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Does Frequent Use of Signature Strengths Enhance Academic Well-Being?

Phillip Anton Ianni

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By

Phillip Anton Ianni

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Phillip Anton Ianni

APPROVED BY:

_____
Dr. Phil Graniero, Department of Earth and Environmental Sciences

_____
Dr. Dennis Jackson, Department of Psychology

_____
Dr. Kenneth Hart, Advisor

_____
Dr. Ken Cramer, Chair of Defense

(September 10, 2012)

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ABSTRACT

The present study investigated the effect of strengths use on students' academic well-being. Specifically, it examined 'StrengthsQuest', a workbook-based program that helps students identify and utilize their natural talents, also known as 'signature strengths'. The present study sought to answer whether strengths use is associated with higher marks, academic happiness, and academic flow. University students ($n = 292$) completed an eight week StrengthsQuest program. GPA data were obtained using self-report and from the Registrar's Office. Other data were obtained via questionnaires administered at two time points: before and after students completed the StrengthsQuest program. Although the present study found no support for the association between strengths use and grades, the findings suggest that frequent use of strengths is associated with higher levels of flow and happiness in one's academic life. These findings are consistent with prior theory and research on strengths. The findings also have implications for academic advisors.

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CHAPTER 1

INTRODUCTION

1.1 The scope of the issue: Academic Well-Being

The present study aims to explore and redefine the construct of student success by applying the latest theory and scientific evidence from the field known as positive psychology. Recently, researchers in positive psychology have put emphasis on the idea of thriving, sometimes called flourishing or well-being (Keyes & Haidt, 2003; Seligman, 2011). People who are thriving do not simply lack mental illness (indeed, there are people who score low on well-being - this is termed languishing). Instead, they are able to overcome obstacles and challenges, have healthy relationships, are engaged and productive, and look out for the well-being of others (Keyes & Haidt, 2003).

The general consensus in the well-being literature is that psychological well-being is a multifaceted construct (Ryff, 1995; Seligman, 2011). For example, Seligman (2011) has operationalized well-being as being made up of five factors: positive emotions, engagement/flow, relationships, meaning, and accomplishment. The present study seeks to test whether using one's character strengths enhances psychological well-being as measured by positive emotions, flow, and accomplishment.

The general concern of the present study is to explore the concept of "academic wellbeing". Academic well-being is a holistic construct that maps onto quality of life in the educational setting. The present study examined three aspects of academic well-being: academic performance, academic happiness, and academic flow. So far, there is a

dearth of research examining what psychological processes lead students to engage in and fully benefit from the university experience.

1.1.1 Positive pedagogy: Interventions in the classroom

Recently, the Journal of Positive Psychology devoted an entire Special Issue to examining ways to promote a "positive university" by incorporating positive psychology content and applications into psychology courses (Oades, Robinson, Green, & Spence, 2011; Magyar-Moe, 2011). According to Oades et al., a positive university "needs to be a positive institution, insofar as its activities enable key stakeholders to utilize positive traits (e.g. strengths) in the service of individual, joint and collective goals." Further, they maintain that universities need to develop interventions that tap theory and research on human strengths. One potential avenue for such interventions is positive psychology courses, which feature scholarship on human strengths within the curriculum. Positive psychology courses are becoming increasingly common in universities throughout North America and can provide a unique vehicle for embedding interventions that not only help students learn, but also help them flourish in their everyday lives (Seligman, Ernst, Gillham, Reivich, & Linkins, 2009).

1.1.2 Strengths Development Programs

The present study seeks to test an intervention based on the principles of strengths-based education. Strengths-based education aims to promote pupils' utilization of their strengths. Personal strengths have been defined by some authors (e.g. Wood, Linley, Maltby, Kashdan, & Hurling, 2011) as being the "characteristics of a person that allow them to perform well or at their personal best". Strengths-based education (Lopez & Louis, 2009) is founded on five basic principles. First, strengths-based education

emphasizes the importance of measurement of strengths and potential positive outcomes. Second, strengths-based education emphasizes individualization, which requires the tailoring of a program to each students' needs and interests. Third, strengths-based education emphasizes the need to network with other people who can affirm one's strengths. Fourth, strengths-based education emphasizes deliberate application of strengths inside the classroom setting. Lastly, strengths-based education emphasizes the intentional development of strengths through practice across an extended period of time.

Several systems have been created to classify and develop individuals' character strengths. The Values in Action (VIA) inventory of character strengths (Peterson & Seligman, 2004) is composed of 24 strengths that were derived from universally valued character traits thought to promote fulfillment and happiness. Although the VIA program has been used in several studies (including many of the articles reviewed here), there is no formal strengths development program that accompanies the assessment.

Another classification, known as the Realise-2 (Linley, 2009), identifies 60 strengths and categorizes them into realized and unrealized strengths. Unlike the other strengths classifications, the Realise-2 also gives respondents feedback on their weaknesses. While the Realise-2 has been used in many diverse settings (including educational and business settings), there are no known published empirical studies testing the Realise-2.

Lastly, there is the StrengthsQuest (SQ) program (Clifton, Anderson, & Schreiner, 2006), which was used in the present study. This system was devised after interviewing thousands of professionals with the aim of identifying the talent themes that characterized the top performers. Thirty-four themes that could be used to differentiate top performers

from the rest of the respondents were identified (see Appendix C for all 34 themes and a brief description of each theme). Like the VIA, StrengthsQuest is widely used in education and business; however, unlike the VIA, there is a lack of research supporting the claims of the creators of the program.

The SQ program has three primary components. In the first step of the program, respondents take a brief online questionnaire called StrengthsFinder that helps them discover their top five strengths (sometimes dubbed "Top Themes of Talent" or "Signature Themes"). SQ is designed in such a way that everyone who takes it is only given feedback on their top five strengths (though the strengths differ from person to person). Second, after learning what their strengths are, students read the StrengthsQuest workbook (Clifton et al., 2006). This workbook helps students understand their strengths, teaches them how to build their strengths, and provides suggestions about ways in which they can apply their strengths in the domains of academics, careers, relationships, and extracurricular activities. After students have read the workbook, students put their strengths into action. Students are coached to actively apply their strengths in the life domains in which they want to excel (Schreiner, 2010).

1.2 Review of Strengths-Based Research

At present, research on character strengths is very limited, and should be interpreted with caution. The literature, for the most part, has been over-enthusiastic, as theory currently far outstrips data. Due to lack of empirical findings, favourable conclusions about strengths interventions with students are considered tentative. This lack of evidence is a limitation and a weakness of the science in this area. This paucity of findings serves, in part, to justify the need for the present study, which seeks to correct

this limitation by examining whether hard evidence supports claims that are largely speculative.

1.2.1 Findings of previous strengths research

While the purported benefits of using one's strengths remain in doubt, many researchers and practitioners have created positive psychology interventions in clinical, educational, and organizational contexts (Biswas-Diener, 2009). In the clinical domain, positive psychotherapy techniques that build on clients' strengths are associated with better client outcomes in comparison to non-strengths interventions (Seligman, Rashid, & Parks, 2006). Coaching psychology has applied the principles of positive psychology by enhancing the well-being and performance of athletes and executives (Linley & Harrington, 2007). In the educational domain, strengths-based curricula have been found to increase students' intrinsic motivation, social support, and ability to build upon past successes (Louis, 2008; Bowers & Lopez, 2010).

One recently-published article (Quinlan, Swain, & Vella-Brodrick, 2011) reviewed the effectiveness of several character strengths intervention studies conducted in academic environments. Quinlan et al. reviewed eight studies that 1) taught or used a strengths classification system to enhance well-being, and 2) used pre- and post-intervention measures. They found that character strengths interventions in the classroom have consistently shown that individuals who use their top strengths exhibit consistent improvements in well-being.

The first published study investigating the effects of strengths use was conducted by Seligman, Steen, Park, and Peterson (2005). They conducted an on-line study that encouraged participants to make use of one of their top five VIA strengths in a different

way every day of the week. Participants who made use of their strengths in this manner exhibited significant long-lasting improvements in happiness. A comparison group that simply identified their strengths did not show these benefits.

Another intervention conducted as part of a dissertation (Rashid, 2004). This intervention, which was incorporated as part of a class in Positive Psychology, assessed 24 VIA strengths. Using cognitive and behavioural techniques, Rashid tested whether these strengths can be enhanced. Students were encouraged to recognize their own strengths, build on them and use them more often. Rashid found that compared to the control group, the intervention that received the strengths-based intervention exhibited significantly greater increases in well-being.

The next published study, which was conducted by Austin (2005), examined the effects of a strength development intervention on high school students' self-reported academic abilities. Students were randomly assigned to either an intervention group (who received the strengths development intervention) or a control group. Like the present study, the students in Austin's intervention group took the Gallup StrengthsFinder test to discover their strengths. Compared to students in the control group, students in the intervention group scored significantly higher on measures of academic efficacy, expectancy, positive academic behaviors, and extrinsic motivation. However, it should be cautioned that there was no pre-test assessment of participants in Austin's study.

Govindji and Linley (2008) examined the effects of a school-wide strengths approach integrated with everyday classroom teaching that encouraged children to identify times in which they used their VIA character strengths. Using a qualitative

methodology, they found that this program produced increases in the children's self-confidence and achievement motivation.

In 2009, Mitchell, Stanimirovic, Klein, and Vella-Brodrick conducted a study where participants were randomly selected to participate in a strengths-based intervention, a problem solving intervention, or a placebo control group. The students in the strengths intervention chose their top strengths from VIA's list of 24 character strengths. They found that while the participants in the intervention group exhibited significantly greater gains in well-being in eight life domains, there were no significant changes in measures of positive and negative affect or life satisfaction.

Rust, Diessner, and Reade (2009) conducted a study of a strength-based intervention. Unlike other studies, however, Rust et al. examine d the relative benefits of working on two strengths versus working on one strength and one weakness. After completing the VIA, they found that university students in both of the intervention groups reported having significantly greater increases in well-being in comparison to students in the control group.

A study reported by Seligman, Ernst, Gillham, Reivich, and Linkins (2009), a strengths-based intervention was designed to help high school students identify their VIA strengths and use them in a new way. After a two-year follow-up, Seligman et al. (2009) reported (compared to a control group) that there were significant improvements in students' academic scores, social skills and learning strengths.

The most recent study reviewed by Quinlan et al. (2011) was a study conducted by Proctor et al. (2011a). As part of the intervention, high school students built on their top five VIA character strengths, learned new strengths and learned how to recognize

strengths in others. They found that although students reported significant increases in life satisfaction, there was no significant change in positive affect and self-esteem.

Several other studies not reviewed by Quinlan et al. yielded similar findings. A study conducted by Wood, Linley, Maltby, Kasdan, & Hurling (2011). This study was unique in that it emphasized the concept of strengths use. They found (at three- and six-month follow-up) that strengths use was associated with lower levels of stress, and higher levels of self-esteem, vitality and positive affect. Despite these encouraging findings, it should be cautioned that although Wood et al. assessed strengths use, they did not use a strengths assessment to inform individuals of what strengths they possessed. This limitation was addressed in the present study by incorporating a strengths assessment and strengths development program, and assessing the extent to which those strengths were used.

One study has examined the association between signature strengths and higher academic performance (Lounsbury et al., 2009). While superficially similar to the present study, Lounsbury et al.'s study had several key differences in measurement. This study examined which strengths (not the degree to which strengths were used) were associated with student satisfaction and GPA. Lounsbury et al. operationalized strengths use as the degree to which they endorsed certain items in the VIA. In Lounsbury et al.'s study, student satisfaction was operationalized by a measure of satisfaction (not mood). Students indicated how satisfied with various aspects of their college life on a seven-point Likert scale ranging from Very Dissatisfied (1) to Very Satisfied (7). These items asked respondents how satisfied they were with what they were learning, their progress toward their degree, the availability of courses, the quality of the instructors, the

availability/quality of academic advisors, their major and their GPA. Using self-report students rated their grade point average (GPA) on a seven-point scale.

Lounsbury et al. found that 22 out of 24 strengths were significantly positively related to College Satisfaction; and 16 out of 24 strengths were significantly positively related to GPA. It should be cautioned, however, that this operationalization of strengths use has come under criticism by some authors (Wood et al., 2011). As Wood et al. note, while most studies in the strengths literature have examined the consequences of having high or low levels of a particular strength, it is not sufficient simply to possess a strength. Instead, strengths must be realized and used. This is a serious limitation that the present study seeks to remedy. The philosophy underlying StrengthsQuest is that it does not matter which strengths you have (since they are personality traits, they are nearly immutable), but rather the manner and the degree to which they are used.

Lounsbury et al.'s operationalization of student satisfaction is also problematic as it does not measure positive affect stemming from academics, only the degree to which students are satisfied. Life satisfaction is not a measure of psychological well-being; instead it only measures a small part of psychological well-being (Seligman, 2011). Life satisfaction is also not synonymous with positive affect (Seligman, 2011). Further, only positive affect is thought to result from flow experiences, not life satisfaction (Eisenberger et al., 2005). In response to this, the present study has used a measure of positive affect (as in Wood et al., 2011). However, unlike Wood et al., the measure in the present study is one adapted to academic life.

Only one study (Cantwell, 2005) has examined the impact of a strengths-based curriculum on first-year students' academic engagement. Cantwell compared two

introductory public speaking courses: one used a strengths-infused curriculum and another used a traditional method of teaching. Cantwell used a quasi-experimental, pretest-posttest design. Students who were enrolled in the class that served as the treatment group were exposed to a strengths-based intervention that included the *Clifton StrengthsFinder* and the *StrengthsQuest* text. The students in the control group were not exposed to any of the strengths materials. For the pretest, students were asked to report their previous knowledge of course content, pre-existing public speaking skill level, and academic engagement during the first week of class. Students were administered the Academic Engagement Index (Schreiner, 2004), which assessed academic engagement. Cantwell found that students in the experimental condition had significantly higher levels of academic engagement at the end of the semester compared to their counterparts in the control condition. Students who participated in the experimental condition also exhibited greater proficiency in their public speaking skill compared to those in the control condition.

Other studies have examined the academic consequences of strengths use, but have not examined academic performance per se. Students who received specific instruction on how to utilize their strengths exhibited increased quality of effort in their mathematics classes (Gillum, 2005). Strengths-based curricula have been shown to increase students' academic intrinsic motivation (Austin, 2005). This is a notable finding as intrinsic motivation is one of the antecedents of flow (Haworth & Hill, 1992). However, it should be cautioned that strengths-based interventions have not always been shown to increase student motivation (Cave, 2003). Lastly, qualitative data suggest that strengths-based interventions can help students to become more engaged with the

demands of their courses, boost academic motivation, increase understanding of how to apply their strengths, and enhance social capital (Estevez, 2005).

1.2.2 Criticism of StrengthsQuest and the strengths-based approach

Despite its roughly 10-year existence, there has been surprisingly little published criticism of StrengthsQuest, or the strengths-based philosophy in general. Research has been unduly enthusiastic and at present theory far outstrips data. The purveyors of the strengths-based approach have marketed their products, interventions, and theories as being effective, despite scant evidence. Some skeptics (e.g. Ehrenreich, 2009) have suggested that those in the positive psychology movement have made unsubstantiated claims and that the promotion of positive thinking has been counterproductive. Given the dearth of research on character strengths, such criticism may have merit.

A few extant studies have argued for a more balanced approach to strengths use. In an unpublished manuscript, Haidt (2002) found that the gains in emotional well-being amongst students encouraged to build their strengths were no greater than students who were encouraged to remediate their weaknesses (though students reported that a strengths-focused approach felt more intrinsically rewarding). In an organizational context, Kaiser and Overfield (2011) found that the overuse of one's strengths and ignorance of one's weaknesses may impede successful leadership development. They have called this the "dark side" of strengths and caution against relying solely on developing one's strengths for fear that it will cause individuals to neglect their weak areas. These findings cast a shadow of doubt over the mostly positive findings reported thus far, but more critical research is necessary to draw any firm conclusions.

