, & Fiola, 2009). Other studies have found that cognitive change in a non-specific factor that is modified even by pharmacological interventions, where cognition is not the focus of change (Fournier, DeRubeis, Hollon, Gallop, Shelton, & Amsterdam, 2013; Quilty, McBride, & Bagby, 2008). Finally, it has also been demonstrated in some studies that changes in cognitive processes and skill-building in cognitive restructuring are not necessary to produce depressive symptom reduction (Jacobson, et al., 1996).

Similarly, as seen in the literature on mechanism of onset, it is unclear whether or not it is necessary to focus on reduction of negative cognitive biases or augmentation of positive cognitive structures. For instance, in a CBT vs. antidepressant RCT, it was found that those receiving a combination of CBT and pharmacotherapy experienced greater change in positive self-schema content, compared to other treatment groups, suggesting that the modification of *positive*, rather than *negative*, schema structures may be the mechanism of change in combined treatment (Dozois, et al., 2009). Another CBT trial from this research group suggests that CBT may act to *both* strengthen positive schematic

structures (greater integration) and destabilize negative schematic content (Quilty, Dozois, Lobo, Ravindran, & Bagby, 2014). Therefore, as discussed in the above review of the mechanism of depression onset literature, it may be preferable to target negative and positive cognitive processes in prevention programs in order to maximize potential benefits.

Furthermore, to increase the potency of prevention interventions we can also learn lessons from other mechanisms researched in trials of CBT for depression. Additional factors that promote improved outcomes in CBT trials include higher homework compliance outside of session, greater acceptance of CBT conceptualization of problems, and improved client willingness to try CBT techniques in session (Detweiler & Whisman, 1999; Kwon & Oei, 2003; Strunk, et al., 2010). Early maladaptive schemas related to “impaired limits” (i.e., self-control) have been shown to be amenable to CBT (Dozois, et al., 2014). In addition, a greater sense of self-control or self-efficacy predicts fewer depression relapses post-treatment (Dozois & Quilty, 2014). “Sudden gains” in a CBT trial was found to be significantly associated with problem-solving activities (German, Lorenzo-Luaces, & DeRubeis, 2014). Finally, patient characteristics, for example, a sense of optimism for positive outcomes of engaging in CBT, accepting responsibility for this change, and feeling capable to participate in CBT skills-building predict greater improvement in depressive symptoms post-treatment (Renaud, Russell, & Myhr, 2014). These findings suggest that clients with greater willingness/readiness or motivation to engage in learning CBT skills experience greater depressive symptom reduction. It also implies that it would be helpful to apply theories of behaviour change that encompass self-efficacy, motivation, acceptance of and willingness to learn new skills to improve

our understanding of the mechanism of change in depression prevention programs. The theory of planned behaviour contains these constructs (TPB; Ajzen, 1991) and has successfully explained the uptake of a wide variety of health behaviours, including psychological service use (Armitage & Connor, 2001; Mo & Mak, 2009; Skogstad, Deane, & Spicer, 2006).

TPB postulates that in order to perform a particular behaviour, one must have intention to perform that behaviour and this intention is influenced by three categories of cognitive antecedents: attitude, subjective norms, and perceived behaviour control (Ajzen, 1991). Attitude encompasses the belief that performing the behaviour (learning strategies to change negative thinking patterns) will produce favourable outcomes. Subjective norms indicate a person's beliefs about the opinions of important others regarding the target behaviour (i.e., "My parents think I should change my negative thinking patterns"). Perceived behaviour control describes the beliefs people have regarding their capacity to perform the behaviour (i.e., "I could learn techniques to change negative thinking patterns"). According to the TPB, these antecedents predict someone's intention (motivational component, the desire or willingness) to change thinking patterns (Ajzen, 1991). Theoretically speaking, the TPB has potential to help understand people's willingness to engage in changing cognitive biases that put them at risk to develop depression (Hobbis & Sutton, 2005). In particular, previous studies have suggested that optimism about treatment (attitude) predicts improved CBT outcomes (Renaud, Russell, & Myhr, 2014). A greater sense of mastery (perceived behaviour

control) has been shown to significantly mediate the relationship between treatment group and both dysfunctional attitudes and depressive symptom reduction (Strunk, Adler, & Hollars, 2013; van der Zanden, Galindo-Garre, Kramer, & Cuijper, 2014). In addition to clarification of which cognitive biases are best to target for prevention, a greater understanding of behaviour change factors may also help us develop a more refined understanding of why both the mechanism of *onset* and mechanism of *change* literatures have mixed findings. Perhaps motivational factors protect HR persons in pushing them towards positive thinking and away from negative thinking. Preliminary research conducted by these authors suggest that theory of planned behaviour variables partially mediate the relationship between depressive symptoms and negative automatic thinking and intentions to try thought-change strategies (Study 1 – Bradley, Santor, & Moreno, 2015). It will also be important to determine if these motivational factors can be *changed* by CBT intervention strategies.

### **The Study Rationale.**

Thus, the purpose of this pilot study was to develop a targeted, *brief*, and low-cost depression prevention program that teaches strategies to change depression-related cognitive processing biases and is specifically designed for university students and to conduct an open feasibility trial of this program. Given Sutton's (2007) call to focus efforts on understanding the mechanisms in prevention (both mechanisms of *onset* and of *change*) and the potential of targeting proximal risk factors for depression (cognitive biases) to improve the detection of intervention effects, this intervention focuses on teaching strategies to change thinking patterns. Since TPB antecedents have been shown to influence intention and intention is the greatest predictor of health-behaviour change

(Armitage & Connor, 2001), we also aimed to explore the potential for this CBT-based program to influence TPB factors.

### **Hypotheses.**

The participants in the workshop will experience a significant increase from pre- to –post intervention period in their attitude, subjective norms, perceived behaviour control about increasing their positive thinking, as well as a significant increase in their intention to increase their positive thinking from pre- to post-workshop. They will also experience a significant increase in positive affect. The participants in the workshop will experience a significant decrease in depressive symptoms, negative affect, and negative automatic thoughts from pre- to post-workshop.

### **Methods**

This study was reviewed and approved by the University of Ottawa Research Ethics Board.

**Participants.** Thirty-seven participants completed the feasibility trial of the “Setbacks and Negative Thinking: Start Making a Change” Workshop. Most participants were in the first or second year of their undergraduate degrees, but several participants were more senior undergraduates and students in graduate programs. The mean age of the participants was 22.08 years ( $SD = 5.18$ ) and 83.8% were female (31 females, 6 males). Most participants completed this study for course credit.

**Procedure.** One week prior to the intervention, the participants were provided a link via e-mail where they gave informed consent and completed the study questionnaires online. Next they attended Part 1 of the workshop, a one-hour session that was facilitated

by the first author (KB). They were provided with exercises to complete daily at home for one week. Then they met again with KB for Part 2 of the workshop (one week after Part 1). The groups consisted of 3 – 8 individuals plus the facilitator. After the second session they were provided with more homework exercises to complete daily at home. Finally, the participants were sent the link to complete the post-workshop questionnaire online one week after Part 2. The entire intervention, including questionnaires, was completed over a three-week period.

**Intervention.** The “Setbacks and Negative Thinking: Start Making a Change” workshop is based on cognitive-behavioural principles and techniques from various CBT protocols. The workshop aims to prevent the onset of depression in university students by targeting a proximal common risk factor, dysfunctional thinking patterns. To accomplish this task, the participants learn strategies to increase positive and fair thinking patterns and reduce/challenge negative thoughts. We expect that interventions included will also impact TPB factors. For instance, psychoeducation demonstrates the effectiveness of program techniques to change destructive thinking patterns, which would improve a participant’s beliefs that the program could work (attitude). The group-based format allows the facilitator and group members to talk about negative thoughts they have and practice the strategies together; thus, helping the members to develop beliefs that others think using these skills is a good idea (subjective norms). Finally, teaching skills will help participants feel able to use these skills (perceived behaviour control). Influencing the TPB antecedents ultimately predicts improvements in intention to engage in changing thinking patterns.

In Part 1, the facilitator begins by normalizing the experience of setbacks or stressors (negative life events) and negative reactions to these situations. She asks questions about how people react to setbacks. Next, the participants are socialized to the “Negativity Cycle,” (CBT model) which describes how certain situations spawn different thoughts, feelings, and actions, which can influence each other and produce negative outcomes. After this, the workshop turns to focusing on thoughts, as a way to reverse the cycle and produce positive outcomes. First, the participants are taught how to distinguish negative thoughts from positive thoughts. Consistent with Persons and colleagues’ (2001) definition of functional thoughts, “positive thoughts” are defined as thoughts “that are fair to you and helpful to solving problems.” The authors chose “increasing positive thoughts” as the target behaviour because it was thought to be more intuitive for participants. The participants were made aware that “positive thoughts” were defined as described above both when completing the theory of planned behaviour questionnaire and in the workshop. Given that CBT interventions have been shown to modify both positive and negative cognitive processes (Quilty, Dozois, Lobo, Ravindran, & Bagby, 2014) and that there is evidence suggesting that both types of thoughts may be implicated in first depressive episode onset (Joorman, Talbot, & Gotib, 2007; Taylor & Ingram, 1999), this wording was deemed appropriate for the current study. Then participants practice generating positive thoughts for other stressful or upsetting scenarios. The participants are then further educated on a subset of common “types of negative thoughts” (cognitive distortions; Burns, 1999). The facilitator then describes the long-term negative

consequences of chronic negative thinking, as well as explaining some difficulties in shifting to positive thinking. The participants are then taught a skill to increase positive thinking about themselves, "Counting Accomplishments" (developed by Dr. Santor)

Counting accomplishments is recommended as a way to start noticing your daily successes and feeling better. For homework, the participants are asked to track their series of negative thoughts and accomplishments daily for the next week and several other exercises in their workbooks.

After one week, the participants are asked to return for Part 2 of the workshop. Part 2 begins by eliciting from the audience what they learned in the previous session, as well as from the homework exercises. The bulk of Part 2 is dedicated to teaching strategies to deal with negative thoughts. The first strategy is to develop a personalized list of distractions that participants can use to distract themselves from negative thoughts temporarily. Next participants are taught how to challenge their negative thoughts directly (cognitive restructuring). Next there is a review and skill consolidation. The facilitator then describes how to complete the Daily Thought Logs for the next week, incorporating steps to challenge their series of negative thoughts. For homework, the participants must monitor and challenge their negative thoughts daily and complete workbook exercises.

### **Measures.**

*Center for epidemiologic studies depression scale (CES-D; Radloff, 1977).* The CES-D is a 20-item, Likert-type scale measure of current depressive symptomology over the previous two weeks in non-clinical populations. It has been validated for use in numerous university student samples (Radloff, 1977; Yao, Fang, Zhu, & Zuroff, 2009).

The CES-D has demonstrated highly satisfactory internal consistency (alphas ranging from 0.85 - 0.90) and split-half reliabilities ( $r$ 's = 0.76 - 0.85; Radloff, 1977). For the current study, strong internal consistency was found for both the pre-workshop ( $\alpha = 0.88$ ) and post-workshop ( $\alpha = 0.88$ ) administrations of the CES-D.

***Short automatic thoughts questionnaire (Netemeyer, et al., 2002, ATQ-S).*** The ATQ-S is a shorter version of the original Automatic Thoughts Questionnaire (ATQ; Hollon & Kendall, 1980), which is a 30-item, 5-option Likert-type scale questionnaire with higher scores indicating greater severity of negative automatic thoughts. Both forms of the ATQ were normed on university students. The ATQ-S has strong psychometric properties, with an internal consistency reliability of 0.92, which is comparable to the original version (Netemeyer, et al., 2002). For the current study, strong internal consistency was found for both the pre-workshop ( $\alpha = 0.92$ ) and post-workshop ( $\alpha = 0.94$ ) administrations of the ATQ-S.

***Positive and negative affect scale-child (PANAS-C; Laurent, et al., 1999).*** Negative and positive affect were measured using the PANAS-C. The PANAS-C is a 30-item, 5-option Likert-type scale questionnaire with two sub-scales, positive and negative affect (15 items each). This measure has been normed on participants up to 18 years of age (appropriate since we are targeting first-year students; Laurent, Joiner, & Catanzaro, 2011) and shows satisfactory internal consistency on both sub-scales (positive affect  $\alpha = 0.87$ , negative affect  $\alpha = 0.92$ ; Hughes & Kendall, 2009). Adequate convergent and discriminant validity has also been demonstrated between the PANAS-C and measures of depression and anxiety. For the current study, strong internal consistency was found for both the pre-workshop (positive affect  $\alpha = 0.89$ , negative affect  $\alpha = 0.88$ )

and post-workshop (positive affect  $\alpha = 0.93$ , negative affect  $\alpha = 0.95$ ) administrations of the PANAS-C.

***Satisfaction survey.*** The satisfaction survey was a 10-item scale used to determine the participants' satisfaction with the workshop, developed by K. Bradley and D. Santor. The score is calculated by assigning scores of 1, 2, 3, 4, and 5 to the response categories of "strongly disagree", "disagree", "neither agree nor disagree", "agree", and "strongly agree". Example survey items are "I enjoyed the workshop" and "I found this workshop helpful". The participants were also given the option of providing additional comments regarding the workshop. The survey was given to the participants upon completion of the second workshop session.

***The theory of planned behaviour questionnaire (TPBQ).*** The TPBQ was developed by K. Bradley and D. Santor based on Ajzen's (2006) guidelines and a literature review of the theory of planned behaviour. The behaviour targeted was "increasing positive thinking." We created a 15-item, 7-point Likert-type (ranges from disagree = 1 to agree = 7) scale questionnaire that assesses attitude (4 items), subjective norms (5 items), perceived behaviour control (3 items), and intentions (3 items) around thinking positively. Greater scores indicate increasingly positive antecedents and intentions. This study was one of the pilot tests of the TPBQ to establish its psychometric properties. Please see Table 1 for questionnaire properties.

Table 1

*The Characteristics of the TPBQ*

Sub-Scale	Sample Item	Number of Items	Scale Range	Pre-workshop $\alpha$	Post-workshop $\alpha$
Attitude	Thinking more positively when I have negative thoughts would help me feel better when I am sad.	4	4 - 28	0.92	0.93
Subjective norms	Most of my friends would want to think more positively.	5	5 - 35	0.54	0.50
Perceived behaviour control	It would be hard for me to think more positively when I have negative thoughts. (reverse score)	3	3 - 21	0.32	0.44
Intention	I plan to think more positively when I have negative thoughts.	3	3 - 21	0.86	0.82

**Statistical analyses.** A series of paired-samples *t*-tests were computed to examine the pre to post within-subjects' changes in attitude, subjective norms, perceived behaviour control, and intention to increase positive thinking, as well as changes in negative automatic thoughts, affect, and depressive symptoms.

## Results

Detailed results of the various *t*-tests can be found in Table 2. Our analyses indicated that the participants experienced a significant increase in their perceived behaviour control from pre- to post-intervention. In other words, they grew in their belief

that they can increase their positive thoughts. This change is considered to be a small to medium-sized effect (Cohen, 1992). The participants also experienced a significant increase in positive affect over the course of the workshop and this change is considered to be a medium-sized effect.

Table 2

*Means and t-tests for the feasibility trial outcome variables.*

Variable	Pre-Workshop <i>Mean (SD)</i>	Post-Workshop <i>Mean (SD)</i>	<i>t</i> (36)	<i>p</i>	<i>d</i>
Attitude	24.32 (4.71)	24.51 (3.99)	-0.27	0.79	0.05
Subjective norms	27.24 (4.61)	27.11 (4.50)	0.19	0.86	0.03
Perceived behaviour control	10.08 (2.89)	11.19 (3.47)	-2.41	0.021*	0.40
Intention	17.94 (3.64)	18.38 (2.61)	-0.99	0.33	0.16
Negative affect	37.62 (10.56)	35.84 (14.05)	1.05	0.30	0.17
Positive affect	44.18 (9.28)	49.59 (11.57)	-4.03	<0.001**	0.66
Negative automatic thoughts	20.19 (8.22)	20.05 (8.22)	0.16	0.88	0.03
Depressive symptoms	18.65 (7.17)	17.84 (7.22)	0.88	0.38	0.15

\* $p < 0.05$

\*\* $p < 0.001$

The Satisfaction Survey results reflected a high level of participant satisfaction. The total mean score for the items was quite high ( $M=46.50$ ,  $SD=3.79$ , maximum possible scale score was 50), as all of the participants were satisfied or very satisfied with this intervention. Additional comments provided by the participants also reflected a high level of satisfaction: “This intervention helped me reduce my negative thinking significantly” and “The content was effectively communicated.”

**Discussion**

The goal of this study was to develop a brief, low-cost program to prevent depression in university students and to conduct a feasibility trial of the “Start Making a Change” program. This prevention program is unique in that it focuses specifically on the proximal risk of depression-related cognitive biases (increased dysfunctional attitudes, lowered positive self-schema, etc). In addition, we also aimed to examine the potential of the theory of planned behaviour to explain engagement in thought-change strategies, as well as the capacity of our intervention to change TPB factors: intention, attitude, subjective norms, and perceived behaviour control.

Over the course of the intervention, the participants experienced significant improvement in their perceived behaviour control over increasing their positive thinking. This can be otherwise thought of as their beliefs in their capacity to use the strategies they learned in the intervention to improve thinking patterns. This likely reflects the explicit teaching of skills and opportunities to practice these skills during the course of the program. There was no significant change in other TPB constructs and this could be for several reasons. First, the participants sign up voluntarily to participate in this program and thus likely already believe that the program could be helpful to them (attitude), that, given the group format, others approve of this behaviour (subjective norms), and have intentions to work on their thinking patterns. This is reflected in the near-ceiling mean scores on the attitude, subjective norms, and intention sub-scales pre-intervention (see Table 2). Perhaps, in general, university students have favorable beliefs regarding positive thinking and thus there was a ceiling effect. Finally, perceived behaviour control was considerably lower pre-intervention compared to the other constructs. This combined

with the emphasis on skill-building in the intervention may have created the opportunity to improve participants' beliefs about their self-efficacy to improve positive thinking. Consistent with this, perceived behaviour control, as well as beliefs about barriers to psychological service use, have been found to be the most important factors for seeking professional help in some studies (see Collins, Westra, Dozois, & Burns, 2004, for review; Hyland, McLaughlin, Boduszek, & Prentice, 2012). Concepts related to perceived behaviour control, such as self-efficacy and mastery, have also shown to significantly improve with CBT intervention and to predict improved outcomes (Renaud, Russell, & Myhr, 2014; Strunk, Adler, & Hollars, 2013; van der Zanden, Galido-Garre, Kramer, & Cuijper, 2014). Given some methodological limitations of the theory of planned behaviour questionnaire and the limited sample size of this study (to be discussed further below), it will be important for future research to replicate this finding. However, as mentioned above, this finding is promising given its consistency with other CBT trial results.

The participants also experienced significant improvements in positive affect from pre- to post-intervention. Evidence from the field of positive psychology suggests that positive affect is an important protective factor to promote in interventions and to research in depression prevention studies. According to the broaden-and-build theory, positive affect provides us with internal resources to cope with challenging life circumstances and can prevent depression (Fredrickson, 2001). Similarly, Lightsey Jr. and colleagues (1994, 2013) have identified positive affect and positive thinking as the “stress-buffer” that prevents depression; that is, positive affect and thinking are the opposite side of the coin of the well-established diathesis-stress model of depression

onset (see Beck, 2008, for review). In addition, those at risk to develop depression also demonstrate significant deficits in positive cognitive processes (lower endorsement of positive self-referent words, less tightly integrated positive self-schema; Seeds & Dozois, 2010; Taylor & Ingram, 1999). Positive cognitive processes can also be modified with CBT intervention (Quilty, Dozois, Lobo, Ravindran, & Bagby, 2014). Therefore, positive affect and positive thinking should be targets of depression prevention programs. The “Start Making a Change” program incorporates several strategies to improve positive thinking and affect (counting accomplishments). This is an important area for future research in depression prevention programs.

There were no significant changes in negative automatic thinking, depressive symptoms or negative affect over the course of the intervention period. Perhaps three weeks and two one-hour sessions is too low a “dose” to affect long-standing cognitive biases and low mood. Conversely, the findings around change in negative cognitive processes in CBT have been mixed (Garratt, Ingram, Rand, & Sawalani, 2007; Webb, Auerbach, & DeRubeis, 2012). Some studies have found changes in dysfunctional attitudes and deeper cognitive structures, but not negative automatic thoughts (Kwon & Oei, 2003). Another important factor to consider regarding altering cognitive biases is the role of practice. Homework compliance anecdotally seemed to be low in this trial, but the authors did not formally measure compliance. Previous research has demonstrated that increased homework compliance predicts greater improvements in negative automatic thinking and depressive symptoms in CBT trials (Detweiler & Whisman, 1999). In Study 3, we completed a randomized control trial (RCT) of the “Start Making a Change” program where homework completion rates were near 100% and preliminary analyses

indicated promising intervention effects on negative automatic thinking (Bradley, Santor, & Oram, 2015).

Although not necessarily a target of our prevention program, depressive symptoms also did not decrease. It is particularly difficult to assess and create significant change in depressive symptoms when the base rate of symptoms in the population is low (Coie, et al., 1993) and thus may not be an ideal target for prevention programs. For this study, the mean score on the CES-D (18.65) was just within range of acceptable cut-offs for clinically significant depressive symptoms (16-22; Radloff, 1977). Therefore, at least 50% of the sample was not clinically depressed and thus this may not be an appropriate benchmark for intervention effects. This feasibility trial was designed to target “increasing positive thinking” and to determine if the theory of planned behaviour factors can also be modified by a CBT intervention. In our randomized control trial, we aimed to target and measure change in negative *and* positive automatic thoughts, as well as dysfunctional attitudes, to provide a more refined test of prevention effects. Several authors have noted that the greatest test of a prevention program is to determine its capacity to prevent depression episode onset (Horowitz & Garber, 2006; Sutton, 2007). Although this study cannot address this question explicitly, future studies should put greater emphasis on testing prevention of depressive disorder onset over reductions in depressive symptoms in prevention research.

#### **Limitations and future research directions.**

Certain characteristics of this study limit the generalizability of these findings. First, this is a feasibility trial with a low sample size and no control group. One of the authors (KB) facilitated all groups, which limits the findings in that she is both invested

in this research and is a clinical psychologist in training (not ideal for broad program dissemination, as there are not enough clinical psychologists and they are too expensive for prevention work). As previously mentioned, Study 3 addresses several of these issues: There is a control group, a larger sample size (approximately 150 university students), and a senior undergraduate student was trained by KB to facilitate groups independently (Bradley, Santor, & Oram, 2015).

This was also a pilot study of our theory of planned behaviour questionnaire, which did not perform optimally in terms of internal consistency (see Table 1). Despite efforts to follow Ajzen's guidelines and a thorough literature review, this may be perhaps due to having too few items in each sub-scale or failing to capture all aspects of the constructs under study. However, there is no established convention for TPB questionnaire development (Ajzen, 2006). More pilot work is needed to improve this questionnaire.

Finally, this is a university student sample where 50% of participants were below threshold for clinically significant depressive symptoms according to the CES-D; therefore, this is not a high-risk sample. This may explain our lack of ability to detect changes in negative thinking and depression. Future studies, with larger sample sizes, should divide samples by symptom severity. They could also recruit students who meet certain cut-offs on important indicators. For instance, Seligman, Schulman, and Tryon (2007) screened for the most severe quartile of their sample for negative inferential style and intervened on this sub-sample. Conversely, university students are an at-risk group simply by nature of the stressors they experience during this period (Adlaf, et al., 2001). In addition, there are a myriad of forms of cognitive biases, both positive and negative,

that demonstrate potential risk for developing a first depressive episode. The only clinical measure of cognitive processes in this study was the Short Negative Automatic Thoughts Questionnaire (Netemeyer, et al., 2002). In our RCT, we have expanded our outcomes to include indicators of change in positive automatic thoughts, dysfunctional attitudes, as well as negative automatic thinking. Future studies could also incorporate implicit measures of cognitive bias as they seem to be differentially related to depressive symptoms (Study 3 – Bradley, Santor, & Oram, 2015; Rawal, Collishaw, Thapar, & Rice, 2013).

### **Conclusions.**

In summary, we have developed a brief, low-cost depression prevention program that has the potential to be easily disseminated on university campuses. In the short term, this program has demonstrated preliminary evidence of its capacity to teach thought-change skills and improve participants' perceptions of self-efficacy around changing thinking patterns, as well as improve positive affect.

### References

- Abramson, L.Y., Metalsky, G.I., & Alloy, L.B. (1989). Hopelessness depression: A theory-based subtype of depression. *Psychological Review*, *96*(2), 358-372. doi:10.1037//0033-295X.96.2.358
- Adlaf, E. M., Gliksman, L., Demers, A., & Newton-Taylor, B. (2001). The prevalence of elevated psychological distress among canadian undergraduates: Findings from the 1998 Canadian campus survey. *Journal of American College Health*, *50*(2), 67–72. doi: 10.1080/07448480109596009
- Ajzen, I. (2006). TPB measurement: Conceptual and methodological considerations. 2006-01-30/[2011-05-15]. Retrieved from <http://www.People.Umass.Edu/aizen/pdf/tpb.Measurement.Pdf>. on June 25, 2013.
- Ajzen, Icek. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, *50*(2), 179–211. doi:10.1016/0749-5978(91)90020-T
- Alloy, L. B., Black, S. K., Young, M. E., Goldstein, K. E., Shapero, B. G., Stange, J. P., ... Abramson, L. Y. (2012). Cognitive vulnerabilities and depression versus other psychopathology symptoms and diagnoses in early adolescence. *Journal of Clinical Child & Adolescent Psychology*, *41*(5), 539–560. doi: 10.1080/15374416.2012.703123
- Armitage, C. J., & Conner, M. (2001). Efficacy of the theory of planned behaviour: A meta-analytic review. *British Journal of Social Psychology*, *40*(4), 471–499. doi:10.1348/014466601164939
- Beck, A. T. (2008). The evolution of the cognitive model of depression and its neurobiological correlates. *The American Journal of Psychiatry*, *165*(8), 969–977.

