

The Motivational Impact of an Ideal Self Intervention on
Goal-Directed Behaviours as Mediated by Positive or Negative Affect

by

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Author's Declaration

I hereby declare that I am the sole author of this thesis. This is a true copy of the thesis, including any required final revisions, as accepted by my examiners.

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Abstract

This research examines the connection between the behavioural and affective responses to envisioning an ideal self. In Study 1, undergraduate students were randomly assigned to one of two conditions and were given a workbook. In the treatment, ideal self condition, students' workbooks encouraged them to envision their ideal academic self. In the control condition, students' workbooks were superficially the same but without the envisioning of an ideal academic self. Students were found to increase the quality and quantity of their study behaviours in the weeks after the experimental treatment to the extent that they experienced positive affect (e.g., excitement, inspiration). In Study 2, a systematic replication further supported the mediating role of positive affect, and again did not support the mediating role of negative affect (e.g., guilt, shame). Implications for future interventions are discussed, including the recommendation to seek to induce positive affect (e.g., anticipatory pride) but not negative affect (e.g., dissatisfaction with the current self) in interventions of this kind.

Keywords: ideal self, positive affect, negative affect, goal-directed behaviours, motivation

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To my future self: The sky is the limit

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Introduction

The basic premise of ideal self interventions is the idea that when people imagine a better future self, they will act so as to pursue that ideal self. These interventions are often used by practitioners. For example, an online search reveals hundreds of coaching businesses promoting their ideal self interventions as a tool to marshal motivation to pursue the ideal self, whether that ideal self be in relation to careers, healthy lifestyles, interpersonal relationships and so forth. This is a moneymaking industry and yet, despite the research that exists on the effectiveness of ideal self interventions (e.g., Oyserman, Bybee, & Terry, 2006), there is no research to date that examines how these interventions work and what processes are involved. The contribution of this paper is to advance our theoretical understanding of the processes involved in ideal self interventions. This paper will empirically test whether the affect engendered by an ideal self intervention acts as the process through which the envisioning of a desired future self results in behaviours aimed at helping the person become that self.

The research relevant to this topic falls into two categories and are typically designed as interventions that involve envisioning an ideal self in some sense. That is, researchers ask participants to elaborate an image of what their ideal self would look like and subsequently measure either participants' behavioural responses to the activity (e.g., greater school attendance in Oyserman, Bybee, & Terry, 2006) or participants' affective responses to the activity (e.g., positive affect in King, 2001). Because, in theory, affective experience is connected with motivated behaviour in various ways (Aarts & Custers, 2005a; Carver & Scheier, 2001, Deci & Ryan, 1985), it is striking that this connection has not, however, been a topic of research.

Our review of the corresponding research will first describe ideal selves and associated interventions. Then, it will document the behavioural and affective impacts of envisioning an ideal self. Later, it will describe motivational theory that can explain how affect acts as a process through which the interventions have their impact on the resulting goal-directed behaviours. Finally, two studies which aim to test for the proposed affective-motivational processes will be presented.

Ideal Self as a Future-Oriented Self-Schema

Self-schemas are theorized to have a pervasive influence on the way information relevant to the self is processed (Epstein, 1973; Markus & Nurius, 1986; Wurf & Markus, 1991). They give us an orientation to the world and thus to the way we perceive it, such that they provide information that helps us determine which stimuli in the environment we pay attention to, which stimuli are remembered and even the kinds of inferences we draw (Markus & Nurius, 1986). More specifically, Markus and Nurius (1986) state that “In particular domains, these well-elaborated structures of the self shape the perceiver’s expectations” (p. 955). In these and related ways, it is through self-schemas that an individual becomes attuned to certain rewards and incentives, whereas another person, with different self-schemas, may be drawn to different rewards and incentives.

Just as the current self is theorized to be a schema encompassing characteristics such as memories, personal beliefs, experiences and generalizations about the self, ideal selves describe alternate characteristics that one could perceive about one’s self in the future. Thus, ideal selves are cognitive-schematic structures that pertain to how an individual thinks about himself or herself in the future (Markus & Nurius, 1986; Wurf & Markus, 1991). They are cognitive representations which provide a link between an individual's self-concept and motivation, such that envisioning an ideal self increases the salience of the ideal self, and of the rewards that are to be had in becoming that ideal person.

Many researchers are involved in research involving ideal selves and though we have referred to these future-oriented self-schemas as *ideal selves*, others refer to them using different terms. For example, Markus and Nurius (1986) use the term *possible self* to refer to ideal selves while Strauss, Griffin, and Parker, (2012) use the term *future work-self* to refer to ideal selves in the work domain. Emphasizing the commonalities among these approaches, and for the purposes and emphases of our research, we will continue to refer to these various kinds of desirable, future imaged selves as “ideal selves.” However, recognizing that researchers are specific about the use

of terms in their work, we will continue to employ their terms (e.g., “possible selves”) when describing their work directly.

Ideal Self Interventions

Ideal self interventions are prominent in research and in practice. There are a number of studies that empirically demonstrate the effectiveness of ideal self interventions in motivating goal-directed behaviours and there are some studies that empirically demonstrated the affective experiences engendered by the interventions. Practitioners also readily make use of this kind of intervention to help motivate their clients to achieve their ideal self in a number of domains, including the workplace, health and fitness, sports, etc. In all of these applications, there are two fundamental characteristics that ideal self interventions include: 1) the envisioning of the ideal self, and 2) thinking about the outcomes associated with the ideal self. In addition to these two characteristics, there is a third characteristic that is sometimes included, albeit less consistently: 3) thinking about the means required to attain the ideal self (e.g., Gonzales et al., 2011; Oyserman, Bybee, & Terry, 2002; Senge, 1990).

First, ideal self interventions include the actual envisioning of an ideal self. The participant is asked to take a few moments to relax (sometimes they’re encouraged to close their eyes which helps to eliminate distractions) and to envision their ideal self. Second, these interventions include thinking about the outcomes that are associated with the envisioned ideal self. Because ideal selves are so intimately connected to incentives and rewards, participants are encouraged to consider the outcomes associated with the future self and to imagine themselves accepting these outcomes as truth. For example, if Sally envisions herself as a high school teacher, she would envision herself in a classroom in front of her students and she may become more aware of the pride she would feel while teaching students. She may also become more aware of how much she would enjoy preparing lesson plans and marking student tests.

Beyond the fundamental characteristics mentioned above, ideal self interventions sometimes include the explicit instruction to think about the means that are required to attain the ideal self and the outcomes associated with this end. Returning to our example, if Sally envisions

herself as a teacher, and becomes aware of the pride that is to be gained, in this case, she would also consider the necessary steps to achieve becoming a teacher, such as the education required, the volunteer experience she needs to gain, etc...

Behavioural outcomes. Ideal self interventions can be used in many different applications or domains. As mentioned previously, professional coaches use this intervention to motivate a client to achieve their ideal work self, healthy self, athletic self, financial self and so forth. The behaviours that are motivated as a result of envisioning an ideal self are therefore dependent on the domain of the ideal self. The behaviours motivated following the envisioning of an ideal work self (e.g., completing executive report or asking for a promotion) are different from those following the envisioning of an ideal healthy self (e.g., going for a hike or purchasing nutrition supplements). In this way, the class of behaviours that are motivated by ideal self interventions can generally be understood as goal-directed behaviours, that is, behaviours that are directed towards becoming the envisioned ideal self.

Several studies of the behavioural effects of an ideal self intervention in an academic domain have observed improvements in high school students' academic behaviours. Oyserman, Bybee and Terry (2002) randomly assigned students to a seven-week intervention which was intended to highlight the relevance of school to attaining one's possible selves. They used a small-group active learning paradigm that lasted nine weeks, requiring 1.5 hours per week. The intervention included all three of the core intervention components, the imagining of possible selves, thinking about the associated outcomes and associated means required to attain the possible self. This intervention increased school attendance and use of effective strategies to help attain their possible self, and it reduced delinquent behaviour. Another such intervention study (Oyserman, Bybee, & Terry, 2006) yielded greater classroom initiative, greater homework hours, and greater self-reported motivation. Impressively, a subsequent two-year follow-up study found that these improvements were enduring, as they were sustained over the two years (Oyserman, Brickman, & Rhodes, 2007).

Other researchers have studied ideal selves in different domains or for different research purposes. For example, in the work domain, possible selves have been used to better understand the formation of a professional identity in new teachers (Hamman, Coward, Johnson, Lambert, Zhou, & Indiatsi, 2013). In the health domain, possible selves has been used to better understand adolescents and their use of alcohol (Lee, Corte, Stein, Park, Finnegan, & McCreary, 2015), and young adults and their exercise activities (Murru & Ginis, 2010). Together, these studies demonstrate that envisioning a positive future-self can result in changing (and motivating) goal-directed behaviours. However, beyond the resulting goal-directed behaviours, the envisioner of the ideal self may also experience emotions following the intervention. A separate but complementary literature has shed light on affective outcomes associated with ideal self interventions.

Affective outcomes. Ideal self interventions produce various affective states in participating members. In a study about the health benefits of making one's life-goals more salient, King (2011) asked participants to write about their best possible future selves, spending twenty minutes per day for four consecutive days (i.e., this study included only the main two components of ideal self interventions). King found that simply thinking about attaining a possible self was associated with increased positive affect and subjective well-being, measured three weeks following the intervention. The benefits of this envisioning also included a decrease in illness five months later. Sheldon and Lyubomirsky (2006) similarly found that among other happiness interventions, only the best possible selves exercise significantly boosted immediate positive affect (i.e., again this study included only the main two components of ideal self interventions). Furthermore, participants who continued to perform this exercise on their own reported stronger positive mood in follow-up assessments up to four weeks later.

However, interventions have been found to induce negative affect in some instances. In a study by Gonzales and colleagues (2011), we learn about the moderating role of plan quality on participants' affective reactions to the intervention (i.e., this study included all three components of ideal self interventions). Participants who provided less detailed plans for achieving their

imagined possible selves reported higher positive affect. However, participants who produced more detailed plans experienced a mix of positive (e.g., energetic and determined) and negative affect (e.g., anxiety and guilt).

In sum, it is clear that asking people to envision an ideal self can propel a change in behaviour that is consistent with this envisioned self. It is also clear that ideal self interventions can result in the experience of both positive and negative affect. This raises the question: does affect play a role in the motivating goal-directed behaviours? There are two distinct streams of motivational theory that may help to answer this question.

The Role of Affect in Motivating Goal-Directed Behaviours

The thoughts and feelings that become salient while people envision an ideal self may be important factors in how people become motivated toward behaving in ways consistent with that self. For example, suppose a student is instructed to envision an ideal self in a classroom-based intervention. That student may focus on the current self and emphasize its shortcomings. A traditional, deficit-reducing approach to motivation (e.g., Carver & Scheier, 2001) could feature this discrepancy and its associated *negative* affect as being central in a theoretical account of resulting motivated behaviour. Then again, the student may give greater emphasis to the enhanced possibilities afforded by the future self, thus yielding more *positive* affect both as an immediate consequence of this envisioning and as an incentive to seek to realize the ideal self. The alternative affect-as-information approach to motivation (e.g., Schwarz & Clore, 2003) accounts for resulting motivated behaviour in line with this emphasis.

Negative affect. The concept of deficit-reduction is prominent in many theoretical approaches to motivation. These approaches include Hull's theory (1943) in which behaviour occurs in response to "drives" that arise from a range of bodily disturbances or deficits, including hunger, thirst, sex, feeling warm or cold, and so forth. These deficits are held to energize behaviour to resolve the deficit. Prominent contemporary theories that draw upon concepts of deficit reduction include self-regulation theory (Carver & Scheier, 2001) and self-discrepancy theory (Higgins, 1987; Stanley & Burrow, 2015). In these theories, an envisioned ideal self can

serve as a referent against which the current self is compared and evaluated. Self-discrepancy theory holds that when a discrepancy exists between the current self and the ideal self, dejection-type emotions are likely to occur (Higgins, 1987). These emotions include feelings of guilt, shame and frustration. This discrepancy (and its concomitant negative affect, referred to as negative tension) motivates behaviour consistent with the referent and, in this case, is likely to cause the individual to strive towards “being a better me.”