Furthermore, despite the purported benefits of strengths development (using StrengthsQuest and other programs) by their respective developers and users, there have only been a few published empirical studies to document these claims. Even fewer studies have attempted to explain why strengths development is beneficial. This is unfortunate, since without support from relevant fields of scholarship, the strengths-based educational approach is in danger of becoming a short-term fad (Schreiner, Hulme, Hetzel, & Lopez, 2009). What is lacking is evidence showing that 1) strengths development creates positive outcomes for students and 2) if there are any benefits of strengths development, what explanations can be given for these apparent beneficial outcomes?

1.3. Facets of Academic Well-being

There are three facets of Academic Well-being reviewed in the present study. The first aspect to be reviewed is academic happiness (the affective aspect of academic well-being). The second is known as academic flow (the motivational aspect of academic well-being). The third is known as academic performance (the behavioural aspect of academic well-being).

1.3.1 Academic Happiness

In the present study, the construct of academic happiness was devised as an assessment of the emotional facet of academic well-being.

1.3.1.1 Assessing Well-being

Recent literature on well-being has attempted to address and correct perceived shortcomings in previous conceptualizations of well-being. One of the prevailing views of well-being is known as hedonic well-being. One example is Authentic Happiness

theory (Seligman, 2002). Authentic Happiness Theory views well-being as being entirely dependent on one's level of life satisfaction. Critics of this theory have pointed out that being happy does not directly translate into higher levels of psychological wellness. Instead, some researchers (Waterman, 1993) have suggested that a psychologically healthy life is one that fulfills one's potential (known as the eudaimonic perspective of psychological well-being). Despite this, research suggests that hedonic and eudaimonic forms of happiness are equally beneficial and important components of psychological well-being (Ryan & Deci, 2001).

For the purpose of this study, a new construct called "academic happiness" is proposed. This is a hedonic measure of students' emotional experiences related to their academics and is based on the Positive Affect Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988). Academic happiness is related to the concept of "student satisfaction", which has been previously examined as a measure of student's emotional well-being in the education literature. The present measure of academic happiness is an attempt to improve upon the concept of student satisfaction as academic happiness more consistent with current theory on happiness and well-being.

1.3.1.2 Research on Academic happiness

Recent research has shown that strengths use can lead to increases in happiness (Seligman, Steen, Park, & Peterson, 2005). This leads to the question: why is the experience of positive emotion beneficial to one's well-being? The broaden-and-build theory of positive emotions (Fredrickson, 2004) explains that happiness is not merely a pleasurable state; instead, positive emotion may help individuals cope with stress and improve their well-being. First, broaden-and-build theory posits that positive emotions

broaden individuals' thought-action repertoire by increasing the variety of thoughts and actions that are salient to the individual. Second, broaden-and-build theory posits that positive emotions build individuals' personal resources. This model would suggest that positive emotions that result from the identification of strengths allow them to use their strengths across a wider range of domains. Furthermore, the positive emotions that result from building on character strengths may help contribute to psychological resources that promote flourishing.

1.3.2 Academic Flow

1.3.2.1 Definition of Flow

The concept of flow in education has only recently been given attention in the literature (Galang, Magno, Paterno, & Roldan, 2011; Asakawa, 2004). Flow theory was developed by Mihalyi Csikszentmihalyi to describe experiences in which people are maximally engaged. Flow occurs when individuals engage in activities that are inherently enjoyable to them. Individuals in a state of flow perceive these activities as having intrinsic value even if no extrinsic goal is expected (Nakamura & Csikszentmihalyi, 2002). According to Csikszentmihalyi (1988), flow is composed of nine components: challenge-skill balance, action-awareness merging, the presence of clear goals, unambiguous feedback, total concentration, a sense of control, loss of self-consciousness, time distortion, and autotelic experience. These components are not to be confused with antecedents or consequences of flow, which are described in the following paragraphs.

1.3.2.2 Antecedents of flow

Flow theory states that flow occurs when perceived challenges stretch existing skills and clear proximal goals are present (Csikszentmihalyi, 1990). Challenge and skill

must be evenly matched, otherwise the flow state cannot be achieved. Boredom results when the challenge is below one's skills, and anxiety results when the challenge is beyond one's skills. Other antecedents of flow are more obscure. In a qualitative study, Jackson (1995) found that flow is often preceded by pre-competitive planning and physical readiness. Other studies found that motivation, particularly intrinsic motivation, was associated with flow experiences (Haworth & Hill, 1992).

In her dissertation, Louis (2008) proposed that the experience of flow may indicate that one is making use of one's strengths. However, no published studies have investigated whether strengths use can promote flow experiences, and no studies have yet to examine whether flow could mediate any associations between strengths use and academic well-being. At this point, any hypothesized link between strengths use and academic flow is simply conjecture. However, despite the lack of empirical evidence, it has been suggested helping individuals find to opportunities to make more frequent use of their strengths can enhance engagement and flow (Seligman, Rashid, & Parks, 2006). However, this speculation has not withstood empirical scrutiny.

1.3.2.3 Consequences of flow

One key benefit stemming from flow experiences is the enjoyment and pleasurable absorption it provides. Among other benefits, flow has been found to be associated with positive mood (Eisenberger et al., 2005). As noted by Rupayana (2008), "Flow in academic work should also lead to these positive outcomes and positively affect student effort due to pleasurable absorption in studies and reduce students' stress and increase well being." Preliminary evidence supports this statement and suggests that flow is associated with improved psychological and physical well being in students (Steele &

Fullagar, 2009). Interestingly, these authors found that flow completely mediated the relationship between academic work characteristics and psychological well-being.

1.3.2.4 Similarities between flow and engagement

A hint at a possible link between strengths use and flow can be found in Cantwell (2005). Here, Cantwell examined the association between strengths use and academic engagement (but not flow). While not exactly the same, flow and engagement are conceptually similar constructs (Steele & Fullagar, 2009). Research in education and educational psychology has focused primarily on academic engagement. Research suggests that engagement predicts student success in university because of its relationship to student learning (Carini, Kuh, & Klein, 2006), motivation and commitment (Shernoff & Hoogstra, 2001) and persistence (Milem & Berger, 1997).

However, engagement is a problematic construct as it does not have a strong conceptual foundation (Steele & Fullagar, 2009). There is no consensus on a definition of the construct of student engagement. In fact, there are no fewer than 19 definitions of student engagement present in the literature (Appleton, Christenson, & Furlong, 2008). Conceptual problems notwithstanding, the most commonly used definition of engagement is that of Schaufeli, Martinez, Pinto, Salanova, & Bakker, 2002), who defined engagement as "a positive, fulfilling, work related state of mind that is characterized by vigor, dedication and absorption" (the authors also offered a more concise definition: "the opposite of burnout").

The present study is not the first of its kind to make the connection between engagement and flow. Some authors consider engagement to be an underlying factor of flow (Kahn, 1990). Other authors view flow as the consequence of engagement

(Schaufeli, 2005); while others suggest that engagement is the consequence of flow (Shernoff et al., 2003; Bakker, 2005). Yet others view flow and engagement as closely related constructs (Steele & Fullagar, 2009).

There are several similarities between flow and engagement. First, both flow and engagement require some element of challenge as a prerequisite (challenge-skill balance for flow and dedication for engagement). Second, both flow and engagement feature some concept of absorption. In both the engagement and flow literatures, absorption is marked by total immersion and concentration, loss of self-consciousness and time distortion (Schaufeli et al., 2002). Third, both flow and engagement are dependent upon unambiguous positive feedback (Nakamura & Csikszentmihalyi, 2002; Salanova et al., 2006). Fourth, both flow and engagement occur when individuals perform an intrinsically motivated activity. Workers that score high on engagement have been found to be more likely to identify intrinsic reasons for their remaining in their occupations (Schaufeli et al., 2002).

Lastly, both flow and engagement have been found to have similar antecedents and consequences. Autonomy, feedback and social support have been found to foster higher levels of flow and engagement (Schaufeli & Salanova, 2007; Ghani & Deshpande, 1994). In addition, both engagement and flow have been found to be associated with better psychological and physical health (Hallberg & Schaufeli, 2005; Steele & Fullagar, 2009).

1.3.2.5 Proposed Mediational model

The theoretical framework proposed in the present study can be represented as a mediational model. That is, academic flow is thought to mediate the association between

strengths use and academic happiness. This model is illustrated in Figures 1. As shown

in Figure 1, it is anticipated that there will be a direct association between strengths use

and grades (path C). This path represents Hypothesis #1, as described in the Preface. It is

also expected that there will be a direct association between strengths use and academic

flow (path A) and between academic flow and academic happiness (path B).

Figure 1. Proposed mediational model, using academic happiness as an outcome measure
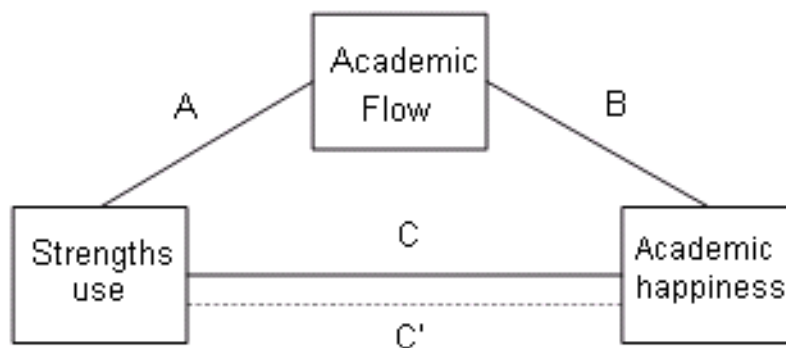
1.4 Specific Hypotheses

Based on the theoretical considerations and empirical literature detailed above,

several hypotheses were formulated.

Hypothesis 1: Students who use their strengths more frequently will have higher

levels of academic happiness (post-semester) in comparison to their counterparts

who reported using their strengths less often (controlling for pre-semester

academic happiness). Furthermore, it is hypothesized that there will be a strengths

x time interaction. That is, students who score higher on strengths use at post-

semester will score higher on academic happiness than their peers who used their

strengths less often, but only at post-semester (no difference in academic

happiness according to students' level of strengths use will be evident at pre-semester). Similarly, there will only be an increase in academic happiness between pre- and post-semester among students who make frequent use of their strengths. This increase will not occur among students who use their strengths less often.

Hypothesis 2: Students who use their strengths more frequently will have higher levels of academic flow (post-semester) in comparison to their counterparts who reported using their strengths less often (controlling for pre-semester academic flow). Furthermore, it is hypothesized that there will be a strengths x time interaction. That is, students who score higher on strengths use at post-semester will score higher on academic flow than their peers who used their strengths less often, but only at post-semester (no difference in academic flow according to students' level of strengths use will be evident at pre-semester). Similarly, there will only be an increase in academic flow between pre- and post-semester among students who make frequent use of their strengths. This increase will not occur among students who use their strengths less often.

Hypothesis 3: Students who use their strengths more frequently will earn higher grades (from Fall 2010 to Winter 2012) in comparison to their counterparts who reported using their strengths less often (controlling for grades at baseline/Winter 2010). Furthermore, it is hypothesized that there will be a strengths x time interaction. That is, students who score higher on strengths use at post-semester will have a higher GPA than their peers who used their strengths less often, but only in the follow-up semesters (not at Winter 2010 baseline). Similarly, there will

only be an increase in GPA between Winter 2010 and subsequent semesters among students who make frequent use of their strengths. This increase will not occur among students who use their strengths less often.

CHAPTER 2

METHODS

2.1 Participants

The participants in this study ($n = 292$) were selected from archival data collected from a study on which the author was a co-investigator (Student Strengths Study, REB #10-167). This dataset was supplemented by data obtained from the Registrar's Office regarding students' academic performance in the Fall 2010, Winter 2011, and Fall 2011 semesters). The study was conducted the University of Windsor in the Fall 2010 semester. Participants in this study were recruited from a Positive Psychology class. Students had the option of completing the questionnaire battery for extra credit (they also could complete an alternative assignment for extra credit). Completing the questionnaire battery was not a compulsory course requirement.

Out of 289 participants who responded to the age question (Demographics question 4), it was found that the mean age was 21.63 with a standard deviation of 5.61 years. The minimum and maximum ages were 17 and 48, respectively. Out of 288 participants who responded to the gender question (Demographics question 5), there were 88 males (31%) and 200 females (69%). Of the 289 participants who provided data on their year of study (Demographics question 12), 42% of participants were in first year ($n = 122$), 24% were in second year ($n = 68$), 18% were in third year ($n = 53$), 13% were in fourth year ($n = 37$), and 3% were in fifth year or higher ($n = 9$). Of the 288 participants

who responded to the ethnicity question (Demographics question 9), 210 identified themselves as Caucasian (73%), 13 as African/Black (4%), 7 as East Asian (2%), 23 as South Asian (8%), 15 as Middle Eastern/North African (5%), 1 as Native/Aboriginal/First Nations (0.3%), 4 as Hispanic/Latino (1%), and 15 as Other/multi-ethnic (5%). Four percent of the participants (13 out of 290) participants identified themselves as international students (Demographics question 19) and 85% of the participants (246 out of 289) reported that English was their first language (Demographics question 13).

2.2 Measures

Key study variables. The present study assessed the following variables: strengths use in academics, GPA variables in the baseline semester (i.e. self-reported Winter 2010 GPA), and the four follow-ups (i.e., Fall 2010, Winter 2011, Fall 2011, and Winter 2012), pre-semester and post-semester academic flow, and pre-semester and post-semester academic happiness.

Figure 2. Timeline of data collection.
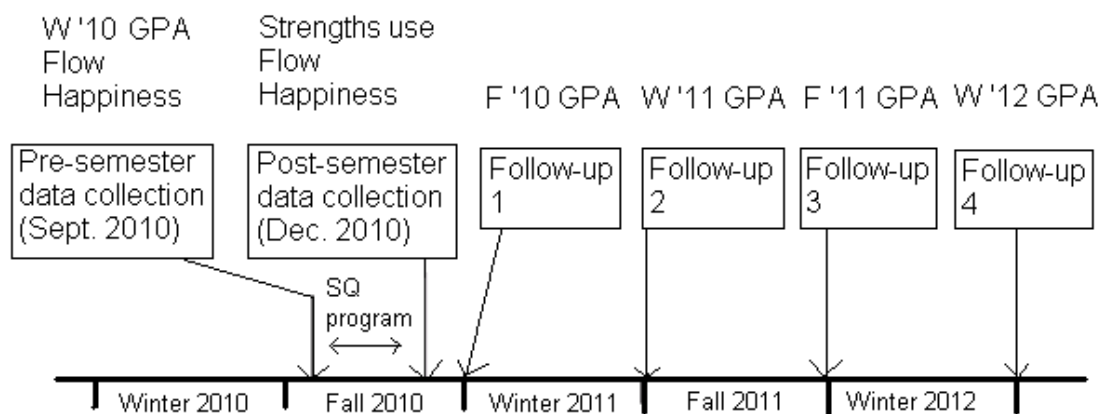
Six data collections are shown in Figure 2. "Pre-semester" data were provided by participants using self-report in September 2010. These data included basic

demographics, Baseline (Winter 2010) GPA data, academic flow items, and the academic

happiness items. "Post-semester" data were provided by participants using self-report in

December 2010. These data included strengths use (in academics), the academic flow

items, and the academic happiness items. "Follow-up" data consisted of GPA data

provided by the Registrar's office (with prior consent of the participants) after the study

had commenced. The "follow-up" data collections occurred shortly after the end of the

Fall 2010, Winter 2011, Fall 2011, and Winter 2012 semesters.

Demographics. The pretest questionnaire asked students to provide basic

demographic information such as their age, gender, ethnicity, major, and year of study.

The demographics questionnaire is shown in Appendix A.

The Clifton StrengthsFinder. The Clifton StrengthsFinder (Gallup, 1999) was used

in this study as part of the curriculum of the Positive Psychology curriculum. The online

StrengthsFinder instrument assesses the respondent's talent in 34 areas called signature

themes. StrengthsFinder consists of 180 items. Each item presents a pair of potentially

self-descriptive statements, such as "I like to organize" or "I like to analyze."