- doi:10.1176/appi.ajp.2008.08050721
- Beck, A. T., & Dozois, D. J. A. (2011). Cognitive therapy: Current status and future directions. *Annual Review of Medicine*, *62*(1), 397–409. doi: 10.1146/annurev-med-052209-100032
- Burns, D. D. (1999). *The Feeling Good Handbook*. New York: Penguin Group.
- Christopher, M. S., Jacob, K. L., Neuhaus, E. C., Neary, T. J., & Fiola, L. A. (2009). Cognitive and behavioral changes related to symptom improvement among patients with a mood disorder receiving intensive cognitive-behavioral therapy. *Journal of Psychiatric Practice*, *15*(2), 95–102. doi: 10.1097/01.pra.0000348362.11548.5f
- Cohen, J. (1992). A power primer. *Psychological bulletin*, *112*(1), 155-159. doi: 10.1037/0033-2909.112.1.155
- Coie, J. D., Watt, N. F., West, S. G., Hawkins, J. D., Asarnow, J. R., Markman, H. J., ... & Long, B. (1993). The science of prevention: a conceptual framework and some directions for a national research program. *American Psychologist*, *48*(10), 1013-1022. doi: 10.1037/0003-066X.48.10.1013
- Collins, K. A., Westra, H. A., Dozois, D. J., & Burns, D. D. (2004). Gaps in accessing treatment for anxiety and depression: Challenges for the delivery of care. *Clinical Psychology Review*, *24*(5), 583–616. doi: 10.1016/j.cpr.2004.06.001
- Cuijpers, P., Berking, M., Andersson, G., Quigley, L., Kleiboer, A., & Dobson, K. S. (2013). A meta-analysis of cognitive-behavioural therapy for adult depression, alone and in comparison with other treatments. *Canadian Journal of Psychiatry*. *Revue Canadienne de Psychiatrie*, *58*(7), 376–85.

- Cuijpers, P., van Straten, A., Smit, F., Mihalopoulos, C., & Beekman, A. (2008). Preventing the onset of depressive disorders: a meta-analytic review of psychological interventions. *The American Journal of Psychiatry*, *165*(10), 1272–1280. doi:10.1176/appi.ajp.2008.07091422
- Deitweiler, J.B., & Whisman, M.A. (1999). The role of homework assignments in cognitive therapy for depression: potential methods for enhancing adherence. *Clinical Psychology: Science and Practice*, *6*(3), 267-282. doi: 10.1093/clipsy.6.3.267
- De Raedt, R., & Koster, E. H. W. (2010). Understanding vulnerability for depression from a cognitive neuroscience perspective: A reappraisal of attentional factors and a new conceptual framework. *Cognitive, Affective & Behavioral Neuroscience*, *10*(1), 50–70. doi: 10.3758/CABN.10.1.50
- Dozois, D. J. A., Bieling, P. J., Evraire, L. E., Patelis-Siotis, I., Hoar, L., Chudzik, S., ... Westra, H. A. (2014). Changes in core beliefs (early maladaptive schemas) and self-representation in cognitive therapy and pharmacotherapy for depression. *International Journal of Cognitive Therapy*, *7*(3), 217–234. doi: 10.1521/ijct.2014.7.3.217
- Dozois, D. J. A., J., Bieling, P. J., Patelis-Siotis, I., Hoar, L., Chudzik, S., McCabe, K., & Westra, H. A. (2009). Changes in self-schema structure in cognitive therapy for major depressive disorder: A randomized clinical trial. *Journal of Consulting and Clinical Psychology*, *77*(6), 1078–1088. doi: 10.1037/a0016886
- Eisenberg, D., Gollust, S. E., Golberstein, E., & Hefner, J. L. (2007). Prevalence and correlates of depression, anxiety, and suicidality among university students. *The*

- American Journal of Orthopsychiatry*, 77(4), 534–542. doi:10.1037/0002-9432.77.4.534
- Fournier, J. C., DeRubeis, R. J., Hollon, S. D., Gallop, R., Shelton, R. C., & Amsterdam, J. D. (2013). Differential change in specific depressive symptoms during antidepressant medication or cognitive therapy. *Behaviour Research and Therapy*, 51(7), 392–398. doi: 10.1016/j.brat.2013.03.010
- Garratt, G., Ingram, R. E., Rand, K. L., & Sawalani, G. (2007). Cognitive processes in cognitive therapy: Evaluation of the mechanisms of change in the treatment of depression. *Clinical Psychology: Science and Practice*, 14(3), 224–239. doi: 10.1111/j.1468-2850.2007.00081.x
- German, R. E., Lorenzo-Luaces, L., & DeRubeis, R. J. (2014). Patient's attributions about symptom improvement in CBT for depression: Development of a rating system and an initial test of validity. *International Journal of Cognitive Therapy*, 7(3), 272–286. doi: 10.1521/ijct.2014.7.3.272
- Hayden, E. P., Hankin, B. L., Mackrell, S. V. M., Sheikh, H. I., Jordan, P. L., Dozois, D. J. A., ... Badanes, L. S. (2014). Parental depression and child cognitive vulnerability predict children's cortisol reactivity. *Development and Psychopathology*, 26(Special Issue 4pt2), 1445–1460. doi: 10.1017/S0954579414001138
- Hayden, E. P., Klein, D. N., Durbin, C. E., & Olino, T. M. (2006). Positive emotionality at age 3 predicts cognitive styles in 7-year-old children. *Development and Psychopathology*, null(02), 409–423. doi: 10.1017/S0954579406060226
- Hobbis, I., & Sutton, S. (2005). Are techniques used in cognitive behaviour therapy

- applicable to behaviour change interventions based on the theory of planned behaviour? *Journal of Health Psychology*, *10*(1), 7-18.  
doi:10.1177/1359105305048549
- Horowitz, J.L., & Garber, J. (2006). The prevention of depressive symptoms in children and adolescents: A meta-analytic review. *Journal of Consulting and Clinical Psychology*, *74*(3), 486-503. doi:10.1037/0022-006X.74.3.401
- Hyland, P. E., McLaughlin, C. G., Boduszek, D., & Prentice, G. R. (2012). Intentions to participate in counselling among front-line, at-risk Irish government employees: An application of the theory of planned behaviour. *British Journal of Guidance & Counselling*, *40*(3), 279–299. doi:10.1080/03069885.2012.681769
- Hughes, A. A., & Kendall, P. C. (2009). Psychometric properties of the Positive and Negative Affect Scale for Children (PANAS-C) in children with anxiety disorders. *Child psychiatry and human development*, *40*(3), 343-352. doi: 10.1007/s10578-009-0130-4
- Hysenbegasi, A., Hass, S. L., & Rowland, C. R. (2005). The impact of depression on the academic productivity of university students. *The Journal of Mental Health Policy and Economics*, *8*(3), 145–51.
- Ingram, R. E., & Ritter, J. (2000). Vulnerability to depression: Cognitive reactivity and parental bonding in high-risk individuals. *Journal of Abnormal Psychology*, *109*(4), 588–596. doi: 10.1037/0021-843X.109.4.588
- Jacobson, N. S., Dobson, K. S., Truax, P. A., Addis, M. E., Koerner, K., Gollan, J. K., ... Prince, S. E. (1996). A component analysis of cognitive-behavioral treatment for depression. *Journal of Consulting and Clinical Psychology*, *64*(2), 295–304.

- Jane-Llopis, E. (2003). Predictors of efficacy in depression prevention programmes: Meta-analysis. *The British Journal of Psychiatry*, *183*(5), 384–397. doi: 10.1192/bjp.183.5.384
- Joormann, J., Talbot, L., & Gotlib, I. H. (2007). Biased processing of emotional information in girls at risk for depression. *Journal of Abnormal Psychology*, *116*(1), 135–143. doi: 10.1037/0021-843X.116.1.135
- Kavanagh, J., Oliver, S., Lorenc, T., Caird, J., Tucker, H., Harden, A., ... Oakley, A. (2009). School-based cognitive-behavioural interventions: A systematic review of effects and inequalities. *Health Sociology Review*, *18*(1), 61–78. doi:10.5172/hesr.18.1.61
- Kwon, S., & Oei, T.P.S. (2003). Cognitive change processes in a group cognitive behavior therapy of depression. *Journal of Behavior Therapy and Experimental Psychiatry*, *34*(1), 73-85. doi: 10.1016/S0005-7916(03)00021-1
- Ladouceur, C. D., Dahl, R. E., Williamson, D. E., Birmaher, B., Ryan, N. D., & Casey, B. J. (2005). Altered emotional processing in pediatric anxiety, depression, and comorbid anxiety-depression. *Journal of Abnormal Child Psychology*, *33*(2), 165–177. doi: 10.1007/s10802-005-1825-z
- Laurent, J., Catanzaro, S. J., Joiner Jr, T. E., Rudolph, K. D., Potter, K. I., Lambert, S., ... & Gathright, T. (1999). A measure of positive and negative affect for children: scale development and preliminary validation. *Psychological Assessment*, *11*(3), 326-338. doi: 10.1037/1040-3590.11.3.326
- Laurent, J., Joiner Jr, T. E., & Catanzaro, S. J. (2011). Positive affect, negative affect, and physiological hyperarousal among referred and nonreferred youths. *Psychological*

- Assessment*, 23(4), 945-957. doi: 10.1037/a0024080
- Lightsey Jr., O.R. (1994). "Thinking positive" as a stress buffer: The role of positive automatic cognitions in depression and happiness. *Journal of Counseling Psychology*, 41(3), 325-334. doi:10.1037/0022-0167.41.3.325
- Lightsey Jr., O.R., Gharghani, G.G., Katz, A.M., McKinney, V.A., & Rarey, E.B. (2013). Positive automatic cognitions mediate the relationship between personality and trait positive affect. *Journal of Happiness Studies*, 14, 115-134. doi: 10.1007/s10902-011-9319-x
- Mackrell, S. V. M., Johnson, E. M., Dozois, D. J. A., & Hayden, E. P. (2013). Negative life events and cognitive vulnerability to depression: Informant effects and sex differences in the prediction of depressive symptoms in middle childhood. *Personality and Individual Differences*, 54(4), 463-468. doi: 10.1016/j.paid.2012.09.007
- Merry, S. N., & Spence, S. H. (2007). Attempting to prevent depression in youth: a systematic review of the evidence. *Early Intervention in Psychiatry*, 1(2), 128-137. doi:10.1111/j.1751-7893.2007.00030.x
- Mezulis, A. H., Hyde, J. S., & Abramson, L. Y. (2006). The developmental origins of cognitive vulnerability to depression: Temperament, parenting, and negative life events in childhood as contributors to negative cognitive style. *Developmental Psychology*, 42(6), 1012-1025. doi: 10.1037/0012-1649.42.6.1012
- Mikolajczyk, R. T., Maxwell, A. E., Naydenova, V., Meier, S., & El Ansari, W. (2008). Depressive symptoms and perceived burdens related to being a student: Survey in three European countries. *Clinical Practice and Epidemiology in Mental Health* :

- CP & EMH*, 4, 19. doi:10.1186/1745-0179-4-19
- Mo, P. K. H., & Mak, W. W. S. (2009). Help-seeking for mental health problems among Chinese: the application and extension of the theory of planned behavior. *Social Psychiatry and Psychiatric Epidemiology*, 44(8), 675–684. doi:10.1007/s00127-008-0484-0
- Netemeyer, R. G., Williamson, D. A., Burton, S., Biswas, D., Jindal, S., Landreth, S., ... & Primeaux, S. (2002). Psychometric properties of shortened versions of the Automatic Thoughts Questionnaire. *Educational and Psychological Measurement*, 62(1), 111-129. doi: 10.1177/0013164402062001008
- Quilty, L. C., Dozois, D. J. A., Lobo, D. S. S., Ravindran, L. N., & Bagby, R. M. (2014). Cognitive structure and processing during cognitive behavioral therapy vs. pharmacotherapy for depression. *International Journal of Cognitive Therapy*, 7(3), 235–250. doi: 10.1521/ijct.2014.7.3.235
- Quilty, L. C., McBride, C., & Bagby, R. M. (2008). Evidence for the cognitive mediational model of cognitive behavioural therapy for depression. *Psychological Medicine*, 38(11), 1531–41. doi:10.1017/S0033291708003772
- Ostrom, I., Franke, B., Vasquez, A. A., Rinck, M., Tendolkar, I., Verhagen, M., ... & Janzing, J. G. (2013). Never-depressed females with a family history of depression demonstrate affective bias. *Psychiatry research*, 205(1), 54-58. doi: 10.1016/j.psychres.2012.08.004
- Persons, J. B., Davidson, J., & Tompkins, M. A. (2001). *Essential Components of Cognitive-Behavior Therapy for Depression*. USA: American Psychological Association.

- Radloff, L. S. (1977). The CES-D scale a self-report depression scale for research in the general population. *Applied Psychological Measurement, 1*(3), 385-401. doi: 10.1177/014662167700100306
- Rawal, A., Collishaw, S., Thapar, A., & Rice, F. (2013). A direct method of assessing underlying cognitive risk for adolescent depression. *Journal of Abnormal Child Psychology, 41*(8), 1279–1288. doi: 10.1007/s10802-013-9760-x
- Renaud, J., Russell, J. J., & Myhr, G. (2014). Predicting who benefits most from cognitive-behavioral therapy for anxiety and depression.
- Schomerus, G., Matschinger, H., & Angermeyer, M. C. (2009). Attitudes that determine willingness to seek psychiatric help for depression: a representative population survey applying the Theory of Planned Behaviour. (1). *Psychological Medicine, 39*(11), 1855–65. doi:10.1017/S0033291709005832
- Seeds, P. M., & Dozois, D. J. A. (2010). Prospective evaluation of a cognitive vulnerability-stress model for depression: the interaction of schema self-structures and negative life events. *Journal of Clinical Psychology, 66*(12), 1307–1323. doi: 10.1002/jclp.20723
- Segal, Z.V., Williams, J.M.G., & Teasdale, J.D. (2013). *Mindfulness-based cognitive therapy for depression: Second edition*. New York: Guildford.
- Seligman, M.E.P., Schulman, P., DeRubeis, R.J., & Hollon, S.D. (1999). The prevention of depression and anxiety. *Prevention and Treatment, 2*(1), 8a. doi: 10.1037/1522-3736.2.1.28a
- Seligman, M.E.P., Schulman, P., & Tryon, A.M. (2007). Group prevention of depression and anxiety symptoms. *Behaviour Research and Therapy, 45*(6), 1111-1126.

doi:10.1016/j.brat.2006.09.010

- Skogstad, P., Deane, F. P., & Spicer, J. (2006). Social-cognitive determinants of help-seeking for mental health problems among prison inmates. *Criminal Behaviour and Mental Health : CBMH*, 16(1), 43–59. doi:10.1002/cbm.54
- Stice, E., Shaw, H., Bohon, C., Marti, C. N., & Rohde, P. (2009). A meta-analytic review of depression prevention programs for children and adolescents: Factors that predict magnitude of intervention effects. *Journal of Consulting and Clinical Psychology*, 77(3), 486–503. doi:10.1037/a0015168
- Strunk, D. R., Adler, A. D., & Hollars, S. N. (2013). Cognitive therapy skills predict cognitive reactivity to sad mood following cognitive therapy for depression. *Cognitive Therapy and Research*, 37(6), 1214–1219. doi: 10.1007/s10608-013-9570-z
- Strunk, D. R., Brotman, M. A., & DeRubeis, R. J. (2010). The process of change in cognitive therapy for depression: Predictors of early inter-session symptom gains. *Behaviour Research and Therapy*, 48(7), 599–606. doi: 10.1037/a0029281
- Sutton, J.M. (2007). Prevention of depression in youth: A qualitative review and future suggestions. *Clinical Psychology Review*, 27(5), 552-571.  
doi:10.1016/j.cpr.2007.01.014
- Taylor, L., & Ingram, R. E. (1999). Cognitive reactivity and depressotypic information processing in children of depressed mothers. *Journal of Abnormal Psychology*, 108(2), 202–210. doi: 10.1037/0021-843X.108.2.202
- Timbremont, B., & Braet, C. (2004). Cognitive vulnerability in remitted depressed children and adolescents. *Behaviour Research and Therapy*, 42(4), 423–437. doi:

10.1016/S0005-7967(03)00151-7

Van der Zanden, R., Galindo-Garre, F., Curie, K., Kramer, J., & Cuijpers, P. (2014).

Online cognitive-based intervention for depression: Exploring possible circularity in mechanisms of change. *Psychological Medicine*, *44*(06), 1159–1170. doi:

10.1017/S003329171300175X

Vázquez, F. L., Torres, A., Blanco, V., Díaz, O., Otero, P., & Hermida, E. (2012).

Comparison of relaxation training with a cognitive-behavioural intervention for indicated prevention of depression in university students: A randomized controlled trial. *Journal of Psychiatric Research*, *46*(11), 1456–1463. doi:

10.1016/j.jpsychires.2012.08.007

Voelker, R. (2003). Mounting student depression taxing campus mental health services.

*JAMA*, *289*(16), 2055-2056. doi:10.1001/jama.289.16.2055

Vrijzen, J. N., Becker, E. S., Arias-Vásquez, A., van Dijk, M. K., Speckens, A., & van

Oostrom, I. (2014). What is the contribution of different cognitive biases and stressful childhood events to the presence and number of previous depressive episodes? *Psychiatry research*, *217*(3), 134-142. doi:

10.1016/j.psychres.2014.02.033

Wang, C. E., Halvorsen, M., Eisemann, M., & Waterloo, K. (2010). Stability of

dysfunctional attitudes and early maladaptive schemas: A 9-year follow-up study of clinically depressed subjects. *Journal of Behavior Therapy and Experimental Psychiatry*, *41*(4), 389-396. doi: 10.1016/j.jbtep.2010.04.002

Webb, C. A., Auerbach, R. P., & DeRubeis, R. J. (2012). Processes of change in CBT of

adolescent depression: Review and recommendations. *Journal of Clinical Child &*

- Adolescent Psychology*, 41(5), 654-665. doi: 10.1080/15374416.2012.704842
- Yan, J., Kong, T., He, Y., Mcwhinnie, C. M., Yao, S., & Xiao, J. (2015). Daily hassles and depression in individuals with cognitive vulnerability to depression: The mediating role of maladaptive cognitive emotion regulation strategies. *Nordic Psychology*, 67(1), 87-100. doi: 10.1080/19012276.2014.957717
- Yao, S., Fang, J., Zhu, X., & Zuroff, D. C. (2009). The Depressive Experiences Questionnaire: construct validity and prediction of depressive symptoms in a sample of Chinese undergraduates. *Depression and anxiety*, 26(10), 930-937. doi: 10.1002/da.20465

### Study 3

#### **The “start making a change” program: A randomized control trial of an intervention to promote mental wellness and readiness to change destructive thinking patterns**

**Abstract.** We aimed to conduct a randomized control trial of a brief intervention to promote change in the theory of planned behaviour constructs that predict intentions to change biases in cognitive processing (i.e., increase positive and reduce negative thinking), as well as to promote improvement in relevant clinical and well-being outcomes. One hundred forty-eight university students were randomized to participate in the intervention or waitlist control group arms of the study. The participants completed online questionnaire pre- and post-intervention period, whether or not they participated in the intervention. Results suggested that attitude, subjective norms, perceived behaviour control, and intention regarding “reducing negative thinking” can be improved with intervention, as well as perceived behaviour control about “increasing positive thinking” and positive automatic thoughts, as compared to no change in the control group. Results did not differ by facilitator. The findings of this work indicate that brief, low-cost interventions can effectively change, at least in the short term, important risk factors for depression onset in university students.

**The “Start Making a Change” Program: A Randomized Control Trial of an  
Intervention to Promote Mental Wellness and Readiness to Change Destructive  
Thinking Patterns**

**Introduction**

The transition to university life is a stressful time that can increase the risk of depression onset in university students (Adlaf, Gliksman, Demers, & Newton-Taylor, 2001; Mikolajczyk et al., 2008). In an American college sample, almost half of the students surveyed experienced depressive symptoms of sufficient severity to affect academic performance negatively and 13.8% of these students met diagnostic criteria for Major Depressive Disorder (Eisenberg, Gollust, Golberstein, & Hefner, 2007). University students diagnosed with depression miss more classes, exams, assignment deadlines and social events and drop more courses than healthy student counterparts, which can affect job opportunities and development of social support networks negatively (Hysenbegasi, Hass, & Rowland, 2005).

Cognitive Behaviour Therapy (CBT) has demonstrated efficacy in reducing depressive symptoms, but there are a limited number of trained practitioners to provide this service to the growing population of students that require it (Cuijpers, et al., 2013; Voekler, 2003). Given the lack of resources to provide intensive CBT and the costs of a depressive disorders, as they are cyclic in nature, the development of effective programming to prevent first episode onset is essential. Successful CBT-based prevention programs have been developed for university students (Seligman, Schulman, & Tryon, 2007), but these programs are multi-session (minimum of 8, 2-hour sessions) and are facilitated by clinicians. Thus, the feasibility of widespread dissemination of these

programs is limited. In addition, meta-analyses of depression prevention programs demonstrated that these programs have small effect sizes that often dissipate at follow-up (Merry & Spence, 2007).

There are numerous potential reasons for the limited effects of depression prevention programs. One important criticism of the prevention literature is the lack of emphasis on mechanism of change research. Sutton (2007) suggested that mechanism research on prevention programs is necessary to determine *how* these programs prevent the onset of depression. That would enable us to develop programs with the minimum number of active ingredients necessary to foster larger, more long-lasting effects, within fewer sessions. Most existing depression prevention programs resemble CBT treatment protocols for patients with major depression disorder, as opposed to high-risk (HR) individuals, and contain many interventions: behaviour activation, relaxation, cognitive restructuring, problem-solving, etc. (Horowitz & Garber, 2006). This is not ideal, as HR individuals and those experiencing an active depressive episode differ in fundamental ways relating to intervention. Furthermore, as will be elaborated upon later, CBT has a clear theoretical mechanism of change, but it has not been consistently demonstrated in the literature (Beck & Dozois, 2011; Garratt, Ingram, Rand, & Sawalani, 2007). If the mechanism of change in CBT for depression is unclear, how can we downward extend and test this model in a prevention population? Therefore, basing depression prevention programs on CBT protocols solely is problematic at best.

According to Sutton (2007), to create an effective prevention program, one must choose interventions that target specific risk factors for the disorder to be prevented. This method would differ substantially from symptom reduction, which is the focus of

*treatments* for depression (and most current depression prevention programs; Sutton, 2007). In the context of depression, we should focus on targeting known precursors of onset of *first* depressive episodes (Beck, 2008), which necessitates an understanding of the mechanism of *onset* for first episodes of depression.

Prominent theories of depression, for example, Beck's cognitive theory of depression and the hopelessness theory (Abramson, Metalsky, & Alloy, 1989; Beck, 2008), hypothesized cognitive diathesis-stress models of first depressive episode onset. Individuals at risk for developing depressive disorders have certain diatheses or vulnerabilities in cognitive processing (negative automatic thoughts and schemas, negative inferential style, etc.). Those HR individuals who go on to develop a first depressive episode also experience significant and/or chronic negative life events or stressors that are often congruent with their vulnerable cognitive biases. Numerous studies have found support for the diathesis stress model. Some studies of HR children, adolescents and adults (defined as having at least one parent with a history of major depressive disorders), demonstrated associations between self-report and physiological measures of stress and positive and negative biases in information-processing, even when controlling for baseline depressive symptoms (Hayden, et al., 2014; Seeds & Dozois, 2010). There is also evidence of mediation of the relationship between stress and depression by cognitive vulnerability factors (Yan, Kong, He, McWhinnie, Yao, & Xiao, 2015). However, some studies do not find evidence of the diathesis-stress model (Mackrell, Johnson, Dozois, & Hayden, 2013).

Given Sutton's (2007) advice, an exploration of what kinds of cognitive vulnerabilities are experienced by HR individuals is warranted to develop targets for the

prevention of *first episode onset* (as opposed to relapse prevention, which has different cognitive processes to consider; see Segal, Williams, & Teasdale, 2013), especially given that targeting the removal of all stressors in life is likely an unfeasible goal for intervention! Most studies that compare HR children, adolescents, and young adults to currently-depression and low-risk peers find, when negative mood is primed, that HR individuals have similar cognitive vulnerabilities to currently-depressed peers: negative self-referent bias, negative inferential style, implicit dysfunctional attitudes, and tighter interconnection of negative schema content. HR individuals resemble their low risk peers when exposed to a neutral mood prime (Mezulis, Shibley Hyde, & Abramson, 2006; Rawal, Collishaw, Thapar, & Rice, 2013; Seeds & Dozois, 2010; Taylor & Ingram, 1999). Furthermore, when in a negative mood, HR individuals experience a loss of protective positive cognitive factors: reduced endorsement of positive self-descriptors, decreased positive schematic processing, and more loosely interconnected positive schema content (Hayden, Klein, Durbin, & Olino, 2006; Seeds & Dozois, 2010; Taylor & Ingram, 1999). One reason why the effects of depression prevention programs may be so small and fleeting is a lack of experience of negative mood at the time of intervention. Given the inevitability of the experience of stress and low mood for HR individuals, interventions that focus on reducing negative cognitive processes *and* supporting positive cognitive processes may be essential ingredients for a successful depression prevention program. Programs that target one risk factor (i.e., cognitive vulnerability) would provide one clearly identified mechanism of change to test.