For example, imagine a student named Josh who envisions an ideal student self, one who studies diligently, is up-to-date in his work, and so forth. Josh might construct this ideal as an improvement over how he currently procrastinates a lot, frequently uses his cell phone while studying, and so forth. It is possible that during envisioning an ideal self, Josh would have heightened awareness of the gap between the actual and ideal, and consequently would experience feelings of shame and guilt. These negative feelings could contribute to a cybernetic motivational process in which movement toward the ideal (e.g., through sticking to his self-scheduled study periods and turning off his cell phone in those periods) reduces the negative affect from the actual-ideal gap. In this instance, Josh's *negative* affect would be central to his motivation to seek his ideal self.

Positive affect. A second approach to understanding the impact of the affect engendered in ideal self intervention is one that concerns the information made available during the envisioning.

This approach holds that goal-directed behaviour is energized by the positive emotions that arise from the incentives made salient during the intervention (Deci & Ryan, 1985). Positive affective information that is generated when envisioning a possible self is processed as a signal that the end is worth pursuing (Custers & Aarts, 2005a; Custers & Aarts, 2005b). That is, in this instance, the motivation to pursue the ideal self depends on the extent to which the mental representation of the ideal self is associated with positive affect. Because the envisioning of an ideal self increases the salience of the rewards associated with that future self, the positive affect

induced in ideal self interventions may propel the individual to want to attain the behavioural outcomes which leads to goal pursuit.

In returning to the earlier example of Josh, a student who envisions a better student self, it is now possible to imagine that Josh may experience positive feelings of inspiration and excitement as a result of focusing on the opportunities and rewards (e.g., having more time to himself and feeling less stressed) made salient by thinking about an ideal self. Accordingly, these positive feelings will signal to Josh that the ideal self is worth pursuing and he will be motivated to make the appropriate changes in his behaviour to reach the desired end. He may stick to his self-scheduled study periods and turn off his cell phone in those periods. In this instance, Josh's *positive* affect would be central to his motivation to seek his ideal self.

The two motivational approaches proposed illustrate that there may be more than a single account for the motivational mechanisms involved in the motivating impact of ideal selves. With both foci readily available (i.e., the shortcomings of the current self and the opportunities associated with the ideal self), we can expect that people are going to vary in which focus they are going to take and which affect and associated motivation is going to be dominant in producing the behavioural outcomes, either the guilt and shame, or the excitement and inspiration. It may be that the deficit state and accompanying likely negative affect is in certain situations a sufficient condition, but it may not be a necessary condition to being motivated.

Approach to the Ideal Self Intervention

The objective of the present study was to empirically test whether affect engendered by ideal self interventions acts as the motivational mechanism through which these induce behavioural change, in the form shown in Figure 1. To test this, an academic domain was chosen in which undergraduate students participated in an in-lab group session where they were given a workbook. In the ideal self condition, students' workbooks encouraged them to consider certain topics which lead to the envisioning of their ideal academic self. In the control condition, students' workbooks were superficially the same, but the content of the topics were placebic and non-motivating. The undergraduate context is ideal for studying the motivating role of affect in

motivating behaviours since, compared to high-school and college students, undergraduate students are given a lot of freedom and flexibility in their school work and in this way, are self-directed in their academic behaviours. This makes it possible to empirically measure students' change in goal-directed behaviours as it is reasonable to expect there to be room for changes in their behaviours. Since older students may be more set in their ways and more resistant in changing their behaviours, only students who were registered in a first or second year psychology course were selected to participate.

During the in-lab session, the session facilitator (i.e., myself) provided each participant with a workbook. Students worked through each part of the workbook independently, first, and then the facilitator lead a discussion for each part before moving onto the next. This allowed each student to come up with their own thoughts first, but to also hear others' observations and thoughts. In study 1, the intervention was designed to include the two main components of ideal self interventions (i.e., envisioning of the ideal self and thinking about the outcomes associated with that ideal self) and in study 2, the third component was added to the intervention (i.e., thinking about the means required to attain the ideal self). Akin to King (2011), Sheldon and Lyubomirsky (2006) and Gonzales et al.'s (2011) operationalizations of possible selves, our study of ideal selves included the envisioning of only an ideal self (whereas other possible self interventions include feared selves and ought selves; c.f., Oyserman, Bybee & Terry 2006).

Hypotheses

The reviewed literature implies that either negative affect, positive affect or both may contribute to the process through which ideal selves motivates goal-directed behaviour. Thus, we hypothesize:

- 1) Positive affect mediates the relationship between the envisioning of ideal self and study behaviours *and*,
- 2) Negative affect mediates the relationship between the envisioning of ideal self and study behaviours.

Study 1

Method

Participants. Participants were University of Waterloo undergraduate students who received a credit towards their psychology course final grade as compensation for their participation. A total of 151 students were recruited and 139 students were retained as they participated in both pre and post sessions of the study. Of the participants, 72.7% were female ($n = 101$) and 27.3% were male ($n = 38$), with ages ranging from 17-34 years ($M = 19.88$ years, $SD = 2.13$). The average self-reported overall grade average of 80.7% ($SD = 5.62$) was unremarkable for this population.

Pre-post measures. The following variables were measured both in advance of, and following the intervention. The two versions of measures were identical with the exception of the time framing. The instructions for the pre-test asked participants to answer based on their experiences "in general", whereas the instructions for the post-test asked participants to answer based on their experiences in the last month. The instructions for the pre-test were intentionally vaguer since this study was conducted in the fall term and many students were first year students who did not study during the summer (and therefore would not have had an answer if the instructions asked participants to answer based on their experiences in the last month).

Academic behaviour. A questionnaire assessing participants' academic behaviours was adapted from past work (Whittington & Michela, 2007) for the purpose of this study (Appendix A). This questionnaire was used in this study because it successfully assessed students' academic behaviours in past work (e.g., Goyert & Michela, 2011, Whittington & Michela, 2007).

Participants responded to twelve items on a nine-point Likert scale (1 = Completely Disagree, 5 = Neither Agree Nor Disagree, 9 = Completely Agree; Appendix A). A principal component factor analysis with varimax rotation was executed on the data. Because residual change scores of the pre- and post-measures of this questionnaire will be used in the future analyses, the factor analysis was executed using these change scores (i.e., a residual change score was created for each of the twelve items). As I will explain later, using residual change scores in

the analyses provides a context for a discussion of students' change of behaviours following an ideal self intervention, without magnifying the error that is typically associated with other change scores. A principal component with varimax rotation was used primarily because varimax rotation is simpler to interpret than oblique rotations.¹ The factor analysis revealed three subcomponents with eigenvalues greater than one (Table 1), which was consistent with previous work using this questionnaire. The first factor concerns the quality of study behaviour. The items with the four highest loadings (e.g., "When I am studying I avoid distractions") were combined to form the *quality* composite ($\alpha=.61$). The second factor concerns how participants prepare for, and keep up with course material ($\alpha=.64$), and, the third factor concerns participants' general tardiness ($\alpha=.46$). In our analyses, we used only the first factor because it was not clear how preparedness- and tardiness-related behaviours would or would not be related to students' effort towards becoming their ideal academic selves.

Participants also responded to a three free-entry item .The first item assessed the quantity of student study behaviour, (e.g., "How many hours of homework or studies did you do on average a week? (e.g., ___ hrs)" (test-retest reliability control group: $r_{\text{pre-post}} = .69$ / treatment group: $r_{\text{pre-post}} = .61$). Observed responses on this item ranged from 1 – 72 hours and 1 – 125 hours at pre and post respectively. It is our belief that a single item is sufficient for assessing students' quantity of study behaviour since this item has successfully been used in past research (e.g., Whittington & Michela, 2007). The second and third items assessed the percentage of class and tutorial time missed per week respectively, but were also not used in future analyses since it was not clear how these behaviours may or may not relate to students' ideal academic self.

In sum, the following variables were used in future analyses: (1) quality of study behaviour (a composite of four items), and (2) quantity of study behaviour (a single item).

Immediate post measure. The following variables were measured only once, immediately following the intervention.

¹ The results do not change when promax rotation is used.

Affect. Participants' immediate affective reactions to the intervention were measured using the twenty-item Positive and Negative Affect Schedule (Watson, Clark, & Tellegen, 1988). Participants responded using a five-point Likert scale to indicate how they were feeling at the present moment (see Appendix B).

The resulting composites of these items were determined by the existing literature on the factor structure of the questionnaire (Watson, Clark, & Tellegen, 1988). The first composite concerns participants immediate *positive affect* (10 items, $\alpha=.89$; e.g., “determined”, “enthusiastic”). The second concerns participants immediate *negative affect* ($\alpha=.85$; e.g., “guilty”, “scared”).

Intervention materials. All participants completed an activity booklet. The booklets for participants in the treatment condition were designed to closely resemble other ideal self interventions. The booklets included questions that lead to the envisioning of an ideal student self and the consideration of the outcomes associated with that ideal self. Though participants weren't asked to consider the means required to achieve their envisioned ideal self, the students were asked to discuss the characteristics of high achieving students more generally (Appendix C). Participants in the control condition were asked questions placebic in nature and were also asked discuss the characteristics of high achieving students more generally (Appendix D). We believed the discussion about the study skills was important to include because it ensured that all students had the same base knowledge about study skills, should they feel motivated following the intervention.

A study skills package containing specific study strategies as well as information about useful resources (e.g., links to helpful web pages, information about study workshops provided on campus) from the university's counselling services was provided to all participants (Appendix E).

Procedure. Study procedures were described to students when they signed up to participate in the study through the online experiment management system. Groups of approximately five participants were randomly assigned to the control ($n = 74$) or treatment ($n =$

79) conditions. At the beginning of each session, participants were reminded of the study procedures, which included an initial in-lab session that involved the intervention materials described immediately above, followed by an individual online session six weeks later involving data collection only. See Figure 2 for a visual representation of the procedure.

Stage 1 (lab – “pre-measure” - control and treatment). Participants arrived at the lab and were provided with the information letter and consent forms. They were told the in-lab session would include both individual reflection and group discussions. To begin, participants spent ten minutes individually completing the academic behaviours questionnaire.

Stage 2 (lab - “means” –control and treatment). The objective of this stage was to provide all participants with the “means” for academic success. Students were then provided with the first activity in which they individually brainstormed characteristics of high-achieving students and study habits effective in increasing academic achievement. Upon completion, the research assistant facilitated a group discussion in which participants shared their answers. The content of the group discussions was naturally very consistent between sessions; however, where necessary, the research assistant directed the conversation to ensure the same characteristics and study skills were discussed.

Stage 3a (lab – “placebic” - control only). In the second activity, participants in the control group individually brainstormed very general positive and negative aspects of attending university followed by a group discussion of their answers. This activity was included to ensure that the time and effort involved in study participation was essentially equal between conditions.

Stage 3b (lab- “outcomes”- treatment only). The intervention activities were constructed to closely resemble what is known about personal visions. In this way, participants were asked to imagine themselves in a number of scenarios where they had either been successful or unsuccessful students. This was meant to allow students to become more aware of connections among academic behaviours, and outcomes. In addition, the activities built on one another such that participants were equipped the self-knowledge about their future potential to create an ideal

self as an academically successful student. Ultimately, this stage of the intervention allowed participants to build on the ‘means for success’ and establish the ‘outcomes’.