Respondents are given 20 seconds to indicate which of the statements more accurately

describes them by choosing the best answer along a Likert-style continuum, where the

statements are opposite anchors. Upon completion of the Clifton StrengthsFinder, scores

for each talent theme are calculated. The respondents are provided with list of their top 5

talent themes (signature themes), along with a brief description of those themes.

The psychometric properties of the Clifton StrengthsFinder were documented by

Schreiner (2006). Data from the themes have been found to have satisfactory internal

consistency (for example, the Discipline theme has been found to have an internal

consistency of .80. Across the 34 themes, the Clifton StrengthsFinder themes have a mean test-retest reliability of .70 (Schreiner, 2006). Data from the StrengthsFinder items have been found to have higher levels of correlation with their designated themes than with other themes (Lopez, Hodges, & Harter, 2005). The StrengthsFinder themes have been found to be correlated with the five factor model of personality (Harter & Hodges, 2003), providing evidence for construct validity.

The Strengths Use Questionnaire. The Strengths Use Questionnaire was used to assess the frequency to which students use their strengths. This 21-item instrument assesses the respondent's strengths use in several life domains. There are three items (7, 8, and 20) that are relevant for this study. Students responded to all items using a 4-point Likert scale.

Measures of Academic Well-being

Academic Happiness Scale (AHS). This scale was based on the Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988). In contrast to the existing PANAS happiness measure, which assesses non-specific happiness (that is, overall happiness across all domains of life), my adapted measure, assesses happiness or emotional satisfaction with the academic domain of life. This was done by modifying the instructions so that students answered each item with reference to their academics. In addition, 57 items were added to the additional scale to tap into other facets of well-being and to serve as distractor items. The scale is shown in Appendix A (the items included in this scale are indicated using asterisks). The original Likert scale was replaced with a checklist response format so that students could complete the questionnaire in a more expedient manner. The original 20 item scale is divided into two subscales: positive affect

(PA) and negative affect (NA). Both subscales have 10 items each. Watson et al. (1988) showed that the original scale is reliable (between .86 to .90 for PA and between .84 to .87 for NA). To ensure that the new scale is internally consistent, Cronbach's alpha will be calculated for this scale.

In this study, academic happiness scores were calculated by adding all of the PA items that a participant endorses and subtracting all of the NA items that a participant endorses. This is consistent with the original operationalization of the PANAS, in which a 'difference' score was calculated by subtracting negative affect scores from positive affect scores. Thus, the maximum and minimum possible scores ranged from 10 (extremely high PA) to -10 (extremely high NA). A score of zero indicated that either 1) the participant endorsed zero items or 2) the number of PA items endorsed was equal to the number of NA items endorsed.

To establish construct validity for this measure, academic happiness scores will be compared to scores on the Bradburn Affect Balance Scale (BABS; Bradburn, 1969), which was used in this study unmodified as a global measure of happiness. It is anticipated that participants' scores on academic happiness will be moderately positively correlated with scores on the BABS. A low correlation may indicate that the construct of academic happiness used in this study is not a valid measure of happiness. Similarly, a high correlation may indicate that academic happiness is too closely related to the construct of general happiness, a finding that would challenge the discriminant validity of the measure of academic happiness.

The Academic Flow Scale (AFS). The Academic Flow Scale is inspired by measures of flow such as the Flow State Scale-2 (FSS-2), which was developed by

Jackson and Eklund (2002). This existing flow measure found in the published literature is specific to the context of sports. Jackson and Eklund developed their scale by asking athletes to rate how often they experience flow (intense absorption) during athletics. This scale was adapted in the present study so as to make it appropriate for the context of academics. The Academic Flow Scale attempts to assess the nine components of flow suggested by Csikszentmihalyi (1988), and applies them to the academic domain only. The Academic Flow Scale has 58 items. Students answered the items on the scale using a 4-point Likert format.

To establish concurrent validity for this measure, academic flow scores will be compared to scores on the 17-item Intrinsic Motivation Scale (IMS; Lepper, Corpus, & Iyengar, 2005), which was used in this study unmodified as a measure of students' sense of curiosity, independent mastery and love of challenge. Intrinsic motivation and flow are closely related constructs (Deci & Ryan, 1985). It is anticipated that participants' scores on academic flow will be moderately positively correlated with scores on the IMS. A low correlation may indicate that the construct of academic flow used in this study is not a valid measure of flow. Similarly, a high correlation may indicate that academic flow is too closely related to the construct of intrinsic motivation, a finding that would challenge the discriminant validity of the measure of academic flow.

GPA. Baseline GPA was obtained using a self-report measure. Participants were asked whether their GPA in the Winter 2010 semester (which would have been "last semester" in Fall 2010) was in the A-range, B-range, C-range, D-range, or F-range (see Appendix A, question 44 of demographics). This was done because first-year students would not have had a record at the University of Windsor Registrar's Office prior to

attending the university. Subsequent GPA data were obtained from the Registrar's Office. GPA data was requested for the four "follow-up" semesters (Fall 2010, Winter 2011, Fall 2011, and Winter 2012). GPA was calculated as an average of the grades received in all of the courses that the student took in that semester (not a cumulative GPA score). Letter grades were converted to numbers using University of Windsor's 13-point GPA system.

While GPA is generally regarded as a valid measure of academic achievement (Allen, 2005), it has its shortcomings. First, grading practices vary depending on the instructor. This variance occurs because instructors have different evaluation procedures, different teaching practices, and different grading habits. Second, course level and grading policies influence grades. Higher level courses will generally have higher overall class averages in comparison to lower level courses. Third, grades do not capture all aspects of academic achievement. Other measures of student success, such as enrollment in postsecondary education, persistence, length of time to complete a degree, and graduation/degree attainment could be examined (Venezia, Callan, Finney, Kirst, & Usdan, 2005). However, these factors could not be examined within the timeframe of the present study.

2.3 Procedure

The ethics review application, a copy of the informed consent form, and the questionnaires used in this study (Appendix A) were submitted to the Research Ethics Board at the University of Windsor. Following the receipt of institutional approval at the university at which this study was conducted, the study was made available to students. Students were eligible to participate in the research if they were registered in one of the three psychology courses. They were permitted to participate in the study after reading a

letter of information (the online equivalent of an informed consent document). After agreeing to participate (by clicking on a button labeled "I Agree"), the students completed the questionnaire.

The data for this study were collected at several points in time. In late September 2010 ("pre-semester"), students completed an online questionnaire shortly after completing the Clifton StrengthsFinder, but before starting the StrengthsQuest program. The second data collection occurred in December 2010 ("post-semester"), participants completed another online questionnaire soon after the conclusion of the strengths intervention program. Starting at the end of the Fall 2010 semester and continuing to the end of the Winter 2012, academic performance data was collected on students from the university Registrar's Office after the marks for each semester were finalized. This data was collected with the consent of students and with permission from the Registrar's Office.

To ensure that data were collected in an ethical manner, several precautions were taken before participants were exposed to the surveys associated with this study. In order to match the students' pre-semester and post-semester data, students were asked to provide their student number. Survey data that included personally identifying information was kept on a password-protected computer. Lastly, students were informed in the letter of information that data about their academic performance would be collected from the Registrar's Office.

2.4 Planned analyses

The hypotheses stated above will be tested using a variety of statistical techniques. These techniques are detailed below.

Hypothesis 1. To test whether students are happier (more satisfied) with their education if they use their strengths more frequently, a multiple linear regression analysis was conducted. This was tested by entering pre-semester academic happiness and strengths use as predictor variables. Pre-semester academic happiness was entered in step 1 and strengths use was entered in step 2. Post-semester academic happiness served as the outcome variable in the regression. To test an interactional model, a second multiple regression analysis was conducted. In this analysis, pre-semester academic happiness and strengths use were entered in step 1 and the interaction term was entered in step 2. Post-semester academic happiness served as the outcome variable in the regression.

Hypothesis 2. To test whether students experience higher levels of academic flow if they use their strengths more frequently, a multiple linear regression analysis was conducted. This was tested by entering pre-semester academic flow and strengths use as predictor variables. Pre-semester academic flow was entered in step 1 and strengths use was entered in step 2. Post-semester academic flow served as the outcome variable in the regression. To test an interactional model, a second multiple regression analysis was conducted. In this analysis, pre-semester academic flow and strengths use were entered in step 1 and the interaction term was entered in step 2. Post-semester academic flow served as the outcome variable in the regression.

Hypothesis 3. To test whether students earn higher marks if they play to their strengths more often, four different multiple linear regression analyses were conducted between strengths use (assessed at Time 2) and GPA over the four follow-up periods (Fall 2010, Winter 2011, Fall 2011, and Winter 2012). Self-reported GPA from Winter 2010

were included as a covariate in the regression analyses, and GPA from the four follow-up semesters were entered as a predictor variables in four separate regressions.

Additional analyses. Mediational analyses were also conducted to see whether academic flow explained why students benefit from making more frequent use of their strengths. If Hypothesis 1 was supported, a mediational analysis would be conducted between strengths use and GPA. If Hypothesis 2 was supported, a mediational analysis would be conducted between strengths use and academic happiness. The predictor variable in the mediational analyses was strengths use. The mediator variable in all analyses would be academic flow.

CHAPTER 3

RESULTS

This section is divided into four parts. The first section describes how the data were cleaned. The second section reviews the basic descriptive data and correlations between key study variables. The third section depicts the analyses used to test the hypotheses stated in this study. The fourth and final section describes several analyses that were conducted in addition to the analyses intended to test the hypotheses. The statistical tests conducted in this study were performed by using SPSS 20.0 software or were calculated by hand in cases where statistical tests were not available in SPSS.

3.1 Preliminary analyses

3.1.1 Data cleaning

Prior to conducting the analyses, the data were cleaned. Although 292 participants enrolled in Positive Psychology in the Fall 2010 semester completed questionnaires, 139 listwise deletions were made. The criteria for deletion are shown in Table 1.

Table 1. Summary of decision rules for data cleaning

Criteria for deletion	*n*
No data for post-semester questionnaire battery	46
No data for pre-semester questionnaire battery	5
Did not complete one of the questionnaires	24
Large amounts of missing data (> 5% of items)	23
Unusual patterns of response	41
Minor amounts of missing data (< 5% of items)	38

All 51 participants who had missing data for either the post-semester battery ($n = 46$) and the pre-semester battery ($n = 5$) were removed from the dataset. Twenty-four participants had no data on one of the questionnaires. Of these participants, five did not complete the Strengths Use Questionnaire, three did not complete the Pre-semester Academic Flow Scale, seven did not complete the Post-semester Academic Flow Scale, three did not complete the Pre-semester Academic Happiness Scale, and six did not complete the Post-semester Academic Happiness Scale.

Twenty-three participants appeared to have large amounts of missing data in one or more of the questionnaires. A decision was made to remove participants from the dataset if they had missing data for a large proportion of the items that made up a scale (more than 5%). The maximum allowable number of items missing for each scale is shown in Table 2. If a participant had less than 5% missing data, several techniques were used. If the participant had missing data at pre-semester, the missing items were assigned a value based on the conditional mean (that is, the mean for that person on the other scale items, not the item mean). Schafer and Graham (2002) have noted that although this method is not ideal (as it can result in biased coefficients and underestimated standard errors), it is preferable to imputing the item mean for missing values.

Table 2. Maximum acceptable number of items missing per scale

Scale	Number of items	Maximum acceptable number of items missing
Strengths Use Questionnaire	3	0
Academic Flow Scale (Pre and Post)	58	3
Academic Happiness Scale (Pre and Post)	20	1

The remaining deletions ($n = 41$) were made because the student had patterns of response that were logically inconsistent or were indicative of response set bias (a tendency of participants to answer a series of items in the same manner without consideration of the content of the items). For example, participants who gave the same answer to all of the items in a scale used in this study (even for reversed-scored items) were removed the dataset. The final total sample size (N) was 153.

It should be noted that the sample sizes declined over time. The analyses involving Fall 2010 ($N = 136$), Winter 2011 ($N = 125$), Fall 2011 ($N = 102$), and Winter 2012 ($N = 94$) GPA were lower because of student attrition during the semesters starting Fall 2010. Possible sources of the attrition observed in the present study include students dropping out of the university, transferring to another institution, or graduating. No data were collected on these variables, so it is impossible to ascertain the cause of attrition for each participant.

3.1.2 Basic Descriptive Analyses

Table 3 shows the means, medians, standard deviations, minima, maxima, skewness, and kurtosis for the Winter 2010, Fall 2010, Winter 2011, Fall 2011, and Winter 2012 GPA variables for all of the participants. GPA was calculated by converting letter grades into the University of Windsor's 13-point GPA system.

Table 3. Basic Descriptive Data for all GPA Variables among all Participants

	W10 GPA	F10 GPA	W11 GPA	F11 GPA	W12 GPA
Mean	8.82	8.27	8.11	7.55	7.84
Median	9.00	8.40	8.40	7.75	8.00
SD	2.72	2.35	2.57	2.62	2.82
Minimum	.00	.33	1.50	1.00	.67
Maximum	12.00	13.00	12.80	13.00	12.75
Skewness	-.70	-.37	-.51	-.36	-.49
Kurtosis	.50	-.34	-.42	-.14	-.28
n	153	136	125	102	94

The means, medians, standard deviations, minima, maxima, skewness, kurtosis, and Cronbach's alpha values for all pre- and post-semester flow, happiness, and strengths use for all participants are shown in Table 4. The mean scores presented in these tables were used to centre the variables for the regression analyses. The standard deviations shown in these tables were used to calculate the residualized change scores. The skewness and kurtosis values can be used to provide evidence to test the regression assumption of normality. Finally, the Cronbach's alpha values show internal consistency reliability of the variables, and can be used to provide evidence to test the regression assumption of reliability.

Table 4. Basic Descriptive Data for Strengths use, Pre- and Post-semester Academic Flow, and Pre- and Post-semester Academic Happiness among all Participants ($N = 153$)

	Strengths Use in Academics	Academic Flow		Academic Happiness	
		Pre-semester	Post-semester	Pre-semester	Post-semester
Mean	2.94	2.74	2.84	1.86	2.02
Median	3.00	2.77	2.82	2.00	2.00
SD	.58	.33	.31	3.99	3.61
Minimum	1.33	1.38	1.97	-9	-9
Maximum	4.00	3.86	3.78	9	10
Skewness	-.18	-.33	.16	-.43	-.02
Kurtosis	-.18	1.96	.93	-.15	-.34
Cronbach's α	.74	.93	.94	.78	.71

Correlations between all key study variables for all participants are shown in

Table 5. All conceptually related variables were correlated with one another. All of the

GPA measures were positively and highly significantly associated with one another. Pre-

semester academic flow was positively and significantly associated with post-semester

academic flow ($r = .44$, $p < .01$). Pre-semester academic happiness was positively and

significantly associated with post-semester academic happiness ($r = .47$, $p < .01$). Lastly,

all of the follow-up measures of GPA were highly correlated with one another ($r > .69$).

Table 5. Summary of Bivariate Correlation Analyses among all key variables among all
participants.