As alluded to above, a second criticism of depression prevention literature is that these programs closely resemble CBT treatment protocols. While CBT does have a clear

conceptualization of the mechanism of change (i.e., techniques target changing dysfunctional cognitive biases and reductions in these biases promote remission of depressive episode; Beck & Dozois, 2011), CBT randomized control trials demonstrated mixed support for this process of change (Garratt, Ingram, Rand, & Sawalani, 2007; Webb, Auerbach, & DeRubeis, 2012). Some studies find that reductions in negative automatic thoughts and dysfunctional attitudes predict depressive symptom reduction (Christopher, Jacob, Neuhas, Neary, & Fiola, 2009; Kwon & Oei, 2003). However, other studies have shown cognitive change to predict symptom change in non-cognitive therapies, such as pharmacotherapy, as well as non-significant prediction of depressive symptom change from cognitive change in CBT (Fournier, DeRubeis, Hollon, Gallop, Shelton, & Amsterdam, 2013; Quilty, McBride, & Bagby, 2008). Finally, while traditionally negative cognitive processes were the focus of CBT mechanism research, findings from more recent trials suggest that perhaps the modification of positive cognitive structures is just as, if not *more* important. For instance, in one study, changes in positive self-schema content predicted depression remission in combined CBT and pharmacotherapy (Dozois, et al., 2009). Similarly, one CBT randomized trial showed that CBT promotes greater integration of positive schematic structures and destabilization of negative schema content (Quilty, Dozois, Lobo, Ravindran, & Bagby, 2014).

Similarly, as seen in the literature on mechanism of onset, it is unclear whether or not it is necessary to focus on reduction of negative cognitive biases or augmentation of positive cognitive structures. For instance, in a CBT versus antidepressant RCT, it was found that those receiving a combination of CBT and pharmacotherapy experienced greater change in positive self-schema content, compared to other treatment groups,

suggesting that the modification of *positive*, rather than *negative*, schema structures may be the mechanism of change in combined treatment (Dozois, et al., 2009). Another CBT trial from this research group suggests that CBT may act *both* to strengthen positive schematic structures (greater integration) and destabilize negative schematic content (Quilty, Dozois, Lobo, Ravindran, & Bagby, 2014). Therefore, as discussed in the above review of the mechanism of depression onset literature, it may be preferable to target negative and positive cognitive processes in prevention programs in order to maximize potential benefits.

There are several other important mechanisms of change in CBT to consider. Greater symptom reduction in CBT trials occur for patients who are more accepting of the CBT conceptualization of depression-related problems and are more optimistic about outcomes (Kwon & Oei, 2003; Renaud, Russell, & Myhr, 2014). They are more willing to try CBT techniques in session and complete more homework exercises (Detweiler & Whisman, 1999; Strunk, et al., 2010). Lastly, they demonstrate greater acceptance of responsibility for change and experience a greater sense of self-control or self-efficacy to implement change (Dozois, et al., 2014; Renaud, Russell, & Myhr, 2014).

Greater understanding of the mechanisms of change in CBT treatment and prevention programs could be gained from consolidating all of these findings under a single theory of behaviour change. The theory of planned behaviour (TPB; Ajzen & Madden, 1985) is a health-behaviour change theory that encompasses self-efficacy, motivation and acceptance of and willingness to learn new skills and has successfully explained the uptake of a wide variety of health behaviours, including psychological service use (Armitage & Connor, 2001; Mo & Mak, 2009, Schomerus, Matschinger, &

Angermeyer, 2009, Skogstad, Deane, & Spicer, 2006). Thus, it may be appropriate for understanding the mechanisms of change in CBT intervention/prevention.

There are several additional benefits to adopting the theory of planned behavior (TPB) in our efforts to understand how negative thinking can change in CBT interventions. First, TPB is a formal model that outlines how certain cognitions can lead to behaviour change. Second, it is an established model of behaviour change in a wide variety of health arenas. In fact, TPB constructs have been shown to predict 42-57% of the variance in psychological service uptake of various forms across diverse samples, which is similar to its predictive power of uptake of other health behaviours (Armitage & Connor, 2001; Hyland, McLaughlin, Boduszek, & Prentice, 2012; Mo & Mak, 2009, Schomerus, Matschinger, & Angermeyer, 2009; Sheeran, Harris, & Epton, 2014; Skogstad, Deane, & Spicer, 2006) Third, negative automatic thinking (and related biases of cognitive processing) is a behaviour that can be changed, as demonstrated in some CBT studies (Kwon & Oei, 2003). Fourth, cognitive antecedents or beliefs in TPB (attitudes, etc.) are similar to salient automatic thoughts in CBT in that they are both surface-level cognitions that are amenable to change by intervention, either TPB or CBT-based (Hobbis & Sutton, 2005). Finally, considerable overlap has been demonstrated between the content of skills taught in TPB-based interventions and CBT-based interventions (Hobbis & Sutton, 2005; Michie, 2005). These areas of overlap support a call to researchers to begin exploring the integration of CBT and TPB models in determining health-behaviour change outcomes from both a theoretical and intervention standpoint (Hobbis & Sutton, 2005; Baranowski, 2005).

The theory of planned behavior (Ajzen, 1991) postulates that when an individual experiences favorable cognitive antecedents toward a behaviour (attitude, subjective norms, and perceived behaviour control), he or she will have greater intention to complete this behaviour. Intention is defined by Ajzen (1991) as the motivational component or the readiness/willingness to try a behaviour, is the strongest predictor of health-behaviour change (Armitage & Connor, 2001; Fishbein & Ajzen, 2011). In the traditional conceptualization of TPB, there are three cognitive antecedents that influence one's intention. The first, and often the most influential, is attitude. The "attitude" construct describes one's beliefs about the expected outcomes of performing a behaviour; will the outcomes be favorable or unfavorable? How likely is this expected outcome? The second cognitive antecedent is "subjective norms," which encompass one's beliefs about the opinions of important others regarding this behaviour and his willingness to comply with their opinions. Finally, "perceived behaviour control," which is conceptually similar to self-efficacy (Ajzen, 2011), describes one's beliefs about whether or not he is able to perform the target behaviour. For instance, to have intention to learn/use cognitive restructuring techniques in CBT for depression a patient must believe that these techniques are likely to reduce his or her depressive symptoms, which is a favorable outcome (attitude). He or she must believe that important others think that cognitive restructuring is a good idea and will support him/her (subjective norms). Finally, he or she has sufficient skills and resources to learn and use cognitive restructuring techniques (perceived behaviour control).

More recent research on TPB has addressed some criticisms of this theory. For instance, subjective norms is often the weakest predictor of intention (Armitage &

Connor, 2001; McEachan, et al., 2011). Some have proposed that this is simply a measurement issue (Armitage & Connor, 2001), but others have identified a theoretical weakness in this construct. Sheeran and colleagues began a research program into the role of “descriptive norms” in predicting intentions. They re-conceptualized subjective norms as “injunctive norms,” defined as “what significant others think the person *ought* to do” or perceived social pressure (Rivis & Sheeran, 2003, p. 219). This was contrasted with “descriptive norms,” which is a person’s perception of what important others do *themselves*. For example, an injunctive norm would be, “My friends think I should try thought-change strategies to reduce my depression.” A descriptive norm would be, “My friends use thought-change strategies to reduce low mood.” The addition of descriptive norms has been shown meta-analytically to increase the prediction of intention by 5%, even after controlling for other variables in the model and correlates significantly with other TPB constructs (Rivis & Sheeran, 2003). This construct has significantly more predictive power in child and undergraduate samples (Rivis & Sheeran, 2003). Rivis, Sheeran, and Armitage (2006) have postulated that the relative importance of descriptive norms may be related to how similar people perceive themselves to be to important others who they perceive to be performing the target behaviour.

In addition, the premise of psychology as a discipline is that past behaviour predicts future behaviour. Past (successful) experience with psychological services predicts seeking psychological services anew (Jaycox, et al., 2006). In their meta-analysis of the theory of planned behaviour studies, McEachan and colleagues (2011) found that past behaviour significantly predicted an additional 5% of the variance in behaviour after controlling for attitude, subjective norms, perceived behaviour control, and intention.

However, past behaviour did not reduce the significance of the other predictors. Ajzen (2011) agreed that past behaviour is a predictor of future behaviour, but argued that it did not have a place in the theory of planned behaviour. Past behaviour is an indicator of the strength of habit formation. As a behaviour becomes habitual, one no longer needs to make a conscious *rational* decision to do it and thus this automaticity overrides intention. (once exercise becomes part of a person's weekly routine; Fishbein & Ajzen, 2011). Since the theory of planned behaviour assumes that a person makes a rational decision to perform a behaviour, automatic behaviours are not going to be captured adequately by the theory of planned behaviour (Fishbein & Ajzen, 2011). Descriptive norms and past behaviour will be tested in the current study, alongside traditional TPB constructs, to examine their potential to improve understanding of intention to use CBT skills.

Webb and Sheeran (2006) conducted a meta-analysis of intervention studies that used techniques to promote positive attitudes, subjective norms and perceived behaviour control to complete a variety of health behaviours (helmet use, class attendance, exercise, contraceptive use). The meta-effect size for change in intention was  $d = 0.66$  and  $d = 0.36$  for behaviour change. There was also a significant effect size correlation between intentions and behaviour (0.57), indicating that interventions with a greater influence on intention had a greater impact on behaviour (Webb & Sheeran, 2006). Interventions with greater effects had higher ratings of perceived behaviour control and were conducted over short intervals by research assistants (versus trained facilitators or teachers). Individual and group formats were equally effective (Webb & Sheeran, 2006). The authors also compared interventions based on the theory of planned behaviour over other health-behaviour change models (social-cognitive theory, health belief model) and found that

interventions based on the theory of planned behaviour had significantly larger effect sizes (Webb & Sheeran, 2006). Certain techniques within the interventions improved the effect size. Interventions with incentives and social support had a medium effect on behaviour ( $d = 0.56$ ); techniques around provision of information and outcomes had a small effect ( $d = 0.26$ ); techniques around planning, experimenting and skill rehearsal also had a small effect ( $d = 0.20$ ); and techniques that contained monitoring and homework exercises had small effects ( $d = 0.12$ ). Clearly, many of these techniques overlap with classic CBT protocols (Beck, et al., 1979).

There is a case for the incorporation of TPB into a CBT-based depression prevention program. If a CBT program can influence TPB antecedents, Ajzen's (1991) theory suggests that the participants in the program would have greater intention to try CBT techniques and intention is the strongest predictor of health-behaviour change. However, prior to testing a cognitive mechanism of change model in a CBT prevention program, it is essential to determine if such a program can influence TPB factors. If so, then such research would pave the way for testing a mediation model where TPB antecedents influence intention, which in turn promotes CBT skill uptake and practice. This would theoretically resolve cognitive biases and lead to reduced depressive symptoms (or prevention of depressive episode onset in the case of a prevention program; see Figure 1, General Introduction, for theorized model).

In addition to using TPB to improve our understanding of what promotes CBT-skill uptake, we need to choose an exact behaviour to target! As outlined above, negative *and* positive cognitive processes influence onset and resolution of depressive disorders. Such findings suggest that programs targeting HR individuals could focus on a traditional

clinical psychology model of reducing psychopathology *or* we could shift to a positive psychology model of promoting well-being. As much as psychological treatment can reduce mental illness or promote well-being, programs have also been developed to reduce risk factors and promote protective factors to stop depressive episodes from starting in the first place and encourage mental wellness over the lifespan. In 2013, WHO released its “Global Action Plan for the Prevention and Control of Noncommunicable Disease: 2013-2020” which included mental health. In this action plan, WHO (2013) emphasized the need for both programs to prevent mental illness and programs to promote mental health and well-being.

Both types of programming are useful to reduce depressive symptoms. Durlak and colleagues (2011) conducted a meta-analysis on social-emotional learning programs (mental health promotion focused on developing social skills, empathy, conflict resolution, etc.) in pre-teen children and found that these programs had a small effect on “emotional distress”, a mixture of depression and anxiety outcome measures ( $d = -0.24$ ). Although far more studies have been conducted in the area of depression prevention, similar effects have been found in these programs focusing on adolescents (Horowitz & Garber, 2006; Merry & Spence, 2007). It would be ideal to compare our CBT-TPB hybrid model’s influence on traditional psychopathology and well-being factors to determine which behaviour targets produce the most benefits for individuals at risk to develop depression.

### **Purpose**

Therefore, the purposes of this study were four-fold. 1) We aimed to replicate the findings related to our initial study of our CBT-TPB hybrid model (Study 1 - Bradley,

Santor, & Moreno, 2015). In addition, we wanted to explore the potential additional predictive power of descriptive norms and past behaviour. 2) We sought to develop a brief, CBT-based program for university students that would be both cost-effective and focused on one mechanism of interest (cognitive processes) to simplify the study of mechanisms of change in a prevention program. 3) We aimed to explore whether or not a CBT-based prevention program could influence TPB factors, clinical outcomes, and well-being outcomes, compared to a waitlist control. 4) We wanted to compare target behaviours, “increasing positive thinking” and “reducing negative thinking” to determine whether a clinical or well-being model would be more predictive of skill uptake and produce stronger and more lasting outcomes. The wording of these targets was chosen to promote ease of understanding for participants. Definitions on questionnaires and in the workshop allude to positive and negative cognitive processes like those described above.

## **Hypotheses**

### *Theoretical model and psychometrics of revised TPB questionnaire.*

- 1) The Theory of Planned Behaviour Questionnaire - Revised will demonstrate adequate psychometric properties for theory testing.
  - a. All sub-scales (attitude, subjective norms, descriptive norms, perceived behaviour control, intention) will have adequate internal consistency reliability.
  - b. Construct validity will be established for each TPB scale.
    - i. The TPB constructs targeting “increasing positive thinking” will have positive correlations with well-being variables (positive affect, positive automatic thinking, and life satisfaction) and

- negative correlations with clinical variables (depressive symptoms, negative automatic thinking, and dysfunctional attitudes).
- ii. The TPB constructs targeting “reducing negative thinking” will have positive correlations with clinical variables and negative correlations with well-being variables.
- 2) Theory of planned behaviour constructs about reducing negative thinking will predict intentions to reduce negative thinking.
    - a. Attitude, subjective norms, and perceived behavioural control will predict intentions to reduce negative thinking.
    - b. The addition of descriptive norms and past behaviour about reducing negative thinking will improve model prediction of intention to reduce negative thinking.
  - 3) Theory of planned behaviour constructs about increasing positive thinking will predict intention to increase positive thinking.
    - a. Attitude, subjective norms, and perceived behavioural control will predict intention to increase positive thinking.
    - b. The addition of descriptive norms and past behaviour about increasing thinking will improve the model prediction of intention to reduce negative thinking.

***Intervention Outcomes.***

- 1) The participants in the intervention group will experience significant increases in attitude, subjective norms, perceived behavioural control, descriptive norms and

- intention to increase positive thinking and reduce negative thinking from pre- to post-intervention.
- 2) The participants in the intervention group will experience significant decreases in depressive symptoms, negative affect, negative automatic thinking, and dysfunctional attitudes from pre- to post intervention.
  - 3) There will be no change in the participants' scores in the wait-list control group on any outcome variables.
  - 4) The participants in the intervention group will experience significantly greater increases in attitude, subjective norms, perceived behaviour control, descriptive norms and intention to increase positive thinking and reduce negative thinking from pre- to post-intervention than the wait-list control group.
  - 5) The participants in the intervention group will experience significantly greater decreases in depressive symptoms, negative affect, negative automatic thinking, and dysfunctional attitudes from pre- to post-intervention than the wait-list control group.

## **Methods**

This study was reviewed and approved by the University of Ottawa Research Ethics Board.

**Participants.** The participants were 148 individuals recruited through the University of Ottawa Integrated System of Participation in Research (undergraduate student subject pool), as well as online advertisements and posters in Ottawa, Canada. The age of the participants ranged from 17 – 57 years, with a mean age of 20.6 years. Eighty percent of the sample was female (119 participants), 18% were male (26

participants), and 3 individuals preferred not to identify their sex. The majority first-language spoken by participants was English (71.6%), followed by French (12.8%). Those participating through the subject pool received course credit as compensation for their participation.

**Procedure.** The participants were randomized to the intervention (INT) or waitlist control (CON) group using [www.randomizer.org](http://www.randomizer.org). Seventy participants were randomized to the INT group and 78 to the control group. In terms of timeline, both groups had one week to complete their first set of questionnaires online. Then the INT group completed session one of the intervention (Day 1), followed by a week of daily exercises at home (Days 2-7). On Day 8, they attended session two of the intervention, followed by another week of daily exercises at home (Days 9 – 14). On Day 15, they were sent an online link to complete the second set of questionnaires and were asked to complete the survey within one week. The CON group completed the first and second set of questionnaires during the same time periods as the INT group, with no intervention in between.

**Intervention.** Details of the “Start Making a Change” depression prevention program can be found in the publication of our feasibility trial (Study 2 - Bradley, Santor, & Oram, 2015). Briefly, the “Setbacks and Negative Thinking: Start Making a Change” Workshop is based on cognitive behavioural principles and techniques from various CBT protocols, including those of Jacqueline Persons and Aaron Beck (Beck, et al., 1979; Persons, et al., 2001). In session one, the participants learn about the mutual influences of cognitions, emotions, and behaviours, as well as how to identify cognitive distortions (Burns, 1999) and generate alternative positive thoughts (defined as “functional and/or fair thoughts”). Finally, they learn how to notice and count their accomplishments and are

provided a small exercise book to practice these skills at home daily for the next week. In session two, the participants work intensively on cognitive restructuring and distress tolerance strategies (namely, various forms of distraction) to cope with negative thoughts and stressors. They are then asked to practice all of their skills in the booklets for one week. The entire intervention, including questionnaires, spans over approximately three weeks.

Three modifications were made from our previous study, based on the outcomes from the feasibility trial. First, given what anecdotally seemed to be low homework completion rates, as well as the important role of homework completion in other CBT trials, daily homework completion was made mandatory for receipt of subject pool study participation bonus points and/or permission to participate in session two of the program (Detweiler & Whisman, 1999). To ensure homework completion, workbooks of each participant were checked for written content prior to beginning session 2. The participants were allowed to withdraw from the study at any point, without penalty, upon request. Second, to increase efficiency of data collection and assess if the intervention could be run to similar effectiveness as with the original researcher, K. Bradley, an undergraduate research assistant was trained by K. Bradley to run workshops independently (R. Oram). Third, given the overwhelming popularity of the positive thinking exercises of “Counting Accomplishments” and our interest in exploring positive thinking and negative thinking targets, another positive thinking intervention was added to session 1 of the intervention. “How do you see yourself” is a modified version of Persons’ Positive Data Log (Persons, et al., 2001), where participants are asked to think about a way they see themselves negatively and an alternative, positive way they could

see themselves. They are asked to look for evidence of this new, positive way to see themselves over the next week. This intervention is adapted from a schema-change strategy to reduce the potency of negative schemas and strengthen positive schemas (Persons, et al., 2001).

### **Measures**

#### **Theory of planned behaviour variables.**

*Theory of planned behaviour questionnaire – revised.* Revisions of our theory of planned behaviour questionnaire (Study 1 - Bradley, Santor, & Moreno, 2015) were conducted to improve construct validity by incorporation of more recent theoretical modifications of and empirical findings regarding the theory of planned behaviour (assessment of “descriptive norms” vs. “injunctive norms,” past behaviour; Ajzen & Fishbein, 2011; Ravis & Sheeran, 2003). We also wanted to improve the psychometric properties of our assessment of perceived behaviour control, in particular, because it performed poorly in our previous psychometric study (Study 1 - Bradley, Santor, & Moreno, 2015). Finally, we wanted to compare the target behaviours of “reducing negative thinking” versus “increasing positive thinking” for theoretical reasons disclosed above. To accomplish the necessary modifications to improve the TPB questionnaire in terms of validity and reliability and to assess the role of TPB in increasing positive thinking and reducing negative thinking, a 34-item Likert-type questionnaire was constructed. The participants completed the 34 items once for the target behaviour of “reducing negative thoughts” and the second time for “increasing positive thoughts.” The sub-scales assess original and novel TPB concepts: attitude, subjective (injunctive) norms, descriptive norms, perceived behaviour control, intention, and past behaviour.

This study was the pilot test of the TPBQ-R. Table 1 indicates that all sub-scales demonstrated excellent internal consistency reliability, with Cronbach's alphas ranging from 0.88 – 0.96.

Table 1

*Internal Consistency for the Measures at Time 1 and Time 2*

Variable	Chronbach's $\alpha$
<i>Time 1</i>	
Attitudes Neg	0.86
Subjective Norms Neg	0.84
Perceived Behaviour Control Neg	0.89
Intentions Neg	0.94
Descriptive Norms Neg	0.88
CES-D (Depression)	0.94
ATQ-N (Negative Automatic Thoughts)	0.98
ATQ-P (Positive Automatic Thoughts)	0.97
SPANE (Positive Affect Subscale)	0.90
Dysfunctional Attitudes	0.83
Life Satisfaction	0.90
Attitudes Pos	0.91
Subjective Norms Pos	0.91
Perceived Behaviour Control Pos	0.94
Intentions Pos	0.96
Descriptive Norms Pos	0.91
<i>Time 2</i>	
Attitudes Neg	0.91
Subjective Norms Neg	0.93
Perceived Behaviour Control Neg	0.93
Intentions Neg	0.96
Descriptive Norms Neg	0.87
CES-D (Depression)	0.82
ATQ-N (Negative Automatic Thoughts)	0.98
ATQ-P (Positive Automatic Thoughts)	0.97
SPANE (Positive Affect Subscale)	0.90
Dysfunctional Attitudes	0.87
Life Satisfaction	0.92
Attitudes Pos	0.93
Subjective Norms Pos	0.94
Perceived Behaviour Control Pos	0.95
Intentions Pos	0.97
Descriptive Norms Pos	0.94

*Note.* "Neg" refers to Theory of Planned Behaviour Questionnaire focusing on "reducing negative thinking" and "Pos" refers to Theory of Planned Behaviour Questionnaire focusing on "increasing positive thinking"

**Clinical outcomes.**

*Dysfunctional attitudes scale short form (DAS-SF; Beevers, et al., 2007).* The DAS-SF is a short version of the Dysfunctional Attitude Scale. It is a 9-item, 4 option Likert-type questionnaire. This short version is correlated highly with the original DAS ( $r = 0.91$ ) and also demonstrates convergent validity with other depression constructs (Beevers et al., 2007). It also has strong internal consistency reliability ( $\alpha = 0.84$ ). We chose to use this measure instead of the original 70-item measure to reduce participant fatigue. In contrast to other measures, higher scores indicate *decreasing* severity.

*Automatic thoughts questionnaire (Hollon & Kendall, 1980).* This is a 30-item, 5-option Likert-type scale questionnaire with higher scores indicating greater severity of negative automatic thoughts. This questionnaire has been normed on university students and shows highly satisfactory internal consistency reliability with a Chronbach's alpha of 0.96 and a split-half reliability of 0.97. It also shows adequate convergent validity with measures of depression ( $r$ 's from 0.45 - 0.70; Hollon & Kendall, 1980).

*Center for epidemiologic studies depression scale (Radloff, 1977).* The CES-D is a measure of current depressive symptomology over the previous two weeks. It is a 20-item, Likert-type scale questionnaire that was designed explicitly for research studies of depressive symptoms in non-clinical populations. It has been validated for use in numerous university student samples (Radloff, 1977; Yao, Fang, Zhu, & Zuroff, 2009). The CES-D has demonstrated highly satisfactory internal consistency (alphas ranging from 0.85 to 0.90) and split-half reliabilities ( $r$ 's = 0.76 to 0.85; Radloff, 1977). Discriminant validity has also been established with significant negative correlations with

measures of positive affect (Bradburn Positive Affective Scale; Radloff, 1977).

Convergent validity has been established with significant, positive correlations with negative automatic thoughts ( $r = 0.79$ ), dysfunctional attitudes ( $r = 0.36$ ) and other measures of depressive symptoms (Yao, Fang, Zhu, & Zuroff, 2009). The CES-D has also been shown to be more effective in discriminating differences in depression severity in university students than the Beck Depression Inventory (Santor, Zuroff, Ramsay, Cervantes, & Palacios, 1995).

### **Well-being outcomes.**

*Subjective well-being (Diener et al., 1985).* The PANAS scales are problematic in that they are considered to measure high-valence emotions (excited, cheerful), which are not experienced with the same frequency as other emotions measured (happy; Diener et al., 1985). Therefore, Diener and Emmons (1985) created the Scale for Positive and Negative Affect, which measures emotions that are more similarly valenced to one another. This is a 9-item, 7-option Likert-type scale questionnaire with 4 positive affect items and 5 negative affect items. This measure has been demonstrated to produce two unique factors (positive and negative affect) and have strong convergent and discriminant validity with other measures of positive and negative emotions (Diener & Emmons, 1985). This measure also demonstrates strong internal consistency reliability (positive affect  $\alpha = 0.87$ , negative affect  $\alpha = 0.81$ ). Only the positive affect measure was used for this study. We have also added Diener, Emmons, Larsen, and Griffins' (1985) Satisfaction With Life Scales (LS), which is a 5-item, 7-option Likert-type questionnaire. It has strong internal consistency reliability ( $\alpha = 0.87$ ) and has demonstrated convergent validity with other measures of subjective well-being and discriminant

validity with measures of negative affect (Diener et al., 1985). Together, the Scale for Positive and Negative Affect and Satisfaction with Life Scales are considered to be a well-established measures of subjective well-being (Huta & Waterman, 2014)

*Positive automatic thoughts questionnaire (Ingram & Wisnicki, 1988).* This is a 30-item, 5-option Likert-type scale questionnaire, where higher scores demonstrate greater prevalence of positive automatic thoughts. This questionnaire was also normed on university students and it demonstrates discriminant validity against the ATQ and strong internal consistency ( $\alpha = 0.91$ ). Studies have demonstrated its ability to discriminate depressed from non-depressed individuals (Ingram, Kendall, Siegle, Guarino, & McLaughlin, 1995).

As noted in Table 1, all measures demonstrated strong internal consistency reliability for this study.

### **Data Analysis Plan**

*Theoretical modeling.* First, psychometric analyses were conducted to establish validity and reliability. Chronbach's alphas were computed for the attitude, subjective norms, perceived behaviour control, and intention around increasing positive thinking and reducing negative thinking. Correlations were computed between TPB variables and clinical and well-being variables as hypothesized to establish convergent and discriminant validity.