More specifically, the participants in the treatment condition envisioned themselves in seven years and brainstormed benefits they would be experiencing because of performing well at university, as well as drawbacks had they performed poorly. This activity also provided an opportunity for participants to generate ideas and cognitive representations about their future. A group discussion followed, in which the research assistant encouraged participants to share their answers. Next, participants in the treatment condition reflected on their academic performance and potential, and recorded how the discussed study habits could improve their academic achievement and the benefits of increasing their academic achievement

Stage 4 (lab- “visualization”- treatment only). The final component of the vision intervention for participants in the treatment group required participants to visualize themselves performing at their full potential at university, thereby translating their future desires into a vision of the self. Participants spent approximately twenty minutes visualizing and writing both a detailed description of their vision, and a shorter concise vision statement. A large portion of time was allotted for this activity, since according to Taylor, Pham, Rivkin, and Armor (1998), it is the simulation of the process that enables mental simulations to be effective. Upon completion, each participant transcribed their personal vision statement on to a cue card and was encouraged to revisit their statement following the session.

Stage 5 (lab - “post-measure” - control and treatment). Immediately following the completion of the activity booklets, participants completed the immediate post-measure of affect. They were then provided with instructions to complete the follow up online questionnaire in six weeks and they were given the study skills booklet that contained a study skills guide and additional study resource information.

Stage 6 (online – “reminders” - control and treatment). In the six-week period between the lab and online sessions, all participants received two emails reminding them of their participation in the study. Participants in the control group were reminded to revisit the online

study skill resource (means), whereas participants in the treatment condition were reminded of their study skills resources and their personal vision statements (means and outcomes).

Stage 7 (online – “post-measures” - control and treatment). Six-weeks following the lab session, all participants received an email containing a link to complete the follow-up questionnaire. Participants completed post-measures of academic behaviours questionnaire. Upon completion of the follow-up questionnaire, all participants received an information and feedback letter with the opportunity to provide any comments about their experience participating in the study.

Analyses. The analyses for this study involved the examination of affect as a mediator between the participants’ condition and their change in goal-directed behaviour. Of particular interests in this study was the students’ change of quantity of study behaviour as a result of the intervention and students’ change of quality of study behaviour as a result of the intervention. For the quantity outcome variables, a residual gain score was created using participants’ self-reported homework hours per week from the academic behaviour questionnaire completed immediately prior to, and six weeks following the intervention. This score was calculated as the post-test report minus the pre-test report, with the pre-test report multiplied by the unstandardized regression coefficient obtained in a prior regression analysis of the prediction of the post-test measure by the pre-test measure (post-test – pre-test*B). The residual gain scores is equivalent to controlling for pre-test scores in a multiple regression and using the post-test scores as the dependent variable. Therefore using this kind of residual gain score does not magnify the error, which is typically associated with change scores (Stekee & Chambless, 1992). A gain score is especially appropriate in this context since we are interested in the degree of change in student behaviours as a result of the intervention. The gain scores make it easy to interpret the findings with this lens. A residual gain score was also created for the quality of study behaviour outcome variable using the same technique with participants’ self-reported quality of study behaviours from the academic behaviours questionnaire. In sum, there were two outcome variables: 1) change in quantity of study behaviour and 2) change in quality of study behaviour.

Results

Baseline similarities between groups. There were no significant differences between the control group and vision group with respect to demographic variables, including age, gender, or self-reported grades. Additionally, there were no significant differences between groups on the pre-measure of their academic behaviours, including quantity and quality of study behaviour.

Immediate affective reactions to the vision intervention. The following analyses were performed in order to determine whether participants' immediate affective reactions following the vision intervention are consistent with the two different theoretical approaches previously outlined. Figure 3 illustrates the differences in ratings on the positive and negative affect composites between control and treatment participants. Participants in the treatment condition reported significantly higher positive affect ($M = 2.99, SD = 0.82$) than participants in the control condition ($M = 2.68, SD = 0.78$), $t(137) = -2.30, p = .023$. However, participants in the treatment condition did not report any significant differences in negative affect ($M = 1.43, SD = 0.63$) compared to participants in the control condition ($M = 1.36, SD = 0.57$), $t(137) = -.79, p = .43$.

Affect as a mediator of behavioural outcomes from the intervention. To test whether the ideal self exercise generated an increase in behaviour through the energization of the positive affect or the negative tension generated by the negative affect, we adopted the bootstrapping approach to path analysis developed by Hayes and Preacher (2010). As applied to our study, this approach examined whether the individuals who responded favourably to the intervention, with increased study behaviour, also experienced positive or negative affect. The parallel testing of the indirect effects of positive and negative affect tell us that positive affect significantly mediated the relationship between experimental condition and participants' change in quality of study behaviour, I.D. effect = .27, bootstrap 95% C.I. = [.017, .826], and negative affect did not, I.D. effect = -.01, 95% C.I. = [-.325, .131] (Figure 4). The parallel testing of the indirect effects of positive and negative affect tell us that positive affect significantly mediated the relationship between experimental condition and participants' change in quantity of study behaviours, I.D. effect = .79, bootstrapping 95% C.I. = [.027, .2377], and negative affect again did not, I.D. effect

= -.04, 95% C.I. = [-.786, .255] (Figure 5). These results provide support for hypothesis 1², such that participants experienced more positive affect after envisioning an ideal self, which in turn led them to study more and focus more during their studying, however, hypothesis 2 was not supported.

Discussion

The results of study 1 provided support for hypothesis 1. As such, the positive affect engendered by the envisioning exercise was found to be a mechanism through which the intervention had its effect on students' study behaviours, including both an increase in the number of hours they studied and the quality of their study behaviour. This is remarkable; suggesting that not only do people feel positive emotions when they participate in these sorts of interventions; but ultimately, these positive emotions are the active ingredients to changing their behaviours towards the ideal self they envisioned.

Study 1 did not provide support for hypothesis 2. However, the conditions for detecting its effect were poor, since the groups did not significantly differ in their report of negative affect following the intervention.

In study 2, we again tested whether positive and negative affect acts as mediators in the relationship between the intervention and the change in study behaviours in an ideal self intervention. This time, the intervention would include all three of the major components found among ideal self interventions (as reviewed previously). In this way, changes were made to the intervention material to reflect the addition of the third component (i.e., students in the treatment condition were explicitly asked to consider the changes required in their study behaviours in order to achieve their ideal self). As a systematic replication in study 2, we hoped to replicate the findings from study 1.

² Figures 3 and 4 include unstandardized coefficients for each path. Despite the lack of a significant β path for positive affect, the only requirement to demonstrate mediation is a significant indirect effect, $\alpha \times \beta$ (Preacher and Hayes, 2004, 2008). A significant β path is not required (Zhao, 2010). The bootstrapping test for the indirect test is generating a confidence interval for the product of the IV to mediator path and the mediator to DV path. This emphasizes the joint relation of participants' scores on all three variables involved in the hypothesized mediated path.

Study 2

Method

Participants. Participants were university undergraduate students who received a credit towards their psychology course final grade as compensation for their participation. A total of 141 students were recruited and 127 students were retained as they participated in both the pre and post sessions of the study. Of the total participants, 77% were female ($n = 109$) and 23% were male ($n = 32$). The average self-reported overall grade average of 83.3% ($SD = 6.48$) was unremarkable for this population.

Pre-post measures. The following variables were measured both in advance of, and following the intervention. Again, the versions were identical with the exception of the instructions. The instructions for the pre-test asked participants to answer based on their experiences "in general", whereas the instructions for the post-test asked participants to answer based on their experiences in the last month.

Academic behaviour. Participants responded to the same academic behaviours questionnaire as study 1 (Appendix A). As a reminder, this questionnaire is comprised of twelve items assessing students' study behaviour, with responses on a nine-point Likert scale (1 = Completely Disagree, 5 = Neither Agree Nor Disagree, 9 = Completely Agree) as well as the three self-reported items.

A principal component factor analyses with varimax rotation on the residual gain scores of each of the twelve items again revealed three subcomponents with eigenvalues greater than one (Table 2). The first factor concerns the quality of study behaviours. There were five highest loadings for this factor, but only four were retained, consistent with study 1. They were combined to form the quality composite ($\alpha=.72$). The second and third factors concerned participants' preparation ($\alpha=.54$) and tardiness ($\alpha=.54$) respectively. Akin to study 1, only the quality composite was used in future analyses.

Additionally, the first free-entry item assessed participants' quantity of study behaviour (e.g., "How many hours of homework or studies did you do on average a week? (e.g., ___ hrs)")

(test-retest reliability control group: $r_{\text{pre-post}} = .69$ / treatment group: $r_{\text{pre-post}} = .71$). Observed responses on this item ranged from 1 – 60 hours and 1 – 95 hours at pre and post respectively. The second and third items assessed the percentage of class and tutorial time missed per week respectively, but akin to study 1, were not used in future analyses.

In sum, as in study 1, the following variables were used in future analyses: (1) quality of study behaviour (a composite of four items), and (2) quantity of study behaviour (a single item).

Immediate post measure. Akin to study 1, the following variables were measured only once, immediately following the intervention.

Affect. Participants' immediate affective reactions to the intervention were measured using the twenty-item Positive and Negative Affect Scale (Watson, Clark, & Tellegen, 1988). Participants again were instructed to respond using a five-point Likert scale about how they were feeling at the present moment (see Appendix B). The same two components were analysed: *positive affect* ($\alpha=.88$); *negative affect* ($\alpha=.83$).

Intervention materials. Consistent with the rationale behind study 2, some changes were made to the intervention materials. All participants continued to complete an activity booklet that prompted the identification of characteristics and study habits of high-achieving students. However, participants in the treatment condition were asked to consider which study behaviours they do not currently engage in which may help to increase their effectiveness. Additionally, to rule out the possibility that the effects found in study 1 were due to the envisioning of a future state, in study 2, participants in both the treatment and the control condition were asked to participate in visioning activities (see Appendix F for treatment condition; Appendix G for control condition). The booklets were revamped to become more visually appealing in an attempt to maintain the students' interest during the intervention. Participants in the treatment condition were asked to write a concise vision statement of themselves as high-achieving students by completing the statement "I look forward to becoming a student who..." The wording of the statement was changed from study 1 (e.g., "I am capable of being a student who...") in order to

more closely resemble the positive wording typically associated with ideal self interventions in practice (c.f., Senge, 1990).

Consistent with study 1, a study skills package containing specific study strategies as well as information about useful resources (e.g., links to helpful web pages, information about study workshops provided on campus) from the university's resources was made available to all participants. This time, the material was available to students on the university blackboard system rather than a paper copy. This was meant to make the material more readily accessible to the student (Appendix H).

Procedure. The procedure of study 2 was similar to the procedure of study 1, however some changes were made. The first change was that the facilitator of the both the control and treatment sessions was myself, the researcher. Since the research assistant was not supervised in study 1, it was not possible to determine whether the difference between groups on positive affect was a result of experimenter effects. That is, it's possible that students were responding to demand characteristics resulting in a greater self-reported positive affect in the treatment group than in the control group. By facilitating the sessions myself, I can try my best to make sure that participants in both conditions are treated equally and are met with an equal amount of enthusiasm and excitement. The second change is the order of the activities within the activity booklets. The third change is the addition of the visualization activity for participants in the control condition.

The study procedures were described to students when they signed up to participate in the study through the online experiment management system. Groups of approximately four participants were randomly assigned to the control ($n = 63$) or treatment ($n = 64$) conditions. At the beginning of each session, participants were reminded of the study procedures which included a brief description of the activities to be completed during the session respective of their condition and a reminder about the follow-up individual online session six weeks later. See Figure 6 for a visual representation of the procedure

Stage 1 (lab - “pre-measures” - control and treatment). Participants arrived at the lab and were provided with the information letter and consent forms. They were told the in-lab session would include both individual reflection and group discussions and were given a brief description of the activities they would be participating in. To begin, participants spent ten minutes individually completing their pre-test academic behaviours questionnaire.

Stage 2a (lab - “placebic” – control only). The participants were then invited to begin working in their activity booklets. In the first activity, participants in the control condition individually brainstormed about aspects of attending university followed by a group discussion of their answers. Again, this activity was included to ensure that the time and effort involved in study participation was essentially equal between conditions.

