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## Motivation and Well-being: A Test of Self-Determination Theory Using a Person-Centered Approach

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A thesis submitted in partial fulfillment of the requirements for the degree in Master of Science  
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MOTIVATION AND WELL-BEING: A TEST OF SELF-DETERMINATION  
THEORY USING A PERSON-CENTERED APPROACH

Thesis format: Monograph

by

Chelsea Vaters

Graduate Program in Psychology

A thesis submitted in partial fulfillment  
of the requirements for the degree of  
Master of Science

The School of Graduate and Postdoctoral Studies  
The University of Western Ontario  
London, Ontario, Canada

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## Abstract

Self-determination theory postulates that individuals can experience motivation in different ways and that these different types of motivation fall along a continuum from controlled to autonomous regulation. Recently, there have been challenges to the notion that an individual's motivation can be categorized as falling at a particular point along the autonomy continuum. Researchers have begun to investigate the possibility that individuals can experience different types of motivation simultaneously. The current study used a person-centered approach to study motivation and also examined how the profiles detected related to well-being outcomes and adaptive student behaviours. Latent profile analyses of data from two samples of university students revealed three profiles in each of the samples. The most favourable profile found was comprised of both autonomous and controlled forms of motivation. This finding suggests that favourable outcomes can be attained when controlled forms of motivation are experienced if combined with autonomous forms of motivation.

## **Keywords**

Self-determination theory, motivation, well-being, latent profile analysis, person-centered analysis

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## Introduction

Self-determination theory (Deci & Ryan, 1985, 2000; Ryan & Deci, 2000) makes the assumption that individuals can experience motivation in different ways and that these different types of motivation fall along a continuum from controlled to autonomous regulation. One important reason for distinguishing among the different types of motivation is that they can have different implications for well-being. Recently, there have been challenges to the notion that an individual's motivation can be categorized as falling at a particular point along the autonomy continuum and/or that the individual measures of motivation can be combined to reflect a measure of relative autonomy. Most notably, researchers have begun to investigate the possibility that individuals can experience different types of motivation simultaneously. That is, rather than examining the types of motivation individually in variable-centered analyses, researchers have started to use person-centered strategies to identify motivation profiles. The purpose of this study is to build on this line of research.

In the following sections, I elaborate on some of the tenets of self-determination theory and the conventional methods that have been used to test the theory. Following that, I discuss potential problems with self-determination theory with a focus on issues pertaining to the way in which the theory has been tested. I then describe the alternative person-centered approach that has been applied recently and explain how it will be applied to test my hypotheses in the current study.

### Self-determination Theory

Self-determination theory (Deci & Ryan, 1985, 2000; Ryan & Deci, 2000) postulates that there are different types of motivation. The three types of motivation are amotivation, extrinsic motivation, and intrinsic motivation. *Amotivation* represents the absence of motivation for a specific behaviour. Individuals who are amotivated do not perform behaviours, or they perform behaviours without intention. Amotivation is stated to be a non-regulated type of motivation. The concept of *extrinsic motivation* represents the "performance of an activity in order to attain some separable outcome" (Ryan & Deci, 2000, p. 71). Extrinsic motivation has four different subtypes which will be outlined in the next paragraph. *Intrinsic motivation* represents "doing an activity for the inherent satisfaction of the activity itself" (Ryan & Deci, 2000, p. 71).

The four different subtypes of extrinsic motivation are: external regulation, introjected regulation, identified regulation, and integrated regulation. *External regulation* refers to performing behaviours to “satisfy an external demand or reward contingency” (Ryan & Deci, 2000, p. 72). For example, performing behaviours at work to get a monetary reward, or studying for an exam solely to get a good grade.

*Introjected regulation* involves a contingency of self-worth and occurs when behaviours are “performed to avoid guilt or anxiety or to attain ego enhancements such as pride” (Ryan & Deci, 2000, p. 72). An example would be a student who studies for an exam to uphold feels of adequacy.

*Identified regulation* emanates from a “conscious valuing of a behavioural goal or regulation, such that the action is accepted or owned as personally important” (Ryan & Deci, 2000, p. 72). For example, students study for their exam instead of spending time with their peers, because they value learning the material and think it is important for their education to do well on that exam.