To replicate the findings from Bradley, Santor, and Moreno (2015, Study 1; initial test of TPB model to predict intention), simultaneous regressions were computed to examine attitude, subjective norms, and perceived behaviour control, as predictors of intention to increase positive thinking and reduce negative thinking. Next, to determine if

descriptive norms and past behaviour predict additional variance in the prediction of intention, hierarchical regressions were computed, with attitude, subjective norms, and perceived behaviour control in Step 1 and descriptive norms and past behaviour were entered in Step 2. Only Time 1 data was included in this analysis as the INT and CON group data can be amalgamated due to being statistically and theoretically identical (as it was prior to randomization and intervention). This data collection period also most closely resembled study methods used in Bradley, Santor, and Moreno (2015, Study 1).

***Intervention Outcomes.*** To replicate and expand on the findings from our feasibility trial (Study 2 - Bradley, Santor, & Oram, 2015), doubly multivariate ANOVAs, that is, ANOVAs with multiple dependent variables, as well as two timepoints, were computed to assess pre-post intervention period changes on attitude, subjective norms, descriptive norms, perceived behaviour control, intention, clinical variables, and well-being variables in the INT and CON groups. There were 4 double multivariate ANOVAs computed to assess pre-post intervention period changes in the INT and CON group: 1) TPB variables focusing on the target of “reducing negative thinking” (attitudes, subjective norms, perceived behaviour control, descriptive norms, intentions), 2) TPB variables focusing on the target of “increasing positive thinking” (attitudes, subjective norms, perceived behaviour control, descriptive norms, intentions), 3) clinical variables (depression, negative automatic thinking, dysfunctional attitudes), and 4) well-being variables (positive affect, positive automatic thinking, life satisfaction). These doubly multivariate ANOVAs were also used to assess differences between groups on outcomes and time x group interactions. These analyses were followed up by simple effects analyses of INT vs. CON and Time 1 vs. Time 2 effects when multivariate

interaction effects are significant for those individual variables that demonstrate significant interaction effects. Doubly MANOVAs were also conducted on the intervention group to examine differences between facilitators (a clinical psychology doctoral student versus a trained undergraduate student in psychology). Follow-up simple effects analyses were conducted only when multivariate interaction effects (time X facilitator) were significant.

## **Results**

**Psychometrics.** As indicated in Table 1, all sub-scales of the TPBQ-R demonstrated excellent internal consistency reliability, with Cronbach's alphas ranging from 0.88 – 0.96.

Table 2 contains correlations of TPB variables for “reducing negative thinking” (TPB-Neg variables) and for “increasing positive thinking” (TPB-Pos variables), as well as clinical and well-being outcome variables. There was evidence of construct validity. In general, the TPB variables (regardless of target) were most often inter-correlated. One exception was descriptive norms, where both versions did not correlate significantly with most variables. Descriptive norms did correlate significantly with subjective norms. Highest inter-correlations were between same sub-scales for different target behaviours (ATT-Neg and ATT-Pos). Correlation patterns between TPB variables and clinical and well-being outcomes, were similarly mixed, regardless of behaviour target. Subjective norms and perceived behaviour control correlated, for the most part, as expected with clinical and well-being variables, but attitude and descriptive norms were not related to clinical or well-being outcomes. Interestingly, intention-neg was most often unrelated to

clinical or well-being variables and the opposite findings were true for intention-pos, inconsistent with hypotheses about construct validity.

**Theoretical model testing.** A hierarchical regression was computed to replicate findings from Bradley, Santor, and Moreno (2015, Study 1) and to explore whether or not descriptive norms and past behaviour can explain additional variance in “intentions to increase positive thinking.” In Step 1, the TPB antecedents (attitude, subjective norm, and perceived behaviour control) significantly predicted 42% of the variance in intention,  $F_{(3, 144)} = 34.37, p \leq 0.0001$  (see Table 3 for details). The addition of descriptive norms-pos and past behaviour-pos in step 2 did not significantly improve prediction (Table 3); however, descriptive norms demonstrated a trend towards significance,  $t = -1.82, p = 0.07$ .

Table 2

*Correlations for all variables at Time 1*

Variable	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
<b>1. ATT-Neg</b>	0.23**	0.11	0.21*	0.42**	0.64**	0.19*	0.07	0.27**	0.41**	-0.08	0.01	0.05	-0.04	0.001	0.06
<b>2. SN-Neg</b>	--	0.11	-	0.08	0.20*	0.80**	0.24**	-0.18*	0.03	0.14	0.40**	-0.14	-	-0.21*	-0.19*
			0.25**										0.27**		
<b>3. DN-Neg</b>		--	-0.06	-0.05	-0.01	0.07	0.64**	-0.01	-0.08	0.03	0.10	-0.05	-0.02	-0.03	-0.03
<b>4. PBC-Neg</b>			--	0.33*	0.16	-	-0.03	0.75**	0.35**	-	-	0.47**	0.50**	0.41**	0.40**
						0.27**				0.28**	0.45**				
<b>5. IN-Neg</b>				--	0.40**	0.10	0.01	0.46**	0.76**	-0.10	-0.05	0.11	0.10	0.12	0.17*
<b>6. ATT-Pos</b>					--	0.34**	0.09	0.34**	0.51**	-0.04	-0.02	0.10	0.001	0.10	0.21**
<b>7. SN-Pos</b>						--	0.33*	-0.13	0.10	0.17*	0.38**	-0.17*	-	-0.18*	-0.12
													0.27**		
<b>8. DN-Pos</b>							--	0.17*	0.01	0.13	0.16*	-0.08	-0.03	-0.07	-0.07
<b>9. PBC-Pos</b>								--	0.54**	-	-	0.34**	0.44**	0.33**	0.34**
										0.22**	0.41**				
<b>10. IN-Pos</b>									--	-0.04	-0.13	0.18*	0.16*	0.23**	0.23**
<b>11. CES-D</b>										--	0.58**	-	-	-	-
												0.26**	0.40**	0.41**	0.40**
<b>12. ATQ-N</b>											--	-	-	-	-0.61
												0.53**	0.79**	0.64**	
<b>13. Dys Att</b>												--	0.54**	0.44**	0.43**
<b>14. ATQ-P</b>													--	0.68**	0.75**
<b>15. PA</b>														--	0.65**
<b>16. Life Sat</b>															--

*Note.* ATT = Attitudes; SN = Subjective Norms; PBC = Perceived Behaviour Control; DN = Descriptive Norms; IN = Intentions; Neg = reducing negative thoughts; Pos = increasing positive thoughts; CES-D = Depression; ATQ-N = Negative Automatic Thoughts, Dys Att = Dysfunctional Attitudes; ATQ-P = Positive Automatic Thoughts; PA: Positive Affect; Life Sat = Life Satisfaction

\* $p \leq 0.05$

\*\*  $p \leq 0.01$

A second hierarchical regression was computed to explore TPB antecedents in predicting “intentions to reduce negative thinking” and to determine whether or not descriptive norms-neg and past behaviour-neg improve prediction. In Step 1, the TPB antecedents significantly predicted 24% of the variance in intention,  $F_{(3, 144)} = 15.03, p \leq 0.0001$  (see Table 4 for details). The addition of descriptive norms-neg and past behaviour-neg in Step 2 did not significantly improve prediction (Table 4).

Table 3

*Hierarchical regression predicting intention to “increase positive thinking” from traditional TPB-pos predictors, as well as descriptive norms-pos and past behaviour-pos.*

Variable	<i>R</i>	<i>R</i> <sup>2</sup>	<i>R</i> <sup>2</sup> <i>Change</i>	$\beta$	<i>F/t</i>	Sig	Sig change
Step 1	0.65	0.42	--	--	34.37	$\leq 0.0001$	--
Attitude	--	--	--	0.36	4.88	$\leq 0.0001$	--
Subjective Norms	--	--	--	0.03	0.45	0.653	--
Perceived Behaviour Control	--	--	--	0.42	6.02	$\leq 0.0001$	--
Step 2	0.66	0.44	0.02	--	22.0	$\leq 0.0001$	0.09
Descriptive Norms	--	--	--	-0.13	-1.82	0.070	--
Past Behav.	--	--	--	0.09	1.37	0.172	--

Table 4

*Hierarchical regression predicting intention to “reduce negative thinking” from traditional TPB-neg predictors, as well as descriptive norms-neg and past behaviour-neg.*

Variable	<i>R</i>	<i>R</i> <sup>2</sup>	<i>R</i> <sup>2</sup> Change	$\beta$	<i>F</i> / <i>t</i>	Sig	Sig change
Step 1	0.49	0.24	--	--	15.04	≤ 0.0001	--
Attitude	--	--	--	0.35	4.44	≤ 0.0001	--
Subjective Norms	--	--	--	0.07	0.94	0.35	--
Perceived Behaviour Control	--	--	--	0.27	3.48	0.001	--
Step 2	0.50	0.25	0.01	--	9.26	≤ 0.0001	0.50
Descriptive Norms	--	--	--	-0.08	-1.06	0.293	--
Past Behav.	--	--	--	-0.04	-0.45	0.66	--

**Intervention outcomes.** Prior to conducting intervention outcomes, we briefly examined effects of sex on all variables at T1 and T2, separately for the INT and CON groups. Because sex differences were not included in our hypotheses, small cell numbers for some categories, and the potential loss of power to detect outcome effects in an already small sample, we opted to not examine sex as a covariate for these analyses. We performed 4 doubly multivariate GLMs. Table 6 contains the T1 and T2 mean scores for the INT and CON group on all outcome variables.

**Multivariate analysis 1: TPB “reducing negative thinking” (TPB-neg) outcomes.** We performed a doubly multivariate GLM with 1 between-subjects independent variable (IV; experimental condition - intervention or control), 1 within-subjects IV (time – pre or post), and 5 dependent variables (attitude, subjective norms, perceived behavioural control, descriptive norms, and intention, targeting “reducing negative thinking”). We used GLM Repeated Measures in SPSS version 21.0. The results for all multivariate analyses appear in Table 5. We will focus here on the interactions, as these represented the tests of our hypotheses. The interaction

multivariate effect of TPB-neg variables was significant. When following up with univariate analyses, we found that the interaction effect was present in nearly all of the TPB variables, except for descriptive norms-neg.

We expected significantly greater improvement over time in the experimental condition than in the control condition for each TPB-neg variable. As shown in Figure 2, this hypothesis was supported in the case of attitude, subjective norms, intention and perceived behaviour control.

For a more fine-grained analysis, we followed up the significant interactions by testing simple main effects, doing all pairwise comparisons among the four cells. The results appear in Table 6 (Analysis 1), where means that were significantly different are noted in the far right column ( $p \leq 0.05$ ). As expected, given that participants were assigned to INT and CON groups at random, there were no differences between groups at T1. The outcomes favoured the INT group over the control group in all but one variable (descriptive norms) at T2. The INT group significantly improved over time on all variables; whereas, the CON group improved significantly only on one variable (perceived behaviour control). All other variables remained stable across time for the CON group.

***Multivariate analysis 2: Clinical outcomes.*** We performed a doubly multivariate GLM with 1 between-subjects independent variable (IV; experimental condition - INT or CON), 1 within-subjectives IV (time – pre or post), and 3 dependent variables (depression, negative automatic thoughts, dysfunctional attitudes). Time was the only significant multivariate effect. When following up with univariate analyses, we found that the multivariate effect of time was driven by increasing depressive symptoms and decreasing negative automatic thoughts in both

groups over time. Given the lack of significant multivariate interaction effects and their importance in testing our hypotheses, simple main effects analyses were not conducted.

**Multivariate analysis 3: TPB “increasing positive thinking” (TPB-Pos) outcomes.** We performed a doubly multivariate GLM with 1 between-subjects independent variable (IV; experimental condition - INT or CON), 1 within-subjects IV (time – pre or post), and 5 dependent variables (attitude, subjective norms, perceived behavioural control, descriptive norms, and intention, targeting “increasing positive thinking”). We will focus here on the interactions, as these represented the tests of our hypotheses. The interaction effect of TPB-pos variables was significant. When following up with univariate analyses, we found that the interaction effect was present in perceived behaviour control.

We expected significantly greater improvement over time in the experimental condition than in the control condition for each TPB-Pos variable. As shown in Figure 3, this hypothesis was supported only in the case of perceived behaviour control.

For a more fine-grained analysis, we followed up the significant interactions by testing simple main effects, doing all pairwise comparisons among the four cells. The results appear in Table 6 (Analysis 3). As expected, given that participants were assigned to INT and CON groups randomly, there was no difference in perceived behaviour control between groups at T1. The INT group significantly improved over time on perceived behaviour control, whereas, the CON group remained did not change between T1 and T2.

**Multivariate analysis 4: Well-being outcomes.** We performed a doubly multivariate GLM with 1 between-subjects independent variable (IV; experimental condition - INT or CON), 1 within-subjects IV (time – pre or post) and 3 dependent variables (positive automatic thoughts, life satisfaction, and positive affect). The results appear in Table 5. We will focus here on the

interactions, as these represented the tests of our hypotheses. The interaction effect of well-being variables was significant. When following up with univariate analyses, we found that the interaction effect was present in positive automatic thoughts.

We expected significantly greater improvement over time in the experimental condition than in the control condition for each of the well-being variables. As shown in Figure 3, this hypothesis was supported only in the case of positive automatic thoughts.

For a more fine-grained analysis, we followed up the significant interactions by testing simple main effects, doing all pairwise comparisons among the four cells. The results appear in Table 6 (Analysis 4), where means with differing superscripts were significantly different ( $p \leq 0.05$ ). As expected, given that participants were assigned to INT and CON groups at random, there was no difference in positive automatic thoughts between groups at T1. The INT group significantly improved over time on positive automatic thoughts; however, the T2 mean score on positive automatic thoughts for the INT group did not differ from T1 and T2 mean scores for the CON group. Positive automatic thoughts for the CON group did not change across time.

***Facilitator effects.*** The above-mentioned MANOVAs were repeated for the intervention group only to examine differences between facilitators on outcomes. Time x facilitator interaction effects were non-significant for TPB-neg variables, TPB-pos variables and well-being variables ( $F$ 's = 0.38 to 1.16). The interaction effect for clinical outcomes was significant,  $F = 5.06$ ,  $p = 0.003$ . Upon inspection of interaction effects, it seems that this finding is driven by a significant depressive symptom x time interaction,  $F = 7.17$ ,  $p = 0.009$ . Simple effects analyses revealed that this interaction is explained by mean depressive symptoms being significantly lower for K. Bradley's groups at time 1 ( $F = 7.85$ ,  $p = 0.007$ ), but these mean depressive symptoms do not differ at time 2 ( $F < 0.0001$ ,  $p = 0.99$ ).

Table 5

*F values for doubly multivariate GLM analyses of study outcomes*

<b>Variable</b>	<b>Experimental condition</b>	<b>Time</b>	<b>Interaction</b>
<b>Analysis 1: TPB-neg variables</b>			
<i>Multivariate effect</i>	2.60*	10.35**	4.14**
<i>Univariate effects</i>			
ATT	3.35	2.47	13.73**
SN	1.46	1.76	10.17**
PBC	5.33*	46.22**	9.02**
DN	0.36	2.47	1.94
IN	11.94**	0.04	6.64*
<b>Analysis 2: Clinical variables</b>			
<i>Multivariate effect</i>	0.33	27.12**	0.61
<i>Univariate effects</i>			
Depression	0.20	37.18**	0.14
ATQ-N	0.39	7.60**	1.56
Dys Attitudes	0.06	2.26	0.37
<b>Analysis 3: TPB-pos variables</b>			
<i>Multivariate effect</i>	2.69*	4.10**	2.19**
<i>Univariate effects</i>			
ATT	8.35**	5.96*	0.60
SN	2.60	0.57	1.40
PBC	5.23*	4.54*	9.77**
DN	0.002	4.03*	0.36
IN	10.25**	2.04	2.79
<b>Analysis 4: Well-being variables</b>			
<i>Multivariate effect</i>	1.27	5.16**	3.62*
<i>Univariate effects</i>	1.45		
ATQ-P	0.32	15.35**	9.66**
Life Sat		4.44*	0.06
PA		4.08*	2.81

*Note.* ATT = Attitude; SN = Subjective Norms; PBC = Perceived Behaviour Control; DN = Descriptive Norms; IN = Intention; Neg = reducing negative thoughts; Pos = increasing positive thoughts; ATQ-N = Negative Automatic Thoughts, Dys Attitudes = Dysfunctional Attitudes; ATQ-P = Positive Automatic Thoughts; PA: Positive Affect; Life Sat = Life Satisfaction;

\*significant at  $p \leq 0.05$

\*\*significant at  $p \leq 0.01$

Table 6.

*Means (standard deviations) for all outcome variables at Time 1 and 2*

Variable	INT				CON				Significant Mean Differences
	Time 1 (1)		Time 2 (2)		Time 1 (3)		Time 2 (4)		
<i>Analysis 1</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
<b>ATT-Neg</b>	74.90	11.56	78.99	9.79	74.89	9.79	73.24	11.47	2>1> 3, 4
<b>SN-Neg</b>	17.41	5.82	19.52	5.76	17.81	6.09	16.93	7.01	2> 1, 4
<b>PBC-Neg</b>	24.04	5.84	28.11	5.44	23.10	6.96	24.68	6.65	2>4> 1, 3
<b>DN-Neg</b>	5.01	2.62	5.87	3.37	5.68	3.32	5.73	3.33	
<b>IN-Neg</b>	29.04	5.27	30.14	4.69	27.31	6.19	26.03	6.86	2>1, 4; 2>3
<i>Analysis 2</i>									
<b>Depression</b>	35.96	15.13	43.07	8.48	36.27	15.82	44.28	9.15	
<b>ATQ-N</b>	62.37	27.75	55.93	22.58	63.06	29.85	60.64	30.78	
<b>Dys Attitudes</b>	24.88	4.62	25.50	5.18	25.25	5.07	25.51	4.93	
<i>Analysis 3</i>									
<b>ATT-Pos</b>	78.91	9.98	77.65	10.73	74.69	10.60	72.27	12.69	
<b>SN-Pos</b>	18.53	6.15	19.29	6.13	17.38	6.88	17.21	6.77	
<b>PBC-Pos</b>	26.17	5.90	28.29	5.41	25.17	7.23	24.77	7.04	2>1, 3, 4
<b>DN-Pos</b>	5.67	3.22	6.40	3.73	5.86	3.18	6.25	3.48	
<b>IN-Pos</b>	29.43	5.29	29.54	4.86	27.32	6.60	25.97	6.81	
<i>Analysis 4</i>									
<b>ATQ-P</b>	95.51	23.71	104.92	20.88	99.63	24.07	100.71	26.00	2>1
<b>Positive Affect</b>	13.94	3.32	14.77	2.65	14.03	3.43	14.11	3.60	
<b>Life Sat.</b>	23.27	6.51	24.15	6.34	22.03	7.60	22.73	7.74	

*Note.* Within a given row, means that are significantly different from one another at  $p < .05$  are noted in the farthest column. Simple effects analyses were conducted for significant univariate interactions. ATT = Attitudes; SN = Subjective Norms; PBC = Perceived Behaviour Control; DN = Descriptive Norms; IN = Intentions; Neg = reducing negative thoughts; Pos = increasing positive thoughts; ATQ-N = Negative Automatic Thoughts, Dys Attitudes = Dysfunctional Attitudes; ATQ-P = Positive Automatic Thoughts; PA: Positive Affect; Life Sat = Life Satisfaction

## Discussion

The purposes of this study were as follows: 1) pilot test a revised form of the theory of planned behaviour questionnaire to improve upon psychometrics of the previous measure (Study 1 - Bradley, Santor, & Moreno, 2015), as well as to expand this measure to examine target behaviours of “increasing positive thinking” and “decreasing negative thinking;” 2) to replicate and expand upon TPB models of thought-change targets mentioned above to incorporate descriptive norms and past behaviour; 3) to conduct the first randomized control trial of the “Start Making a Change” program and examine if this CBT-based program can promote change in TPB factors and traditional clinical outcomes, as well as well-being outcomes.

**Psychometrics.** Psychometric analyses were conducted using time 1 data, to allow us to collapse INT and CON group data and increase statistical power, as they are theoretically equivalent at time 1. As indicated in Table 1, we were able to improve on internal consistency reliability with the theory of planned behaviour questionnaire – revised (TPBQ-R), especially in the case of perceived behaviour control, compared to our previous measure (Study 1 - Bradley, Santor, & Moreno, 2015). By contrast, we found mixed support for convergent and discriminant validity, in that the TPB-neg variables were inconsistently related to clinical variables and well-being variables. A similar story occurred for the TPB-pos variables. Given that TPB variables, regardless of their behaviour target, seemed to relate to clinical and well-being variables in similar ways, and that the highest correlations occurred between TPB negative and positive counterparts (attitude-neg and attitudes-pos  $r = 0.64$ ), correlational findings may suggest that TPB variables targeting “reducing negative thinking” and “increasing positive thinking” are considered by participants to be very similar to each other. To further support this, TPB variables, regardless of their behaviour targets, often had similar means (subjective norms-neg

mean at T1 = 17.41 and subjective norms-pos mean at T1 = 18.53; see Table 6). It may be difficult for the participants, at least prior to intervention, to distinguish between “reducing negative thinking” and “increasing positive thinking.”

**Theoretical modeling.** Theoretical modeling analyses were conducted using time 1 data, to allow us to collapse the INT and CON group data and increase statistical power, as they are theoretically equivalent at time 1. In the first model, which examined the prediction of intention to “increase positive thinking”, it was found that TPB antecedents predicted a similar amount of variance in intention as our previous study (41.7% vs. 49.6%; Study 1 - Bradley, Santor, & Moreno, 2015). This model demonstrated similar predictive power as studies of TPB antecedent prediction of intention to seeking psychological services and other health behaviours (Armitage & Connor, 2001; Mo & Mak, 2009, Schomerus, Matschinger, & Angermeyer, 2009, Skogstad, Deane, & Spicer, 2006).

Similar to our previous work, attitude was the strongest predictor of intention. By contrast, in the current study, perceived behaviour control was a significant predictor of intention and subjective norms was not. Numerous other studies have found the opposite (Study 1 - Bradley, Santor, & Moreno, 2015; Mo & Mak, 2009, Schomerus, Matschinger, & Angermeyer, 2009, Skogstad, Deane, & Spicer, 2006). However, some studies outline a central role for perceived behaviour control (Armitage & Connor, 2001; Hyland, et al., 2012). There are several potential reasons for these divergent findings. First, Ajzen (2011) predicted that the relative strength of TPB antecedents as predictors of intention will vary both by the particular target behaviour and sample characteristics. Second, and perhaps more important, is the role of study methodology. Previous TPB studies have used survey methodology to assess the TPB model. In this study, participants knew, regardless of what condition to which they were randomized, that

this was a group intervention study. Therefore, such information may have primed them to consider more their ability to actually change their thinking (perceived behaviour control). They may also experience less social stigma because it was a group program, meaning their peers may have thought this behaviour was acceptable (subjective norms). Several CBT trials have found support for the role of a sense of self-efficacy or self-control in improving treatment outcomes (Dozois & Quilty, 2014; Renaud, Russell, & Myhr, 2014). Furthermore, among adolescents, greater perception of social support/approval of psychotherapy predicts increased interest to try psychotherapy (Bradley, McGrath, Brannen & Bagnell, 2010).

The TPB model targeting “reducing negative thinking” replicated the findings mentioned above, in that TPB antecedents significantly predicted intentions to “reduce negative thinking” and in that attitude and perceived behaviour control were significant predictors of intention. However, a substantially lower proportion of variance was predicted (24%) than was predicted in the model of “increasing positive thinking.” It is difficult to discern the exact cause of this finding. “Reducing negative thinking” does not seem to be a “less popular” behaviour target, as means for similar constructs across targets were often similar at time 1 (see Table 6). This study was the pilot test of the TPB-neg questionnaire and thus replication of these findings will be needed before in-depth interpretation can occur.

Contrary to hypotheses, descriptive norms and past behaviour did not improve the prediction of intention in either TPB model. This finding contrasts with previous TPB meta-analytic studies, where descriptive norms and past behaviour each contributed an additional 5% variance to the prediction of intention (McEachan, et al., 2011; Ravis & Sheeran, 2003). There are several potential explanations for this finding. First, both of these constructs were measured with only two items. The meta-analytic studies of TPB constructs indicated that multi-item

measures of TPB antecedents perform better than those with fewer than three items (Armitage & Connor, 2001; McEachan, et al., 2011). Particularly in the case of descriptive norms, lack of predictive power may be a theoretical issue. The construct of descriptive norms describes a person's perception of what important others do *themselves* (Rivis & Sheeran, 2003). Considering that our target behaviour is a mental process, it may be difficult to observe others' behavioural manifestations of "thinking positively" or "reducing negative thinking." Furthermore, given the considerable social stigma around mental illness, participants may have no model of CBT-skill practice (Collins, Westra, Dozois, & Burns, 2004; Wisdom & Agnor, 2007).

When reviewing the null findings for the role of past behaviour, one must consider its place in the theory of planned behaviour. Ajzen (2011) explained that TPB describes the process of making a conscious *rational* decision to take up a health behaviour. Traditionally, past behaviour predicts future because over time, behaviour can become habitual. Once a behaviour becomes habitual, Ajzen (2011) postulated that there is no longer a rational decision-making process; thus intention (and its antecedents) are irrelevant. Automaticity overrides intention. When people enter a CBT prevention program or treatment for the first time, it is a conscious decision whether or not to try these new skills and by default cannot be habitual. Therefore, past behaviour may not be relevant to prediction of CBT-related behaviour uptake.

#### **Intervention outcomes.**

***TPB "reducing negative thinking" outcomes.*** As hypothesized, the participants in the "Start Making a Change" workshop experienced significant improvements over the control group in attitude, subjective norms, perceived behaviour control, and intention in regards to the target behaviour of "reducing negative thinking." Descriptive norms remained stable in both groups. The outcomes in various CBT trials highlight the importance of improvement of similar

factors to those outlined in TPB to remission of depressive symptoms. For instance, similar to having a positive attitude towards changing thinking patterns, those with greater expectancy of positive outcomes and acceptance of CBT conceptualization experience steeper reductions in depressive symptoms (Kwon & Oei, 2003; Renaud, Russell, & Myhr, 2014). Willingness to try CBT skills in session and at home reflect intention to engage in CBT-related processes (Detweiler & Whisman, 1999; Strunk, et al., 2010). A sense of self-efficacy, closely related to perceived behaviour control, also predicts depressive symptom improvement and reduced rates of relapse (Ajzen, 2011; Dozois, et al., 2014; Renaud, Russell, & Myhr, 2014). Finally, in the broader scheme of mental health service use, those who have parents or peers who support and openly discuss mental health service use experience less stigma and are more likely to seek psychological supports when needed (Wisdom & Agnor, 2007). Likely, this is related to experiencing positive subjective norms about psychological services.