Stage 2b (lab – “outcomes” - treatment only). Participants in the treatment condition were also asked to begin working in the activity booklets. Similarly to study 1, participants were asked to imagine themselves in a number of future-oriented scenarios intended to allow students to become more aware of connections among their academic behaviours and outcomes. Changes were made to the scenarios presented to the participants in study 2 such that participants were asked to imagine themselves in either an ideal or not-so-ideal career years after they graduate reflective of their academic behaviours, rather than 7 years after they graduate, in order to eliminate any distractions the specific timeframe in study 1 may have elicited. This stage of the intervention allowed participants to begin establishing the ‘outcomes’ they desire. Participants were given time to brainstorm followed by a group discussion in which the facilitator encouraged participants to share their answers.

Stage 3a (lab - “means” – control and treatment). Participants in both the control and treatment condition continued onto the second activity in their work book which asked participants to brainstorm characteristics of high-achieving students and study habits effective in increasing academic achievement. Upon completion, a group discussion was led by the facilitator in which participants shared their answers. The content of the group discussions was naturally

very consistent between sessions; however, where necessary, the research assistant directed the conversation to ensure the same characteristics and study skills were discussed.

Stage 3b (lab - “means” –treatment only). Participants in the treatment condition completed the same question as those in the control condition, and they were further prompted to consider how the study behaviours discussed relate to their university experience. They were explicitly asked to evaluate whether or not they currently engage in the study behaviours discussed.

Stage 4a (lab - “visualization” –control only). Next, participants in the control condition were told about a new building that is going to be built especially as study and social space for Arts students on campus. They are given some details about the building and are asked to participate in a visualization activity. In the visualization, participants are asked to imagine themselves walking into the building and answer a number of questions about their imagined experienced.

Stage 4b (lab - “visualization” – treatment only). Participants in the treatment condition were also asked to participate in a visualization activity, this one more self-reflective than the generic activity in the control group. Participants were asked to imagine themselves in the near future on a typical day, performing at their full potential at university, engaging in the study behaviours discussed during the session and accepting the full manifestation of the benefits imagined earlier in the session. The details given to the participants were derived from Senge’s (1990) personal visioning exercise instructions. Akin to study 1, participants spent approximately twenty minutes visualizing and writing both a detailed description of their vision, and a shorter concise vision statement. Upon completion, each participant transcribed their personal vision statement on to a cue card and was encouraged to re-visit their statement following the session.

Stage 5 (lab - “post-measure” - control and treatment). Immediately following the completion of the activity booklet, participants completed the immediate post-measure of affect. They were then provided with instructions to complete the follow up online questionnaire in six weeks and they were reminded about the study skills made available to them online.

Stage 6 (online - “reminders” - control and treatment). In the six-week period between the lab and online sessions, all participants received two emails reminding them of their participation in the study. Participants in the control group were reminded to revisit the online study skill resource (means) and were provided with an image of a crest that included more in-depth details of the new Arts building (see Appendix I), whereas participants in the treatment condition were reminded of their study skills resources and received an image of a crest that included their personal vision statement (means and outcomes; See Appendix J for an example).

Stage 7 (online – “post-measures” - control and treatment). Six-weeks following the lab session, all participants received an email containing a link to complete the follow-up questionnaire. Participants completed the post-measure of academic behaviours questionnaire. Upon completion of the follow-up questionnaire, all participants received an information and feedback letter with the opportunity to provide any comments about their experience participating in the study.

Analyses. The analyses for this study paralleled the analyses for study 1. This again involved the examination of affect as a mediator between the participants’ condition and their change in goal-directed behaviour. Students’ change in quantity and change in quality of study behaviour variables were again calculated as residual gain scores (post-test – pre-test*B).

Results

Baseline similarities between groups. There were no significant differences between the control group and vision group with respect to demographic variables, including age, gender, or self-reported grades. Conversely, there were significant and marginally significant differences between groups on the pre-measures of their academic behaviours. Figure 7 illustrate the differences between groups on self-reported quantity of study behaviour. Participants in the treatment condition reported participating marginally significantly greater quantity of study per week in general ($M = 20.12$, $SD = 12.00$) than participants in the control condition ($M = 16.60$, $SD = 9.25$), $t(125) = -1.96$, $p = .053$. Figure 8 illustrates the differences between groups on self-reported quality of study behaviour. Participants in the treatment condition reported significantly

greater quality in their study ($M = 6.49, SD = 1.28$) than participants in the control condition ($M = 6.01, SD = 1.26$), $t(125) = -2.26, p = .026$. Evidently, this failure of random assignment makes it difficult to interpret the treatment effects in a straightforward way; fortunately the main objective of this study was to replicate the process tracing findings from study 1 in a slightly more developed intervention design.

Immediate affective reactions to the vision intervention. Figure 9 illustrates the differences in ratings of the positive and negative affect composites between control and treatment participants. Consistent with study 1, participants in the treatment condition reported significantly higher positive affect ($M = 3.22, SD = 0.74$) than participants in the control condition ($M = 2.88, SD = 0.70$), $t(125) = -2.67, p = .009$. Additionally, participants in the treatment condition reported significantly higher negative affect ($M = 1.55, SD = 0.52$) than participants in the control condition ($M = 1.24, SD = 0.38$), $t(125) = -3.80, p < .001$.

Affect as a mediator of behavioural outcomes from the intervention. Consistent with study 1, we adopted the bootstrapping approach to path analysis developed by Hayes and Preacher (2010) to test whether affect acted as a mediator in the relationship between experimental condition and change in behavioural outcomes.

The parallel testing of the indirect effects of positive and negative effect tell us that positive affect significantly mediated the relationship between experimental condition and participants' change in quality of study behaviour, I.D. effect = .29, bootstrap 95% C.I. = [.028, .931], and negative affect did not, I.D. effect = .12, 95% C.I. = [-.434, .758] (Figure 10). Conversely, the parallel testing of the indirect effects of positive and negative effect tell us that this time, positive affect did not significantly mediate the relationship between experimental condition and participants' change in quantity of study behaviours, I.D. effect = -.27, bootstrapping 95% C.I. = [-1.402, .502], and negative affect also did not mediate the relationship, I.D. effect = 1.03, 95% C.I. = [-.393, 2.674] (Figure 11). Thus, we find partial support for hypothesis 1, and again, we do not find support for hypothesis 2.

Discussion

As in study 1, hypothesis 1 was confirmed by the test of the indirect effect. As such, students demonstrated an increase in quality of study behaviour to the extent that they experienced positive affect as a result of the ideal self intervention. Additionally, consistent with study 1, hypothesis 2 was not confirmed, even though it had more opportunity as a result of the greater experience of negative affect than in study 1. As will be considered further in the general discussion, it is not necessary to conclude that negative affect never mediates, but we do claim clear evidence for the mediation by positive affect in this kind of context.

The failure of random assignment seems like a problem with respect to results pertaining to the overall effectiveness of the intervention, however, it does not take precedence over the meditation effects that were found in both study 1 and study 2. The systematic replication in this study further strengthens our confidence in the results.

Finally, it is important to consider the impact that the experimenter as facilitator may have had on the results of this study. It may be that participants in the treatment group reported greater positive affect than participants in the control group as a result of responding to demand characteristics from the experimenter/facilitator, however this is likely not the case. Participants in the treatment group also reported greater negative affect therefore, it is not likely that participants in the treatment condition simply enjoyed the session more or were responding to the facilitator in a positive manner given that the positive affect was accompanied with negative affect as well.

General Discussion

A review and integration of key theoretical and empirical research suggested that interventions which allow individuals to spend time thinking about who they would like to be in the future would result in both an immediate emotional response and also changes in behaviours. The goal of this study was to provide empirical evidence to establish whether these phenomena are connected. More specifically, the current study aimed to determine whether either (or both) positive and negative affect act as the mechanism through which the changes in behaviours

occur. Together, studies 1 and 2 revealed that although both positive and negative affect may be experienced as a result of an ideal self intervention, only those participants who experienced greater positive affect, regardless of their experience of negative affect, were most likely to engage in greater academic behaviours in line with the ideal self.

The Motivating Impact of Affect

The central finding in our study is that the ideal self intervention was effective in catalyzing improved study behaviours through the immediate experience of positive affect following the intervention. This positive striving approach is consistent with the affect-as-information theory proposed. Accordingly, as students were asked to imagine themselves as an ideal student, they experienced an emergence of positive emotions associated with the rewards and incentives made salient during the envisioning. These positive emotions energized their behaviours towards becoming their ideal self and, lead to improved academic behaviours (Custers & Aarts, 2005a; Deci & Ryan, 1985; Ryan & Deci, 2008). Though we did not directly assess how positive affect continued to influence students' behaviours for weeks following the intervention, we believe that the ideal self (including the associated rewards and incentives) that is made salient through the intervention, remains salient in students' minds as they continue in their studies. Akin to the gap that is made salient and remains salient in situations when negative affect is a key player in motivating behaviour, we believe that the positive outcomes remain salient in students' minds until they attain their ideal self. It would be an important contribution to directly assess whether this is the case in future research.

Regardless of the theoretical basis for predicting the mediating role of negative affect, negative emotions did not lead to an improvement in students' academic behaviours following the ideal self intervention. In other words, the negative affect neither sustained positive striving as some traditional motivational theory might not suggest, nor did it inhibit it. This is an especially important finding given the predominance of deficit-reducing approaches in the literature concerning motivation.

Ideal Self Interventions as Contextual

The current study aimed to examine the role of affect in the relationship between imagining an ideal self and the consequent changing of behaviours consistent with the desired end. The rationale for our test of positive and negative affect as mediator in the effect of the ideal self and the behavioural changes was theoretically derived. Even though the theories supporting this study were contradictory and therefore appeared to support a study of strong inference (Edwards & Berry, 2010; Platt, 1964), we were agnostic regarding the outcome of the mechanism. Rather than trying to overturn one of the theories supporting this study, we were trying to get some information about which theory is more applicable to this particular context.

In operationalizing the ideal self intervention, a number of interventions that boast an essence of self-growth and future-thinking were reviewed and integrated into a category that we called ideal self interventions. The studies reviewed were used to guide the operationalization of ideal self.

Our findings therefore, remain context-dependent. In other words, it is important to remember that our main finding of positive affect as mediator is true of this particular context, the context where people envision an ideal self (in whatever domain) and strive to achieve it. We are not suggesting that positive affect is the sole motivating mechanism, debunking the role of negative affect altogether in all circumstances. Rather, we stand to support the mediating role of positive affect in ideal self interventions. There is however, great value to this study given its' relevance to workplace behaviours. Students are essentially working full-time in an academic role where they have a workload and deadlines to meet. University students are also given a lot of autonomy in their work, which, as mentioned previously, made this context especially suitable for studying the motivating role of ideal self interventions.

Considerations for Future Research

The current study was not intended to be a subtle test of a narrow issue within this extremely complex field of motivation, but rather it was intended to get a more basic examination of the motivational processes that occur when people envision an ideal self in the

future. This was the primary goal since it was the first of its kind to test the connection between affect and behaviours in ideal self interventions. Future research on the motivational impact of affect may now benefit from a richer understanding of these relationships. In this way, it would be interesting to consider how information about participants' self-efficacy may play a role in the experience of affect. For example, self-efficacy may be affected by mood such that happy moods appear to increase feelings of self-efficacy (Baron, 1990; Lyubomirsky, King, & Diener, 2005; Samson & Rachman, 1989; Schuettler & Kiviniemi, 2006). Furthermore, self-efficacy may act as an antecedent to the experience of affect. Bandura's (1986) social cognitive theory recognizes self-efficacy as crucial in the link between effort and performance. If participants judge themselves as likely (not likely) to be able to enact study behaviours required to achieved the desired end, then they may feel more (less) optimistic about working towards becoming the ideal self. In sum, future research may benefit from the tracking of self-efficacy.