	1	2	3	4	5	6	7	8	9	10
1. Strengths Use in Academics	1.00									
2. Pre-semester Academic Flow	.23**	1.00								
3. Post-semester Academic Flow	.50**	.44**	1.00							
4. Pre-semester Academic Happiness	.12	.49**	.29**	1.00						
5. Post-semester Academic Happiness	.30**	.30**	.47**	.47**	1.00					
6. Winter 2010 GPA	.11	.20*	.18*	.23**	.18**	1.00				
7. Fall 2010 GPA	.12	.17*	.27**	.19**	.30**	.40**	1.00			
8. Winter 2011 GPA	.17*	.12	.26**	.22**	.32**	.30**	.85**	1.00		
9. Fall 2011 GPA	.15	.14	.21**	.19*	.27**	.21**	.75**	.87**	1.00	
10. Winter 2012 GPA	.14	.24**	.27**	.28**	.26**	.27**	.69**	.79**	.75**	1.00

$* p < .05$, $**p < .01$

There appears to be a general trend where many of the correlations between a

given variable and the post-semester variables are greater in magnitude than the

correlations between the same variable and the pre-semester variables. For example, there

is a significant positive correlation between strengths use in academics and pre-semester

academic flow ($r = .23$, $p < .01$), there is a much stronger significant correlation between

strengths use in academics and post-semester academic flow ($r = .50$, $p < .01$). Furthermore, it is interesting to note that while there is no significant correlation between strengths use in academics and pre-semester academic happiness ($r = .12$, $p = $ ns), there is a strong significant positive correlation between strengths use in academics and post-semester academic happiness ($r = .30$, $p < .01$). In addition, the correlations between post-semester academic flow and the four follow-up GPA variables ($r = .21$-.27) were greater in magnitude than the correlations between pre-semester academic flow and the same four follow-up GPA variables ($r = .12$-.24). A similar pattern can be observed for the correlations that were conducted between academic happiness and the four follow-up GPA variables.

To test for validity of the new scales devised in this study, evidence for convergent and divergent validity was tested. Scores on the new AHS scale were correlated with scores on the unmodified Bradburn Affect Balance Scale (BABS; Bradburn, 1969). Correlations revealed that at pre-semester, there was a moderate correlation between AHS and BABS scores ($r = .31$, $p < .01$). At post-semester, there was a stronger moderate correlation between AHS and BABS scores ($r = .56$, $p < .01$). These moderate correlations indicate that while the academic happiness scores are similar enough to general happiness scores to suggest a common bond between the two constructs, they are not similar enough to suggest that the two constructs measure the exact same thing.

In addition, scores on the new AFS scale were correlated with scores on the unmodified Intrinsic Motivation Scale (IMS; Lepper et al., 2005). Correlations revealed that at pre-semester, there was a moderate correlation between AFS and IMS scores ($r = $

.46, $p < .01$). At post-semester, there was a stronger moderate correlation between AFS and IMS scores ($r = .62$, $p < .01$). These moderate correlations indicate that while the academic flow scores are similar enough to intrinsic motivation scores to suggest a common bond between the two constructs, they are not similar enough to suggest that the two constructs measure the exact same thing.

To ensure that the assumption of normality was met, data on skewness, kurtosis, and outliers were collected on all study variables. First, all outliers beyond three standard deviations of the mean on the dependent measures (GPA, academic flow, and academic happiness) were identified. After running the analyses with and without outliers, a decision was made to remove these outliers. It should be noted that the removal of outliers made did not change any of the findings. After removal of these data, there were no variables that had a skewness value with an absolute value greater than 2, or a kurtosis value with an absolute value greater than 2.

3.2 Hypothesis testing

The hypotheses were tested using multiple linear regression analyses. Note that for each regression, change scores were not used. Simple change scores were not used for several reasons. Change scores can produce misleading findings as they are dependent on pre-test scores, and can lead to overcorrection of the post-test score by the pre-test score (Cohen, Cohen, West, & Aiken, 2003). Instead, the pre-test scores were entered in the first step of each regression analysis. In each regression, the strengths use variable was entered in the second step of the regression. Post-test scores were entered into the regression as the outcome variable.

In addition to the regressions, interactional models were tested. In each of these regressions, the pre-semester variable and the strengths use variable were entered in the first step and the interaction variable was entered in the second step. Figures were constructed in order to illustrate the interaction effects. To construct the figure, the sample was divided into two groups based on strengths use: high strengths use in academics (one SD above mean) and low strengths use in academics (one SD below mean). Anyone who scored 2.33 or below was placed in the low group ($n = 36$) and anyone who scored 3.67 or above was placed in the high group ($n = 26$). Participants who scored between 2.33 and 3.67 were excluded from the figure, as they were close to the mean.

3.2.1 Assumptions of multiple regression

The interpretation of the results of the regression analyses performed in this study depends on the verification of several assumptions. If any of these assumptions were violated, this might affect the power of the analyses and the conclusions may not generalize.

The basic descriptive data showed that four of the assumptions had been met. First, all of the variables included in this study were either categorical or continuous. All of the predictor variables (except for Winter 2010 GPA) were continuous and all of the outcome variables, without exception were continuous). Second, all of the predictor variables had a variance greater than zero. Third, sample size in all regressions was greater than 15 people per predictor. Fourth, as Table 4 shows, the reliability assumption was met. Data presented in Table 4 showed that all of the variables used in this study had Cronbach's alpha values of at least .7.

The assumption of the absence of multicollinearity of the predictors was assessed by examining the tolerance and VIF statistics. Multicollinearity is defined as the unacceptably high correlation between two or more predictors and violation of this assumption can increase Type II error, limit the size of R^2, obfuscate individual importance of the predictors, and produce unstable predictor equations (Field, 2009). Multicollinearity was assessed using the VIF (variance inflation factor) statistic. A VIF > 10 may indicate that the assumption of multicollinearity has been violated (Field, 2009).

The assumption of independence of errors was tested by performing a Durbin-Watson test. The Durbin-Watson test is designed to test whether the errors of different observations are correlated. If the Durbin-Watson value is less than 1.5, or greater than 2.5, then the assumption of independence of errors has been violated (Tabachnick & Fidell, 2007).

The assumption of linearity was tested by constructing a plot of standardized residuals. Linearity can be tested by examining whether or not the scatterplot deviates from a straight horizontal line (non-linear patterns suggest that the assumption has been violated). To construct the plot, the standardized predicted values were placed on the x-axis and standardized residuals were placed on the y-axis. If examination of the standardized residual-standardized predictor value plot showed the scatter of dots approximated a horizontal line, this would suggest that there was a linear relationship between the variables).

The assumption of homoscedasticity was tested by constructing a plot of standardized residuals using the same method described in the preceding paragraph. Violations of the assumption of homoscedasticity are evident when the residual plot

resembles anything other than a random scatter, especially if there is unevenness in the pattern of scatter (Cohen et al., 2003).

The assumption of normality was tested by calculating skewness, kurtosis, and the Shapiro-Wilks statistic for all variables. If skewness or kurtosis values are greater than 2 or less than -2, then the assumption of normality has been violated (Garson, 2012), and may require bootstrapping or transformation in order to normalize the variable (Preacher & Hayes, 2004). Normality was also verified by examining the residual plot. The Shapiro-Wilk test was performed to compare the scores in the sample to a normally distributed sample with the same mean and standard deviation. When this test is significant, this indicates that the sample is significantly different from the normal distribution (Field, 2009). In contrast, non-significance indicates that the sample was close to a normal distribution. However, it should be noted that the assumption of normality is robust to violation when the sample size is large (more than 15 cases per predictor; Garson, 2012). This condition was satisfied for all regression analyses conducted in this study because the analyses contained only a few predictors.

The assumption of normality of errors was tested by constructing a standardized residual plot. If the plot of residuals approximates a normal curve, then the assumption has not been violated. Violation of this assumption is evident when the distribution of residuals exhibits any other pattern (Cohen et al., 2003).

Outliers were identified by identifying that any residual values that exceeded 2.5 standard deviations above the mean residual. The analyses were conducted with and without the outliers removed to see if there were any differences in the findings, and the *less* favourable analysis was reported (in the event that any significant discrepancies

between the findings with outliers removed and without outliers removed were found, this discrepancy would be noted in the results section). To test for the presence of univariate outliers, Z-scores were calculated. Mahalanobis distances, the Leverage statistic, and Cook's distance were calculated in order to test for multivariate outliers and influential observations.

Outliers on X were identified by calculating Mahalonobis distances and leverage scores. Based on the size of the sample (approximately 100 to 150, depending on the analysis) and the number of predictors (2), a cut-off score of $D^2 = 15$ was chosen (Field, 2009). Influential observations were found using leverage values, which measure undue influence on the regression coefficients (Stevens, 2009). Cutoffs for leverage values were calculated using the formula that appears in Stevens (2009), which is shown as Formula (1) in Appendix B.

Outliers on Y were identified by calculating Standardized Residuals (due to the large size of the sample, this method was chosen over the alternatives of Studentized and Deleted Studentized Residuals). In order to discover potential outliers, a cut-off Z-score of 3 was chosen (Field, 2009). This value was chosen because if the sample has a normal distribution, it is unlikely that any observations will exceed this value (Field, 2009).

Influential observations were identified by calculating Cook's distance. Cook's Distance values that are greater than 1 are cause for concern because they exert undue influence on the regression coefficients (Stevens, 2009).

3.2.2 Hypothesis #1

It was hypothesized that students who use their strengths more frequently will have higher levels of academic happiness (post-semester) in comparison to their

counterparts who reported using their strengths less often (controlling for pre-semester academic happiness).

The first hypothesis was tested primarily using a multiple linear regression analysis. A secondary analysis used a regression with an interaction term. The pre-semester and post-semester academic happiness variables were centred by subtracting each score from the raw means of the variables (shown in Table 4). The centred pre-semester academic happiness variable was entered in step 1 and the centred strengths use in academics variable was entered in step 2 of the regression. Centred post-semester academic happiness was entered as the dependent variable.

All of the assumptions of multiple regression were tested. The sample size per predictor was 76.5 (153/2), which far exceeded the required 15 observations per predictor. Tolerance/VIF values were well within the acceptable range for both variables, indicating that the assumption of multicollinearity was not violated. The value obtained from Durbin-Watson for the regression was 2.10, which suggests that the independence of errors assumption was not violated. Examination of the pattern of the scatter of dots in the standardized residual-standardized predictor value plot approximated a horizontal line near 0, which suggested that there was a linear relationship between the predictors and the outcome. An examination of the same plot showed that there was a random scatter, which indicated that there was homoscedasticity. Thus, both the assumption of linearity and assumption of homoscedasticity were met. However, the frequency distribution of the standardized residuals had a somewhat leptokurtic pattern (though there was no noticeable skewness). This suggests that the assumption of normality of errors may have

been violated (unfortunately, regression is not robust to violation of this assumption). Thus, all the assumptions (with the possible exception of normality of errors) were met.

In addition to testing the assumptions, potential outliers were identified. None of the observations exceeded the Mahalanobis critical value of 15 (the maximum was 9.86). However, one observation exceeded the cutoff for the leverage value (.059), indicating that there was one outlier on X. The standardized residual values ranged from -3.69 to 2.32. The score of -3.52 was the only observation that exceeded the critical value of |3|, indicating that there was one outlier on Y. (This outlier was not the same as the outlier on X identified by the leverage value, meaning that there were two outliers in total). None of the cases had a Cook's distance above 1 (the maximum was .14), indicating no influential observations. The findings shown are the results without outliers removed (there were no substantial differences between the analyses with and without outliers removed).

Table 6. Regression model for Regression 1 (Outcome is Post-semester academic happiness)

	B	Std. error	β	t	p	sr^2	95% CI	
							Lower bound	Upper bound
Pre-semester academic happiness	.416	.066	.442	6.331	.000	.438	.29	.54
Strengths use in academics	1.494	.425	.245	3.517	.001	.244	.66	2.33

Using a stepwise regression (Table 6), the variance accounted for jointly by pre-semester happiness and strengths use in academics was significant ($R^2 = .281$, *adj* $R^2 = .271$, $p < .001$). This means that the two variables accounted for 27.1% of the variance in post-semester academic happiness, leaving 73% of the variance unaccounted for. While pre-semester academic happiness was a significant predictor of post-semester academic

happiness ($B = .416$, $t = 6.331$, $p < .001$), strengths use in academics was also a

significant predictor ($B = 1.494$, $t = 3.517$, $p < .001$). These findings support the

hypothesis that strengths use in academics is positively correlated with academic

happiness above and beyond the effects of pre-semester academic happiness.

Figure 3. Mean levels of academic happiness amongst students scoring high and low on Strengths Use in Academics
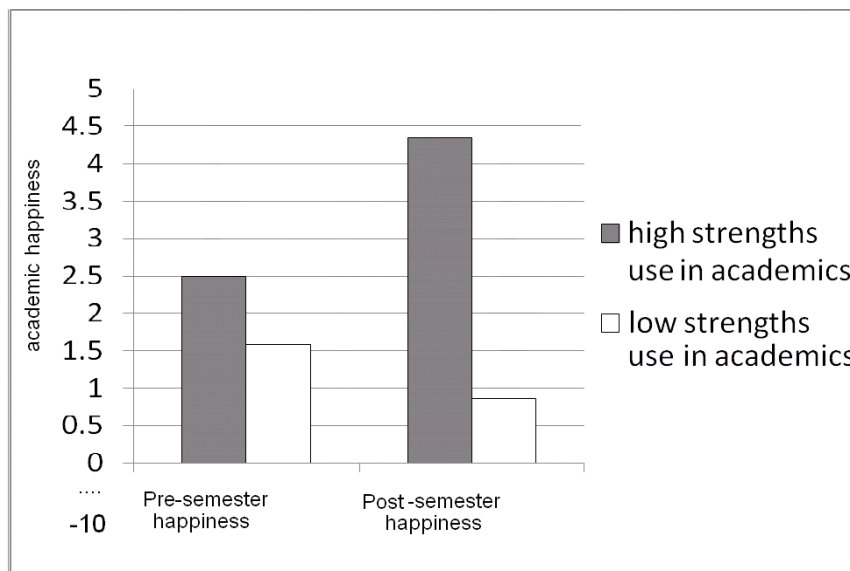
To test whether there was a significant interaction between strengths use and pre-

semester happiness, a second multiple regression analysis was conducted. The variables

were entered using a stepwise regression, in which pre-semester happiness and strengths

use were entered in step 1 and the interaction term was entered in step 2. The variance

accounted for jointly by pre-semester happiness, strengths use in academics, and their

interaction was significant ($R^2 = .421$, *adj R^2* $= .405$, $p < .001$). This means that the three

variables accounted for 40.5% of the variance in post-semester academic happiness,

leaving 59.5% of the variance unaccounted for. Pre-semester academic happiness was a

significant predictor of post-semester academic happiness ($B = 1.525$, $t = 3.626$, $p <$

.001). Strengths use in academics was also a significant predictor of academic happiness

(B = .401, t = 6.139, p < .001). The interaction was also a significant predictor of

academic happiness (B = .228, t = 2.029, p < .05). This interaction is illustrated in Figure

4, which shows the differences in pre- and post-semester academic happiness between the

students scoring 1 SD above the mean or higher on strengths use (high strengths use

group) and 1 SD below the mean or lower on strengths use (low strengths use group).

These findings support the hypothesis that there is an interaction between strengths use in

academics and pre-semester academic happiness in which students who score high on

strengths use score higher on post-semester academic happiness than their low-strengths

use counterparts.

In summary, Hypothesis 2 suggested that learning to utilize one's strengths in

academics will help students to increase their level of academic happiness. The findings

supported this hypothesis. The meaning of these significant results will be interpreted in

the Discussion section.

3.2.3 Hypothesis #2

It was hypothesized that students who use their strengths more frequently will

have higher levels of academic flow (post-semester) in comparison to their counterparts

who reporting using their strengths less often (controlling for pre-semester academic

flow).

The second hypothesis was tested primarily using a multiple linear regression

analysis. A secondary analysis used a regression with an interaction term. The pre-

semester and post-semester academic flow variables were centred by subtracting each

score from the raw means of the variables (see Table 4). The centred pre-semester

academic flow variable was entered in step 1 and the centred strengths use variable was entered in step 2. Centred post-semester academic flow served as the dependent variable.

All of the assumptions of multiple regression were tested. The sample size per predictor far exceeded 15 per predictor. Tolerance/VIF values were well within the acceptable range for both variables, indicating that the assumption of multicollinearity was not violated. The value obtained from Durbin-Watson for the regression was 1.86, which suggests that the independence of errors assumption was not violated. Examination of the pattern of the scatter of dots in the standardized residual-standardized predictor value plot approximated a horizontal line near 0, which suggested that there was a linear relationship between the predictors and the outcome. An examination of the same plot showed that there was a random scatter, which indicated that there was homoscedasticity. Thus, both the assumption of linearity and assumption of homoscedasticity were met. The frequency distribution of the standardized residuals had no noticeable skewness or kurtosis. This suggests that the assumption of normality of errors was not violated. Thus, all of the assumptions were met.