Lastly, *integrated regulation* takes place when “identified regulations are fully assimilated to the self, which means they have been evaluated and brought into congruence with one’s other values and needs” (Ryan & Deci, 2000, p. 73). Gagné and Deci (2005) provide an excellent example of integrated regulation:

...nurses would not only identify with the importance of the activities for maintaining their patients’ comfort and health, but regulation of the activities would be integrated with other aspects of their jobs and lives. Thus, the profession of nurse would be more central to their identity, they would be more likely to act in ways that are consistent with caring for people more generally, and they could come to appreciate the importance of doing uninteresting activities. (p. 335)

Self-determination theory (Deci & Ryan, 1985, 2000; Ryan & Deci, 2000) also states that these different types of motivation (including subtypes) are aligned along a continuum of autonomy or self-determination. Therefore, the different types of motivation are associated with differing levels of autonomous regulation or internalization. Internalization is an “active, natural process in which individuals attempt to transform socially sanctioned mores or requests into personally endorsed values and self-regulations” (Ryan, Connell, & Deci, 1985, as cited in Deci & Ryan, 2000, pp. 235-

236). The perceived locus of causality (where the motivation comes from) of the types of motivation is an indication of the level of internalization that has occurred. At one end of the autonomy continuum is amotivation. Amotivation is stated to have an impersonal locus of causality (or level of internalization). Extrinsic motivation is featured in the middle of the autonomy continuum and varies in its level of internalization depending on the subtype. External regulation is seen as being completely external. *Introjected regulation* entails “taking in a regulation but not fully accepting it as one’s own” (Ryan & Deci, 2000, p. 72). Therefore, introjected regulation is thought to be somewhat external, given that one assesses their behaviour against some external standard, rather than their own standard. Identification is considered to be somewhat internal because the behaviour is perceived as important yet is still instrumental to obtaining a separate outcome, and it is not necessarily inherently satisfying. Integration is considered to be fully internalized because the desired outcome coincides with one’s self-concept. Integrated regulation is distinct from intrinsic motivation due to the fact that the behaviours are still performed to achieve a separable outcome as opposed to solely for the sake of doing that behaviour. At the other end of the autonomy continuum is intrinsic motivation. Behaviours that are intrinsically motivated are fully internalized.

Self-determination theorists believe that it is important to distinguish among the different types of motivation because they have distinct outcomes for well-being, performance and learning (Ryan & Deci, 2000). It is theorized that the more a person feels autonomously motivated, the more personal well-being they will also experience (Ryan & Deci, 2000). It is also theorized that the more a person experiences controlled motivation, the lower their level of well-being will be (Ryan & Deci, 2000). This is believed to be true because the more a person is autonomously motivated, the more their basic psychological needs (i.e., autonomy, competence, and relatedness) are satisfied (Ryan & Deci, 2000).

Hypotheses regarding the positive relations between more autonomous forms of motivation and personal well-being outcomes, and the negative relations between more controlled forms of motivation and personal well-being outcomes, have been supported in empirical research. For example, higher levels of autonomous motivation have been shown to be correlated with higher feelings of self-efficacy (Fernet, Senécal, Guay,

Marsh, & Dowson, 2008), basic psychological needs satisfaction (in de Wal, den Brok, Hooijer, Martens, & van den Beem, 2014), job satisfaction (Millette & Gagné, 2008), and life satisfaction and self-esteem (Levesque, Zuehlke, Stanek, & Ryan, 2004). Higher levels of autonomous motivation have also been shown to be correlated with lower levels of burnout (Fernet et al., 2008) and emotional exhaustion and physical and mental health problems (Blais, Brière, Lachance, Riddle, & Vallerand, 1993). Furthermore, higher levels of autonomous regulation have been shown to be correlated with higher levels of affective commitment, positive affect, work engagement, in-role performance and organizational citizenship behaviours, and lower levels of continuance commitment, negative affect, and general health complaints (Meyer, Stanley, & Parfyonova, 2012).

Higher levels of controlled motivation have been shown to be correlated with higher levels of burnout (Fernet et al., 2008) and emotional exhaustion and physical and mental health problems (Blais et al., 1993). Higher levels of controlled motivation have also been shown to be correlated with lower levels of self-efficacy (Fernet et al., 2008), basic psychological needs satisfaction (in de Wal et al., 2014), and job satisfaction (Millette & Gagné, 2008); with the exception that introjected regulation was not significantly correlated with autonomy satisfaction (in de Wal et al., 2014) and job satisfaction (Millette & Gagné, 2008).