***TPB “increasing positive thinking” outcomes.*** As hypothesized, the participants in the “Start Making a Change” workshop experienced significant improvements over the control group in perceived behaviour control in regards to the target behaviour of “increasing positive thinking.” Contrary to hypotheses, scores remained stable for all other TPB variables, except for attitude, which worsened slightly in both the intervention and control groups. Perceived behaviour control was consistently improved for both types of thinking in this intervention, most likely because of the program’s emphasis on skill-building in both positive and negative thinking. However, the intervention’s limited impact on TPB-pos variables may reflect its foundation in CBT principles, which focus on restructuring negative cognitions. Efforts were made to target the formation of positive cognitions (counting accomplishments and positive schema development strategies), but the dose of positive interventions may have been

insufficient to influence the TPB-pos variables. Future studies that dismantle this workshop and compare its positive and negative thinking interventions would be useful to test this hypothesis. Overall, it is important to consider the consistent finding of promoting a sense of capacity to learn and use thought-change strategies and the potential this sense of capacity has to help participants cope with distress (Dozois & Quilty, 2014). This finding of perceived behaviour control as amenable to change by the “Start Making a Change” workshop is consistent with previous results of our open feasibility trial (Study 2 - Bradley, Santor, & Oram, 2015).

*Clinical outcomes.* Contrary to hypotheses, there were no significant group differences in change in depression, negative automatic thinking, and dysfunctional attitudes over time. Perhaps this is related to sample characteristics; this is a university sample, not a clinical one. Prevention studies are often plagued by low base rates of disorder-related symptoms (Sutton, 2007). However, mean depression scores indicate that the participants, on average, experienced a moderate amount of depression (see Table 6; Radloff, 1977). Therefore, it seems that we reached our high-risk target audience, but without more intensive screening measures it is hard to be certain (to be discussed further below). Another potential explanation of these findings is the dose effect. Perhaps there was not a sufficient “dose” of techniques to influence clinical outcomes. Alternatively, perhaps the dose was sufficient to alter more proximal variables (improving attitude, perceived behaviour control, etc.), but with follow-up (and participant continued practice) change in clinical variables may have occurred. For instance, some CBT trials have demonstrated that changes in negative automatic thinking did not change until week four of therapy (Kwon & Oei, 2003). Our intervention was only 2-3 weeks in length.

There were significant changes over time for both groups in depression and negative automatic thinking. Depressive symptoms worsened over time for both groups. Because

depression was not influenced by random assignment, we suspect that another, unmeasured, variable accounts for this change. For instance, most participants began this study in mid-September and were finished by mid-October, which is a typical time for midterms to occur. University students experience considerable distress and depressive symptoms spikes with increasing academic burden (Adlaf, et al., 2001). This finding is underscored by significantly lower mean depression symptom for K. Bradley's versus R. Oram's groups at time 1, given that K. Bradley began most of her groups at the beginning of the semester and R. Oram facilitated most of her groups in October and November. Perhaps the dose of the intervention was insufficient to help them overcome these stressors. Future studies should include a covariate for "time of semester when workshop commenced" to explore this hypothesis.

On the other hand, an examination of means in negative automatic thinking suggests that the intervention group did experience a reduction in negative automatic thinking. This difference in slopes between groups is in the right direction, but not large enough to produce a significant interaction effect, which may reflect the need for a "larger dose." It could also reflect the challenge of CBT mechanism of change research where, in general, cognitive change is inconsistent (Garratt, et al., 2007). One might suggest that this intervention could be well-suited in an early phase of a "stepped-care" model, where those university students who are at risk for depression try the "Start Making a Change" workshop to learn CBT strategies and acquire positive beliefs about these techniques, followed by increasingly more intense intervention as needed.

***Well-being outcomes.*** There was a significant interaction effect for positive automatic thinking, in that the intervention group experienced a significantly greater slope of improvement than the control group. However, because the intervention group had (non-significantly) lower

positive automatic thinking scores at time 1 and the control group had a non-significant increase in score at time 2, there are no significant differences between the intervention and control group at time 2. The significant interaction effect is consistent with findings in CBT trials, where positive cognitive processes changed with intervention and predicted depressive symptom reductions (Quilty, Dozois, Lobo, Ravindran, & Bagby, 2014). Life satisfaction and positive affect were not changed with intervention, possibly because they were not directly targeted by program techniques.

**Limitations and future directions.** These findings should be considered within the context of the following limitations. First, there are some important theoretical limitations to consider. Although TPB variables correlate with some clinical and well-being outcomes and several TPB and outcome variables demonstrated change with intervention, this study does not address the question of where TPB factors may fit in a modified cognitive mechanism of change model for CBT interventions. The above-mentioned findings provide support for conducting future studies where TPB variables are tested as mediators of CBT outcomes in treatment and prevention programs. In addition, given that the participants seemed to have rated them similarly, our targets of “increasing positive thinking” and “reducing negative thinking” may have been too vague for the participants to distinguish and do not necessarily map on directly to specific CBT techniques. Future studies could examine intention (and its antecedents) to “learn cognitive restructuring,” “practice thought records at home,” “attempt behaviour activation,” etc.

There are also several methodological limitations to consider. First, we did not screen for previous mental illness. Similarly, symptoms and well-being outcomes were assessed via self-report measures. University students are by the nature of their milieu and workload considered to be a high-risk group to develop depression, but without specific diagnostic information (semi-

structured clinical interviews) we cannot ascertain if this is a healthy, at-risk, or clinical population in terms of depressive symptom severity. Other methodological issues that may explain the lack of symptom improvement include a lack of follow-up. An additional follow-up period may have enabled us to capture lagging changes in clinical variables, but subject pool recruitment limited the possibility for follow-up (limited time we can reward for, difficulties with tracking participants across semesters). We did monitor whether or not they completed homework exercises, but the quantity or quality of homework completion may also predict intervention outcomes. Future studies should incorporate measures of homework completion and a follow-up assessment. In addition, a waitlist control group is limited in its ability to control for unmeasured differences over time between groups. For instance, perhaps simply experiencing social and professional support in the intervention group setting may be related to outcomes. Future RCTs should include an active-placebo group to control for time spent with the facilitator and fellow group members. Finally, many variables were assessed in the course of this study, which inflates type 1 error rate. As this was the first RCT for the “Start Making a Change” program, we aimed to pilot test many hypotheses with limited resources. In the future, we aim to conduct dismantling studies to focus on specific techniques and TPB behaviour targets and associated outcomes in order to better understand the mechanisms of change in this prevention program.

### **Implications.**

*Theoretical implications: Mechanisms of change.* This is the first study known to the authors to test whether or not CBT interventions can influence TPB constructs and one of few to assess potential mechanisms from the broader psychological literature outside of cognitive-behavioural theory. This study and its companion studies are also the first known to the authors

to assess the relationships among TPB variables and clinical and well-being variables (Study 1 - Bradley, Santor, & Moreno, 2015; Study 2 - Bradley, Santor, & Oram, 2015). This study provides support for future mediation studies to assess whether or not TPB variables influence CBT mechanisms of change and provide greater prediction of CBT outcomes as outlined in Figure 1. One study provides preliminary support for the mediational role of TPB antecedents between severity of depression-related symptoms and intentions to increase positive thinking (Study 1 - Bradley, Santor, & Moreno, 2015).

***Clinical implications and the question of prevention vs. promotion.*** The “Start Making a Change” workshop focuses extensively on understanding and changing the frequency of positive and negative thoughts. It is not surprising that positive automatic cognitions are improved with intervention and that negative automatic cognitions demonstrate a trend towards improvement with intervention. Greater focus/increased practice on cognition-specific interventions may improve cognition-related outcomes on this intervention. Such a focus will also facilitate future work on clarifying the cognitive mechanism of change hypothesis in CBT (Garratt, et al., 2007). In addition, the capacity to improve TPB constructs with intervention, especially perceived behaviour control, indicates that those coming into contact with CBT techniques in this program are having positive experiences that boost their beliefs about the efficacy of CBT and their ability to learn and use these strategies, increase their beliefs that using these strategies is normative and promote willingness to try such strategies. Such positive experiences set the stage for encouraging self-directed seeking of psychological services if needed in the future and, if disseminated more widely, may contribute to an increased sense of “normalcy” to learn CBT strategies to prevent depression. Finally, these intervention effects were achieved within a 3-

week, low-cost group program that would be easier to disseminate than more established and intensive depression prevention programs (Seligman, Schulman, & Tryon, 2007).

Given the mixed findings of this study, one cannot conclude if the prevention (clinical) or promotion (well-being) model is better suited to help those at risk to develop depression. The TPB-pos antecedents seem to more strongly predict intention than the TPB-neg variables, and intention is the greatest predictor of health behaviour change in general (Armitage & Connor, 2001). However, the TPB-neg variables were more amenable to change with this intervention. Furthermore, the TPB-neg variables were strongly correlated with their TPB-pos counterparts, suggesting potential conceptual overlap. The “Start Making a Change” intervention incorporates variables of both clinical and positive psychology fields with promising results. Future dismantling studies and replication of this study will be needed to answer the question of prevention or promotion, or both!

**Conclusion.** This study provides preliminary evidence that the “Start Making a Change” program can, in 3 weeks, promote positive change in theory of planned behaviour constructs and some symptom-related factors. This study also replicates findings from Bradley, Santor, and Moreno (2015, Study 1) in that the TPB antecedents can predict intentions to engage in CBT-related processes. Such findings suggest the potential of the TPB to predict many psychotherapeutic processes and support the incorporation of this model into research on mechanisms of change in CBT.

### References

- Abramson, L.Y., Metalsky, G.I., & Alloy, L.B. (1989). Hopelessness depression: A theory-based subtype of depression. *Psychological Review*, *96*(2), 358-372. doi:10.1037//0033-295X.96.2.358
- Adlaf, E. M., Gliksman, L., Demers, A., & Newton-Taylor, B. (2001). The prevalence of elevated psychological distress among Canadian undergraduates: Findings from the 1998 Canadian campus survey. *Journal of American College Health*, *50*(2), 67–72. doi: 10.1080/07448480109596009
- Ajzen, Icek. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, *50*(2), 179–211. doi:10.1016/0749-5978(91)90020-T
- Ajzen, Icek. (2011). The theory of planned behaviour: Reactions and reflections. *Psychology & Health*, *26*(9), 1113–1127. doi: 10.1080/08870446.2011.613995
- Ajzen, Icek & Madden, T. (1985). From intentions to action: A theory of planned behavior. In J. Kuhl & J. Beckmann (Eds.), *Action Control* (pp. 11-39). Springer Berlin Heidelberg: Berlin.
- Armitage, C. J., & Conner, M. (2001). Efficacy of the theory of planned behaviour: A meta-analytic review. *British Journal of Social Psychology*, *40*(4), 471–499. doi:10.1348/014466601164939
- Baranowski, T. (2005). Integration of two models, or dominance of one? *Journal of Health Psychology*, *10*(1), 19-21. doi:10.1177/1359105305048550
- Beck, A. T. (2008). The evolution of the cognitive model of depression and its neurobiological correlates. *The American Journal of Psychiatry*, *165*(8), 969–977. doi:10.1176/appi.ajp.2008.08050721

- Beck, A. T., & Dozois, D. J. A. (2011). Cognitive therapy: Current status and future directions. *Annual Review of Medicine*, 62(1), 397–409. doi: 10.1146/annurev-med-052209-100032
- Beck, A. T. Rush, J.A., Shaw, B.F., & Emery, G. (1979). *Cognitive Therapy of Depression*. New York: Guilford Press.
- Beevers, C. G., Strong, D. R., Meyer, B., Pilkonis, P. A., & Miller, I. W. (2007). Efficiently assessing negative cognition in depression: An item response theory analysis of the Dysfunctional Attitude Scale. *Psychological Assessment*, 19(2), 199–209. doi:10.1037/1040-3590.19.2.199
- Bradley, K. L., McGrath, P. J., Brannen, C. L., & Bagnell, A. L. (2010). Adolescents' attitudes and opinions about depression treatment. *Community mental health journal*, 46(3), 242-251. doi: 10.1007/s10597-009-9224-5
- Bradley, K.L., Santor, D.A., & Moreno, E.J. (2015). *Re-examination of the cognitive mechanism of change hypothesis in cognitive behaviour therapy: The role of theory of planned behaviour constructs*. Manuscript submitted for publication to the *Journal of Cognitive Therapy and Research*.
- Bradley, K.L., Santor, D.A., & Oram, R. (2015). *A feasibility trial of a novel approach to depression prevention: Targeting proximal risk factors and application of a model of health behaviour change*. Manuscript submitted for publication to the *Journal of Canadian Community Mental Health Research*.
- Burns, D. D. (1999). *The Feeling Good Handbook*. New York: Penguin Group.
- Christopher, M. S., Jacob, K. L., Neuhaus, E. C., Neary, T. J., & Fiola, L. A. (2009). Cognitive and behavioral changes related to symptom improvement among patients with a mood disorder receiving intensive cognitive-behavioral therapy. *Journal of Psychiatric*

- Practice*, 15(2), 95–102. doi: 10.1097/01.pra.0000348362.11548.5f
- Coie, J. D., Watt, N. F., West, S. G., Hawkins, J. D., Asarnow, J. R., Markman, H. J., ... & Long, B. (1993). The science of prevention: a conceptual framework and some directions for a national research program. *American Psychologist*, 48(10), 1013-1022. doi: 10.1037/0003-066X.48.10.1013
- Collins, K. A., Westra, H. A., Dozois, D. J., & Burns, D. D. (2004). Gaps in accessing treatment for anxiety and depression: Challenges for the delivery of care. *Clinical Psychology Review*, 24(5), 583–616. doi: 10.1016/j.cpr.2004.06.001
- Cuijpers, P., Berking, M., Andersson, G., Quigley, L., Kleiboer, A., & Dobson, K. S. (2013). A meta-analysis of cognitive-behavioural therapy for adult depression, alone and in comparison with other treatments. *Canadian Journal of Psychiatry*, 58(7), 376–85.
- Deitweiler, J.B., & Whisman, M.A. (1999). The role of homework assignments in cognitive therapy for depression: potential methods for enhancing adherence. *Clinical Psychology: Science and Practice*, 6(3), 267-282. doi: 10.1093/clipsy.6.3.267
- De Raedt, R., & Koster, E. H. W. (2010). Understanding vulnerability for depression from a cognitive neuroscience perspective: A reappraisal of attentional factors and a new conceptual framework. *Cognitive, Affective & Behavioral Neuroscience*, 10(1), 50–70. doi: 10.3758/CABN.10.1.50
- Diener E., & Emmons, R.A. (1985). The independence of positive and negative affect. *Journal of Personality and Social Psychology*, 47(5), 1105–1117.
- Diener, E. D., Emmons, R. A., Larsen, R. J., & Griffin, S. (1985). The satisfaction with life scale. *Journal of personality assessment*, 49(1), 71-75. doi: 10.1207/s15327752jpa4901\_13

- Dozois, D. J. A., Bieling, P. J., Evraire, L. E., Patelis-Siotis, I., Hoar, L., Chudzik, S., ... Westra, H. A. (2014). Changes in core beliefs (early maladaptive schemas) and self-representation in cognitive therapy and pharmacotherapy for depression. *International Journal of Cognitive Therapy, 7*(3), 217–234. doi: 10.1521/ijct.2014.7.3.217
- Dozois, D. J. A., J., Bieling, P. J., Patelis-Siotis, I., Hoar, L., Chudzik, S., McCabe, K., & Westra, H. A. (2009). Changes in self-schema structure in cognitive therapy for major depressive disorder: A randomized clinical trial. *Journal of Consulting and Clinical Psychology, 77*(6), 1078–1088. doi: 10.1037/a0016886
- Durlak, J. A., Weissberg, R. P., Dymnicki, A. B., Taylor, R. D., & Schellinger, K. B. (2011). The impact of enhancing students' social and emotional learning: A meta-analysis of school-based universal interventions. *Child development, 82*(1), 405-432.
- Eisenberg, D., Gollust, S. E., Golberstein, E., & Hefner, J. L. (2007). Prevalence and correlates of depression, anxiety, and suicidality among university students. *The American Journal of Orthopsychiatry, 77*(4), 534–542. doi:10.1037/0002-9432.77.4.534
- Fishbein, M., & Ajzen, I. (2011). *Predicting and Changing Behavior*. USA: Taylor & Francis.
- Fournier, J. C., DeRubeis, R. J., Hollon, S. D., Gallop, R., Shelton, R. C., & Amsterdam, J. D. (2013). Differential change in specific depressive symptoms during antidepressant medication or cognitive therapy. *Behaviour Research and Therapy, 51*(7), 392–398. doi: 10.1016/j.brat.2013.03.010
- Garratt, G., Ingram, R. E., Rand, K. L., & Sawalani, G. (2007). Cognitive processes in cognitive therapy: Evaluation of the mechanisms of change in the treatment of depression. *Clinical Psychology: Science and Practice, 14*(3), 224–239. doi: 10.1111/j.1468-2850.2007.00081.x

- Hayden, E. P., Hankin, B. L., Mackrell, S. V. M., Sheikh, H. I., Jordan, P. L., Dozois, D. J. A., ... Badanes, L. S. (2014). Parental depression and child cognitive vulnerability predict children's cortisol reactivity. *Development and Psychopathology*, 26(Special Issue 4pt2), 1445–1460. doi: 10.1017/S0954579414001138
- Hayden, E. P., Klein, D. N., Durbin, C. E., & Olino, T. M. (2006). Positive emotionality at age 3 predicts cognitive styles in 7-year-old children. *Development and Psychopathology*, null(02), 409–423. doi: 10.1017/S0954579406060226
- Hobbis, I., & Sutton, S. (2005). Are techniques used in cognitive behaviour therapy applicable to behaviour change interventions based on the theory of planned behaviour? *Journal of Health Psychology*, 10(1), 7-18. doi:10.1177/1359105305048549
- Hollon, S., & Kendall, P. (1980). Cognitive self-statements in depression: Development of an automatic thoughts questionnaire. *Cognitive Therapy and Research*, 4(4), 383–395. doi: 10.1007/BF01178214
- Horowitz, J.L., & Garber, J. (2006). The prevention of depressive symptoms in children and adolescents: A meta-analytic review. *Journal of Consulting and Clinical Psychology*, 74(3), 486-503. doi:10.1037/0022-006X.74.3.401
- Huta, V., & Waterman, A. S. (2014). Eudaimonia and its distinction from hedonia: Developing a classification and terminology for understanding conceptual and operational definitions. *Journal of Happiness Studies*, 15(6), 1425-1456. doi: 10.1007/s10902-013-9485-0
- Hyland, P. E., McLaughlin, C. G., Boduszek, D., & Prentice, G. R. (2012). Intentions to participate in counselling among front-line, at-risk Irish government employees: An application of the theory of planned behaviour. *British Journal of Guidance &*

- Counselling*, 40(3), 279–299. doi:10.1080/03069885.2012.681769
- Hysenbegasi, A., Hass, S. L., & Rowland, C. R. (2005). The impact of depression on the academic productivity of university students. *The Journal of Mental Health Policy and Economics*, 8(3), 145–51.
- Ingram, R. E., Kendall, P. C., Siegle, G., Guarino, J., & McLaughlin, S. C. (1995). Psychometric properties of the Positive Automatic Thoughts Questionnaire. *Psychological Assessment*, 7(4), 495–507. doi:10.1037/1040-3590.7.4.495
- Ingram, R. E., & Wisnicki, K. S. (1988). Assessment of positive automatic cognition. *Journal of Consulting and Clinical Psychology*, 56(6), 898–902. doi:10.1037/0022-006X.56.6.898
- Jacobson, N. S., Dobson, K. S., Truax, P. A., Addis, M. E., Koerner, K., Gollan, J. K., ... Prince, S. E. (1996). A component analysis of cognitive-behavioral treatment for depression. *Journal of Consulting and Clinical Psychology*, 64(2), 295–304.
- Jane-Llopis, E. (2003). Predictors of efficacy in depression prevention programmes: Meta-analysis. *The British Journal of Psychiatry*, 183(5), 384–397. doi: 10.1192/bjp.183.5.384
- Jaycox, L. H., Asarnow, J. R., Sherbourne, C. D., Rea, M. M., LaBorde, A. P., & Wells, K. B. (2006). Adolescent primary care patients' preferences for depression treatment. *Administration and Policy in Mental Health and Mental Health Services Research*, 33(2), 198-207. doi: 10.1007/s10488-006-0033-7
- Kavanagh, J., Oliver, S., Lorenc, T., Caird, J., Tucker, H., Harden, A., ... Oakley, A. (2009). School-based cognitive-behavioural interventions: A systematic review of effects and inequalities. *Health Sociology Review*, 18(1), 61–78. doi:10.5172/hesr.18.1.61
- Kwon, S., & Oei, T.P.S. (2003). Cognitive change processes in a group cognitive behavior therapy of depression. *Journal of Behavior Therapy and Experimental Psychiatry*, 34(1),

73-85. doi: 10.1016/S0005-7916(03)00021-1

Ladouceur, C. D., Dahl, R. E., Williamson, D. E., Birmaher, B., Ryan, N. D., & Casey, B. J. (2005). Altered emotional processing in pediatric anxiety, depression, and comorbid anxiety-depression. *Journal of Abnormal Child Psychology*, *33*(2), 165–177. doi: 10.1007/s10802-005-1825-z

Lightsey Jr., O.R. (1994). “Thinking positive” as a stress buffer: The role of positive automatic cognitions in depression and happiness. *Journal of Counseling Psychology*, *41*(3), 325-334. doi:10.1037/0022-0167.41.3.325

Mackrell, S. V. M., Johnson, E. M., Dozois, D. J. A., & Hayden, E. P. (2013). Negative life events and cognitive vulnerability to depression: Informant effects and sex differences in the prediction of depressive symptoms in middle childhood. *Personality and Individual Differences*, *54*(4), 463–468. doi: 10.1016/j.paid.2012.09.007

McEachan, R. R. C., Conner, M., Taylor, N. J., & Lawton, R. J. (2011). Prospective prediction of health-related behaviours with the theory of planned behaviour: A meta-analysis. *Health Psychology Review*, *5*(2), 97–144. doi: 10.1080/17437199.2010.521684

Merry, S. N., & Spence, S. H. (2007). Attempting to prevent depression in youth: a systematic review of the evidence. *Early Intervention in Psychiatry*, *1*(2), 128–137. doi:10.1111/j.1751-7893.2007.00030.x

Mezulis, A. H., Hyde, J. S., & Abramson, L. Y. (2006). The developmental origins of cognitive vulnerability to depression: Temperament, parenting, and negative life events in childhood as contributors to negative cognitive style. *Developmental Psychology*, *42*(6), 1012–1025. doi: 10.1037/0012-1649.42.6.1012

Michie, S. (2005). Is cognitive behaviour therapy effective for changing health behaviours?

Commentary on Hobbis and Sutton. *Journal of Health Psychology*, 10(1), 37-43.

doi:10.1177/1359105305048553

Mikolajczyk, R. T., Maxwell, A. E., Naydenova, V., Meier, S., & El Ansari, W. (2008).

Depressive symptoms and perceived burdens related to being a student: Survey in three European countries. *Clinical Practice and Epidemiology in Mental Health : CP & EMH*, 4, 19. doi:10.1186/1745-0179-4-19

Mo, P. K. H., & Mak, W. W. S. (2009). Help-seeking for mental health problems among

Chinese: the application and extension of the theory of planned behavior. *Social Psychiatry and Psychiatric Epidemiology*, 44(8), 675–684. doi:10.1007/s00127-008-0484-0

Persons, J. B., Davidson, J., & Tompkins, M. A. (2001). *Essential Components of Cognitive-Behavior Therapy for Depression*. USA: American Psychological Association.

Quilty, L. C., Dozois, D. J. A., Lobo, D. S. S., Ravindran, L. N., & Bagby, R. M. (2014).