In addition to testing the assumptions, potential outliers were identified. None of the observations exceeded the Mahalanobis critical value of 15 (the maximum was 12.84). However, six observations exceeded the cutoff for the leverage value (.059), indicating that there were six outliers on X. The standardized residual values ranged from -2.52 to 2.90. Since none of the observations exceeded the critical value of |3|, there were no outliers on Y. (This outlier was not the same as the outlier on X identified by the leverage value, meaning that there were two outliers in total). None of the cases had a Cook's distance above one (the maximum was .20), indicating that there no influential

observations. The findings shown are the results without outliers removed (though there were no substantial differences between the analyses with and without outliers removed).

Table 7. Regression model for Regression 3 (Outcome is Post-semester academic flow)

	B	Std. error	β	t	p	sr^2	95% CI	
							Lower bound	Upper bound
Pre-semester academic flow	.363	.078	.358	4.670	.000	.350	.21	.52
Strengths use in academics	.264	.045	.449	5.852	.000	.438	.17	.35

Using a stepwise regression (Table 11), the variance accounted for jointly by pre-semester flow and strengths use in academics was significant ($R^2 = .400$, *adj* $R^2 = .389$, *p* < .001). This means that the two variables accounted for 38.9% of the variance in post-semester academic flow, leaving 61% of the variance unaccounted for. Pre-semester academic flow was a significant predictor of post-semester academic flow ($B = .363$, $t = 4.670$, *p* < .001). Strengths use in academics was also a significant predictor of post-semester academic flow ($B = .264$, $t = 5.852$, *p* < .001). These findings support the hypothesis that strength use in academics is positively correlated with academic flow scores above and beyond the effects of pre-semester academic flow.

To test whether there was a significant interaction between strengths use and pre-semester flow, a second multiple regression analysis was conducted. The variables were entered using a stepwise regression, in which pre-semester flow and strengths use were entered in step 1 and the interaction was entered in step 2. The variance accounted for jointly by pre-semester flow, strengths use in academics, and their interaction was significant ($R^2 = .421$, *adj* $R^2 = .405$, *p* < .001). This means that the three variables

accounted for 40.5% of the variance in post-semester academic flow, leaving 59.5% of the variance unaccounted for. Pre-semester academic flow was a significant predictor of post-semester academic flow ($B = .251$, $t = 5.578$, $p < .001$). Strengths use in academics was also a significant predictor of academic flow ($B = .378$, $t = 4.912$, $p < .001$). The interaction was also a significant predictor of academic flow ($B = -.232$, $t = 1.973$, $p < .05$).   This interaction is illustrated in Figure 5, which shows the differences in pre- and post-semester academic flow between the students scoring 1 SD above the mean or higher on strengths use (high strengths use group) and 1 SD below the mean or lower on strengths use (low strengths use group). These findings support the hypothesis that there is an interaction between strengths use in academics and pre-semester academic flow in which students who score high on strengths use score higher on post-semester academic flow than their low-strengths use counterparts.

Figure 4. Mean levels of Academic Flow amongst Students scoring High and Low on Strengths Use in Academics
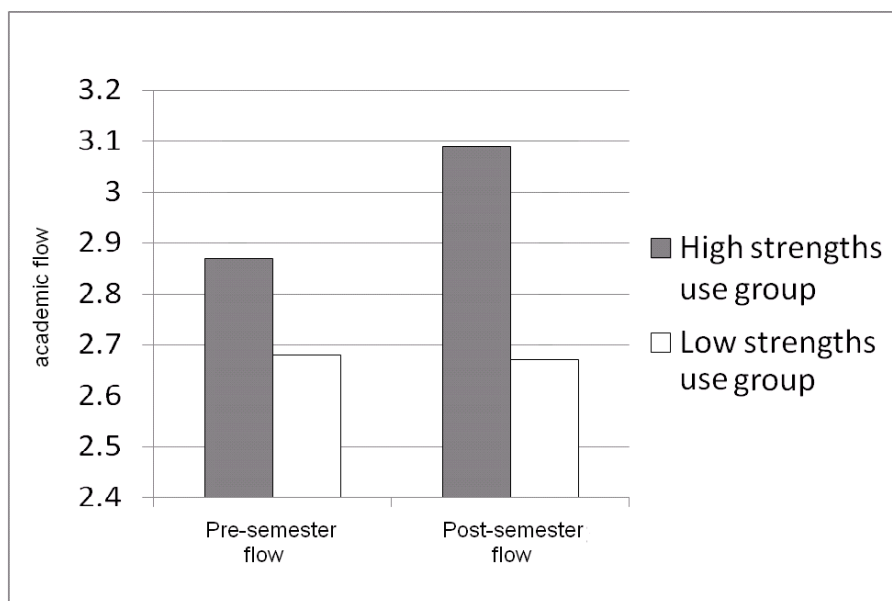
In summary, Hypothesis 2 suggested that learning to utilize one's strengths in academics will help students to increase their level of academic flow. The findings of the analyses described above supported this hypothesis. The meaning of these significant results will be interpreted in the Discussion section.

3.2.4 Hypothesis #3

It was hypothesized that students who use their strengths more frequently will earn higher grades (from Fall 2010 to Winter 2012) in comparison to their counterparts who reporting using their strengths less often (controlling for grades in Winter 2010).

The third hypothesis was tested using multiple linear regression analyses. The variables of Winter 2010 GPA, Fall 2010 GPA, Winter 2011 GPA, Fall 2011 GPA, and Winter 2012 GPA were centred by subtracting each score by the means of the variables (shown in Tables 3 and 4). In the four regressions, the centred Winter 2010 GPA and centred strengths use in academics variables were entered as predictor variables in the same step. The centred GPA variables, centred Fall 2010 GPA (Regression 3a), centred Winter 2011 GPA (Regression 3b), centred Fall 2011 GPA (Regression 3c), and centred Winter 2012 GPA (Regression 3d), were entered as the dependent variable.

3.2.4.1 Regression 1a (Outcome is Fall 2010 GPA)

All of the assumptions of multiple regression were tested. The sample size per predictor was 68 (136/2), which far exceeded the required $n = 15$ per predictor. Tolerance/VIF values were well within the acceptable range for both variables, indicating that the assumption of multicollinearity was not violated. The value obtained from Durbin-Watson for the regression was 1.98, which suggests that the independence of errors assumption was not violated. Examination of the pattern of the scatter of dots in

the standardized residual-standardized predictor value plot approximated a horizontal line near 0, which suggested that there was a linear relationship between the predictors and the outcome. An examination of the same plot showed that there was a random scatter, which indicated that there was homoscedasticity. Thus, both the assumption of linearity and assumption of homoscedasticity were met. The normality of errors assumption was tested by constructing a standardized residual plot. The frequency distribution of the standardized residuals approximated a normal curve (though it did have a slight negative skew), with no sign of high skewness or kurtosis, suggesting that this assumption was met. Thus, all of the assumptions were met.

In addition to testing the assumptions, potential outliers were identified. None of the observations exceeded the Mahalanobis critical value of 15 (the maximum was 12.57). However, 4 observations exceeded the cutoff for the leverage value (.066), indicating that there were 4 outliers on X. The standardized residuals ranged from -2.37 to 1.88, meaning that none of the observations exceeded the critical value of 3, indicating that there were no outliers on Y. None of the cases had a Cook's distance above one (the maximum was .10), indicating that there no influential observations. The findings shown are the results *without* outliers removed (though there were no substantial differences between the analyses with and without outliers removed).

Table 8. Regression testing the association between Strengths use and Fall 2010 GPA.

	B	Std. error	β	t	p	sr^2	95% CI	
							Lower bound	Upper bound
Winter 2010 GPA	.304	.068	.360	4.450	.000	.358	.302	.478
Strengths use in academics	.269	.325	.067	.826	.410	.066	-.225	.204

Using a stepwise regression (shown in Table 8), the variance accounted for jointly by Winter 2010 GPA and strengths use in academics was significant ($R^2 = .140$, *adj R^2* = .127, *p* < .001). This means that strengths use in academics accounted for 12.7% of the variance in Fall 2010 GPA, leaving 87% of the variance unaccounted for. While baseline (Winter 2010) GPA was a significant predictor of Fall 2010 GPA ($B = .304$, $t = 4.450$, *p* < .001), strengths use in academics was not significant ($B = .269$, $t = .826$, *p* = ns). Thus, while the assumptions are valid, the hypothesis is unsupported.

3.2.4.2 Regression 3b (Outcome is Winter 2011 GPA)

All of the assumptions of multiple regression were tested. The sample size per predictor was 62.5 (125/2), which far exceeded the required *n* = 15 per predictor. Tolerance/VIF values were well within the acceptable range for both variables, indicating that the assumption of multicollinearity was not violated. The value obtained from Durbin-Watson for the regression was 2.14, which suggests that the independence of errors assumption was not violated. Examination of the pattern of the scatter of dots in the standardized residual-standardized predictor value plot approximated a horizontal line near 0, which suggested that there was a linear relationship between the predictors and the outcome. An examination of the same plot showed that there was a random scatter, which indicated that there was homoscedasticity. Thus, both the assumption of linearity and assumption of homoscedasticity were met. However, the frequency distribution of the standardized residuals had a noticeable negative skew. This suggests that the assumption of normality of errors may have been violated (unfortunately, regression is

not robust to violation of the assumption of normality of errors). Thus, all of the

assumptions (with the possible exception of normality of errors) were met.

In addition to testing the assumptions, potential outliers were identified. None of

the observations exceeded the Mahalanobis critical value of 15 (the maximum was

12.47). However, 5 observations exceeded the cutoff for the leverage value (.072),

indicating that there were 5 outliers on X. The standardized residuals ranged from -2.49

to 1.66, meaning that none of the observations exceeded the critical value of 3, indicating

that there were no outliers on Y. None of the cases had a Cook's distance above one (the

maximum was .11), indicating that there no influential observations. The findings shown

are the results *without* outliers removed (though there were no substantial differences

between the analyses with and without outliers removed).

Table 9. Regression testing the association between Strengths use and Winter 2011 GPA.

	B	Std. error	$β$	t	p	sr^2	95% CI	
							Lower bound	Upper bound
Winter 2010 GPA	.208	.083	.221	2.511	.013	.218	.04	.37
Strengths use in academics	.608	.400	.134	1.522	.131	.132	.18	1.40

Using a stepwise regression (Table 9), the variance accounted for jointly by

Winter 2010 GPA and strengths use in academics was significant (R^2 = .076, *adj* R^2 =

.061, p < .01). This means that the two variables accounted for 6.1% of the variance in

Winter 2011 GPA, leaving 94% of the variance unaccounted for. While baseline (Winter

2010) GPA was a significant predictor of Winter 2011 GPA (B = .208, t = 2.511, p <

.01), strengths use in academics was not significant (B = .608, t = 1.522, p = ns). Thus,

while the assumptions are valid, the hypothesis is unsupported.

3.2.4.3 Regression 3c (Outcome is Fall 2011 GPA)

All of the assumptions of multiple regression were tested. The sample size per predictor was 51 (102/2), which far exceeded the required 15 observations per predictor. Tolerance/VIF values were well within the acceptable range for both variables, indicating that the assumption of multicollinearity was not violated. The value obtained from Durbin-Watson for the regression was 1.76, which suggests that the independence of errors assumption was not violated. Examination of the pattern of the scatter of dots in the standardized residual-standardized predictor value plot approximated a horizontal line near 0, which suggested that there was a linear relationship between the predictors and the outcome. An examination of the same plot showed that there was a random scatter, which indicated that there was homoscedasticity. Thus, both the assumption of linearity and assumption of homoscedasticity were met. The frequency distribution of the standardized residuals had no noticeable skewness or kurtosis. This suggests that the assumption of normality of errors was met. Thus, all of the assumptions were met.

In addition to testing the assumptions, potential outliers were identified. None of the observations exceeded the Mahalanobis critical value of 15 (the maximum was 12.06). However, 5 observations exceeded the cutoff for the leverage value (.088), indicating that there were 5 outliers on X. The standardized residuals ranged from -2.37 to 1.97, meaning that none of the observations exceeded the critical value of |3|, indicating that there were no outliers on Y. None of the cases had a Cook's distance above one (the maximum was .05), indicating that there no influential observations. The findings shown are the results *without* outliers removed (though there were no substantial differences between the analyses with and without outliers removed).

Table 10. Regression testing the association between Strengths use and Fall 2011 GPA.

	B	Std. error	β	t	p	sr²	95% CI	
							Lower bound	Upper bound
Winter 2010 GPA	.191	.098	.193	1.936	.056	.189	-.01	.39
Strengths use in academics	.496	.488	.101	1.018	.311	.099	-.47	1.46

Using a stepwise regression (Table 10), the variance accounted for jointly by

Winter 2010 GPA and strengths use in academics was not significant ($R^2 = .055$, *adj R^2* =

.036, *p* = ns). This means that the two variables accounted for 3.6% of the variance in Fall

2011 GPA, leaving 96% of the variance unaccounted for. Baseline (Winter 2010) GPA

was not a significant predictor of Fall 2011 GPA ($B = .191$, $t = 1.936$, p = ns). Strengths

use in academics was not significant ($B = .496$, $t = 1.018$, p = ns). Thus, while the

assumptions are valid, the hypothesis is unsupported.

3.2.4.4 Regression 3d (Outcome is Winter 2012 GPA)

All of the assumptions of multiple regression were tested. The sample size per

predictor was 47 (94/2), which far exceeded the required 15 observations per predictor.

 Tolerance/VIF values were well within the acceptable range for both variables,

indicating that the assumption of multicollinearity was not violated. The value obtained

from Durbin-Watson for the regression was 1.93, which suggests that the independence

of errors assumption was not violated. Examination of the pattern of the scatter of dots in

the standardized residual-standardized predictor value plot approximated a horizontal line

near 0, which suggested that there was a linear relationship between the predictors and

the outcome. An examination of the same plot showed that there was a random scatter,

which indicated that there was homoscedasticity. Thus, both the assumption of linearity

and assumption of homoscedasticity were met. The frequency distribution of the

standardized residuals had no noticeable skewness, though it appeared to be slightly

leptokurtic. This suggests that the assumption of normality of errors was met. Thus, all of

the assumptions were met.

In addition to testing the assumptions, potential outliers were identified. None of

the observations exceeded the Mahalanobis critical value of 15 (the maximum was

13.35). However, 4 observations exceeded the cutoff for the leverage value (.096),

indicating that there were 4 outliers on X. The standardized residuals ranged from -2.78

to 2.22, meaning that none of the observations exceeded the critical value of |3|,

indicating that there were no outliers on Y. None of the cases had a Cook's distance

above one (the maximum was .11), indicating that there no influential observations. The

findings shown are the results without outliers removed (though there were no substantial

differences between the analyses with and without outliers removed).

Table 11. Regression testing the association between Strengths use and Winter 2012 GPA.

	B	Std. error	β	t	p	sr^2	95% CI	
							Lower Bound	Upper Bound
Winter 2010 GPA	.369	.102	.352	3.611	.000	.350	.16	.57
Strengths use in academics	.568	.498	.111	1.140	.257	.111	-.42	1.56

Using a stepwise regression (Table 11), the variance accounted for jointly by

Winter 2010 GPA and strengths use in academics was significant ($R^2 = .144$, *adj* $R^2 =$

.125, $p < .001$). This means that the two variables accounted for 12.5% of the variance in

Winter 2012 GPA, leaving 88% of the variance unaccounted for. While baseline (Winter

2010) GPA was a significant predictor of Winter 2012 GPA ($B = .369$, $t = 3.611$, $p <$

.001), strengths use in academics was not significant ($B = .568$, $t = 1.140$, $p = $ ns). Thus, while the assumptions are valid, the hypothesis is unsupported.