### **Conventional Methods of Testing Self-Determination Theory**

Empirical research on self-determination theory has employed different methods of analyzing the relationships between various outcome variables and the different types of motivation. Researchers often start by collecting data on each of the different types of motivation. Some researchers then conduct analyses examining the relation between outcome variables and each of the individual different types of motivation (e.g., Guntert, 2015; Van Beek, Hu, Schaufeli, Taris, & Schreurs, 2012). Another technique used by other researchers involves creating a *controlled motivation* composite variable and an *autonomous motivation* composite variable. This is achieved by combining the scores on external and introjected regulation and by combining the scores on identified regulation, integrated regulation, and intrinsic motivation, respectively. These composite scores are then correlated with outcome variables (e.g., Gagné, Chemolli, Forest, & Koestner, 2008; Williams, Grow, Freedman, Ryan, & Deci, 1996). In addition, a single index has been

computed by subtracting the controlled motivation composite score from the autonomous motivation composite score and then correlating the final score with outcome variables (e.g., Judge, Bono, Erez, & Locke, 2005; Meyer et al., 2012). Researchers also use a different index called the relative autonomy index (RAI; e.g., Bono & Judge, 2003; Grolnick & Ryan, 1987; Levesque et al., 2004). Using the RAI involves measuring the different types of motivation and then computing a total score using the formula:  $2(\text{intrinsic}) + 1(\text{identified}) - 1(\text{introjection}) - 2(\text{external})$  (Grolnick & Ryan, 1987). Grolnick and Ryan state that the use of the RAI is justified by the simplex structure of the motivation continuum. The term simplex structure means that variables that are closer together on a continuum should correlate more highly than variables that are farther apart on the continuum (Ryan & Connell, 1989).

It is important to note that integrated regulation is often not assessed; for example, the Academic Motivation Scale (Vallerand et al., 1992, 1993) and the Multidimensional Work Motivation Scale (Gagné et al., 2013) do not assess integrated regulation. Integrated regulation is often not included because factor and correlational analyses show that identified and integrated regulation are extremely similar constructs (Gagné et al., 2013; Vallerand et al. 1992). Gagné et al. (2013) further point out that there has been no research that shows that integrated regulation accounts for any unique variance in outcome variables, above that of intrinsic motivation or identified regulation. However, integrated regulation is still included in some scales, such as the Work Extrinsic and Intrinsic Motivation Scale (Tremblay, Blanchard, Taylor, Pelletier, & Villeneuve, 2009).

Another important note is that Vallerand et al. (1992, 1993) further differentiate the intrinsic motivation subscale into three subtypes: to know, to accomplish, and to experience stimulation. These intrinsic motivation subtypes are used in the authors' Academic Motivation Scale. However, the original theorists, Deci and Ryan (1985, 2000), do not make this distinction and the correlations between these three subtypes of intrinsic motivation have been found to be rather high:  $r = .52$  to  $.64$  (Vallerand, Blais, Brière, & Pelletier, 1989),  $r = .58$  to  $.62$  (Vallerand et al., 1993),  $r = .56$  to  $.69$  (Blanchard, Vrignaud, Lallemand, Dosnon, & Wach, 1997), and  $r = .71$  to  $.87$  (Fairchild, Horsta, Finneya, & Barron, 2005). Guay, Morin, Litalien, Valois, and Vallerand (2014)

state that it is possible that the intrinsic motivation subtypes represent one dimension due to the high correlations found between the subtypes.

### **Potential Problems with Self-Determination Theory**

A potential problem with self-determination theory is that a person's motivation is characterized as falling at only one point along the continuum of autonomy. This is reflected in the large amount of research that analyzes the relationships between outcome variables and the RAI or single indexes like the RAI. However, it conceptually makes sense that people can be motivated to perform an activity for multiple reasons. For example, an employee may be motivated to carry out their work activities because they want to receive a monetary reward, gain respect from their manager *and* because they value the outcome of their work behaviours. Therefore, a person's motivation can be characterized as falling at multiple points along the continuum of autonomy. This notion is supported by evidence that indicates that the continuum of autonomy structure is weak, the relevant scales are multidimensional, and intrinsic motivation and external regulation have separate neural networks which further emphasizes that they are distinct constructs.