A second approach to extending the present research is one that disentangles students' orientation towards the intervention. In understanding the phenomena in the current study, we have assumed that since students are asked to imagine an ideal self, they would feel motivated to act in ways consistent with that end and would consequently study for longer and focus more during their studying. However, it may be possible that students were strategically trying to avoid behaviours that mismatched their ideal self (Brockner & Higgins, 2001). These two foci are described as promotion focused and prevention focused respectively and are the core components of Higgin's (1997, 1998) regulatory focus theory. Though the measures used in the current study more closely resemble students' promotion focused behaviours, it may be informative to also measure students' prevention focused behaviours as well.

Considerations for Future Ideal Self Interventions

The current study reveals important findings in the application of ideal self interventions as a tool for marshalling motivation to achieve desired outcomes. Rather than focusing on drawing a contrast between whom the person is at the present time and who they hope to be, highlighting the benefits and the rewards that will be made available as a result of becoming the

person they wish to be is the key to a successful intervention. Said differently, it appears that one important ingredient in motivating someone to pursue their ideal self is to make them feel good about it. This message is clear and it resonates with the impetus for positive psychology itself.

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Table 1

Rotated Factor Loadings of the gain scores for each item of the Academic Behaviours

Questionnaire in Study 1, showing the factor loadings: quality, preparedness, general tardiness.

	Component		
	1	2	3
"When I study, I really focus on the task at hand"	0.44	0.31	0.09
"When I am studying , I avoid distractions (e.g. Facebook, YouTube)"	0.60	0.05	0.06
"I put a lot of effort into my assignments/papers"	0.67	0.15	-0.29
"I concentrate deeply on the material I am working on"	0.80	0.08	-0.11
"I complete the assigned readings in preparation for class"	0.03	0.69	-0.03
"During lectures I am highly attentive"	0.30	0.41	-0.15
"I schedule certain times during the week as study time and stick to the schedule"	0.13	0.72	0.17
"I seek extra help (e.g., by going to office hours) if I don't understand material covered in class"	0.07	0.52	-0.30
"I put in the hours each day that are necessary to do well in school"	0.35	0.60	-0.08
"Typically I leave completing assignments to the last minute"	0.25	-0.41	0.46
"I sometimes hand in assignments/papers late"	-0.19	0.11	0.69
"I often arrive late to class"	-0.03	-0.13	0.77

Note. Extraction method: Principal components analysis. Rotation method: Varimax with Kaiser normalization.

Table 2

Pearson Correlations of variables included in the analyses in study 1.

	1.	2.	3.	4.	5.	6.	7.	8.	9.
1. Condition	1								
2. Positive Affect	.19*	1							
3. Negative affect	.07	-.02	1						
4. Change in Quality Study Behaviours	.05	.19*	-.02	1					
5. Change in Quantity Study Behaviour	.13	.18*	-.02	.17*	1				
6. Quality of Study Behaviour Time 1	.16	.34**	-.23**	.00	.13	1			
7. Quality of Study Behaviour Time 2	.15	.38**	-.18*	.72**	.22*	.69**	1		
8. Quantity of Study Behaviour Time 1	-.07	.07	.08	.07	.00	.04	.08	1	
9. Quantity of Study Behaviour Time 2	.06	.18*	.03	.18*	.78**	.12	.22*	.63**	1

Note. Condition coded as 0 = control and 1 = treatment.

* $p < .05$, ** $p < .01$. Both two-tailed.

Table 3

Rotated Factor Loadings of the gain scores for each item of the Academic Behaviours

Questionnaire in Study 2, showing the factor loadings: quality, preparedness, general tardiness.

	Component		
	1	2	3
"When I study, I really focus on the task at hand"	0.76	0.09	0.01
"When I am studying , I avoid distractions (e.g. Facebook, YouTube)"	0.61	0.17	0.12
"I put a lot of effort into my assignments/papers"	0.70	0.04	-0.26
"I concentrate deeply on the material I am working on"	0.74	0.03	-0.15
"During lectures I am highly attentive"	0.55	0.12	-0.03
"I complete the assigned readings in preparation for class"	-0.16	0.63	-0.27
"I schedule certain times during the week as study time and stick to the schedule"	0.32	0.52	0.12
"I seek extra help (e.g., by going to office hours) if I don't understand material covered in class"	0.09	0.69	0.03
"I put in the hours each day that are necessary to do well in school"	0.39	0.67	0.01
"Typically I leave completing assignments to the last minute"	-0.11	-0.21	0.67
"I sometimes hand in assignments/papers late"	0.02	0.01	0.78
"I often arrive late to class"	-0.08	0.12	0.65

Note. Extraction method: Principal components analysis. Rotation method: Varimax with Kaiser normalization.

Table 4

Pearson correlations of variables included in the analyses in study 2.

	1.	2.	3.	4.	5.	6.	7.	8.	9.
1. Condition	1								
2. Positive Affect	.23**	1							
3. Negative affect	.30**	-.04	1						
4. Change in Quality Study Behaviours	.10	.16	.06	1					
5. Change in Quantity Study Behaviour	-.19*	-.12	.09	-.00	1				
6. Quality of Study Behaviour Time 1	.19*	.20*	.02	.00	.09	1			
7. Quality of Study Behaviour Time 2	.20*	.25**	.05	.69**	.07	.73**	1		
8. Quantity of Study Behaviour Time 1	.16	-.07	.17	-.05	.00	.24**	.14	1	
9. Quantity of Study Behaviour Time 2	-.04	-.13	.18*	-.04	.74**	.23**	.14	.68**	1

Note. Condition coded as 0 = control and 1 = treatment.

* $p < .05$, ** $p < .01$. Both two-tailed.

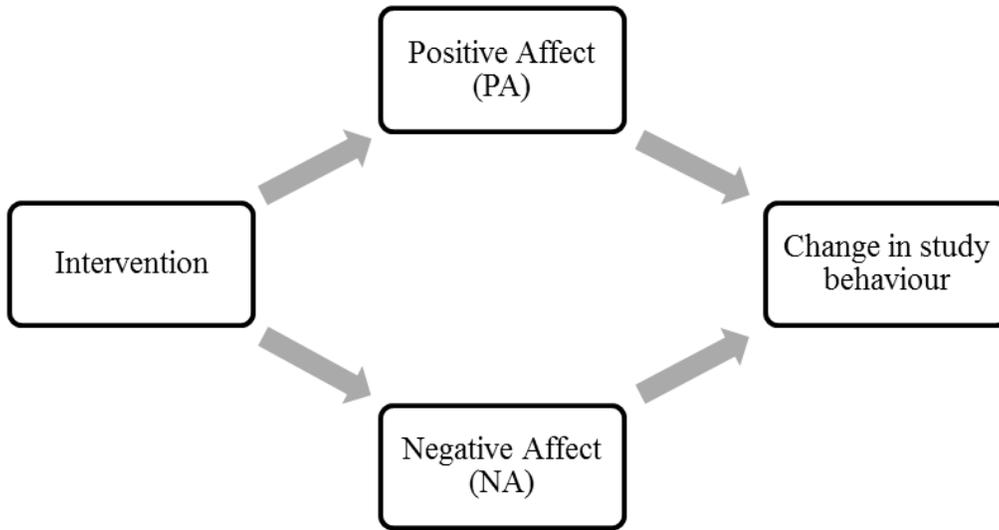
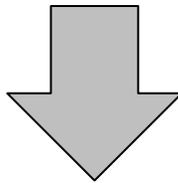


Figure 1. Conceptual path model showing the anticipated relationship between the intervention, positive affect, negative affect and the resulting change in study behaviour.

	In-lab		In-between lab and online	Online, 6 weeks later
Stage 1	Stage 2-4	Stage 5	Stage 6	Stage 7
Pre-measure Academic Behaviours Questionnaire (Time 1)	Activity Booklets (Ideal-Self Activation or Placebic)	PANAS	Participants receive reminder e-mails	Post-measure Academic Behaviours Questionnaire (Time 2)



		In-lab		
		Stage 2a: Means	Stage 3a: Placebic	Stage 4a: N/A
Control Condition		List characteristics of effective students and also list what students could do to improve their effectiveness	List good and bad things about university	
		Stage 2b: Means	Stage 3b: Outcomes	Stage 4b: Ideal Self Visualization
Treatment Condition		List characteristics of effective students and also list what students could do to improve their effectiveness	Imagine yourself in 7 years and list consequences and benefits of performing well at university	Visualize yourself as your ideal student

Figure 2. Procedure chart visually depicting the various stages in study 1, including both the overall stages for the control and treatment groups, and an in-depth look at stages 2 to 4 for the control and treatment groups separately.

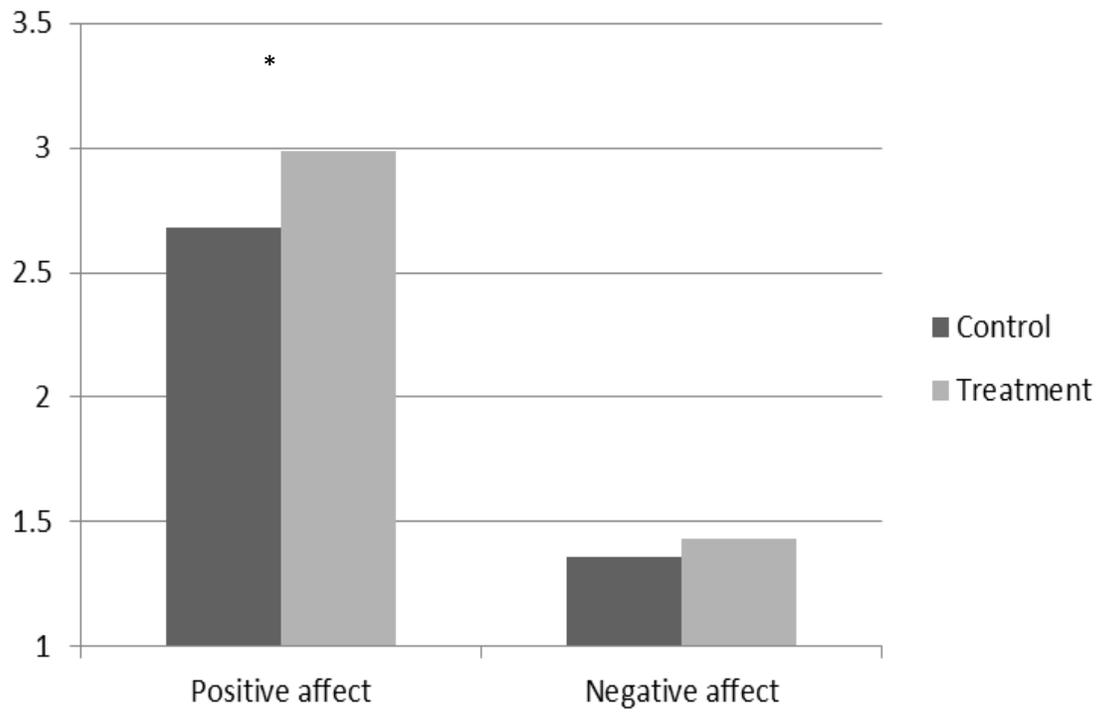
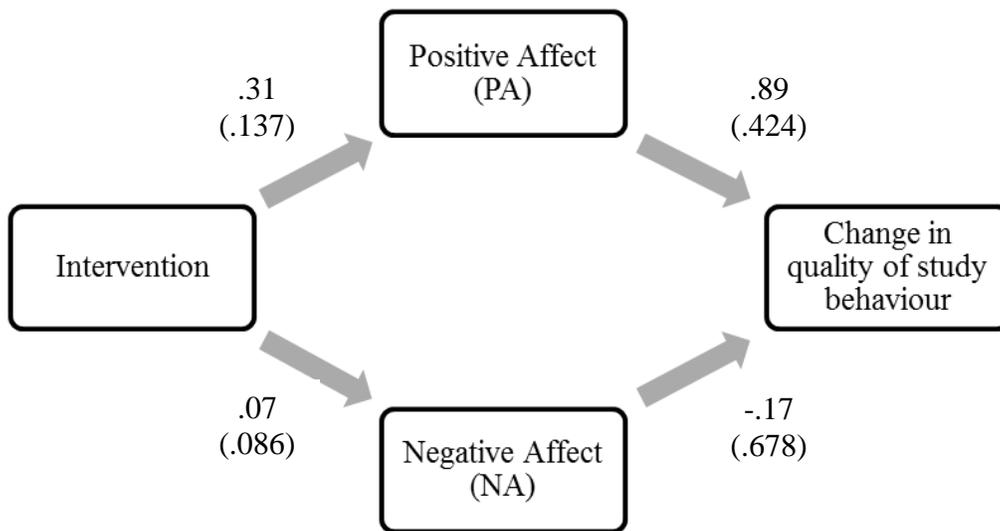


Figure 3. Condition differences on immediate ratings on the PANAS in study 1, $*p < .05$.



$$ID_{PA} = .27, 95\% \text{ C.I.} = [.017, .826]$$

$$ID_{NA} = -.01, 95\% \text{ C.I.} = [-.325, .131]$$

Figure 4. Path model with unstandardized coefficients (and standard errors) of the relationship between the intervention, positive affect, negative affect and the resulting change in quality of study behaviours in study 1.