Figure 5. Mean GPA Values among Participants scoring high and low on Strengths Use in Academics
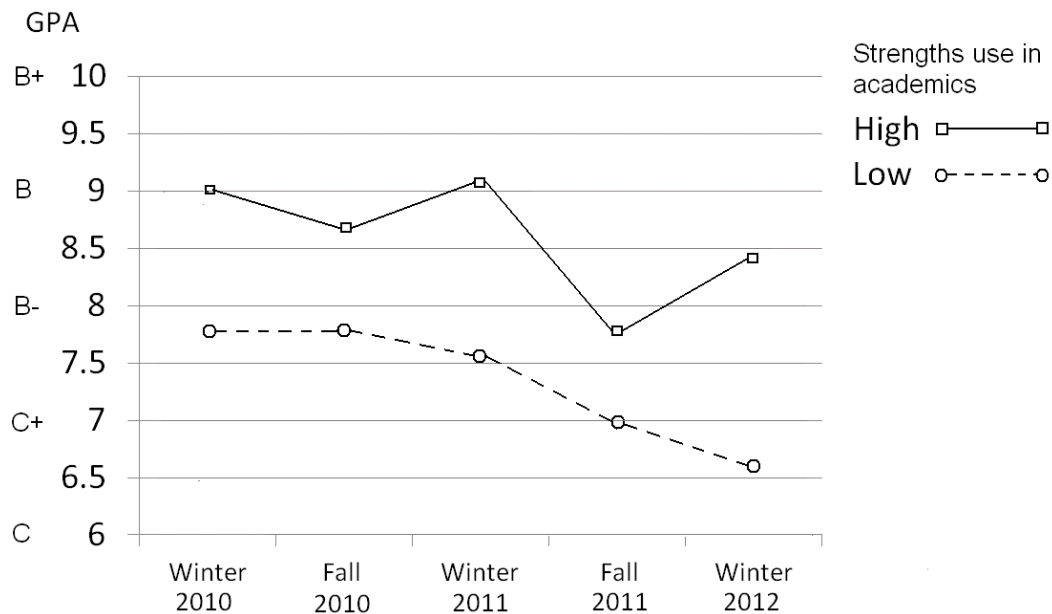
Figure 5 illustrates the differences between the highest and lowest scorers on the measure of strengths use on the measures of GPA. Students in the "high" group scored 1 SD above the mean or higher on strengths use, while students in the "low" group scored 1 SD above the mean or lower on strengths use. As shown above, there was a slight difference in GPA across all 5 semesters between the high and low strengths use groups.

In summary, Hypothesis 3 suggested that learning to utilize one's strengths in academics will help students to increase their level of academic achievement. No evidence was found to support this hypothesis in the present study. The meaning of the null results found in the present study for this hypothesis will be interpreted in the Discussion section.

3.3 Additional analyses conducted

3.3.1 Mediational analyses

Since strengths use in academics was not significantly associated with GPA, a mediational model was not tested (see Regression analyses 3a, 3b, 3c, and 3d). However, a mediational analysis was conducted between strengths use in academics and academic happiness (with academic flow serving as the mediator). This analysis is shown in the following section.

A mediational model hypothesizes that the predictor variable can have an indirect effect on the outcome variable in which the predictor variable explains significant variance in the mediator variable, which in turn explains significant variance in the outcome variable. Mediation can be used to understand the nature of the relationship between the predictor and outcome variables by exploring what intervening mechanism might cause the predictor variable to influence the outcome variable.

Four conditions need to be satisfied in order to establish the existence of a mediation effect (Baron & Kenny, 1986). First, there must be a significant relationship between the predictor and outcome. Second, there must be a significant relationship between the predictor and mediator. Third, there must be a significant relationship between the mediator and outcome. Fourth, when the mediator is included, the relationship between the predictor and outcome should become weaker.

The mediational analyses carried out in this study were based on method developed by Preacher and Hayes (2004). This method was chosen because it improves upon the traditional procedures for testing mediational analyses known as the Baron and Kenny method (Baron & Kenny, 1986) and the Sobel test (Sobel, 1982). The Baron and

Kenny method is problematic for several reasons. It is prone to Type I and Type II error, it does not directly address the mediation hypothesis, and has low statistical power (Preacher & Hayes, 2004). The Sobel test is also problematic. The Sobel test assumes a large sample and that the sampling distributions for a, b, and ab are normally distributed (Preacher & Hayes, 2004). In reality, these assumptions are rarely met. The Preacher and Hayes model corrects for these shortcomings by using a bootstrapping procedure. Bootstrapping is a non-parametric method that can be used to assess indirect effects (Preacher & Hayes, 2004). Bootstrapping computes the indirect effect (ab) by taking a large number of samples (at least 1000) from the data and sampling them with replacement. This procedure makes no assumptions about the shape of the distributions of the variables or the sampling distributions (Preacher & Hayes, 2004). These qualities enable researchers to circumvent the assumptions for the Baron and Kenny model and the Sobel test.

It should be noted that the paths (shown in Figure 6) are not standardized coefficients; rather, they are unstandardized coefficients. In mediation, the unstandardized regression coefficients are used for the significance test and thus they are reported in figure below (Preacher & Hayes, 2008). To determine whether the indirect effect was significantly different from zero, the confidence interval for the indirect effect was examined. If the confidence interval included zero, it was determined that the indirect effect did significantly not differ from zero. If the confidence interval did not include zero, then it was determined that the indirect effect did significantly differ from zero.

Figure 6. Mediation model showing unstandardized coefficients.
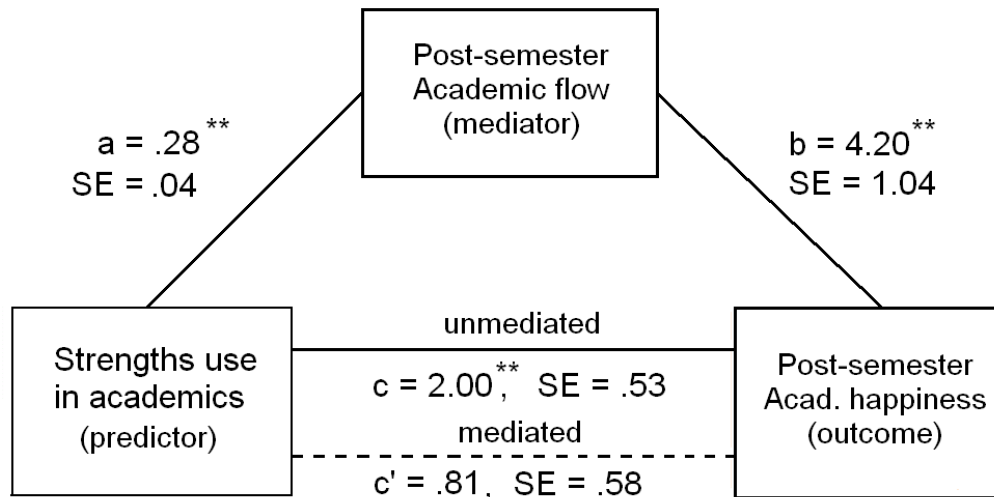
* *p* < .05, **p* < .01

As depicted in Figure 6, strengths use in academics and post-semester academic happiness are significantly associated (*B* = 2.00, *SE* = .53, *p* < .001), as are the strengths use in academics and post-semester academic flow (*B* = .28, *SE* = .04, *p* < .001). In the presence of strengths use in academics, there is a significant association between academic flow and academic happiness (*B* = 4.20, *SE* = 1.04, *p* < .001). Most importantly, in the presence of academic flow, strengths use in academics and academic happiness are no longer significantly associated (B = .81, *SE* = .58, *p* = ns). This suggests that post-semester academic flow at least partly mediates the association between strengths use in academics and post-semester academic happiness.

Tests of the indirect effect revealed that there was a significant reduction in the strength of association between strengths use in academics and academic happiness (*B* = 1.19, *p* < .001). The true indirect effect was estimated to lie between .51 and 1.87 with 95% CI. Because zero is not in the 95% CI, it is reasonable to conclude that the indirect

effect is significantly different from zero. This suggests that there was some mediation of the association between strengths use in academics and post-semester academic happiness by post-semester academic flow.

In summary, these findings suggested that using one's strengths in academics may help students to increase their level of academic happiness, and that this association is accounted for by academic flow. The meaning of this finding will be interpreted in the Discussion section.

3.3.2 Other supplementary post-hoc analyses

A parallel set of regression analyses were run using strengths use in relationships as a predictor variable, replacing strengths use in academics. None of the associations between strengths use in relationships and GPA or post-semester academic happiness were found to be significant. However, strengths use in relationships was found to be significantly positively associated with post-semester academic flow ($\beta = .180$, $t = 2.125$, $p < .05$), above and beyond the effects of pre-semester academic flow ($\beta = .439$, $t = 5.192$, $p < .001$). The non-significant association between strengths use in relationships and academic happiness provides evidence of divergent validity. If this analysis had been significant, this would suggest that strengths use in any domain (not just in academic life) would be beneficial to students' academic happiness. Non-significance of the association between strengths use in relationships and post-semester academic happiness suggests that the utilization of one's strengths is beneficial to one's academic happiness only when they are practiced in the academic domain. Utilizing one's strengths in other domains of life has little benefit to academic happiness, as measured using the outcomes in this study.

Two additional exploratory analyses unrelated to the study hypotheses were conducted and are briefly described here. The first was a set of multiple linear regression analyses between academic flow and GPA across all four semesters. In the regression analyses, Winter 2010 GPA, pre-semester flow and post-semester flow were entered simultaneously as predictors. In four separate regressions, Fall 2010, Winter 2011, Fall 2011, and Winter 2012 GPA were entered as outcome variables in each regression.

Post-semester academic flow (after controlling for pre-semester academic flow and Winter 2010 GPA) was not a significant predictor of Fall 2010 GPA ($\beta = .159$, $t = 1.946$, $p = .06$), Fall 2011 GPA ($\beta = .103$, $t = 1.036$, $p = $ ns), Winter 2012 GPA ($\beta = .153$, $t = 1.478$, $p = $ ns). However, post-semester academic flow (after controlling for pre-semester academic flow and Winter 2010 GPA) was a significant predictor of Winter 2011 GPA ($\beta = .179$, $t = 2.072$, $p < .05$).

The second set of analyses was a set of multiple linear regression analyses between academic happiness and GPA across all four semesters. In the regression analyses, Winter 2010 GPA, pre-semester academic happiness and post-semester academic happiness were entered simultaneously as predictors. In four separate regressions, Fall 2010, Winter 2011, Fall 2011, and Winter 2012 GPA were entered as outcome variables in each regression.

Post-semester academic happiness (after controlling for pre-semester academic happiness and Winter 2010 GPA) was a significant predictor of Fall 2010 GPA ($\beta = .219$, $t = 3.170$, $p < .01$) and Winter 2011 GPA ($\beta = .211$, $t = 2.778$, $p < .01$). However, post-semester academic happiness (after controlling for pre-semester academic happiness and

Winter 2010 GPA) was not a significant predictor of Fall 2011 GPA ($\beta = .169$, $t = 1.947$, $p = $ ns) or Winter 2012 GPA ($\beta = .136$, $t = 1.512$, $p = $ ns).

The results of the two exploratory analyses mentioned above suggest that there may be some significant association between academic flow and academic happiness at post-semester and grades (particularly in the short term). While these findings are interesting, they are not of theoretical relevance to the present study. This being said, these findings do seem to suggest that some aspect of the StrengthsQuest program may have led to affective changes that in turn led to improved academic performance.

CHAPTER 4

DISCUSSION

The purpose of this study was to examine whether using one's strengths more frequently leads to improvements in academic and emotional well-being (i.e., academic performance, academic flow, and academic happiness). Partial support was found for the hypotheses. The following significant results were found: strengths use in academics was significantly and positively related to post-semester academic happiness above and beyond the effects of pre-semester academic happiness (supporting Hypothesis 1); strengths use in academics was significantly and positively related to post-semester academic flow above and beyond the effects of pre-semester academic flow (supporting Hypothesis 2); and the association between strengths use in academics and post-semester academic happiness was mediated by post-semester academic flow. However, strengths use in academics was not significantly and positively related to post-semester academic happiness above and beyond the effects of pre-semester academic happiness (failure to support Hypothesis 3).

4.1 Discussion of the Findings

This section reviews the relevance of each of the major findings in this study as contributors to students' academic and emotional well-being. The findings will be discussed in context with the existing literature. This section will also attempt to determine the reasons for the findings of the present study.

4.1.1 Hypothesis 1

The first hypothesis, that strengths use in academics would be related to academic happiness, was supported. Specifically, the regression analyses suggest that strengths use in academics accounts for significant variance in post-semester academic happiness above and beyond the variance accounted for by pre-semester academic happiness. This finding seems to suggest that the StrengthsQuest program had an effect on students' experience of positive affect in their coursework, and that this association was not present before the start of the program.

This finding replicates the findings of Lounsbury et al. (2009), Wood et al. (2011), Proctor et al. (2011a) and Proctor et al. (2011b). However, the findings of the present study are unique and add to the literature. Unlike Lounsbury et al., Proctor et al. (2011a), and Wood et al., the present study examined the effects of a strengths-based intervention. In addition, the present study used a more conceptually valid measure of positive affect than did Lounsbury et al. and Proctor et al. (2011a), who used a global measure of life satisfaction to assess psychological well-being. The present study is unique in that it used a measure adapted specifically to academic life, which differentiates the findings of the present from those of Wood et al., Proctor et al. (2011a) and Proctor et al. (2011b), who did not adapt their measure of positive affect to a specific life domain.

Lastly, unlike previous studies that used the VIA strengths framework, the present study was the first study to examine the relationship between strengths use and academic happiness using the framework of StrengthsQuest.

4.1.2 Hypothesis 2

The second hypothesis, which stated that strengths use in academics would be related to academic flow, was supported. Specifically, the regression analyses suggest that strengths use in academics accounts for significant variance in post-semester academic flow above and beyond the variance accounted for by pre-semester academic flow. This suggests that the StrengthsQuest program had an effect on students' experience of academic flow in their coursework, and that this association was not present before the start of the program.

This finding is of significance because it not only represents the first known instance that a significant association between strengths use and academic flow has been found, but also it is the first time that any known study has examined this association. This finding supports the speculation by some authors (Seligman et al., 2006) that strengths use may promote flow experiences. This finding is consistent with the findings of Cantwell (2005), who found that frequent use of strengths was related to academic engagement.

4.1.3 Hypothesis 3

The third hypothesis, that strengths use in academics would be related to GPA was not supported. This finding is inconsistent with previous research (e.g., Lounsbury et al., 2009). Across four different regression analyses, no association between strengths use and GPA could be found. This is puzzling, as the effect found by Lounsbury et al. was

quite strong (r = .13 - .31 among strengths that were significantly associated with GPA). However, it should be emphasized that the operationalization of strengths use in the current study differed from that employed by Lounsbury et al. Lounsbury et al. did not examine strengths use; instead they examined the association between participant agreement with items pertaining to particular VIA strengths and GPA. It is plausible that this difference in operationalization accounts for the null findings in the present study. Other interpretations for the null results found in the present study are discussed below in the limitations section.

4.1.4 Other findings

The mediational analysis conducted in the present study found that the association between strengths use in academics and academic happiness was fully mediated by academic flow. This finding suggests that students who use their strengths find opportunities to experience flow. Since most students are unaware of their strengths, the path to flow is often blocked. As a consequence, they may become dissatisfied and disengaged from their studies. When students become aware of and utilize their strengths, the path to flow becomes unblocked. When these students experience flow, they experience an intrinsic reward. As a consequence, students experience increases in positive affect and decreases in negative affect.

4.2 Limitations

This section will attempt to explain the null finding for Hypothesis 1. Also, the significant findings of this study need to be interpreted with caution for several reasons explained below. The findings are interpreted with regard to internal validity, external validity, measurement, and statistics chosen.

4.2.1 Limitations relevant to null findings

The most puzzling finding in this study was the lack of a significant association between strengths use in academics and GPA. Several explanations can be ruled out. None of the assumptions of multiple regression were violated.