Cognitive structure and processing during cognitive behavioral therapy vs. pharmacotherapy for depression. *International Journal of Cognitive Therapy*, 7(3), 235–250. doi: 10.1521/ijct.2014.7.3.235

Quilty, L. C., McBride, C., & Bagby, R. M. (2008). Evidence for the cognitive mediational model of cognitive behavioural therapy for depression. *Psychological Medicine*, 38(11), 1531–41. doi:10.1017/S0033291708003772

Radloff, L. S. (1977). The CES-D scale a self-report depression scale for research in the general population. *Applied Psychological Measurement*, 1(3), 385-401. doi:

10.1177/014662167700100306

Rawal, A., Collishaw, S., Thapar, A., & Rice, F. (2013). A direct method of assessing underlying

- cognitive risk for adolescent depression. *Journal of Abnormal Child Psychology*, 41(8), 1279–1288. doi: 10.1007/s10802-013-9760-x
- Renaud, J., Russell, J. J., & Myhr, G. (2014). Predicting who benefits most from cognitive-behavioral therapy for anxiety and depression.
- Rivis, A., & Sheeran, P. (2003). Descriptive norms as an additional predictor in the theory of planned behaviour: A meta-analysis. *Current Psychology*, 22(3), 218–233.
- Rivis, A., Sheeran, P., & Armitage, C. J. (2006). Augmenting the theory of planned behaviour with the prototype/willingness model: Predictive validity of actor versus abstainer prototypes for adolescents' health-protective and health-risk intentions. *British Journal of Health Psychology*, 11(3), 483–500. doi:10.1348/135910705X70327
- Schomerus, G., Matschinger, H., & Angermeyer, M. C. (2009). Attitudes that determine willingness to seek psychiatric help for depression: a representative population survey applying the Theory of Planned Behaviour. (1). *Psychological Medicine*, 39(11), 1855–65. doi:10.1017/S0033291709005832
- Seeds, P. M., & Dozois, D. J. A. (2010). Prospective evaluation of a cognitive vulnerability-stress model for depression: the interaction of schema self-structures and negative life events. *Journal of Clinical Psychology*, 66(12), 1307–1323. doi: 10.1002/jclp.20723
- Segal, Z.V., Williams, J.M.G., & Teasdale, J.D. (2013). *Mindfulness-based cognitive therapy for depression: Second edition*. New York: Guildford.
- Seligman, M.E.P., Schulman, P., DeRubeis, R.J., & Hollon, S.D. (1999). The prevention of depression and anxiety. *Prevention and Treatment*, 2(1), 8a. doi: 10.1037/1522-3736.2.1.28a
- Seligman, M.E.P., Schulman, P., & Tryon, A.M. (2007). Group prevention of depression and

- anxiety symptoms. *Behaviour Research and Therapy*, 45(6), 1111-1126.  
doi:10.1016/j.brat.2006.09.010
- Sheeran, P., Harris, P.R., Epton, T. (2014). Does heightening risk appraisals change people's intentions and behavior? A meta-analysis of experimental studies. *Psychological Bulletin*, 140(2), 511-543. doi: 10.1037/a0033065
- Skogstad, P., Deane, F. P., & Spicer, J. (2006). Social-cognitive determinants of help-seeking for mental health problems among prison inmates. *Criminal Behaviour and Mental Health : CBMH*, 16(1), 43–59. doi:10.1002/cbm.54
- Strunk, D. R., Brotman, M. A., & DeRubeis, R. J. (2010). The process of change in cognitive therapy for depression: Predictors of early inter-session symptom gains. *Behaviour Research and Therapy*, 48(7), 599–606. doi: 10.1037/a0029281
- Sutton, J.M. (2007). Prevention of depression in youth: A qualitative review and future suggestions. *Clinical Psychology Review*, 27(5), 552-571. doi:10.1016/j.cpr.2007.01.014
- Taylor, L., & Ingram, R. E. (1999). Cognitive reactivity and depressotypic information processing in children of depressed mothers. *Journal of Abnormal Psychology*, 108(2), 202–210. doi: 10.1037/0021-843X.108.2.202
- Van der Zanden, R., Galindo-Garre, F., Curie, K., Kramer, J., & Cuijpers, P. (2014). Online cognitive-based intervention for depression: Exploring possible circularity in mechanisms of change. *Psychological Medicine*, 44(06), 1159–1170. doi: 10.1017/S003329171300175X
- Voelker, R. (2003). Mounting student depression taxing campus mental health services. *JAMA*, 289(16), 2055-2056. doi:10.1001/jama.289.16.2055
- Webb, C. A., Auerbach, R. P., & DeRubeis, R. J. (2012). Processes of change in CBT of

- adolescent depression: Review and recommendations. *Journal of Clinical Child & Adolescent Psychology*, 41(5), 654-665. doi: 10.1080/15374416.2012.704842
- Webb, T.L., & Sheeran, P. (2006). Does changing behavioral intentions engender behavior change? A Meta-Analysis of the Experimental Evidence. *Psychological Bulletin*, 132(2), 249-268. doi:10.1037/0033-2909.132.2.249
- Wisdom, J. P., & Agnor, C. (2007). Family heritage and depression guides: Family and peer views influence adolescent attitudes about depression. *Journal of adolescence*, 30(2), 333-346.
- World Health Organization. (2013). *Global action plan for the prevention and control of noncommunicable diseases: 2013-2020*. Retrieved from [http://www.who.int/nmh/events/ncd\\_action\\_plan/en/](http://www.who.int/nmh/events/ncd_action_plan/en/).
- Yan, J., Kong, T., He, Y., Mcwhinnie, C. M., Yao, S., & Xiao, J. (2015). Daily hassles and depression in individuals with cognitive vulnerability to depression: The mediating role of maladaptive cognitive emotion regulation strategies. *Nordic Psychology*, 67(1), 87-100. doi: 10.1080/19012276.2014.957717
- Yao, S., Fang, J., Zhu, X., & Zuroff, D. C. (2009). The Depressive Experiences Questionnaire: construct validity and prediction of depressive symptoms in a sample of Chinese undergraduates. *Depression and anxiety*, 26(10), 930-937. doi: 10.1002/da.20465

## General Discussion

### Purpose of the Research

The purpose of this series of studies was to address important gaps in the theory and application of CBT-based depression prevention program research. The theoretical goal was to devise and test a formal “hybrid” model of CBT and the theory of planned behaviour (TPB) to help improve our understanding of the mechanism of change in CBT-based prevention programs. As demonstrated in Figure 1 (General Introduction), I hypothesized that in order to engage in thought-change strategies to prevent depression, one must have intention to try these skills and intention is promoted by experiencing positive attitude, subjective norms, and perceived behaviour control. The applied goal was to develop a brief, CBT-based prevention program that requires only limited resources to disseminate in order to address the need for such services in university students, who are a group at-risk to experience depressive disorders. In addition, this program focused on *one* prevention target, thinking patterns, to help further clarify the mechanisms of change in depression prevention. To address these gaps in the literature, the following studies were conducted. Study 1 was a survey study to begin to assess relationships between TPB and CBT-related variables. Studies 2 and 3 were intervention trials to determine if the “Start Making a Change” prevention program (co-developed by K. Bradley and D. Santor) could modify TPB variables, thinking patterns, and related clinical and well-being outcomes. Study 2 was specifically designed to test the feasibility of this workshop (open trial). Study 3 was a RCT designed to test the intervention versus a waitlist control group and compare models of “reducing negative thinking” and “increasing positive thinking” to determine if it is better to focus on a positive or clinical psychology framework for intervention. I consider these studies as pilot work in terms of developing and testing both new measures (TPB) and a new prevention

program and the success of this work will set the stage for future studies of mechanisms of change in prevention.

### **Summary of Findings and Relevance to Existing Literature**

**Theoretical modeling.** In Study 1, the theory of planned behaviour antecedents (attitude, subjective norms, and perceived behaviour control) significantly predicted intentions to increase positive thinking. These findings were replicated and extended to intention to reduce negative thinking in Study 3; however, the TPB model for “reducing negative thinking” predicted less variance in intention. Across studies, it was found that TPB was a better model of intention than the traditional model of symptom severity, that symptom severity did not predict additional variance above and beyond the TPB antecedents, nor did descriptive norms or past behaviour. The relative strength of the predictors varied across regression models, with attitude being a consistently strong predictor of intention. Such variability is expected across samples and behaviour targets (Ajzen, 2011). Interestingly, perceived behaviour control was a non-significant predictor in Study 1 and subjective norms was a non-significant predictor in Study 3. Perhaps this is related to differences in methodology (survey versus intervention, respectively), which may prime the participants to weigh their consideration of these constructs differently. For instance, if one enters an intervention study (Study 3), one might put greater emphasis on whether or not he or she can do what will be asked of him or her. Finally, Study 1 demonstrated Ajzen’s (2011) hypothesis of the distal role of affective and cognitive “traits” in intention, where these variables indirectly influenced intention via their impact on TPB antecedents (Figure 3, Study 1).

The TPB has demonstrated its efficacy in predicting a variety of health behaviours, including psychological service use (Armitage & Connor, 2001; Hyland, et al., 2012; Mo &

Mak, 2009, Schomerus, Matschinger, & Angermeyer, 2009, Skogstad, Deane, & Spicer, 2006). Prior to mediational models of mechanism of change, it is important to establish TPB's predictive abilities of intention, as intention is the strongest predictor of the uptake of health behaviours (Armitage & Connor, 2001). This research did replicate the findings from other work that increasing symptom severity predicts psychological service use (Collins, et al., 2004), but carries our understanding further in its demonstration that symptom severity influences psychological health behaviour indirectly via TPB antecedents. Future studies will be needed to test the next step of this model, i.e., that intention influences skill-uptake and that skill-uptake predicts changes in destructive thinking patterns and thus the prevention of depression onset. Such a model then could also be extended to intervention studies in clinically depressed populations and to the understanding of participant uptake of other psychotherapeutic change processes (therapeutic alliance, trying behavioural activation, relaxation, mindfulness, etc.)

***Competing theories: Is TPB the best model of change to supplement CBT theory?***

Although these studies demonstrate relationships among TPB variables and prevention outcomes, one must also consider whether or not another theory or set of factors could better explain these results. For instance, one's readiness for change may influence a participant's self-selection into these studies, particularly the intervention studies, as they provide skills to promote change. If so, then my participants may already have had the intention to change destructive thinking patterns; thus intention had little room to change. Such issues are reminiscent of the transtheoretical model or the "stages of change" model, which describes a process of change one must go through to contemplate, prepare, plan and execute behaviour change (Prochaska & Clemente, 2005). However, if the participants already had high intention to change before starting the intervention studies, there would be ceiling effects at time 1, which is not the case in

any of the studies. Furthermore, unlike TPB, the transtheoretical model has not been used to assess readiness to change in psychological processes. Finally, in a meta-analysis of health-behaviour change studies, it was found that TPB interventions had the largest and most long-lasting effects compared to many prominent health-behaviour change theories, including the transtheoretical model, self-efficacy theory, and the health belief model (Webb & Sheeran, 2006). Because of these factors, the results of my research, and the common cognitive theoretical complementarity of TPB and CBT, I consider the TPB to be the strongest theoretical model to use to supplement our understanding of mechanisms of change in CBT-based prevention programs (Hobbis & Sutton, 2005).

Numerous other factors and participant characteristics could have influenced these results. For instance, the wording of the TPB questionnaires may have indicated that reducing negative thinking and increasing positive thinking are desirable things to do, which may then trigger social desirability bias in the participants. In other words, they may have ranked their attitude, subjective norms, perceived behaviour control and intention to change thinking patterns highly because they believed that was the *right thing to do*. However, beliefs about what one thinks important others think he or she *ought to do* is captured in the construct of subjective norms (i.e., normative beliefs; Ajzen, 1991). Therefore, it is likely that social desirability would cause a spike particularly in mean scores on subjective norms and/or ceiling effects in all scores, neither of which occurred. In fact, subjective norms was consistently a non-significant predictor of change in the RCT. That said, it would be useful in future studies to include a measure of social desirability to rule out this construct as a confound.

Another relationship factor that may have contributed significantly to the intervention effect (Studies 2 and 3) is the therapeutic alliance between group members and the group

facilitator. The therapeutic alliance has consistently been shown to be an important predictor of psychotherapy outcomes, regardless of the modality (Lambert & Barely, 2001). It has also been shown to be a significant predictor of outcomes in a meta-analysis of CBT trials (Horvath, 2001). Especially in CBT trials, the therapeutic alliance is one of the most important predictors of outcomes in the early stages of treatment (Horvath, 2001). Therefore, the participants could have developed an alliance with their facilitator. Again, this would likely show up in my data as ceiling effects and, especially, as consistently higher mean scores on TPB factors at post-intervention for the experimental group (compared to control), particularly in subjective norms because of its emphasis on beliefs about important others. Such was not the case, as the TPB variables were shown to vary in change and importance across studies. That said, future studies on this workshop should include a measure of therapeutic alliance to rule out this variable as a confound.

Finally, what about the participant characteristics? Especially those that influence cognitions? For instance, gender influences both the propensity for negative thinking patterns *and* one's intentions to engage in psychotherapy (Jaycox, et al., 2006; Nolen-Hoeksema, 1991). Although this study did not control for gender effects, only a handful of inconsistent mean-differences by gender were found among the many outcome variables in Study 3, which I attributed to type 1 error. In future studies, it would be important to examine gender effects, but limitations of this pilot work, such as the overwhelming female majority of participants and small sample sizes in intervention studies to explore many outcomes (i.e., too much splitting up of limited variance) prevented me from doing this. Similarly, one could explore the role of other cognitive processes, for example executive functions, in cognitive antecedents of intention. For instance, working memory and attention bias have both been identified as risk factors for

depression (De Raedt & Koster, 2010). However, participant characteristics, such as gender and executive functioning (among many others), are postulated by Ajzen (2011) to be distal factors that influence the cognitive antecedents. Thus, variance attributed to these factors would be “eaten up” by TPB antecedents in the prediction of intention (i.e., pre-existing affect). Regardless of the many possible competing and supplementary predictors that could have been added, this series of studies aimed to use a formal and well-established model of behaviour change to help our understanding of mechanisms of change in prevention. Once such clarity has been established, researchers can then turn their attention to distal factors that influence the TPB-CBT hybrid model.

**Program outcomes.** Perceived behaviour control consistently displayed intervention effects across Studies 2 and 3 and across target behaviours (positive and negative thinking). Study 2 (open trial, no control group) also demonstrated a pre-post improvement in positive affect; whereas, Study 3 (RCT) demonstrated a trend towards improvement for the intervention group (over waitlist control) in positive affect. In the RCT, the intervention group also experienced significantly greater improvements in all TPB constructs related to “reducing negative thinking” (except descriptive norms), perceived behaviour control related to “increasing positive thinking” and positive automatic thoughts, compared to the control group. The findings were equivalent, regardless of facilitator (clinical psychology doctoral student versus trained undergraduate student).

Although it has not been studied previously, it is not surprising that a mostly CBT-based program could influence TPB variables. CBT protocols emphasize psychoeducation, which should improve one’s expectations that this intervention is effective (attitude). Group-based programs normalize one’s experience of psychological struggle and members can model skill-

uptake, thus, improving subjective norms. Finally, CBT has a strong focus on teaching and practicing skills, which should improve one's sense of capacity to use these skills (perceived behaviour control). Many of these interventions in CBT-based prevention programs are similar to those used in TPB interventions (Michie, 2005; Webb & Sheeran, 2006). Similarly, the ability of the "Start Making a Change" program to demonstrate consistent improvement in perceived behaviour control across studies and behaviour targets is essential, as RCTs of CBT programs support the importance of a sense of self-efficacy as a predictor and mediator of treatment outcomes (Dozois, et al., 2014; Renaud, Russell, & Myhr, 2014; Van der Zanden, et al., 2014).

The participants in the "Start Making a Change" program also experienced increased positive automatic cognitions with intervention. Positive thinking processes (or lack thereof) have been implicated both as a risk factor to the onset of depression (Hayden, et al., 2014; Taylor & Ingram, 1999) and as a target for change in CBT programs that influenced symptom remission (Dozois, et al., 2009; Quilty, et al., 2014). Some research has demonstrated that change in positive automatic thoughts, in particular, was a *stronger* predictor of CBT outcomes than changes in negative thinking (Garamoni, et al., 1992; Shiraishi, 2005.) The positive psychology literature also places an emphasis on positive psychological processes and the promotion of mental well-being. Depressed individuals who practice gratitude exercises, which arguably also focus on increasing positive thoughts, experienced decreases in depressive symptoms (Emmons & McCullough, 2003). Such evidence is consistent with Fredrickson's (2001) Broaden-and-Built Theory, which states that the experience of positive emotions builds up a person's internal resources to cope with stressors. Such internal resources include flexible, creative, and positive thinking and having these resources allows a person to be open to new information and alternate explanations of stressors. This capacity to be open to alternate explanations besides those

generated by negative automatic thoughts is a major target in virtually all CBT protocols and thus, an important outcome for prevention programs as well.

In contrast, the “Start Making a Change” program did not significantly affect negative thinking patterns. There are several potential explanations for this finding. Perhaps this brief intervention does not provide a sufficient “dose” of negative thought-change strategies or these strategies are “watered down” by positive thinking strategies. Conversely, many CBT trials have demonstrated negative thinking to be a non-significant predictor of change (Garratt, et al., 2007). In addition, these participants were not selected for high rates of negative thinking; thus, perhaps base rates were too low to be amenable to change. Also, I did not prime sad mood in my participants, which has been shown to be essential to “unleash” negative thinking processes as a risk factor for depression (Mezulis, Shibley Hyde, & Abramson, 2006). Finally, although negative thinking was not affected, TPB antecedents and intention to reduce negative thinking were improved with intervention. As will be discussed below, dismantling studies will be needed to tease apart positive and negative cognitive processes as targets for prevention. It is fair to say, given the above-mentioned findings, that the “Start Making a Change” program influences both forms of cognitive processes, either directly or indirectly; thus, it may be helpful to incorporate thought-change strategies for both types of thoughts in prevention programs.

### **Limitations and Future Research Directions**

There are several limitations to consider when interpreting this research, many of which are characteristic of pilot work. First, these studies were composed of a convenience sample of university students from the psychology subject pool. Therefore, other than being at risk by virtue of being university students, these students may not experience risk factors to a sufficient degree to find large effects. Conversely, students may have self-selected into this study *because*

they are struggling with depression or depressive symptoms; thus, they may need a larger dose of treatment to produce effects. In the future, I would like to pre-screen students for mental illness and perhaps complete studies on high-risk university students. For instance, Seligman and colleagues (2007) recruited intervention samples for their depression prevention program by screening for high levels of pessimistic explanatory style. Similarly, the students may have self-selected to these studies, particularly the intervention studies, due to experiencing high readiness for change, which would reduce effects. Given that ceiling effects were limited for these studies, this is not a great concern. However, it would help to pre-screen for readiness to change in future studies and incorporate this as a covariate in analyses.

Other participant characteristics that were not considered in these analyses that would be important to consider in future work are sex, previous experience with mental illness and psychological and/or psychiatric services, and social desirability bias (as mentioned above). Given the preliminary nature of this work, I opted to focus analyses on fundamental theoretical outcomes. Further splitting groups by sex, etc., may have significantly reduced power to detect intervention effects. Typically in program development research, foundational trials are completed prior to more fine-grained studies that examine the “what works best for whom.” I designed this series of studies to begin a similar trajectory. That said, it is important to consider our formal theoretical model in choosing variables to examine. Ajzen (2011) articulates that many participant characteristics would be considered as distal factors in TPB (i.e., sex, propensity to please others, etc.) and would affect intention indirectly by influencing one’s beliefs and subsequently attitude, subjective norms, and perceived behaviour control.

Finally, as previously mentioned, although I focused on aspects of cognitive change for my prevention model and program, there are a mix of positive thinking enhancement and

negative thinking reduction strategies in this workshop. Thus, it is difficult to answer questions about the relative importance of using clinical or positive psychology frameworks when developing a brief intervention. This workshop is also mostly based on CBT strategies and thus may not be a holistic test of positive psychology interventions. However, this work *does* allow one to compare how TPB functions depending the behaviour target of positive or negative thinking. It would be important to conduct dismantling studies in the future, where researchers compare a “positive thinking” program to a “negative thinking” program and extend further to determining exactly how few interventions are necessary to maximize the cost-benefit ratio of intervention. That said, this work has moved us closer in the direction of minimizing prevention programs as most of its peer depression prevention programs include a myriad of techniques and resemble depression *treatment* protocols (Horowitz & Garber, 2006).

### **Implications**

**Theory and methodology.** Despite calls from various researchers to both conduct mechanism research in prevention programming and to integrate CBT and TPB theory in research, this series of research is among the first to accomplish these tasks (Hobbis & Sutton, 2005; Sutton, 2007). These studies have taken us several important steps towards improving mechanism of change literature using a formal model of health behaviour change. First, I successfully developed and tested two psychometrically sound measures of the TPB constructs in regards to changing thinking patterns, which allowed me to examine relationships among the TPB constructs and CBT-related constructs of interest (negative and positive automatic thinking). Although, at this time I am unable to assess a full mechanism of change model that integrates CBT and TPB, I was able to set the stage for this future work by developing the necessary measures and a new, focused, *brief*, and low-cost CBT-based depression prevention

program. The program's focus on thought change, without other interventions that are theoretically different, for instance, relaxation and behaviour activation, will also facilitate future mechanism of change work in prevention. In addition, I took initial steps towards resolving the debate of which framework to focus on in developing interventions, clinical psychology (i.e., depression prevention) or positive psychology (i.e., mental health promotion). Although, this series of studies does not provide definitive answers to this question, it is pioneering work in that both frameworks are incorporated into the same study. Future work will demand dismantling studies where researchers can compare directly positive psychology interventions to clinical psychology interventions (i.e., CBT in this case) to directly answer this question. Finally, this preliminary evidence suggests that there is utility in incorporating a formal health-behaviour change model, in this case, TPB, to help us understand client/participant readiness to engage in prevention interventions. Such work could easily be extended and tested in clinical trials for CBT for major depressive disorder, on the uptake of other CBT skills (behaviour activation), and in the engagement in other psychotherapeutic processes more broadly.

**Intervention/prevention and policy.** Brief, low-cost depression prevention programs that are easy to disseminate are desperately needed to fight back against the growing rates of depressive disorders on university campuses. The potential fallout of the experience of chronic depression for any university student can range from increased academic burden to academic failure, dropout, and even suicide; therefore, depression onset must be avoided when at all possible (Eisenberg, et al., 2007). The "Start Making a Change" depression prevention program is a very brief (two-week) intervention that effectively increases motivational antecedents of change necessary to prevent depression and to promote positive cognitive processes. Such positive cognitive change is important, as aspects of positive thinking predict depression onset

and depressive symptom remission (Hayden, et al., 2006; Dozois, et al., 2014). Furthermore, paraprofessionals can be trained to successfully implement this intervention to the standard of a senior, clinical psychology doctoral student. As there are insufficient numbers of CBT-trained professionals to provide these services, it is important to develop programs where high levels of expertise are not required in order to ease broad dissemination on university campuses (Cuijpers, et al., 2013; Voekler, 2003). Even the somewhat small effects of this brief intervention would have a large impact over university campus-wide dissemination. Given the limited resources required to run this intervention, benefits seem to clearly outweigh the costs of NOT preventing depressive episode onset in this population. If a university was unable to provide this workshop to all students, such an intervention could easily be incorporated into a stepped-care model. The students could self-select or be screened to participate in the workshop and the workshop could alert students to more intensive supports available on campus if needed. In fact, anecdotally, I incorporated a campus psychological service resource list into Studies 2 and 3 and students reported to me that it was helpful for next steps. Finally, this brief format has potential to be translated to focus on the prevention of other disorders that run rampant in university student populations, such as anxiety.

### **Conclusion**

In this series of studies, I have successfully developed a hybrid theory of CBT and a formal model of health-behaviour change, TPB, to help improve understanding of mechanisms of change in depression prevention programs. I have also developed an brief prevention program that successfully modifies both TPB and CBT indicators of change in the short term. Such work has the potential to help prevent depression onset in the high-risk population of university students.