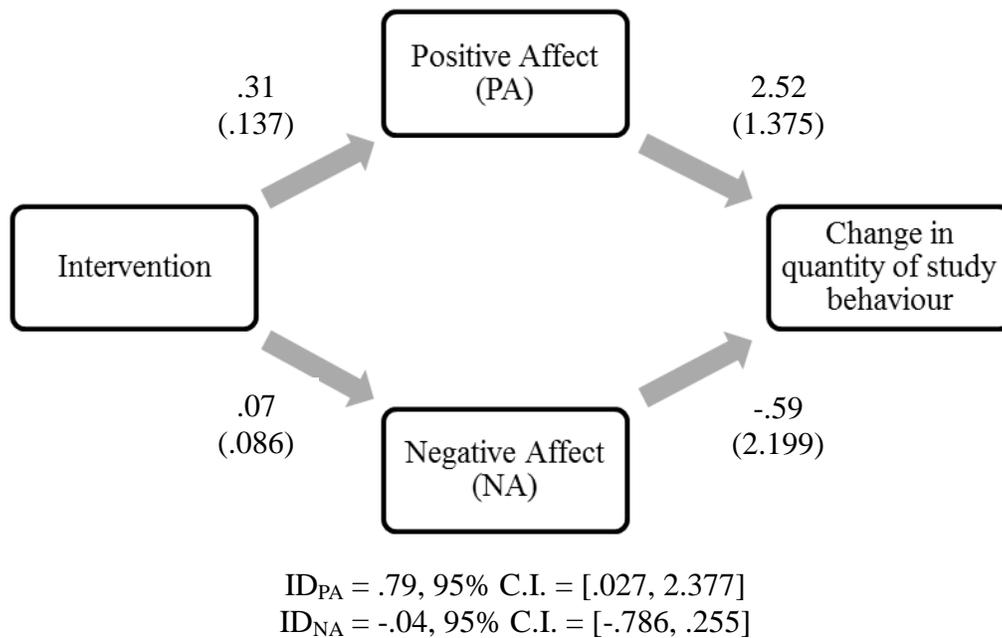


Figure 5. Path model with unstandardized coefficients (and standard errors) of the relationship between the intervention, positive affect, negative affect and the resulting change in quantity of study behaviours in study 1.

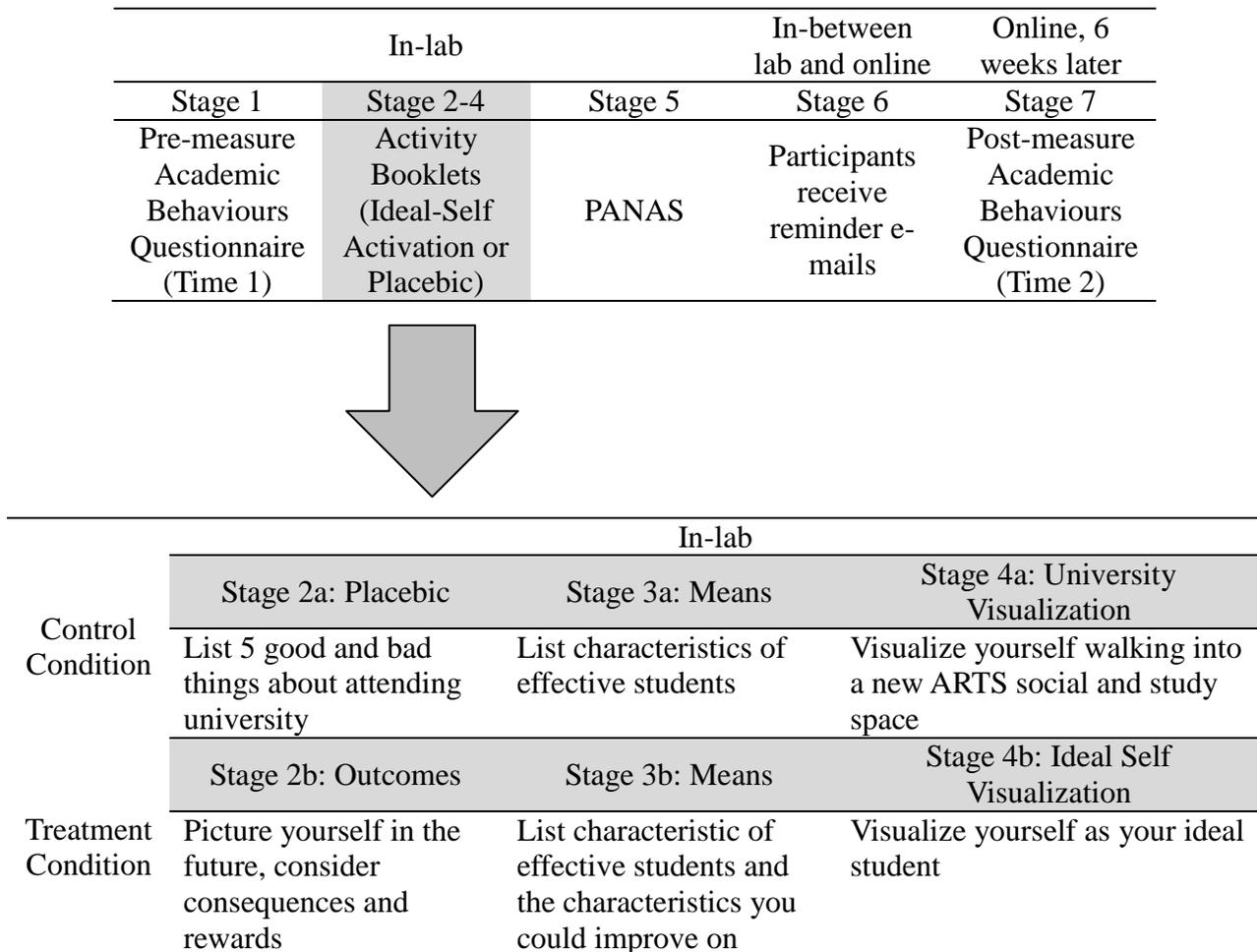


Figure 6. Procedure chart visually depicting the various stages in study 2, including both the overall stages for the control and treatment groups, and an in-depth look at stages 2 to 4 for the control and treatment groups separately.

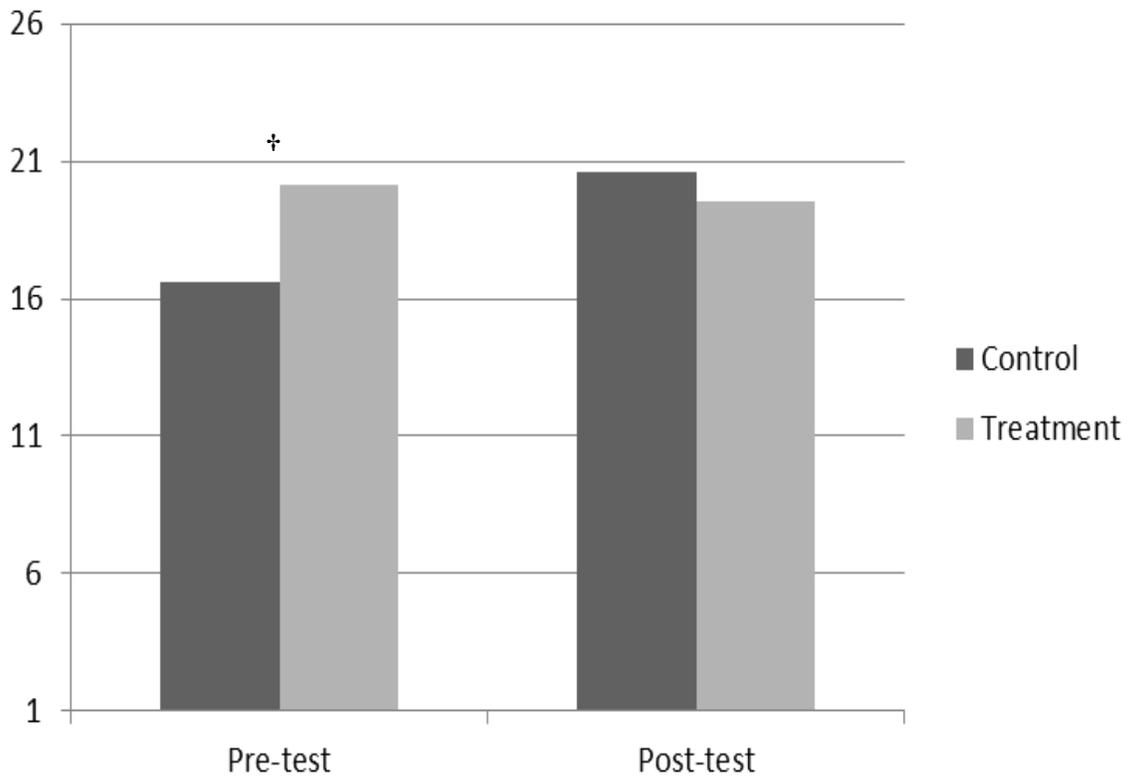


Figure 7. Condition differences on the pre- and post-measure of quantity of study behaviour in study 2, † $p < .10$.

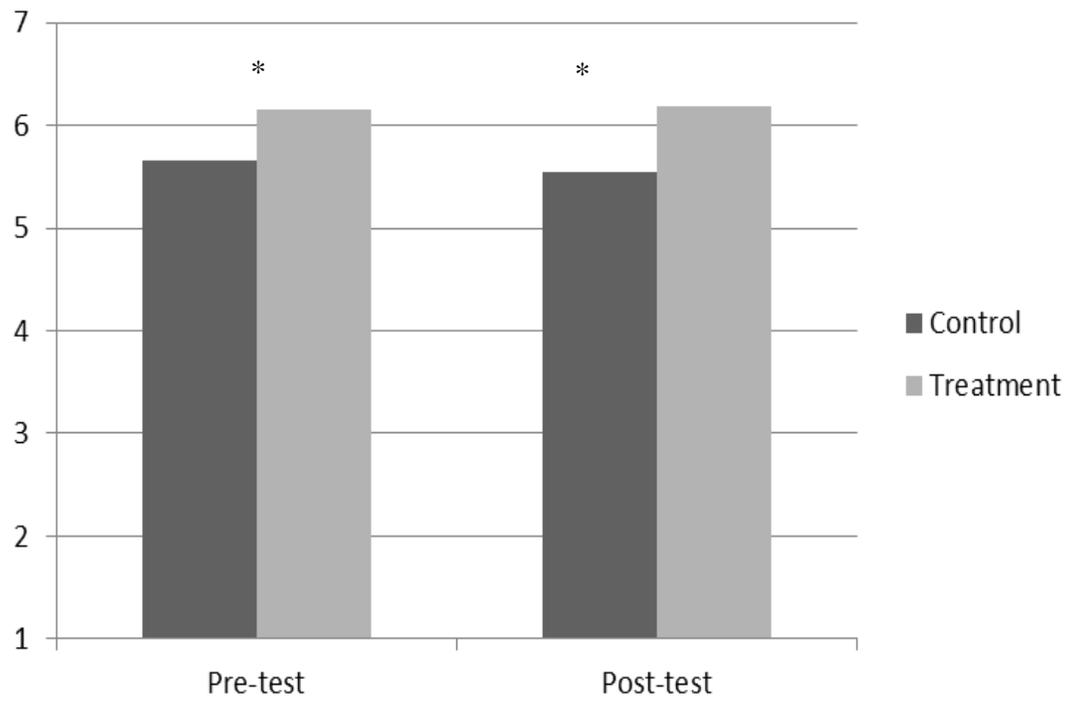


Figure 8. Condition differences on the pre- and post-measure of the quality of study behaviours in study 2, * $p < .05$.