The null results found for Hypothesis 1 may have been the result of flaws inherent in the measures used. Some of the data used for this study were gathered using self-report questionnaires, which may have introduced some error. This is especially problematic for self-reported GPA in the Winter 2010 semester (which may not accurately reflect students' true GPA scores, unlike data obtained from the Registrar's office).However, as noted previously, the first-year and transfer students who participated in this study did not have University of Windsor GPA data in Winter 2010. In addition, the operationalization of strengths use was imperfect, as it was only a three-item measure (and had only satisfactory reliability) and was not empirically validated. Future studies may wish to use the Strengths Use Scale (Wood et al., 2011), which was not available at the time that this study was conducted.

Since strengths use was only measured once (at the end of the course), it is unknown whether students continued to use their strengths in the long term. The GPA variable at each long term follow-up (Winter 2011, Fall 2011, and Winter 2012) was predicated on assumption of continued use of the skills that were presumably acquired and employed in the Fall semester of 2010. But, there is no evidence that students continued to make use of their strengths after they completed the course in which they learned these skills. Students may have decreased their use of their strengths after they completed the course because it was no longer required of them. If this was true for the

students who participated in this study, then this could account for the lack of significant associations found between strengths use and the Winter 2011, Fall 2011, and Winter 2012 semesters (nearly 18 months after the strengths use variable was assessed). With this in mind, researchers may wish to extend their assessment of strengths use for each semester that they wish to evaluate students' academic performance.

While the present study could not demonstrate a significant effect of strengths use on GPA, it is possible that this was an instance of Type II error. A Type II error occurs when there is a failure to reject the null hypothesis even though the alternative hypothesis is true. In other words, the null results represented a false negative. Type II error can occur for several reasons. One consideration is that there may be error introduced with the measurement of the predictor and outcome variables (construct validity of cause and effect). The predictor variable used in this study, strengths use in academics, may not represent all aspects of strengths use in academics. Perhaps a better measure could have been constructed. For example, it may be that strengths use was associated with higher rates of graduation and lower dropout (unfortunately, neither measure was examined in this study).

In addition, while GPA is viewed as the most important indicator of university students' academic performance (Astin, 1993), it is not the only measure of academic performance. Academic achievement is a multidimensional construct and GPA is only one facet of this construct. Other quantifiable measures of student success, such as enrollment in postsecondary education, persistence, length of time to complete a degree, and graduation/degree attainment could be examined (Venezia et al., 2005). It may be that strengths use is beneficial to other aspects of academic achievement that were not

measured in this study. Thus, future researchers may wish to have a multidimensional measure of academic achievement.

It is possible that the lack of an effect could have been due to the short time duration of the study and that a stronger "dose" could have yielded effects on academic performance. However, based on prior research, it seems that eight weeks of training is enough time. Prior studies have reported in the published literature had strengths interventions that lasted from one month to a full semester. Instead, it may be that there were individual differences in the quality of student's execution of their StrengthsQuest program. Some students may have been very conscientious to work the "action items" offered in the StrengthsQuest workbook into their everyday lives, and made deliberate, planned, and careful use of their strengths. Other students, however, may have showed poorer compliance, which may have diluted the effect (if there was one).

Similarly, the null findings may also have been the result of suppressor variables. A suppressor variable is a variable that increases the strength of the association between the predictor and outcome variables when it is included in the regression equation (Cohen et al., 2003). For instance, it may be that course difficulty (not measured in this study) suppresses the association between strengths use and GPA. Students who use their strengths more often may be more likely to take more challenging (but intrinsically rewarding or flow-inducing) courses. Such an increase in course difficulty might act as a countervailing force that acts to lower GPA.

Finally, there is a possibility that researchers investigating the effect of strengths use on GPA (or other measures of academic achievement) found null results, but these results were not reported. Due to the publication bias of positive results in research

(Sterling, Rosenbaum, & Weinkam, 1995), it is possible either the investigators of these studies did not submit them for review or these studies were submitted but were rejected by reviewers/editors for publication. While it is impossible to know for certain whether or not researchers have found similar null findings, the non-publication of null results may have contributed to a positively biased view of strengths use in the literature.

4.2.2 Other potential limitations

The significant findings of the present study should also be interpreted with caution. While this was a longitudinal study, causation cannot be inferred because there was no manipulation to any study variables. It is possible that some of the relationships between variables measured at the same point in time are bidirectional (e.g. it cannot be determined whether academic flow causes academic happiness, or vice versa) or were caused by some unknown third variable. In addition, the use of regression analysis may not be the ideal method for testing the hypotheses in this study. Future studies may wish to use structural equation modeling to test the hypotheses outlined in the present study.

It is also possible that the students' scores were influenced by demand characteristics (Orne, 1962), the phenomenon where participants respond in a manner that they deem to be consistent with what they perceive to be the researcher's expectations. In the present study, students were informed that the purpose was to evaluate the StrengthsQuest program and it is possible that they may have responded to the items in a way that exaggerated the apparent beneficial effects of the program. In addition, students may have exaggerated the degree to which they used their strengths because they felt that this was socially desirable as they were enrolled in a course where their grade partly depended on demonstrating that they are using their strengths. It is

possible that since the study was not anonymous (albeit confidential), some students may have adjusted their responses as they may have (erroneously) thought that their responses might have some influence their course grade. These potential perceptions on the part of some participants may have over-reported the degree to which they used their strengths.

4.3 Implications

The findings of the present study are of importance for theoreticians, researchers, academic advising professionals and administrators at educational institutions. Potential pragmatic applications and possible directions for future research are discussed below.

4.3.1. Implications for Theory

These findings have several implications for theory. Namely, strengths development appears to contribute to at least two facets of academic well-being. The mediational model suggests that academic flow intervenes between the frequent use of strengths and academic happiness. This finding adds to the current theoretical understanding of the mechanisms by which StrengthsQuest works.

The evidence found in the present study will strengthen our trust in the validity of strengths theory. To this end, the findings of the present study support the theory of strengths development proposed by Hodges & Harter (2005). This theory states that when individuals perform activities that are congruent with their talents, this may result in increased self-awareness, yearnings (higher aspirations), and rapid learning. All of these outcomes may be contributing antecedents of flow.

The findings support flow theory (Csikszentmihalyi, 1990), which states that flow occurs when perceived challenges stretch existing skills and clear proximal goals are present. It appears that strengths use favorably disrupts the ratio between challenge and

skill. Strengths use may affect the students' perception of the skills that they have at their disposal. Namely, strengths use can allow students to tap into a reserve of hidden talents that students were unaware of prior to undertaking the StrengthsQuest program. With these skills, they can face challenges with less anxiety (one of the facets of negative affect that was included as part of the academic happiness measure).

Furthermore, these findings support Seligman's PERMA model of psychological well-being (Seligman, 2011). According to this model, strengths use increases one's level of psychological well-being (Seligman et al., 2005). It appears that strengths use may lead to increases in two of the main components of this model (positive affect and engagement).

4.3.2 Implications for Research

The present study had several unique features that future researchers may wish to emulate. At the methodological level, the present study developed and tested new measures that did not previously exist. The existence of these scales is a worthwhile contribution at the level of behavioural science research. The present study has also advanced research by making a case for why the results pertaining to educational satisfaction (happiness) and educational engagement (flow) are encouraging enough to help justify future research involving random assignment.

While the present study contributes several worthwhile elements that future research ought to consider in their own research designs, there are many limitations to this study that could be remedied by future researchers. Researchers may wish to consider examining strengths use over a longer period of time to see whether students maintain their level of strengths use or whether strengths use eventually declines. In addition,

researchers may wish to use a multidimensional model of academic performance instead of simply using GPA. Other indicators such as persistence, length of time to complete a degree, and graduation/degree attainment should be examined. Researchers may also wish to use the Strengths Use Scale, which was developed by Wood et al. (2011).

Future studies should also consider using course-specific assessments of strengths use, where strengths-use items are specifically linked to a particular course. Then, marks for this particular course could then be correlated with course-specific use of signature strengths. For example, if a student takes five courses, researchers may wish to assess the extent to which they use their top five strengths in each course (for a total of 25 items per semester). This data would then be correlated to grades data from each course taken that semester. This method would be repeated for every semester that the researcher wished to assess students' GPA and strengths use.

Future studies should re-assess strengths-utilization each semester for which follow-up marks are being examined. Future researchers ought to do long-term follow-up assessment of course-specific strengths use in tandem with course-pecific marks, for each semester. In other words, they should also follow up on students' strengths use for each semester that GPA data is collected. Future researchers should also consider using "booster sessions" to ensure sustained strengths use in future semesters.

Researchers should identify potential obstacles and structural barriers to doing long-term data collection prior to embarking on such a study. It is imperative to identify logistical issues involving barriers to access of data from students. For example, students may drop out, transfer, or graduate. In addition, future researchers should ensure, at outset, to get cooperation from their university's Registrar's Office. Research that wishes

to do multiple follow-ups will likely need more funding to gain cooperation of the Registrar's Office and the students.

Future research in this area may also wish to identify other mediators of the association between strengths use and academic and psychological outcomes. By doing so, researchers can establish the interceding mechanisms that help to explain why strengths use works. For instance, there should be measures of variables such as study habits, which may mediate the relationship between strengths use and academic well-being (where significant associations exist). There should also be assessment of covariates (such as time on task) that may confound the association between strengths use and academic well-being.

Researchers may also wish to determine whether the findings of this study are generalizable to other populations, which would strengthen the external validity of these findings. For instance, researchers could examine whether the benefits of strengths use interventions hold true for high school students. Researchers may also wish to focus their attention on certain sub-groups who may be at higher risk of dropout and may reap greater benefits than the general population of students (such as first-year students). For example, researchers may wish to test the efficacy of the StrengthsQuest program among students on academic probation, as they are at high risk of dropping out. Research can also focus on the most effective methods for training instructors to design classes in a way that encourages students to use their strengths and experience flow.

4.3.3 Implications for Practitioners

The findings of the present study are also of relevance to academic advisors. The results of the present study tentatively suggest that academic advising professionals ought

to encourage students (especially those who are experiencing low levels of happiness in their academic lives) to use their strengths (as often as they can) in their academic life. The findings seem to suggest that it is important that students use their strengths as often as they can and that these strengths need to be used within the academic domain of their lives in order to accrue benefits in that domain.

4.3.4 Implications for Policy-Makers

Lastly, the findings are of relevance to policy-makers, specifically administrative officials at educational institutions. Such individuals have the power to influence institutional culture. Promoting a strengths-based philosophy at universities and colleges may increase students' academic flow experiences, which in turn will lead to increases in students' academic happiness. Policy makers can create such an environment in several ways. First, they can educate academic advising personnel and faculty on the benefits of the strengths-building model. This can be accomplished by educating academic advisors about the strengths-building model and presenting the findings of studies that are similar to the present study in a seminar format. Second, they can create institution-level strengths-based initiatives to benefit students. Initiatives may include programs to encourage students to become aware of their strengths and to use their strengths more often. Such a program may be of particular relevance to students who are considering changing their major, are in their first year, or are on academic probation. Third, administrators could create marketing initiatives designed for prospective students that highlight the institution's strengths-building philosophy. These marketing initiatives ought to showcase research showing how students may benefit by attending a strengths-based institution.

4.4 Conclusions

In conclusion, the results of the present study demonstrated significant associations between the frequent use of strengths and the variables of academic happiness and academic flow. The findings are strengthened by employing a longitudinal design. Compared with findings other studies of the effects of strengths use, the present results are a mix of convergent and divergent findings. These findings offer tentative support for research and institutional initiatives that encourage students to use their strengths frequently. More research is needed to clarify and extend the present findings.

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APPENDIX

Appendix A: Questionnaires

1. Demographics Questionnaire

Please indicate your name in the boxes below.

Type your last/family name here: [   ]

Type your first name here: [   ]

Type your UWindsor student ID number here: [   ]

4. How old are you? Indicate your age here _____

5. What biological sex is indicated on your birth certificate? male ____ or female ____

6. How tall are you? [ ] _____feet_____ inches OR [ ] _____cm

7. How much do you currently weigh [ ]_____(pounds) OR [ ]_____kg

8. Romantic Relationship Status (click all that apply):
      a. Never Married
      b. Married
      c. Separated or Divorced
      d. Widowed
      e. Common-Law (living together)
      f. In a 'serious' monogamous romantic relationship

9. Ethnicity (select one):
      1. Caucasian (White of European origin)
      2. African-Canadian/American (Black)
      3. East Asian (e.g. Chinese, Japanese, Korean, etc)
      4. South Asian (e.g. Indian, Pakistani, Sri Lankan, etc.)
      5. Middle Eastern
      6. Native/Aboriginal/First Nations
      7. Hispanic/ Latino
      8. Other or multi-ethnic origin

10. Marital Status of Biological Parents (select one):
      1. My biological parents are <u>not</u> living together (divorced or separated)
      2. My biological parents live together
      3. One or both of my parents are deceased
      4. I was adopted

11. Your current employment status (select one):
      1. Not employed
      2. Part-time
      3. Full-time
      4. Unemployed
      5. Seasonal/Temporary/Contract

12. Year in University
- a. yr 1
- b. yr 2
- c. yr 3
- d. yr 4
- e. yr 5 or higher

13. Is English your first language? Yes_____ No_____

14. Were you born in Canada? Yes_____ No_____

15. Was your mother born in Canada? Yes_____ No_____

16. Was your father born in Canada? Yes_____ No_____

17a.Do your parents speak English at home as their primary language? Yes__ No___

17b.If 17a is "No', what language do your parents speak? _____

18. Are you the first in your immediate family to attend university? Yes_____ No_____

19. Are you an international student Yes_____ No_____

20.What country are you a citizen of? _____

21.Do you hold a temporary study permit? Yes__ No__

22a.Is one or both of your parents alive? Yes__ No

22b. If 22a is "Yes", How would you describe your parent's attitude toward you getting a degree from the University of Windsor?
 5=extremely favorable, 4=very favorable,3=favorable,2=unfavorable,1=very unfavorable, 0=extremely unfavorable

23.How do you see yourself in relation to that which our society considers to be sacred? In terms of your orientation toward matters that are spiritual or religious in nature, which category would you say that would best describe you? We have given some suggested definitions for the terms below, however, they are up to interpretation and you are welcome to interpret them as you wish. Choose all categories that you feel apply to you.

a. Agnostic (e.g. You are unsure about the existence of God or other supreme deity/deities)
b. Atheistic (e.g. You believe that God or other supreme deity/deities do not exist)
c. Religious (e.g. You believe in the existence of God or other supreme deity/deities and/or adhere to the beliefs of a religion)
d. Spiritual (e.g. You believe in the existence of something beyond the physical world)
e. Both religious and spiritual
f. Spiritual but not religious
g. Religious but not spiritual

24.Do you regularly attend religious worship services? Yes_____ No_____

25.Do you regularly pray in private ? Yes_____ No_____

26.Do you believe a Divine Entity or Supreme Being (however labeled) caused the universe/cosmos to come into being?   Yes_____   No_____

27a.Did the universe/cosmos and all the galaxies come into existence through random chance? Yes_____   No_____(if' yes continue with 27b, if 'no', skip to 28)

27b.Assuming for a moment that some sort of Divine Entity or Supreme Being exists, do you believe this "God" has a plan for your own life? Yes_____   No_____ (*If yes, continue to question 28. If no, skip to 29).*

NOTE: FOR THE FOLLOWING QUESTION, THE TERM 'DIVINE BEING' AS 'GOD', 'HIGHER POWER' OR SUPREME DEITY OF YOUR RELIGION, FOR EXAMPLE: 'ALLAH')

28.Are you actively seeking greater knowledge of the Divine Being's plan for your life? Yes_____ No_____   N/A _____(don't believe a Divine Being exists)

29. In the past 30 days, have you read poetry as part of a personal quiet time that might be considered a 'spiritual practice"? Yes _____ No _____

30. In the past 30 days, have you viewed or contemplated works of art as part of personal quiet time that might be considered a 'spiritual practice" Yes ____ No ____

31. In the past 30 days, have you read written materials (not poetry) as part of a personal quiet time that might be considered a 'spiritual practice'? Yes __ No ____

32. In the past 30 days, have you either lit a candle or burned incense as part of a personal quiet time that might be considered a 'spiritual practice'? Yes __ No ____

33. In the past 30 days, have you listened to music as part of personal quiet time that might be considered a 'spiritual practice" Yes ____ No _____

34. In the past 30 days, have you spent time in nature (either real or virtual nature) as part of personal quiet time that might be considered a 'spiritual practice" Yes __ No__

ABOUT YOUR EDUCATIONAL BACKGROUND

35.Have you ever won any awards (Dean's List, Academic medals) for academic achievement? Yes_No_

36. How often do you get a bad grade, or lower than expected grade?
a. Very Often, b. Often, c. Seldom, d. Never

37. What was your grade average during high school? Choose one of the following.
        _____ a. 80% or above (A-range)
        _____ b. 70 - 79% (B-range)
        _____ c. 60 - 69% (C-range)
        _____ d. 50 - 59% (D-range)
        _____ e. less than 50% (F-range)

38.When applying to universities, how highly ranked was the University of Windsor?
UWin was ranked 1st.
UWin was ranked 2nd.
UWin was ranked 3rd.
UWin was ranked 4th.