**References (General Introduction and Discussion)**

- Abramson, L.Y., Metalsky, G.I., & Alloy, L.B. (1989). Hopelessness depression: A theory-based subtype of depression. *Psychological Review*, *96*(2), 358-372. doi:10.1037//0033-295X.96.2.358
- Adlaf, E. M., Gliksman, L., Demers, A., & Newton-Taylor, B. (2001). The prevalence of elevated psychological distress among canadian undergraduates: Findings from the 1998 Canadian campus survey. *Journal of American College Health*, *50*(2), 67–72. doi: 10.1080/07448480109596009
- Ajzen, Icek. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, *50*(2), 179–211. doi:10.1016/0749-5978(91)90020-T
- Ajzen, Icek. (2011). The theory of planned behaviour: Reactions and reflections. *Psychology & Health*, *26*(9), 1113–1127. doi: 10.1080/08870446.2011.613995
- Ajzen, Icek & Madden, T. (1985). From intentions to action: A theory of planned behavior. In J. Kuhl & J. Beckmann (Eds.), *Action Control* (pp. 11-39). Springer Berlin Heidelberg: Berlin.
- Alloy, L. B., Black, S. K., Young, M. E., Goldstein, K. E., Shapero, B. G., Stange, J. P., ... Abramson, L. Y. (2012). Cognitive vulnerabilities and depression versus other psychopathology symptoms and diagnoses in early adolescence. *Journal of Clinical Child & Adolescent Psychology*, *41*(5), 539–560. doi: 10.1080/15374416.2012.703123
- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Arlington, VA: American Psychiatric Publishing.
- Armitage, C. J., & Conner, M. (2001). Efficacy of the theory of planned behaviour: A meta-analytic review. *British Journal of Social Psychology*, *40*(4), 471–499.

doi:10.1348/014466601164939

- Bandura, A. (1982). Self-efficacy mechanism in human agency. *American Psychologist*, 37(2), 122–147. doi:10.1037/0003-066X.37.2.122
- Baranowski, T. (2005). Integration of two models, or dominance of one? *Journal of Health Psychology*, 10(1), 19-21. doi:10.1177/1359105305048550
- Beck, A. T. (1963). Thinking and depression: I. idiosyncratic content and cognitive distortions. *Archives of General Psychiatry*, 9(4), 324-333.  
doi:10.1001/archpsyc.1963.01720160014002
- Beck, A. T. (1964). Thinking and depression: II. theory and therapy. *Archives of General Psychiatry*, 10(6), 561-571. doi:10.1001/archpsyc.1964.01720240015003
- Beck, A. T. (2008). The evolution of the cognitive model of depression and its neurobiological correlates. *The American Journal of Psychiatry*, 165(8), 969–977.  
doi:10.1176/appi.ajp.2008.08050721
- Beck, A. T., & Dozois, D. J. A. (2011). Cognitive therapy: Current status and future directions. *Annual Review of Medicine*, 62(1), 397–409. doi: 10.1146/annurev-med-052209-100032
- Beck, A. T. Rush, J.A., Shaw, B.F., & Emery, G. (1979). *Cognitive Therapy of Depression*. New York: Guilford Press.
- Christopher, M. S., Jacob, K. L., Neuhaus, E. C., Neary, T. J., & Fiola, L. A. (2009). Cognitive and behavioral changes related to symptom improvement among patients with a mood disorder receiving intensive cognitive-behavioral therapy. *Journal of Psychiatric Practice*, 15(2), 95–102. doi: 10.1097/01.pra.0000348362.11548.5f
- Cohen, J. (1992). A power primer. *Psychological bulletin*, 112(1), 155-159. doi: 10.1037/0033-2909.112.1.155

- Coie, J. D., Watt, N. F., West, S. G., Hawkins, J. D., Asarnow, J. R., Markman, H. J., ... & Long, B. (1993). The science of prevention: a conceptual framework and some directions for a national research program. *American Psychologist*, *48*(10), 1013-1022. doi: 10.1037/0003-066X.48.10.1013
- Collins, K. A., Westra, H. A., Dozois, D. J., & Burns, D. D. (2004). Gaps in accessing treatment for anxiety and depression: Challenges for the delivery of care. *Clinical Psychology Review*, *24*(5), 583–616. doi: 10.1016/j.cpr.2004.06.001
- Cuijpers, P., Berking, M., Andersson, G., Quigley, L., Kleiboer, A., & Dobson, K. S. (2013). A meta-analysis of cognitive-behavioural therapy for adult depression, alone and in comparison with other treatments. *Canadian Journal of Psychiatry. Revue Canadienne de Psychiatrie*, *58*(7), 376–85.
- Cuijpers, P., van Straten, A., Smit, F., Mihalopoulos, C., & Beekman, A. (2008). Preventing the onset of depressive disorders: a meta-analytic review of psychological interventions. *The American Journal of Psychiatry*, *165*(10), 1272–1280. doi:10.1176/appi.ajp.2008.07091422
- Deitweiler, J.B., & Whisman, M.A. (1999). The role of homework assignments in cognitive therapy for depression: potential methods for enhancing adherence. *Clinical Psychology: Science and Practice*, *6*(3), 267-282. doi: 10.1093/clipsy.6.3.267
- De Raedt, R., & Koster, E. H. W. (2010). Understanding vulnerability for depression from a cognitive neuroscience perspective: A reappraisal of attentional factors and a new conceptual framework. *Cognitive, Affective & Behavioral Neuroscience*, *10*(1), 50–70. doi: 10.3758/CABN.10.1.50
- Dozois, D. J. A., Bieling, P. J., Evraire, L. E., Patelis-Siotis, I., Hoar, L., Chudzik, S., ... Westra,

- H. A. (2014). Changes in core beliefs (early maladaptive schemas) and self-representation in cognitive therapy and pharmacotherapy for depression. *International Journal of Cognitive Therapy*, 7(3), 217–234. doi: 10.1521/ijct.2014.7.3.217
- Dozois, D. J. A., J., Bieling, P. J., Patelis-Siotis, I., Hoar, L., Chudzik, S., McCabe, K., & Westra, H. A. (2009). Changes in self-schema structure in cognitive therapy for major depressive disorder: A randomized clinical trial. *Journal of Consulting and Clinical Psychology*, 77(6), 1078–1088. doi: 10.1037/a0016886
- Durlak, J. A., Weissberg, R. P., Dymnicki, A. B., Taylor, R. D., & Schellinger, K. B. (2011). The impact of enhancing students' social and emotional learning: A meta-analysis of school-based universal interventions. *Child development*, 82(1), 405-432.
- Eisenberg, D., Gollust, S. E., Golberstein, E., & Hefner, J. L. (2007). Prevalence and correlates of depression, anxiety, and suicidality among university students. *The American Journal of Orthopsychiatry*, 77(4), 534–542. doi:10.1037/0002-9432.77.4.534
- Emmons, R. A., & McCullough, M. E. (2003). Counting blessings versus burdens: an experimental investigation of gratitude and subjective well-being in daily life. *Journal of personality and social psychology*, 84(2), 377. doi: 10.1037/0022-3514.84.2.377
- Fishbein, M., & Ajzen, I. (2011). *Predicting and Changing Behavior*. USA: Taylor & Francis.
- Fournier, J. C., DeRubeis, R. J., Hollon, S. D., Gallop, R., Shelton, R. C., & Amsterdam, J. D. (2013). Differential change in specific depressive symptoms during antidepressant medication or cognitive therapy. *Behaviour Research and Therapy*, 51(7), 392–398. doi: 10.1016/j.brat.2013.03.010
- Fredrickson, B. L. (2001). The role of positive emotions in positive psychology: The broaden-and-build theory of positive emotions. *American psychologist*, 56(3), 218 - 226. doi:

10.1037/0003-066X.56.3.218

- Furlong, M., & Oei, T. P. S. (2002). Changes to automatic thoughts and dysfunctional attitudes in group CBT for depression. *Behavioural and Cognitive Psychotherapy, 30*(03), 351-360. doi:10.1017/S1352465802003107
- Garamoni, G. L., Reynolds III, C. F., Thase, M. E., Frank, E., & Fasiczka, A. L. (1992). Shifts in affective balance during cognitive therapy of major depression. *Journal of Consulting and Clinical Psychology, 60*(2), 260–266. doi: 10.1037/0022-006X.60.2.260
- Garratt, G., Ingram, R. E., Rand, K. L., & Sawalani, G. (2007). Cognitive processes in cognitive therapy: Evaluation of the mechanisms of change in the treatment of depression. *Clinical Psychology: Science and Practice, 14*(3), 224–239. doi: 10.1111/j.1468-2850.2007.00081.x
- German, R. E., Lorenzo-Luaces, L., & DeRubeis, R. J. (2014). Patient's attributions about symptom improvement in CBT for depression: Development of a rating system and an initial test of validity. *International Journal of Cognitive Therapy, 7*(3), 272–286. doi: 10.1521/ijct.2014.7.3.272
- Godin, G., Gagné, C., & Sheeran, P. (2004). Does perceived behavioural control mediate the relationship between power beliefs and intention? *British Journal of Health Psychology, 9*(Pt 4), 557–68. doi:10.1348/1359107042304614
- Hayden, E. P., Hankin, B. L., Mackrell, S. V. M., Sheikh, H. I., Jordan, P. L., Dozois, D. J. A., ... Badanes, L. S. (2014). Parental depression and child cognitive vulnerability predict children's cortisol reactivity. *Development and Psychopathology, 26*(Special Issue 4pt2), 1445–1460. doi: 10.1017/S0954579414001138
- Hayden, E. P., Klein, D. N., Durbin, C. E., & Olino, T. M. (2006). Positive emotionality at age 3

- predicts cognitive styles in 7-year-old children. *Development and Psychopathology*, *null*(02), 409–423. doi: 10.1017/S0954579406060226
- Hobbis, I., & Sutton, S. (2005). Are techniques used in cognitive behaviour therapy applicable to behaviour change interventions based on the theory of planned behaviour? *Journal of Health Psychology*, *10*(1), 7-18. doi:10.1177/1359105305048549
- Horowitz, J.L., & Garber, J. (2006). The prevention of depressive symptoms in children and adolescents: A meta-analytic review. *Journal of Consulting and Clinical Psychology*, *74*(3), 486-503. doi:10.1037/0022-006X.74.3.401
- Horvath, A. O. (2001). The alliance. *Psychotherapy: Theory, research, practice, training*, *38*(4), 365. doi: 10.1037/0033-3204.38.4.365
- Huta, V., & Waterman, A. S. (2014). Eudaimonia and its distinction from hedonia: Developing a classification and terminology for understanding conceptual and operational definitions. *Journal of Happiness Studies*, *15*(6), 1425-1456. doi: 10.1007/s10902-013-9485-0
- Hyland, P. E., McLaughlin, C. G., Boduszek, D., & Prentice, G. R. (2012). Intentions to participate in counselling among front-line, at-risk Irish government employees: An application of the theory of planned behaviour. *British Journal of Guidance & Counselling*, *40*(3), 279–299. doi:10.1080/03069885.2012.681769
- Hysenbegasi, A., Hass, S. L., & Rowland, C. R. (2005). The impact of depression on the academic productivity of university students. *The Journal of Mental Health Policy and Economics*, *8*(3), 145–51.
- Ingram, R. E., & Ritter, J. (2000). Vulnerability to depression: Cognitive reactivity and parental bonding in high-risk individuals. *Journal of Abnormal Psychology*, *109*(4), 588–596. doi:

10.1037/0021-843X.109.4.588

Jacobson, N. S., Dobson, K. S., Truax, P. A., Addis, M. E., Koerner, K., Gollan, J. K., ... Prince, S. E. (1996). A component analysis of cognitive-behavioral treatment for depression.

*Journal of Consulting and Clinical Psychology, 64*(2), 295–304.

Jane-Llopis, E. (2003). Predictors of efficacy in depression prevention programmes: Meta-analysis. *The British Journal of Psychiatry, 183*(5), 384–397. doi: 10.1192/bjp.183.5.384

Jaycox, L. H., Asarnow, J. R., Sherbourne, C. D., Rea, M. M., LaBorde, A. P., & Wells, K. B. (2006

). Adolescent primary care patients' preferences for depression treatment. *Administration and Policy in Mental Health and Mental Health Services Research, 33*(2), 198-207. doi:

10.1007/s10488-006-0033-7

Joormann, J., Talbot, L., & Gotlib, I. H. (2007). Biased processing of emotional information in girls at risk for depression. *Journal of Abnormal Psychology, 116*(1), 135–143. doi:

10.1037/0021-843X.116.1.135

Kazdin, A. E. (2007). Mediators and mechanisms of change in psychotherapy research. *Annual Review of Clinical Psychology, 3*(1), 1–27.

doi:10.1146/annurev.clinpsy.3.022806.091432

Kwon, S., & Oei, T.P.S. (2003). Cognitive change processes in a group cognitive behavior therapy of depression. *Journal of Behavior Therapy and Experimental Psychiatry, 34*(1),

73-85. doi: 10.1016/S0005-7916(03)00021-1

Ladouceur, C. D., Dahl, R. E., Williamson, D. E., Birmaher, B., Ryan, N. D., & Casey, B. J. (2005). Altered emotional processing in pediatric anxiety, depression, and comorbid

anxiety-depression. *Journal of Abnormal Child Psychology, 33*(2), 165–177. doi:

10.1007/s10802-005-1825-z

- Lambert, M. J., & Barley, D. E. (2001). Research summary on the therapeutic relationship and psychotherapy outcome. *Psychotherapy: Theory, research, practice, training*, 38(4), 357. doi: 10.1037/0033-3204.38.4.357
- Mackrell, S. V. M., Johnson, E. M., Dozois, D. J. A., & Hayden, E. P. (2013). Negative life events and cognitive vulnerability to depression: Informant effects and sex differences in the prediction of depressive symptoms in middle childhood. *Personality and Individual Differences*, 54(4), 463–468. doi: 10.1016/j.paid.2012.09.007
- McEachan, R. R. C., Conner, M., Taylor, N. J., & Lawton, R. J. (2011). Prospective prediction of health-related behaviours with the theory of planned behaviour: A meta-analysis. *Health Psychology Review*, 5(2), 97–144. doi: 10.1080/17437199.2010.521684
- Merry, S. N., & Spence, S. H. (2007). Attempting to prevent depression in youth: a systematic review of the evidence. *Early Intervention in Psychiatry*, 1(2), 128–137. doi:10.1111/j.1751-7893.2007.00030.x
- Mezulis, A. H., Hyde, J. S., & Abramson, L. Y. (2006). The developmental origins of cognitive vulnerability to depression: Temperament, parenting, and negative life events in childhood as contributors to negative cognitive style. *Developmental Psychology*, 42(6), 1012–1025. doi: 10.1037/0012-1649.42.6.1012
- Michie, S. (2005). Is cognitive behaviour therapy effective for changing health behaviours? Commentary on Hobbis and Sutton. *Journal of Health Psychology*, 10(1), 37-43. doi:10.1177/1359105305048553
- Mikolajczyk, R. T., Maxwell, A. E., Naydenova, V., Meier, S., & El Ansari, W. (2008). Depressive symptoms and perceived burdens related to being a student: Survey in three

- European countries. *Clinical Practice and Epidemiology in Mental Health : CP & EMH*, 4, 19. doi:10.1186/1745-0179-4-19
- Mo, P. K. H., & Mak, W. W. S. (2009). Help-seeking for mental health problems among Chinese: the application and extension of the theory of planned behavior. *Social Psychiatry and Psychiatric Epidemiology*, 44(8), 675–684. doi:10.1007/s00127-008-0484-0
- Nolen-Hoeksema, S. (1991). Responses to depression and their effects on the duration of depressive episodes. *Journal of abnormal psychology*, 100(4), 569. doi: 10.1037/0021-843X.100.4.569
- Ostrom, I., Franke, B., Vasquez, A. A., Rinck, M., Tendolkar, I., Verhagen, M., ... & Janzing, J. G. (2013). Never-depressed females with a family history of depression demonstrate affective bias. *Psychiatry research*, 205(1), 54-58. doi: 10.1016/j.psychres.2012.08.004
- Prochaska, J. O., & DiClemente, C. C. (2005). The transtheoretical approach. In J.C. Norcross & M.R. Goldfried (Eds.), *Handbook of Psychotherapy Integration, Second Edition* (pp. 147-171). New York: Oxford University Press.
- Quilty, L. C., Dozois, D. J. A., Lobo, D. S. S., Ravindran, L. N., & Bagby, R. M. (2014). Cognitive structure and processing during cognitive behavioral therapy vs. pharmacotherapy for depression. *International Journal of Cognitive Therapy*, 7(3), 235–250. doi: 10.1521/ijct.2014.7.3.235
- Quilty, L. C., McBride, C., & Bagby, R. M. (2008). Evidence for the cognitive mediational model of cognitive behavioural therapy for depression. *Psychological Medicine*, 38(11), 1531–41. doi:10.1017/S0033291708003772

- Rawal, A., Collishaw, S., Thapar, A., & Rice, F. (2013). A direct method of assessing underlying cognitive risk for adolescent depression. *Journal of Abnormal Child Psychology*, *41*(8), 1279–1288. doi: 10.1007/s10802-013-9760-x
- Renaud, J., Russell, J. J., & Myhr, G. (2014). Predicting who benefits most from cognitive-behavioral therapy for anxiety and depression.
- Rivis, A., & Sheeran, P. (2003). Descriptive norms as an additional predictor in the theory of planned behaviour: A meta-analysis. *Current Psychology*, *22*(3), 218–233.
- Schomerus, G., Matschinger, H., & Angermeyer, M. C. (2009). Attitudes that determine willingness to seek psychiatric help for depression: a representative population survey applying the Theory of Planned Behaviour. (1). *Psychological Medicine*, *39*(11), 1855–65. doi:10.1017/S0033291709005832
- Seeds, P. M., & Dozois, D. J. A. (2010). Prospective evaluation of a cognitive vulnerability-stress model for depression: the interaction of schema self-structures and negative life events. *Journal of Clinical Psychology*, *66*(12), 1307–1323. doi: 10.1002/jclp.20723
- Seligman, M.E.P., Schulman, P., & Tryon, A.M. (2007). Group prevention of depression and anxiety symptoms. *Behaviour Research and Therapy*, *45*(6), 1111-1126.  
doi:10.1016/j.brat.2006.09.010
- Sheeran, P., Harris, P.R., Epton, T. (2014). Does heightening risk appraisals change people's intentions and behavior? A meta-analysis of experimental studies.  
*Psychological Bulletin*, *140*(2), 511-543. doi: 10.1037/a0033065
- Shiraishi, S. (2005). Cognitive therapy for reducing and preventing depressive moods: A practical study with undergraduates. *Japanese Journal of Educational Psychology*, *53*(2), 252 - 262.

- Skogstad, P., Deane, F. P., & Spicer, J. (2006). Social-cognitive determinants of help-seeking for mental health problems among prison inmates. *Criminal Behaviour and Mental Health : CBMH*, *16*(1), 43–59. doi:10.1002/cbm.54
- Strunk, D. R., Brotman, M. A., & DeRubeis, R. J. (2010). The process of change in cognitive therapy for depression: Predictors of early inter-session symptom gains. *Behaviour Research and Therapy*, *48*(7), 599–606. doi: 10.1037/a0029281
- Stephoe, A., Tsuda, A., & Tanaka, Y. (2007). Depressive symptoms, socio-economic background, sense of control, and cultural factors in university students from 23 countries. *International journal of behavioral medicine*, *14*(2), 97-107. doi: 10.1007/BF03004175
- Stice, E., Shaw, H., Bohon, C., Marti, C. N., & Rohde, P. (2009). A meta-analytic review of depression prevention programs for children and adolescents: factors that predict magnitude of intervention effects. *Journal of Consulting and Clinical Psychology*, *77*(3), 486–503. doi:10.1037/a0015168
- Sutton, J.M. (2007). Prevention of depression in youth: A qualitative review and future suggestions. *Clinical Psychology Review*, *27*(5), 552-571. doi:10.1016/j.cpr.2007.01.014
- Tang, T. Z., DeRubeis, R. J., Beberman, R., & Pham, T. (2005). Cognitive changes, critical sessions, and sudden gains in cognitive-behavioral therapy for depression. *Journal of Consulting and Clinical Psychology*, *73*(1), 168–72. doi:10.1037/0022-006X.73.1.168
- Taylor, L., & Ingram, R. E. (1999). Cognitive reactivity and depressotypic information processing in children of depressed mothers. *Journal of Abnormal Psychology*, *108*(2), 202–210. doi: 10.1037/0021-843X.108.2.202
- Van der Zanden, R., Galindo-Garre, F., Curie, K., Kramer, J., & Cuijpers, P. (2014). Online

- cognitive-based intervention for depression: Exploring possible circularity in mechanisms of change. *Psychological Medicine*, *44*(06), 1159–1170. doi: 10.1017/S003329171300175X
- Voelker, R. (2003). Mounting student depression taxing campus mental health services. *JAMA*, *289*(16), 2055-2056. doi:10.1001/jama.289.16.2055
- Vrijzen, J. N., Becker, E. S., Arias-Vásquez, A., van Dijk, M. K., Speckens, A., & van Oostrom, I. (2014). What is the contribution of different cognitive biases and stressful childhood events to the presence and number of previous depressive episodes?. *Psychiatry research*, *217*(3), 134-142. doi: 10.1016/j.psychres.2014.02.033
- Wang, C. E., Halvorsen, M., Eisemann, M., & Waterloo, K. (2010). Stability of dysfunctional attitudes and early maladaptive schemas: A 9-year follow-up study of clinically depressed subjects. *Journal of Behavior Therapy and Experimental Psychiatry*, *41*(4), 389-396. doi: 10.1016/j.jbtep.2010.04.002
- Warmerdam, L., van Straten, A., Jongasma, J., Twisk, J., & Cuijpers, P. (2010). Online cognitive behavioral therapy and problem-solving therapy for depressive symptoms: Exploring mechanisms of change. *Journal of Behavior Therapy and Experimental Psychiatry*, *41*(1), 64–70. doi:10.1016/j.jbtep.2009.10.003
- Webb, C. A., Auerbach, R. P., & DeRubeis, R. J. (2012). Processes of change in CBT of adolescent depression: Review and recommendations. *Journal of Clinical Child & Adolescent Psychology*, *41*(5), 654-665. doi: 10.1080/15374416.2012.704842
- Webb, T.L., & Sheeran, P. (2006). Does changing behavioral intentions engender behavior change? A Meta-Analysis of the Experimental Evidence. *Psychological Bulletin*, *132*(2), 249-268. doi:10.1037/0033-2909.132.2.249

World Health Organization. (2013). *Global action plan for the prevention and control of noncommunicable diseases: 2013-2020*. Retrieved from

[http://www.who.int/nmh/events/ncd\\_action\\_plan/en/](http://www.who.int/nmh/events/ncd_action_plan/en/).

Yan, J., Kong, T., He, Y., Mcwhinnie, C. M., Yao, S., & Xiao, J. (2015). Daily hassles and depression in individuals with cognitive vulnerability to depression: The mediating role of maladaptive cognitive emotion regulation strategies. *Nordic Psychology, 67*(1), 87-100. doi: 10.1080/19012276.2014.957717

Yao, S., Fang, J., Zhu, X., & Zuroff, D. C. (2009). The Depressive Experiences Questionnaire: construct validity and prediction of depressive symptoms in a sample of Chinese undergraduates. *Depression and anxiety, 26*(10), 930-937.

doi: 10.1002/da.20465

**Appendix A: Measures**

**Measures for Studies 1 and 2**

**Demographics.**

Age: \_\_\_\_\_

Year university: \_\_\_\_\_

Gender:        Male     Female

First Language: \_\_\_\_\_

E-mail            address: \_\_\_\_\_

**Intentions to think positive (theory of planned behavior questionnaire)**

*Instructions*

Please tell us what you think about balancing your thoughts and the skills you learned today to do this. There are no right or wrong answers; we just want to know your opinions about trying to think more positively when you have negative thoughts. To answer the questions, circle the number that best matches how much you agree with the sentence above the numbers. Lower numbers mean that you agree less and higher numbers mean that you agree more. Please circle **ONLY ONE** number.

Thinking more positively when I have negative thoughts would help me feel better when I am sad.

Disagree : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Agree

Having skills in positive thinking will help me think more positively when I am having negative thoughts.

Disagree : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Agree

Thinking more positively will be

Unhelpful : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Helpful

Thinking more positively when I have negative thoughts is

Not Important : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Important

My friends would think its a

Bad idea : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Good idea to think more positively.

Most of my friends would want to think more positively.

Disagree : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Agree

My classmates who did this workshop with me would expect me to try to think more positively when I have negative thoughts.

False : 1 : 2 : 3 : 4 : 5 : 6 : 7 : True

There are roadSteps to me thinking positively when I have negative thoughts.

False : 1 : 2 : 3 : 4 : 5 : 6 : 7 : True (**reverse score**)

It would be hard for me to think more positively when I have negative thoughts.

False : 1 : 2 : 3 : 4 : 5 : 6 : 7 : True (**reverse score**)

13. I want to think more positively when I have negative thoughts.

False : 1 : 2 : 3 : 4 : 5 : 6 : 7 : True

14. I plan to think more positively when I have negative thoughts

False : 1 : 2 : 3 : 4 : 5 : 6 : 7 : True

15. I will try to think more positively when I have negative thoughts.

False : 1 : 2 : 3 : 4 : 5 : 6 : 7 : True

**Satisfaction questionnaire (Study 2).**

Thank you for participating in the Balancing Your Thoughts Program! We would like to know what you thought of the in-class workshop. Please read the statements below, and place a checkmark (“✓”) next to the answer that you choose.

	<b>Strongly Disagree</b>	<b>Disagree</b>	<b>Not Sure</b>	<b>Agree</b>	<b>Strongly Agree</b>
<b>1. It is hard to think positive.</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>2. I believe that I can change my thoughts from more negative to more positive.</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>3. I was interested in the material being presented</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>4. I participated in the workshop by listening and asking and answering questions</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>5. The next time I think negatively I will try to name it.</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>6. The next time I think negatively I will try to challenge my thought.</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>7. The next time I will use my distraction hierarchy to make myself feel better.</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>8. Overall, I feel I learned a lot from the workshop</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>9. Overall, I am satisfied with this experience</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

### Study 3 Measures

#### Revised Theory of Planned Behaviour (Bradley & Santor, 2013)

Please tell us what you think about balancing your thoughts and the skills you learned today to do this. There are no right or wrong answers; we just want to know your opinions about trying to think more positively when you have negative thoughts. To answer the questions, circle the number that best matches how much you agree with the sentence above the numbers. Lower numbers mean that you agree less and higher numbers mean that you agree more. Please circle **ONLY ONE** number.

(Note: the sub-headings were not visible to participants. It is for the committee's benefit to review how I evaluated each construct.)

#### Attitudes (overall).

Reducing the negative thoughts I have about myself would be...  
 very worthless/very worthwhile  
 very bad for me 1 2 3 4 5 6 7 very good for me  
 unpleasant 1 2 3 4 5 6 7 pleasant

“Spending time and energy it will take to learn the skills to reduce the negative thoughts I have about myself would be...”  
 very worthless 1 2 3 4 5 6 7 very worthwhile  
 very bad for me 1 2 3 4 5 6 7 very good for me  
 very unpleasant 1 2 3 4 5 6 7 very pleasant

#### Attitudes: Behavioral Beliefs.

Reducing my negative thoughts will make me feel better.  
 Very unlikely 1 2 3 4 5 6 7 very likely

Reducing my negative thoughts will make it easier to get through my day and accomplish the things I need to get done.  
 Very unlikely 1 2 3 4 5 6 7 very likely

Reducing my negative thoughts will make it easier to get along with others at work and in my personal life.  
 Very unlikely 1 2 3 4 5 6 7 very likely

In order to get through my day and accomplish the things I need to get done, it will be necessary to reducing my negative thoughts.  
 Very unlikely 1 2 3 4 5 6 7 very likely

In order to get along better with others at work and in my personal life, it will be necessary to reducing my negative thoughts.