The theoretical structure of the autonomy-continuum is challenged by two lines of evidence, one pertaining to the simplex pattern of correlations among the motivation types, and the second involving the unexpected correlations between introjected motivation and various outcomes. With regard to the simplex pattern, several deviations from the expected pattern have been reported. For example, researchers have found that at least one of three subtypes of intrinsic motivation correlates more highly with introjected regulation than with identified regulation (e.g., Barkoukis, Tsorbatzoudis, Grouios, & Sideridis, 2008; Blanchard et al., 1997; Fairchild et al., 2005; Ratelle, Guay, Vallerand, Larose, & Senécal, 2007; Vallerand et al., 1989; Vallerand et al., 1993). Ratelle et al. (2007) also found that identified and extrinsic regulations were more highly associated ( $r = .49$ ) than introjected and extrinsic regulation ( $r = .31$ ) in two separate samples. In one of the samples, identified regulation also had almost the same correlation with introjected regulation ( $r = .51$ ) as it did with external regulation ( $r = .49$ ). Finally, Boiché, Sarrazin, Grouzet, Pelletier, and Chanal (2008) found that introjected regulation had high correlations with the intrinsic motivation subtypes and identified regulation ( $r = .52$  to  $.62$ ) but did not significantly relate to external regulation ( $r = -.02$ ).

Moving on to the second piece of evidence that illustrates that the continuum of autonomy structure is weak, tests of the relationships between outcome variables and the introjected regulation have produced results that are against self-determination theory predictions. Introjected regulation is theorized to be somewhat externally regulated (Deci & Ryan, 2000), and it is often combined with external regulation to represent a controlled motivation composite (e.g., Gagné, Chemolli, Forest, & Koestner, 2008; Williams, Grow, Freedman, Ryan, & Deci, 1996). However, introjected regulation has been shown to be positively related to favourable outcomes such as lower turnover intention, and higher job satisfaction in military members (Tremblay et al., 2009), higher work engagement and lower burnout in hospital employees (Van Beek et al., 2012), and higher affective organization commitment and job satisfaction in managers (Graves, Cullen, Lester, Ruderman, & Gentry, 2015). Furthermore, introjected regulation has been shown to be positively correlated with positive emotions, concentration, intrinsic interest and task orientation (i.e., the extent to which a participant values learning something interesting) in college students (Vallerand et al., 1993). In addition, introjected regulation has been shown to be positively associated with mastery-approach goals in college students (Fairchild et al., 2005), and school satisfaction in junior and senior high school students (study one; Ratelle et al., 2007). Ratelle et al. (2007) also showed that introjected regulation was negatively related to distraction in class and school dropout levels in junior and senior high school students (study one). Lastly, introjected regulation was shown to be positively related to basic needs satisfaction and enjoyment, perceived value, metacognitive strategies, and perceived skills learned in project work for junior high school students (Liu, Wang, Tan, Koh, & Ee, 2009). If a type of regulation is not correlated with outcomes as it should, it suggests that something else is going on. In the case of the examples stated above, it is possible that other types of motivation may be combining with introjected regulation to create a positive correlation between introjection and sought-after outcomes. It is also possible that there is an issue with the theory or the measures being used to test the theory.

Also of importance is that the results of many factor analyses of relevant scales are not unidimensional; many of them are multidimensional with each type of motivation represented as a latent factor (e.g., Gagné et al., 2010; Tremblay et al., 2009; Vallerand et



al., 1992). If the different types of motivation are represented by distinct factors and there is evidence that supports that the autonomy continuum is weak, this suggests that the different types of motivation are relatively distinct. From this, it is possible then that these distinct types of motivation may be combined and experienced at the same time.

There is also some neuropsychological evidence to suggest that intrinsic motivation and external regulation are distinct constructs. For example, Lee and Reeve (2013) demonstrated that when participants imagine performing an activity for intrinsic reasons, their anterior cingulate cortex is more active; this part of the brain is recognized as being more active when individuals experience feelings of agency. The researchers also showed that when participants imagine carrying out an activity for externally regulated reasons, their angular gyrus is more active; this part of the brain is recognized as being more active when people feel less agentic (i.e., when people feel more pressured). To summarize, intrinsic motivation was associated with agency areas of the brain and external regulation was associated with areas of the brain known to be related to a loss of agency.

In another study Lee, Reeve, Xue, and Xiong (2012) showed that brain areas that have to do with emotional processing (i.e., the insular cortex) are active when participants think about intrinsically motivating behaviours. Furthermore, they showed that brain areas that have to do with cognitive processing (i.e., the posterior cingulate cortex activity) are active when participants think about externally regulated behaviours. This evidence of separate neural networks suggests that intrinsic motivation and externally regulation are distinct constructs.