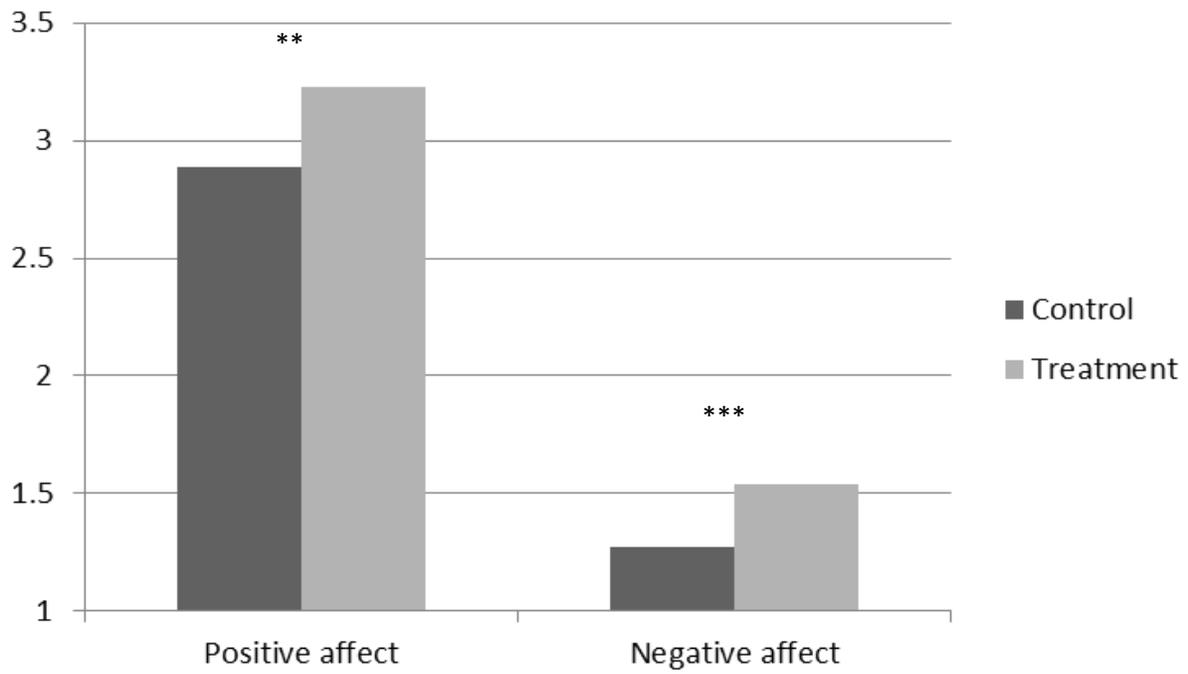


Figure 9. Condition differences on immediate ratings on the PANAS in Study 2, $**p < .01$.

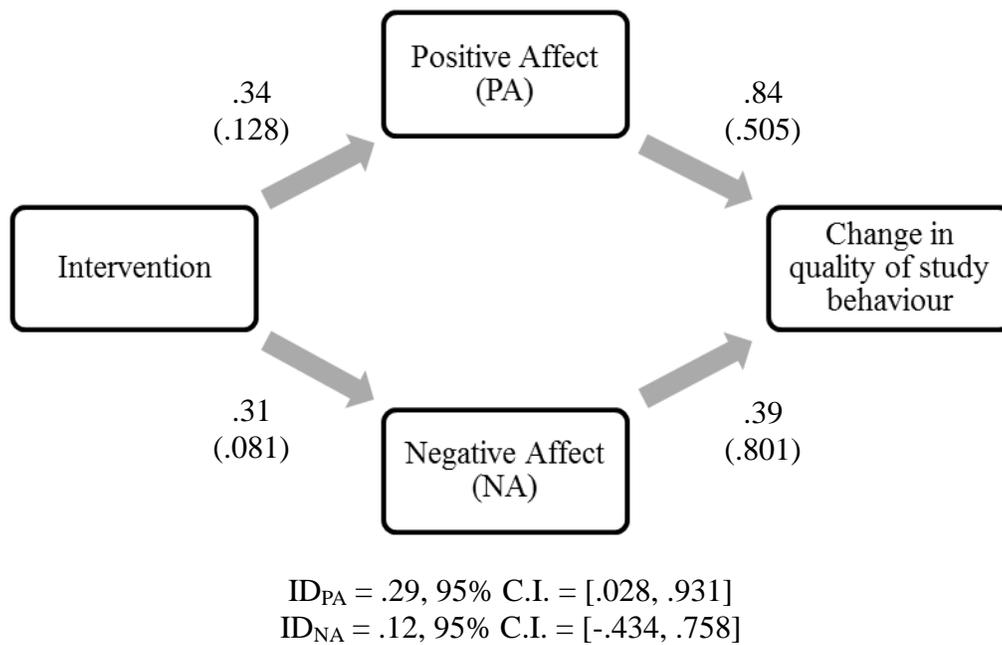


Figure 10. Path model with unstandardized coefficients (and standard errors) of the relationship between the intervention, positive affect, negative affect and the resulting change in quality of study behaviours in study 2.

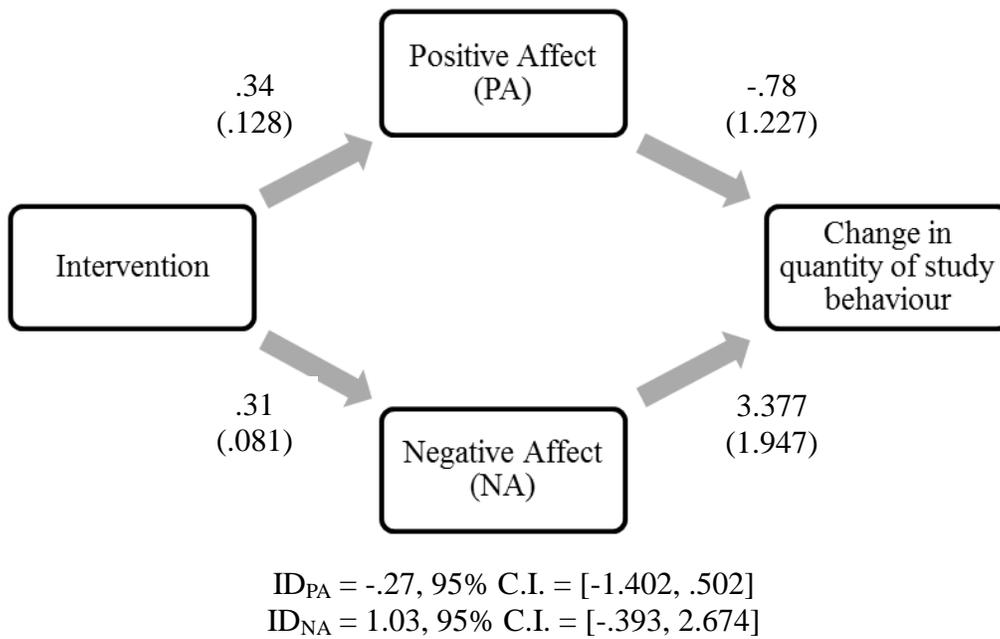


Figure 11. Path model with unstandardized coefficients (and standard errors) of the relationship between the intervention, positive affect, negative affect and the resulting change in quantity of study behaviours in study 2.

Appendix A

Academic Behaviour Questionnaire

Please answer the following questions by circling one of the options. If the question is not applicable, please write an "X" in the space provided.

Typically, when classes are in session:

- How many hours of homework/studying do you do on average per week? _____
- What percentage of class time do you miss on average per month? _____%
- What percentage of tutorial/lab time do you miss on average a month? _____%
- OR- Not Applicable (I have never had a tutorial/lab) _____

The numbers 1-9 refer to the following:

1	2	3	4	5	6	7	8	9
Completely Disagree	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree Nor Disagree	Somewhat Agree	Agree	Strongly Agree	Completely Agree

1. Typically, I leave completing assignments to the "last minute".	1	2	3	4	5	6	7	8	9
--	---	---	---	---	---	---	---	---	---

-OR- Not Applicable _____

2. I complete the assigned readings in preparation for class.	1	2	3	4	5	6	7	8	9
---	---	---	---	---	---	---	---	---	---

-OR- Not Applicable _____

3. I sometimes hand in assignments/papers late.	1	2	3	4	5	6	7	8	9
---	---	---	---	---	---	---	---	---	---

-OR- Not Applicable _____

4. During lectures I am highly attentive.	1	2	3	4	5	6	7	8	9
---	---	---	---	---	---	---	---	---	---

-OR- Not Applicable _____

5. When I study, I really focus on the task at hand.	1	2	3	4	5	6	7	8	9
--	---	---	---	---	---	---	---	---	---

-OR- Not Applicable _____

6. I schedule certain times during the week as "study time" and stick to the schedule.	1	2	3	4	5	6	7	8	9
--	---	---	---	---	---	---	---	---	---

-OR- Not Applicable _____

The numbers 1-9 refer to the following:

1	2	3	4	5	6	7	8	9
Completely Disagree	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree Nor Disagree	Somewhat Agree	Agree	Strongly Agree	Completely Agree

7. I seek extra help (e.g. by going to office hours) if I don't understand material covered in class.	1	2	3	4	5	6	7	8	9
---	---	---	---	---	---	---	---	---	---

-OR- Not Applicable _____

8. I put in the hours each day that are necessary to do well in school.	1	2	3	4	5	6	7	8	9
---	---	---	---	---	---	---	---	---	---

-OR- Not Applicable _____

9. I often arrive late to class.	1	2	3	4	5	6	7	8	9
----------------------------------	---	---	---	---	---	---	---	---	---

-OR- Not Applicable _____

10. When I am studying, I avoid distractions (e.g. Facebook, YouTube, instant messenger).	1	2	3	4	5	6	7	8	9
---	---	---	---	---	---	---	---	---	---

-OR- Not Applicable _____

11. I put a lot of effort into my assignments/papers.	1	2	3	4	5	6	7	8	9
---	---	---	---	---	---	---	---	---	---

-OR- Not Applicable _____

12. I concentrate deeply on the material I am working on.	1	2	3	4	5	6	7	8	9
---	---	---	---	---	---	---	---	---	---

-OR- Not Applicable _____

Appendix B

Positive and Negative Affect Scale

(Watson, Clarck, & Tellegen, 1998)

This scale consists of a number of words that describe different feelings and emotions. Read each item and then mark the appropriate answer in the space next to that word. Please indicate to what extent you are feeling this way right now. Use the following scale to record your answers.

1
very slightly
or not at all

2
a little

3
moderately

4
quite a bit

5
extremely

_____ interested

_____ irritable

_____ distressed

_____ alert

_____ excited

_____ ashamed

_____ upset

_____ inspired

_____ strong

_____ nervous

_____ guilty

_____ determined

_____ scared

_____ attentive

_____ hostile

_____ jittery

_____ enthusiastic

_____ active

_____ proud

_____ afraid

Appendix C
Intervention Materials
Treatment Condition

Activity 1

In the space provided please answer the following questions.

What, in your opinion, are the characteristics of a high-achieving student? Please list as many characteristics that you can think of. (e.g. does homework on time, enjoys attending lectures)

What are some study habits which would help students to increase their academic achievement at university?