Very unlikely 1 2 3 4 5 6 7 very likely

**Attitudes: Outcome Evaluation.**

My being able to reduce my thoughts and feel better is  
bad 1 2 3 4 5 6 7 good

My being able to reduce my thoughts move on with my day is  
bad 1 2 3 4 5 6 7 good

**Subjective Norms: Normative/injunctive beliefs.**

Most people who are important to me think I should *work on* reducing my negative thinking.

strongly disagree 1 2 3 4 5 6 7 strongly agree

Most people who are important to me think reducing my negative thinking would make me feel better.

strongly disagree 1 2 3 4 5 6 7 strongly agree

Most people who are important to me think I *should* reduce my negative thinking

strongly disagree 1 2 3 4 5 6 7 strongly agree

**Subjective Norms: Motivation to Comply.**

When it comes to negative thinking and being upset, I want to do what those who are important to me think I should do.

strongly disagree 1 2 3 4 5 6 7 strongly agree

**Subjective Norms: Descriptive Beliefs.**

Most people reduce their negative thinking when they are upset.

strongly disagree 1 2 3 4 5 6 7 strongly agree

Most people who are important to me reduce their negative thinking when they are upset.

strongly disagree 1 2 3 4 5 6 7 strongly agree

**Perceived Behaviour Control: Self-efficacy.**

I am confident I can reduce my negative thinking

strongly disagree 1 2 3 4 5 6 7 strongly agree

It will be easy for me to learn the skills needed to reduce my negative thinking

strongly disagree 1 2 3 4 5 6 7 strongly agree

**Perceived Behaviour Control: Control beliefs/Controllability.**

I know I will be able to reduce my negative thoughts  
strongly disagree 1 2 3 4 5 6 7 strongly agree

I know I can learn to reduce my negative thoughts  
strongly disagree 1 2 3 4 5 6 7 strongly agree

I can choose to reduce my negative thoughts  
strongly disagree 1 2 3 4 5 6 7 strongly agree

Reducing my negative thoughts is **beyond** my control (REVERSE SCORE)  
strongly disagree 1 2 3 4 5 6 7 strongly agree

**Intentions.**

Over the next few weeks, I want to reduce my negative thoughts  
strongly disagree 1 2 3 4 5 6 7 strongly agree

Over the next few weeks, I will try to reduce my negative thoughts  
strongly disagree 1 2 3 4 5 6 7 strongly agree

Over the next few weeks, I will work on learning the skills needed to reduce my negative thoughts  
strongly disagree 1 2 3 4 5 6 7 strongly agree

Over the next few weeks, I intend to reduce my negative thoughts  
strongly disagree 1 2 3 4 5 6 7 strongly agree

Over the next few weeks, I intend to work on reducing my negative thoughts **every day**  
strongly disagree 1 2 3 4 5 6 7 strongly agree

On a scale from 0 to 10, how likely are you to reduce your negative thoughts in the next month?  
Not at all 1 2 3 4 5 6 7 8 9 10 Definitely

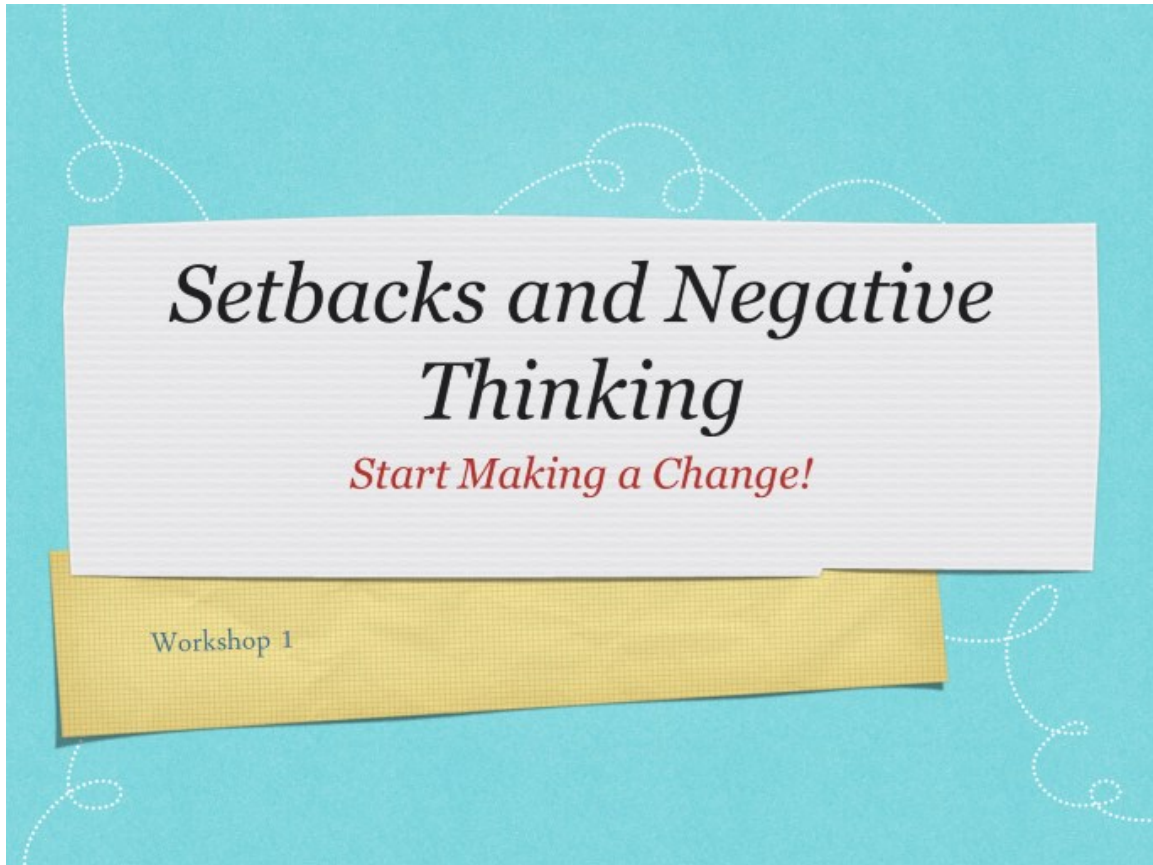
*On a scale from 0 to 10, how likely are you to work on reducing your negative thoughts in the next month?*  
Not at all 1 2 3 4 5 6 7 8 9 10 Definitely

**Past behaviour.**

In the past 6 months, I have tried to reduce my negative thinking.  
Not at all 1 2 3 4 5 6 7 8 9 10 Definitely

In the past 6 months, I was able to reduce my negative thoughts.  
Not at all 1 2 3 4 5 6 7 8 9 10 Definitely

**Appendix B: Intervention Slides**



## Why are we here?

- ▶ Who here has had a setback?
  - ▶ A set back can be something big or small. It could be failing a test, screwing up at work. It could be not passing the tryout for something you really, really wanted. It might be not get a promotion, being told your work is not good enough, being dumped or turned down.
- ▶ Everyone has setbacks
- ▶ What can you do about it?

## Some Trivia

- ▶ **Who am I?** I was rejected from the University of Southern California School of Theater, Film and Television three times. I eventually went to another location, only to drop out to become a director before finishing. 35 years later I finally finished school. I am now a famous director.
- ▶ **Hint:** My best films, had a shark, an extra-terrestrial, and Indiana Jones in it.
- ▶ **Answer:** Steven Spielberg

## Some Trivia

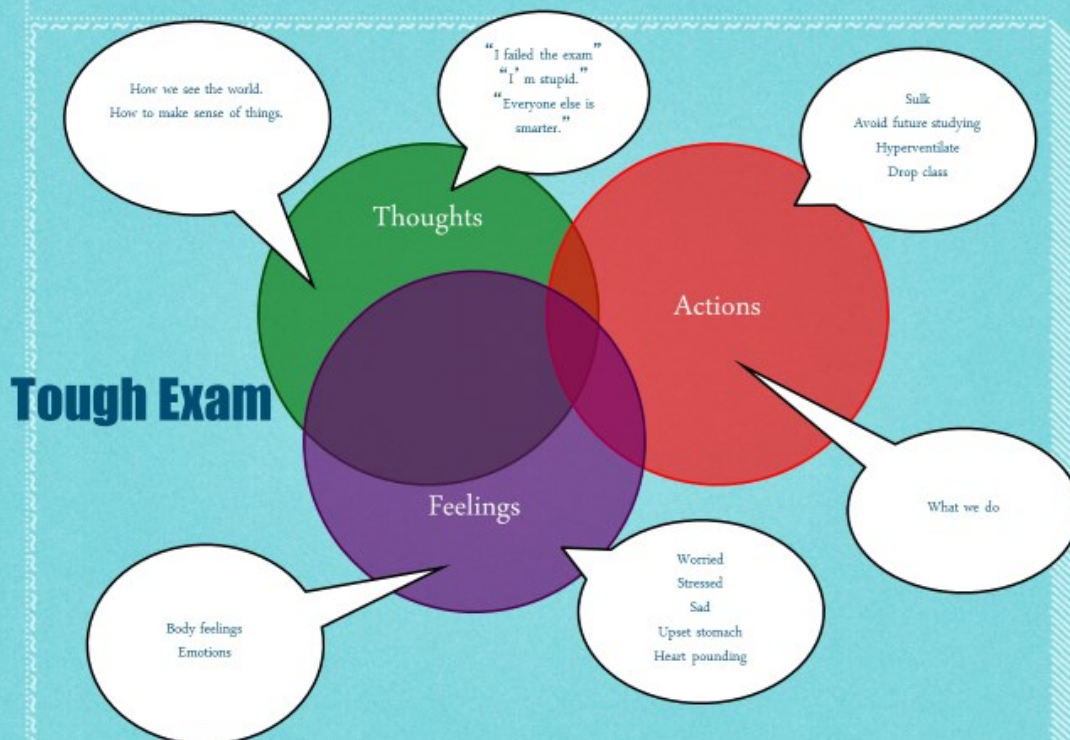
- ▶ **Setback:** I had a rough start. I was fired by a newspaper editor because I "lacked imagination and had no good ideas." Then I started a number of businesses, all of which went bankrupt. Eventually, I started producing animated cartoons.
- ▶ **Hint:** You all watched my cartoons when you were children, such as the Seven Dwarves and Snow White.
- ▶ **Answer:** Walt Disney

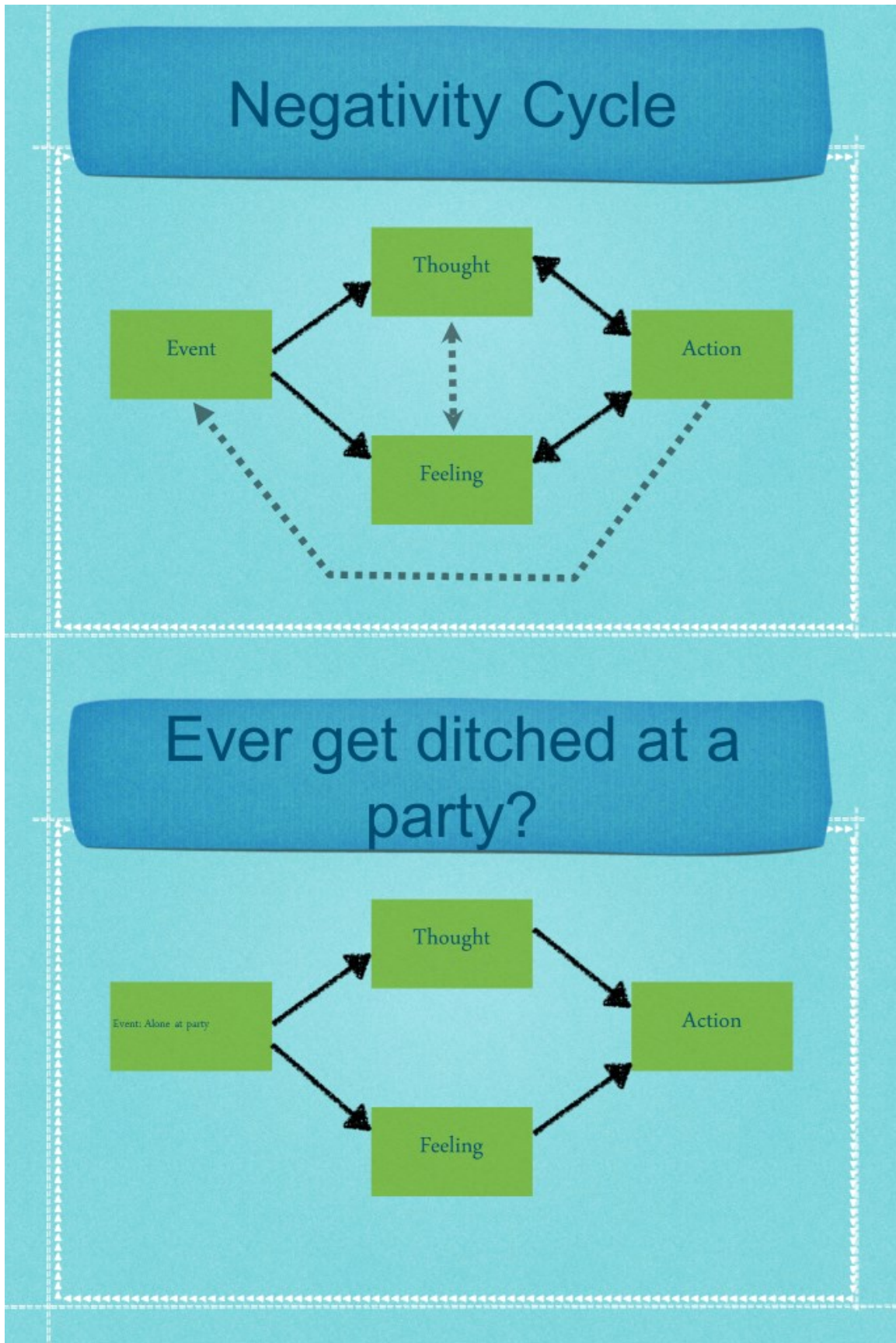
## Some Trivia

- ▶ **Who am I?** I used to be poor and depressed. I was divorced and was raising a child on my own, when I started writing in a cafe. My first book was rejected 31 times before being published.
- ▶ **Hint:** One of the best selling authors of all time. Most of you have read my books.
- ▶ **Answer:** J.K. Rowling

## What's it like to have a setback?

- ▶ What do you do when you have a setback?
- ▶ How do you feel when you have a setback?
- ▶ What do you think when you have a setback?





# Types of thoughts

## Negative Thoughts

(Kristina's example):  
The prof is so unfair.  
He should realize we  
have lots of other things  
to do.

## Positive Thoughts

He's just trying to  
teach us how to  
write big papers

# Types of Negative Thoughts

### Puts downs

(e.g., telling yourself  
you are no good at  
something, calling  
yourself bad names,  
like stupid, dumb  
worthless).

### Taking things personally

(e.g., thinking that a  
poor mark means you  
are a poor student)

### Catastrophic thinking

(e.g., making things  
worse than they  
actually are).

### Hopeless thinking

(e.g., thinking that  
you'll never get  
anything right or  
that you will never  
be good at anything)

### Down-playing success

(e.g., telling yourself  
that something you  
did is really no big  
deal, or that you  
just got lucky or  
that anybody could  
do it).

### Knowing what others think

(e.g., worrying that  
other people think  
you are ugly, stupid,  
or no good at  
anything).

## What's the problem with negative thoughts?

- ▶ Negative thoughts make you start thinking you are stupid, no good, worthless at all things, all the time
- ▶ Negative thoughts make you overestimate bad things
- ▶ Negative thoughts make you underestimate good things
- ▶ Negative thoughts are unhelpful
- ▶ Negative thoughts become automatic, so that you don't even know that it is happening.
- ▶ Positive thoughts are fair to you and help you find solutions to problems
- ▶ Negative thoughts make you stop doing things you used to enjoy.
- ▶ Negative thoughts make you avoid doing things you might want to do.

## Roadblocks to Positive Thinking

- ▶ Feeling stressed out and upset in the moment
- ▶ Thinking negative becomes a habit
- ▶ Being negative seems safer



# Gym Example

```

graph LR
    Event[Event] --> Thought[Thought]
    Event --> Feeling[Feeling]
    Thought --> Action[Action]
    Feeling --> Action
    
```

### Daily Thought Record

Day: \_\_\_\_\_ Month: \_\_\_\_\_ Year: \_\_\_\_\_  
 Day: \_\_\_\_\_ Month: \_\_\_\_\_ Year: \_\_\_\_\_  
 Day: \_\_\_\_\_ Month: \_\_\_\_\_ Year: \_\_\_\_\_

Step 1: Write down the event(s) or thought(s) that triggered your negative thinking.	
Step 2: Write down the entire sequence of thoughts you experienced.	Step 4: Write down a more realistic, fairer way of thinking about what happened.
Step 3: Decide where you would want beyond the facts—where you would have liked to stop your negative thinking. Draw a line at the point where you went beyond the facts.	Step 5: Now write down the fact(s) of the matter, and just the facts.
Step 4: Write down 1 or 2 things that you accomplished today that you felt proud of.	
How many negative thoughts did you have today? No	How many times did you get stuck repeating things? No
Step 5: Record how you felt about yourself today <input type="checkbox"/> -5 very bad <input type="checkbox"/> -4 <input type="checkbox"/> -3 <input type="checkbox"/> -2 <input type="checkbox"/> -1	<input type="checkbox"/> +1 <input type="checkbox"/> +2 <input type="checkbox"/> +3 <input type="checkbox"/> +4 <input type="checkbox"/> +5 very good

© 2003 Debra A. Gentile, Ph.D.

## Questions?

- ▶ Your homework To-Do list is on page 14 of your workbook
- ▶ Workbook: Negativity Cycle (pages 10 - 13)
- ▶ Negative Thoughts Quiz (e-mail)
- ▶ Daily Thought Record, two per day for 7 days
  - ▶ Steps 1 - 3 and accomplishments

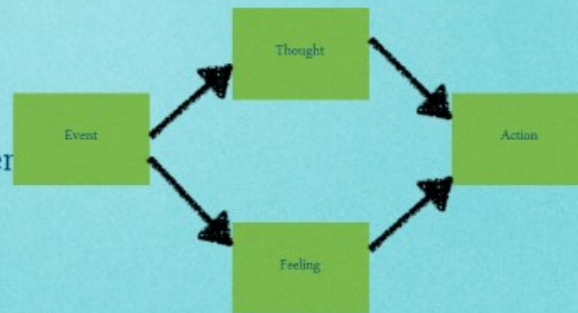
## *Setbacks and Negative Thinking*

*Start Making a Change*

Workshop 2

# Recap

- ▶ Thoughts, feelings, actions
  - influence each other
- ▶ Positive and negative thoughts
- ▶ Counting accomplishments
- ▶ More negative thoughts
- ▶ Roadblocks
- ▶ How did homework go?

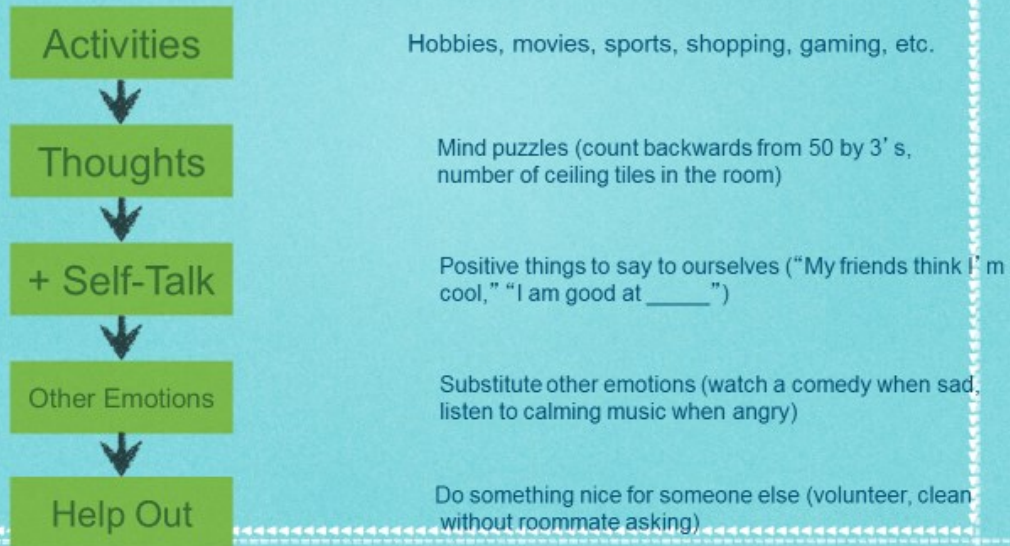


# Controlling our Negative Thoughts

- ▶ Bring the feelings down from 10 to 1.
- ▶ Change behaviour and feelings to change thoughts
- ▶ Name it



# Control Your Thoughts I: Distract Yourself!

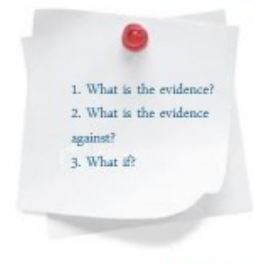


# Control Your Thoughts II: Challenge Negative Thoughts

- ▶ Three questions:
  1. What is the evidence for this thought?
  2. What is the evidence against this thought?
  3. What if?
- ▶ Remember to ask yourself (or a friend) if a good friend would believe you
- ▶ What is a more balanced thought?

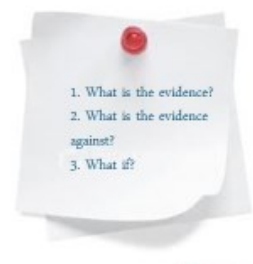


Negative Thought	Evidence For This Thought?	Evidence Against this Thought?	What If? (Worst thing that could happen, can I handle it?)	What would a friend say?
Ex: I will never get this work done	Have lots of other projects due	I have gotten lots of projects done quickly before	I have to set other projects back, supervisor will understand	You get through mountains of work all the time.



### What is a more fair thought?

Negative Thought	Evidence For This Thought?	Evidence Against this Thought?	What If? (Worst thing that could happen, can I handle it?)	What would a friend say?
Ex: I will never get this work done	Have lots of other projects due	I have gotten lots of projects done quickly before	I have to set other projects back, supervisor will understand	You get through mountains of work all the time.



### What is a more fair thought?

# Putting it all Together

- ▶ Step 1: Name it
- ▶ Step 2: Distraction
- ▶ Step 3: A positive thought for each negative thought
- ▶ Step 4: Three questions

**Putting it all Together**

*Scenario: You moved in with your best friend, but it turns out s/he's is very messy. You confront him/her which results in a huge fight and s/he's threatening to move out.*

**STEP 1: Name it**

Name the negative thought \_\_\_\_\_  
 Name the feeling \_\_\_\_\_

**STEP 2: Which Distraction technique(s) will I use?**

1. \_\_\_\_\_ 2. \_\_\_\_\_

**STEP 3: A positive thought for each negative one**

Problem	Negatives	Positives

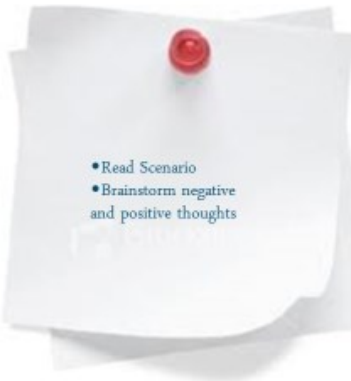
**STEP 4: Fighting Back! Challenging our negative thoughts**

Negative Thought	Evidence For This Thought?	Evidence Against this Thought?	What If? (Worst thing that could happen, can I handle it?)	What would a friend say?

**What is a more fair thought?**

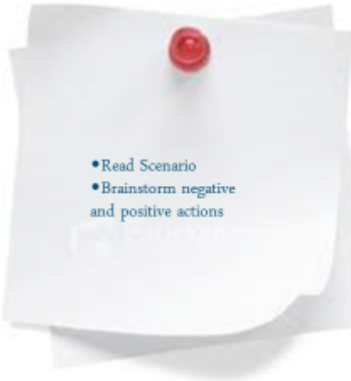
# Practice!

Scenario	Negative Thoughts	Positive Thoughts
Big paper assigned	I will never get all this work done	I am good at managing my time I am a fast worker
I caught my partner cheating		
I am failing a class		
My friends act weird around my partner		
My supervisor is making me start over on a project I put a ton of work into		
I fell down while dancing at a party		
My parents want me to major in something I'm not interested in		
My classmates are smarter than me		
My friends think I'm lame for not going skiing, but I can't afford it.		



- Read Scenario
- Brainstorm negative and positive thoughts

Scenario	Thought	Negative Actions	Positive Actions
<i>(Kristina's example) Big project</i>	<i>I will never get this project done</i>	Ignore my work and just watch TV all day to avoid it	Break big projects into smaller tasks Set up rewards for finishing stuff
Doing all the work for group project. Graded as a group	<i>My other teammates have no respect for me</i>		
Saw ex-partner with their new partner at the bar	<i>I guess I am easy to get over</i>		
My professor gave me a bad grade with no explanation	<i>He/She plays favourites</i>		
I do not understand how to do this physics assignment	<i>I am not as smart as my classmates</i>		
I got into a fight with my roommate	<i>My roommate is an idiot</i>		
Everyone seems to be making new friends in the dorm	<i>I am unlikable and will never make friends</i>		
I don't know what courses I should be taking	<i>I am stupid; everyone else seems to know what to do</i>		
I was assigned a large paper and it's due when everything else is due	<i>I can't juggle all of these assignments. I shouldn't be in university</i>		
I approached someone I was attracted to at a bar and was rejected.	<i>I am unattractive; I will be single forever</i>		
I have to do a presentation in front of the class	<i>I always freeze up in presentations; I will make a fool of myself</i>		
Someone in my dorm/class keeps harassing me	<i>There is nothing I can do about it</i>		



- Read Scenario
- Brainstorm negative and positive actions

**Daily Thought Record**

Day:  Mon.  Tues.  Wed.  Thurs.  Fri.  Sat.  Sun.  
 Month:  Jan.  Feb.  Mar.  Apr.  May  Jun.  Jul.  Aug.  Sep.  Oct.  
 Day:  1  2  3  4  5  6  7  8  9  10  11  12  13  14  15  16  17  18  19  20  21  22  23  24  25  26  27  28  29  30  31

**Step 1:** Write down the event(s) or thought(s) that triggered your negative thinking.

**Step 2:** Write down the entire sequence of thoughts you experienced.

**Step 3:** Decide where you would want to stop your negative thinking. Draw a line at the point where you want to stop your negative thinking.

**Step 4:** Write down a more realistic, fairer way of thinking about what happened.

**Step 5:** Now write down the fact(s) of the matter, and just the facts.

**Step 6:** Write down 1 or 2 things that you accomplished today that you felt proud of.

How many negative thoughts did you have today? No  1  2  3  4  5  
 very bad

How many times did you get stuck repeating things? No  +1  +2  +3  +4  +5  
 very good

© 2003 David A. Gentile, Ph.D.

# What have we learned?

- ▶ Thoughts, feelings, actions
- ▶ Name the thought
- ▶ Counting our accomplishments
- ▶ Positive thoughts to counter negative thoughts
- ▶ Distraction to calm us down
- ▶ 3 questions to challenge negative thoughts

# Homework

- ▶ Homework To-Do List on page 28
- ▶ Workbook: Put it all Together Worksheets (example one page 24)
  - 3 to complete on your own (pp. 25 - 27)
- ▶ Strategies Quiz (online)
- ▶ Daily Thought Record (ALL steps)
  - two per day for 7 days
- ▶ Post-Intervention Questionnaires



*The End!*

*Any questions??*