In summary, evidence showing that the continuum of autonomy structure is weak (i.e., the predicted simplex structure is not always upheld; introjected regulation is significantly related to positive outcomes), the relevant scales are multidimensional, and intrinsic motivation and external regulation have separate neural networks supports the notion that the different types of motivation are relatively independent. The fact that the different types of motivation have been shown to be relatively distinct, sets up the possibility that the different types of motivation can be experienced at the same time.

### **A Person-Oriented Approach to Testing Self-Determination Theory**

As alluded to above, I believe that self-determination theory would be best tested using a person-oriented approach. A person-oriented approach “identifies and compares subgroups of individuals sharing similar patterns of variables within a population” (Meyer, Stanley, & Vandenberg, 2013, p. 191). Compared to the variable-centered approach, the person-oriented approach examines individuals from a more holistic viewpoint (Meyer et al., 2013). Other researchers have also assessed the empirical evidence and agree that the different types of motivation can be experienced at the same time (e.g., Amabile, Hill, Hennessey, & Tighe, 1994; Chemolli & Gagné, 2014; Covington & Mueller, 2001; Lepper & Henderlong, 2000) and that motivational profiles are the next step in this line of research (Sansone & Harackiewicz, 2000; Vallerand, 1997).

Motivational profiles have been tested in a small number of studies in a variety of contexts such as education (e.g., Liu et al., 2009; Ratelle et al., 2007), physical education (e.g., Boiché et al., 2008; Mayorga-vega & Viciano, 2014; Ntoumanis, 2002; Ullrich-French & Cox, 2009), work (e.g., Graves et al., 2015; in de Wal et al., 2014; Van den Broeck, Lens, Witte, & Van Coillie, 2013), sports (e.g., Gillet, Berjot, Vallerand, Amoura, & Rosnet, 2012; Vlachopoulos, Karageorghis, & Terry, 2000), and physical activity (e.g., Ferrand, Martinent, & Bonnefoy, 2014; Ferrand, Nasarre, Hautier, & Bonnefoy, 2012; Stephan, Boiché, & Le Scanff, 2010). The details of all of the studies mentioned above that examine motivation in education and work, and one study in physical education by Boiché et al. (2008) will be discussed below. Please refer to Table 1 for a summary of the key components of the studies to be described.

Ratelle et al. (2007) used the SAS TRAJ procedure (Jones, Nagin, & Roeder, 2001) to detect motivation profiles in three samples of French students. The first two samples were junior and senior high school students from Québec; consisting of 4,498 and 942 participants, respectively. Sample 3 consisted of 410 students in their first-year of college. Academic motivation was measured by the French version of the Academic Motivation Scale (Vallerand et al., 1989). The following types of motivation were used to detect the profiles: intrinsic motivation, identified, introjected, and external regulation, and amotivation.

Table 1

*Summary of the Key Components of the Profile Studies Described*

Research Article	Sample	Target of Motivation and Measure Used	Components used to detect Profiles	Labels of Profiles Detected	Scores on the Components for the Profiles Found	Most to Least Favourable Profile for Outcome Variables Tested
Ratelle et al. (2007)	Samples 1 & 2: Junior and Senior high school students from Québec	Academic motivation measured by the French version of the AMS (Vallerand et al., 1989)	A. Intrinsic motivation B. Identified regulation C. Introjected regulation D. External regulation E. Amotivation	Samples 1 & 2: 1. Controlled 2. Moderate autonomy-controlled 3. High autonomy-controlled	Samples 1 & 2: 1. Low A, B; High C, D, E 2. Moderate A, B, C, D; Low E 3. High A, B, C, D; Low E	Sample 1: • Academic adjustment & persistence: 3, 2, 1
	Sample 3: First-year college students (98% Francophone)			Sample 3: 1. High autonomy-controlled 2. Pure autonomous 3. Low autonomy-controlled	Sample 3: 1. High A, B, C, D; Low E 2. High A, B; Low C, D, E 3. Low to Moderate A, B, C, D, E	Sample 3: • Academic achievement: 1 or 2, 3 • Academic persistence: 2, 1, 3