Activity 2

In the space provided please answer the following questions.

Picture yourself in 7 years, what benefits do you believe you will you be experiencing because you have performed well at university?

Picture yourself in 7 years, what drawbacks do you believe would arise if you had not performed well at university?

Activity 3

Sit back and relax, take a few minutes to visualize yourself performing to your full potential at university. Visualize yourself during a normal school day a year from now: picture yourself using the study skills you just listed and visualize yourself experiencing the benefits that come with increasing your academic performance. Try to include as much detail as possible in your visualization. (e.g.what are you doing, what do you see, what do you feel like?) When you are ready, please write down a *detailed* description of this image in the space provided using the *present* tense.

If you have trouble visualizing yourself, try this exercise to help. Visualize your bedside lamp, or a lamp somewhere in your house that you use a lot. Picture the lamp, picture yourself turning on the lamp, picture yourself looking at the lamp and then turning it off. Now, try visualizing yourself performing to your full potential at university again and record the details in the present tense.

Personal Vision Statement

What are the most important elements in your visualization? Which study habits helped the most with your performance? Which benefits did you enjoy the most? In the following space, write a statement about the kind of student you would like to become. The statement should be general, and just a few sentences long capturing the most important elements of your visualization.

I am capable of being a student who...

Appendix D
Intervention Materials
Control Condition

Activity 1

In the space provided please answer the following questions.

What, in your opinion, are the characteristics of a high-achieving student? Please list as many characteristics that you can think of. (e.g. does homework on time, enjoys attending lectures)

What are some study habits which would help students to increase their academic achievement at university?

Activity 2

In the space provided please answer the following questions.

Please list 5 good things about attending university. (e.g. meet new people)

Please list 5 bad things about attending university (e.g. costs a lot of money)

Appendix E
Study Skills Package

Study Skills Resources

Being a successful student at university can sometimes be challenging. Meeting with a friendly and experienced counsellor can help you handle and manage your goals. In addition, attending a workshop at Counselling Services is one of the best ways to enhance your academic performance.

We have workshops to assist you in many different areas including study skills, preparing for exams, anxiety, procrastination and mindfulness stress reduction.

Like our University's labs, libraries and study groups, Counselling Services provides a wide range of strategies to help you do your very best during your time here at UW. We will help you succeed.

At Counselling Services, you can find help with Study Skills, Career Counselling and personal goals. We provide training to students, faculty & staff alike and support campus life year round.

UW Counselling Services website: <http://www.adm.uwaterloo.ca/infocs/>

Appendix F
Intervention Materials
Vision Condition



Self-Reflection Exercise - Part I

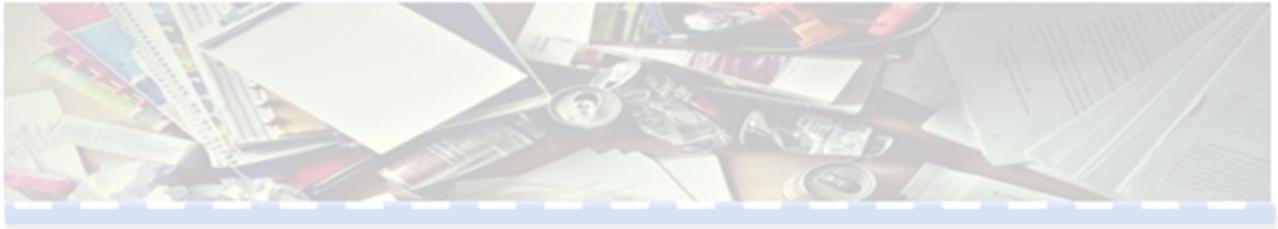
In the space provided please answer the following questions concerning benefits or drawbacks associated with your academic performance.

Take a moment to imagine a less-than-ideal professional life for yourself, a few years after graduating from university. Also imagine that you had been less effective than you could have been as a university student. What thoughts, feelings, and other consequences do you imagine you would experience in this scenario (e.g., feelings of guilt or embarrassment; left with a lot of student loans/debt; unhappy in your job, etc.)?

Next, take a moment to imagine a much-more-ideal professional life for yourself, a few years after graduating from university. Also imagine that you had been quite effective as a university student. What thoughts, feelings, and other consequences do you imagine you would experience in this scenario (e.g., how you would feel about yourself; practical or tangible consequences; enjoyment of your job or career, etc.)?

Now please reflect on, and describe, some *immediate* benefits that you might experience if you were to increase your academic achievement at university by working more effectively as a student (e.g., sense of pride; taking pleasure in completing school-related work; earning scholarships or awards, etc.).

*** Please wait for instructions before going on to the next page ***



Self-Reflection Exercise - Part II

Please answer the questions on this page, which concern study behaviours associated with academic performance.

Take a moment to think about an effective student's study habits. Try to picture what their study behaviours may look like. For example, what do they do every day; what are their habits like; do they have a routine related to their school work? Now please list the study behaviours, work habits or routines of the high-achieving student from your reflection.

What are some study behaviours that you currently do not practice that may help you to increase your academic achievement at university (e.g., doing the readings before class, printing the slides ahead of time to take notes, etc.)?

***** Please wait for instructions before going on to the next page *****



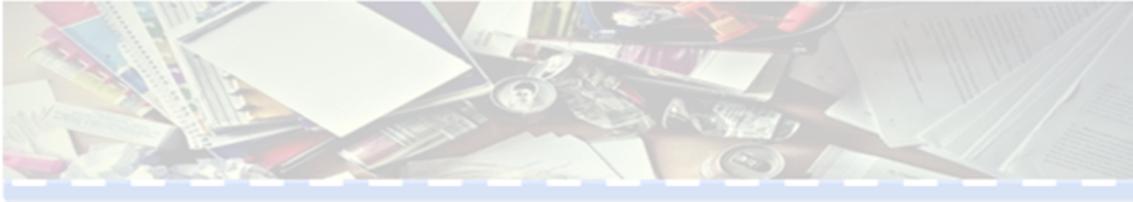
Personal Vision Statement

Now that you have pictured yourself acting more to your potential for academic effectiveness, your task on this page is to compose a personal vision statement that encapsulates your improved ways of acting and of being.

In the following space, write a statement about the kind of student you would like to become. The statement should be just a few sentences long, capturing *the most important elements of your visualization*. It should *include the study behaviours* that will be most helpful in helping you to become a more effective student. It should also *include the benefits* that these new behaviours will allow you to experience.

I look forward to being a student who...

Appendix G
Intervention Materials
Control Condition



University Experience Reflection Activity - Part I

In the space provided please answer the following questions.

Please list at least 5 good things about attending university (e.g., learning new things, meeting new people, participating in clubs/varsity, etc.).

Please list at least 5 bad things about attending university (e.g., consists of a lot of work, costs a lot of money, can be stressful, etc.).

*** Please wait for instructions before going on to the next page ***



University Experience Reflection Activity - Part II

Please answer the following question, which concerns study behaviours associated with academic performance.

Take a moment to think about an effective student's study habits. Try to picture what their study behaviours may look like. For example, what do they do every day; what are their habits like; do they have a routine related to their school work? Now please list the study behaviours, work habits or routines of the high-achieving student from your reflection.

***** Please wait for instructions before going on to the next page *****

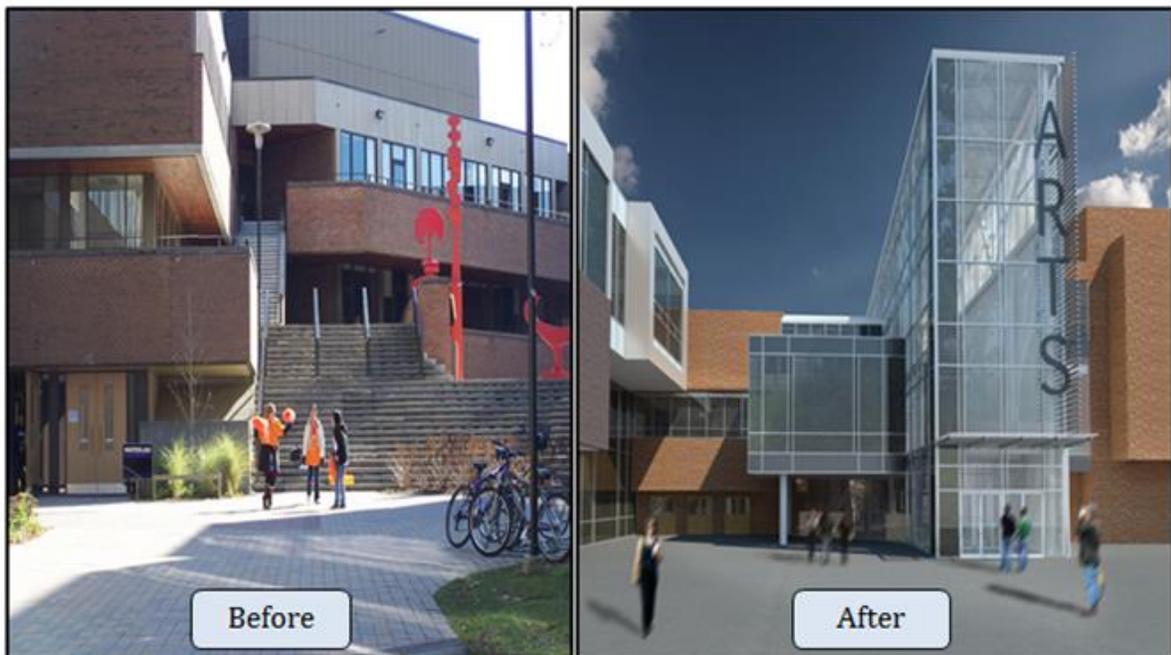


University Experience Reflection Activity - Part III

As part of their strategic plan, the University of Waterloo has recognized the need for more teaching, research, study, and social space for Arts students.

In order to address this need, the university will create an atrium area by enclosing the outdoor courtyard within Hagey Hall. Consequently Arts students will have a dedicated area to do their work while on campus as well as being able to socialize with other Arts students between classes.

Please refer to the images provided below.



*** Please go on to the next page ***



Your task in this part of the activity is to visualize how students will use this space and benefit from it.

Take a few deep breaths, and let go of any tension as you exhale, so that you are relaxed, comfortable, and centered. Sit back, and relax.

Imagine arriving on campus and walking up to the new Hagey Hall atrium. Visualize yourself stepping into the new space and choosing a table to sit at. If you are an Arts student, perhaps you are going there on your own. If you are not an Arts student, perhaps you are meeting up with friends who are already there.

Shut your eyes for a moment, and try to stay with that image.

Visualize yourself during a normal school day. Picture yourself using the study space. Visualize yourself experiencing the benefits of this grand room. Try to include as much detail as possible in your visualization.

- >>What does this space look like?
- >>Are you using this space to socialize or to do school work?
- >>Is this space beneficial to you?
- >>What are some of the services available in this space?
- >>Is this space enjoyable?

When you are ready, please write down a description of this image in the space provided. Please use the preceding questions to help guide your description.

Appendix H

Study Skills Resources

WATERLOO LEARN Study Skills Information

Course Home | Course Materials ▾ | Connect ▾ | Assessments ▾ | Grades | Reports | Edit Course

Study Skills Information

Updates ▾
There are no current updates for Study Skills Information

Course Tools ▾
• Instructor Tools

Library Resources ▾
• [Get Course Reserves](#)
• [Search for books and more](#)
• [See subject & course research guides](#)
• [Search Google Scholar](#)
• [Ask a Librarian](#)

Calendar ▾

Content Browser ▾
Home
Time Management
• [Create a schedule for your semester](#)
• [Ask yourself: Do you sabotage your time?](#)
• [Manage your time effectively](#)
• [How to create a task list](#)
• [Daily to-do list](#)
• [Weekly to-do list](#)
• [Backwards planning](#)

Appendix I
Arts Building Crest
Control Condition



Appendix J

Personal Vision Statement Crest

Treatment Condition