UWin was ranked 5th or lower.

39.Did you graduate from a high school in Canada? Yes_____ No_____
       If no, in what country is your high school located? _____

40.In regards to your grade average in high school, to what extent does it accurately reflect your full potential? Choose one of the following.
      _____ a. Does not at all reflect my potential
      _____ b. Somewhat reflects my potential
      _____ c. Strongly reflects my potential
      _____ d. Very strongly reflects my potential

41.What was the highest level of education achieved by your father?
      _____ a. Less than high school diploma
      _____ b. High school diploma or equivalent
      _____ c. Some college/university
      _____ d. College or university undergraduate degree
      _____ e. Graduate or professional degree

42. What was the highest level of education achieved by your mother?
      _____ a. Less than high school diploma
      _____ b. High school diploma or equivalent
      _____ c. Some college/university
      _____ d. College or university undergraduate degree
      _____ e. Graduate or professional degree

43.Have you completed at least one year of college-level or university-level coursework? Yes__ No__
      If no, skip to question 39.
      If yes, continue to question 36.

44.What was your grade average during your most recent semester of high school or university? Choose one of the following.
      _____ a. 80% or above (A-range)
      _____ b. 70 - 79% (B-range)
      _____ c. 60 - 69% (C-range)
      _____ d. 50 - 59% (D-range)
      _____ e. less than 50% (F-range)

45.In regards to your grade average last year, to what extent does it accurately reflect your full potential? Choose one of the following.
      _____ a. Does not at all reflect my potential
      _____ b. Somewhat reflects my potential
      _____ c. Strongly reflects my potential
      _____ d. Very strongly reflects my potential

46.Compared to the marks you earned in your previous semester, what do you expect of your marks in the coming semester?
      _____ a. My marks will get a lot better
      _____ b. My marks will get better
      _____ c. My marks will stay the same
      _____ d. My marks will get worse
      _____ e. My marks will get much worse

47.How many courses are you taking this semester? 1, 2, 3, 4, 5, 6

2. Strengths Use Questionnaire (SUQ)

The questions below ask you to reflect back on the semester and recall your experiences with the StrengthsQuest program. Please answer each question below to indicate how often you consciously applied knowledge and skill to an area of talent in an effort to build a strength. Below, **tell us about your premeditated 'intentional' efforts**. Use the following scale:

0	1	2	3
Never or rarely	Sometimes	Often	All the time

During the semester, how often did you try to build strengths...

1._____ that capitalized on your top five areas of talent.
2._____ that matched your top ranked talent as identified by StrengthsFinder.
3._____ that matched your second strongest talent as identified by StrengthsFinder.
4._____ that matched your third strongest talent as identified by StrengthsFinder.
5._____ that matched your fourth strongest talent as identified by StrengthsFinder.
6._____ that matched your fifth strongest talent as identified by StrengthsFinder.
7._____ in the area of your life that involved Psyc 107 coursework?
8._____ in the area of your life that involved other courses you are taking.
9._____ in the area of your life that involved your relationships with other students in Psyc 107?
10.____in the area of your life that involved your relationships with other UWin students (not in Psyc 107).
11._____ in several different spheres of your life (both your school life AND your personal life).
12._____ in leisure time activities (eg., hobbies, electronic gaming, or socializing).
13._____ that focused on important medical health goals in your life.
14._____ in the area of your life that involves a quest for greater meaning in life or spiritual purpose.
15._____ in the area of your life that involves romantic relationships.
16.___in the area of your life that involves relationships with university instructors or other university staff.
17._____so as to help you achieve an important personal-growth goal (stop smoking, get fit, lose weight).
18._____ so as to help you achieve an important financial goal.
19._____ so as to help you achieve an important career goal.
20._____ so as to help you achieve an important academic goal.
21._____ so as to help you achieve an important mental health goal (eg., be happier).

3. Academic Happiness Scale (AHS)

Note: questions with asterisks were included in the study. A single asterisk indicates a positive affect item, and a double asterisk indicates a negative affect item.

Being in school brings up a lot of feelings, both good and bad. Think back to your educational experiences during the last semester in which you were in school. Which of the following feelings did you have most often? <u>Not every feeling listed below will be relevant to you.</u>

Last semester, I often felt **(**CLICK ONLY THOSE THAT APPLY)

1. _____ cheerful
2._____ disgusted
*3. _____ attentive
4. _____ bashful
5. _____ sluggish
6. _____ daring
7._____ surprised
8._____ challenged
9._____ in control
*10. _____ strong
11. _____ scornful
12._____ relaxed
**13._____ irritable
14._____ delighted
*15._____ inspired
16._____ fearless
17._____ under-stimulated
18._____ disgusted with self
19._____ sad
20._____ useful
21._____ calm
**22._____ afraid
23._____ tired
24._____ amazed
25._____ shaky
26._____ happy
27._____ timid
28._____ curiosity
29._____ alone
*30._____ alert
**31._____ upset
32._____ angry
33._____ bold
34._____ blue

35._____ confused
36._____ shy
*37._____ active
38._____ useless
**39._____ guilty
40._____ joyful
**41._____ nervous
42._____ lonely
43._____ sleepy
*44._____ excited
45._____ in the zone
46._____ easily distracted
**47._____ hostile
48._____ focused
49._____ lost
*50._____ proud
**51._____ jittery
52._____ lively
**53._____ ashamed
54._____ at ease
55._____ goal-oriented
**56._____ scared
57._____ drowsy
58._____ angry at self
*59._____ enthusiastic
60._____ downhearted
61._____ without direction
**62._____ distressed
63._____ over my head
64._____ blameworthy
*65._____ determined
66._____ frightened
67._____ astonished
68._____ purpose-driven
*69._____ interested
70._____ loathing
71._____ confident
72._____ energetic
73._____ able to concentrate
74._____ dissatisfied with self
75._____ bored
76._____ productive
77._____ skilled

4. The Academic Flow Scale (AFS)

[Title for students: IVAE]

INSTRUCTIONS: In order to answer the questions below, think about your educational experience the last time you took classes. If you were not a student at the University of Windsor last semester, answer the questions below in reference to the school you last attended. Please use the rating scale below to describe your educational experience.

0 Strongly disagree	1 Disagree	2 Agree	3 Strongly agree

During the past semester ...
1.I was able to focus and concentrate so intensely that I would often lose track of time
2.I wanted to do well mainly because I love the good feeling of "acing" an exam or assignment.
3.I found the effort I put in was enjoyable.
4.The courses I took had no value, worth or significance
5..I loved the feeling that came when I was successful, and it was this feeling that made me want to keep up the effort.
6.The academic challenges I faced were well matched to my capabilities (not too easy and not too hard).
7.On some of the exams or assignments, right answers just came to me automatically.
8.It was difficult to see how the stuff I was learning was important and relevant to real life
9.I gave at least one presentation during which the words seemed to come so automatically that I hardly needed to think.
10.I found myself to be overly concerned with what others may have been thinking of me
11.It was hard to distract me because my attention was focused nearly entirely on my school work.
12.I had a strong sense of what I wanted to do and what I wanted to accomplish.
13.I hardly put any effort into my coursework
14.I found the material I was learning to be extremely interesting.
15.I was very easily distracted from my schoolwork
16.When I did course work, time seemed to pass very quickly.
17.I had the sense that my studies mattered
18.I had difficulty seeing the worth, significance and value of what I was learning
19.I felt challenged, but I had plenty of energy and 'know-how' that allowed me to meet these challenges.
20.I had choices about which specific learning tasks to do.
21.When studying for exams or preparing assignments, I knew what I was supposed to be doing.
22.I had the sense of being in control over what I needed to do to get a high grade.
23.The material was so irrelevant and boring, I found it difficult to exert the needed effort
24.I had no problem concentrating and keeping my mind sharply focused
25.Class time seemed to fly by at high speed.
26.I felt motivated to study because the material was very interesting.
27.I found myself thinking about course related ideas even when I was not in class or studying
28.I experienced a sense of near total and complete concentration.
29.The material was more advanced that I had anticipated, but I was able to 'stretch' myself and perform well.
30.The answers to tests or assignments seemed to come so spontaneously that I hardly needed to think.
31.There was a lot of work that was quite challenging, but I found my abilities were equal to the task.
32.I found it easy to focus and keep my mind on my studies

33.I found the right answers seemed to just come to me automatically when taking exams or completing assignments.

34.It felt like I was in total control.

35.It was easy to see why or how the material was important

36.The material was so interesting that it was easy to find the energy needed to do the work.

37.I could tell how well I was doing (even before getting my marks) simply by the way I was studying, absorbing the material, and responding to the learning tasks.

38.I was able to clearly define my personal learning goals

39.When reading or doing assignments, time seemed to pass very quickly.

40.I could see the worth and value of the material and this kept me from giving up when it became difficult

41.I had a lot of choice in what to study or which assignments to do.

42.When studying for an exam, I had the strong feeling of "being in the zone".

43.I was able to totally devote myself to learning because the material was vitally important

44.When doing the work, I often lost my normal awareness of time.

45.I was able to decide for myself how to study or how to do the assignments.

46.I had to seriously 'ratchet-up' my game plan and really apply myself in order to do well.

47.I found the experience of learning extremely gratifying and personally rewarding.

48.The readings and lectures seemed to have a lot of meaning and significance

49.I felt like I was in control over what I needed to do to learn the material properly.

In at least one of my courses, the work required was …

50.Especially hard, but I had what it took.

51.Way too far below my ability level

52.More challenging that I had anticipated, but I was able to rise to the challenge and apply myself.

53.So easy that I found it totally boring

54.Difficult and really challenged me, but I had what was needed to meet the challenges.

55.Too far above my ability level

56.Huge, but I had what it took

57.Not easy, but I found that doing it gave me with a feeling of satisfaction and wellbeing.

58.Important and for this reason the effort I put in was worth it

Appendix B: Formulae

(1) Formula for computing cutoff scores for Leverage values (Stevens, 2009):

$h_{ij} = 3\ (k + 1)/n$,

(where k is the number of predictors in the model, and n is the sample size. The p-value

used for the X^2 table was .01).

Appendix C: The 34 Clifton StrengthsFinder themes (Clifton et al., 2006)

*Achiever
People who are especially talented in the Achiever theme have a great deal of stamina and work hard. They take great satisfaction from being busy and productive.

Activator
People who are especially talented in the Activator theme can make things happen by turning thoughts into action. They are often impatient.

Adaptability
People who are especially talented in the Adaptability theme prefer to "go with the flow." They tend to be "now" people who take things as they come and discover the future one day at a time.

*Analytical
People who are especially talented in the Analytical theme search for reasons and causes. They have the ability to think about all the factors that might affect a situation.

Arranger
People who are especially talented in the Arranger theme can organize, but they also have a flexibility that complements this ability. They like to figure out how all of the pieces and resources can be arranged for maximum productivity.

Belief
People who are especially talented in the Belief theme have certain core values that are unchanging. Out of these values emerges a defined purpose for their life.

Command
People who are especially talented in the Command theme have presence. They can take control of a situation and make decisions.

Communication
People who are especially talented in the Communication theme generally find it easy to put their thoughts into words. They are good conversationalists and presenters.

Competition
People who are especially talented in the Competition theme measure their progress against the performance of others. They strive to win first place and revel in contests.

Connectedness
People who are especially talented in the Connectedness theme have faith in the links between all things. They believe there are few coincidences and that almost every event has a reason.

Consistency
People who are especially talented in the Consistency theme are keenly aware of the need to treat people the same. They try to treat everyone in the world with consistency by setting up clear rules and adhering to them.

Context
People who are especially talented in the Context theme enjoy thinking about the past. They understand the present by researching its history.

*Deliberative
People who are especially talented in the Deliberative theme are best described by the serious care they take in making decisions or choices. They anticipate the obstacles.

Developer
People who are especially talented in the Developer theme recognize and cultivate the potential in others. They spot the signs of each small improvement and derive satisfaction from these improvements.

Discipline
People who are especially talented in the Discipline theme enjoy routine and structure. Their world is best described by the order they create.

Empathy
People who are especially talented in the Empathy theme can sense the feelings of other people by imagining themselves in others' lives or others' situations.

Focus
People who are especially talented in the Focus theme can take a direction, follow through, and make the corrections necessary to stay on track. They prioritize, then act.

Futuristic
People who are especially talented in the Futuristic theme are inspired by the future and what could be. They inspire others with their visions of the future.

Harmony
People who are especially talented in the Harmony theme look for consensus. They don't enjoy conflict; rather, they seek areas of agreement.

Ideation
People who are especially talented in the Ideation theme are fascinated by ideas. They are able to find connections between seemingly disparate phenomena.

Includer
People who are especially talented in the Includer theme are accepting of others. They show awareness of those who feel left out, and make an effort to include them.

Individualization
People who are especially talented in the Individualization theme are intrigued with the unique qualities of each person. They have a gift for figuring out how people who are different can work together productively.

*Input
People who are especially talented in the Input theme have a craving to know more. Often they like to collect and archive all kinds of information.

Intellection
People who are especially talented in the Intellection theme are characterized by their intellectual activity. They are introspective and appreciate intellectual discussions.

*Learner
People who are especially talented in the Learner theme have a great desire to learn and want to continuously improve. In particular, the process of learning, rather than the outcome, excites them.

Maximizer
People who are especially talented in the Maximizer theme focus on strengths as a way to stimulate personal and group excellence. They seek to transform something strong into something superb.

Positivity
People who are especially talented in the Positivity theme have an enthusiasm that is contagious. They are upbeat and can get others excited about what they are going to do.

Relator
People who are especially talented in the Relator theme enjoy close relationships with others. They find deep satisfaction in working hard with friends to achieve a goal.

Responsibility
People who are especially talented in the Responsibility theme take psychological ownership of what they say they will do. They are committed to stable values such as honesty and loyalty.

Restorative
People who are especially talented in the Restorative theme are adept at dealing with problems. They are good at figuring out what is wrong and resolving it.

Self-Assurance
People who are especially talented in the Self-Assurance theme feel confident in their ability to manage their own lives. They possess an inner compass that gives them confidence that their decisions are right.

Significance
People who are especially talented in the Significance theme want to be very important in the eyes of others. They are independent and want to be recognized.

Strategic
People who are especially talented in the Strategic theme create alternative ways to proceed. Faced with any given scenario, they can quickly spot the relevant patterns and issues.

Woo
People who are especially talented in the Woo theme love the challenge of meeting new people and winning them over. They derive satisfaction from breaking the ice and making a connection with another person.

*The author's top 5 themes.

VITA AUCTORIS

NAME:	Phillip Ianni
PLACE OF BIRTH:	Southfield, Michigan, USA
YEAR OF BIRTH:	1985
EDUCATION:	University of Windsor, B.A., Windsor, ON, 2008
	University of Windsor, B.Sc., Windsor, ON, 2010