Boiché et al. (2008)	Junior & senior high-school students from France (both samples)	Physical education motivation measured by adapted items from the AMS (Vallerand et al., 1989), Sport Motivation Scale (Brière et al., 1995) & PLOC Scale (Goudas et al., 1994)	A. Intrinsic motivation to experience stimulation B. Intrinsic motivation to know & to accomplish C. Identified regulation D. Introjected regulation E. External Regulation F. Amotivation	Sample 1: 1. Self-determined 2. Moderate 3. Non self-determined	Sample 1: 1. High A, B, C; Moderate D; Low E, F 2. Moderate A, B, C, D, E, F 3. Low A, B, C, D; High E, F	Sample 1: • Performance in gymnastics: 1, 2, 3
				Sample 2: 1. Self-determined 2. Moderate 3. Non self-determined	Sample 2: 1. High A, B, C; Moderate D; Low E, F 2. Moderate A, B, C, D, E, F 3. Low A, B, C, D; Moderately-high E, F	Sample 2: • Performance in gymnastics & course grade: 1, 2, 3 • Effort mid-program: 1 or 2, 3
Liu et al. (2009)	Junior high-school students from Singapore	Project work motivation measured by an adapted version of the PLOC scale (Goudas et al., 1994)	A. Intrinsic motivation B. Identified regulation C. Introjected regulation D. External regulation E. Amotivation	1. Low self-determined/ high controlled 2. High self-determined/ low controlled 3. Low self-determined/ low controlled 4. High self-determined/ high controlled	1. Extremely-low A, B; Average C; High D; Extremely-high E 2. Extremely-high A, B; Low C; Extremely-low D, E 3. Low A, B; Extremely-low C, D; Low E 4. High A, B; Extremely-high C; High D; Average E	• Metacognitive strategies & communication skills learned: 2, 4, 1 or 3 • Collaboration & problem solving skills learned: 2 or 4, 1 or 3 • Need satisfaction, enjoyment & perceived value: 2, 4, 3, 1

Graves et al. (2015)	Managers from the United States	Work motivation measured by the Motivation at Work Scale (Gagné et al., 2010)	A. Intrinsic motivation B. Identified regulation C. Introjected regulation D. External regulation	1. Self-determined 2. Moderately-high 3. High internal 4. Moderately-low internal 5. Low internal 6. Very low internal	1. High A, B; Moderately-low C; Low D 2. Moderately-high A, B, C, D 3. High A, B, C; Average D 4. Moderately-low A, B, C; Average D 5. Low A, B, C; Average D 6. Very Low A, B, C; Average D	<ul style="list-style-type: none"> <li>• Affective organizational commitment: 1 or 3, 2 or 3, 4 or 5 or 6</li> <li>• Job satisfaction: 1 or 3, 2 or 4, 5 or 6</li> <li>• Turnover intentions: 1 or 2 or 3 or 4 or 5, 4 or 5 or 6</li> <li>• Promotability: no differences</li> </ul>
in de Wal et al. (2014)	Dutch high school teachers	Teacher professional learning motivation measured by an adapted version of the Academic Self-regulation Questionnaire (Ryan & Connell, 1989) translated into Dutch	A. Intrinsic motivation B. Identified regulation C. Introjected regulation D. External regulation	1. Extremely autonomous 2. Moderately motivated 3. Highly autonomous 4. Externally regulated	1. Extremely-high A, B; Medium C; Low D 2. Medium-high A, B; Medium-low C, D 3. High A, B; Medium C; Low D 4. Medium-low A, B; Low C; Medium D	<ul style="list-style-type: none"> <li>• Reading, work-related training, experimenting, &amp; reflecting: 1, 3, 2, 4</li> <li>• Collaborating with colleagues to improve the lesson &amp; collaborating with colleagues to improve school development: 1, 2 or 3, 4</li> </ul>

Van den Broeck et al. (2013)	Employees from Belgium (all three samples)	Work motivation measured by a scale created for the study; based on Motivation at Work Scale (Gagné et al., 2010)	A. Autonomous Motivation B. Controlled Motivation	Samples 1, 2 & 3: 1. High autonomy-high controlled 2. High autonomy-low controlled 3. Low autonomy-high controlled 4. Low autonomy-low controlled	Samples 1, 2, & 3: 1. High A; High B 2. High A, Low B 3. Low A; High B 4. Low A; Low B	<p>Sample 1:</p> <ul style="list-style-type: none"> <li>• Job satisfaction: 1 or 2, 3 or 4</li> <li>• Work-enthusiasm: 1 or 2, 4, 3</li> <li>• Strain: 2, 1, 4, 3</li> </ul> <p>Samples 2 &amp; 3:</p> <ul style="list-style-type: none"> <li>• Job satisfaction: 1 or 2, 3 or 4</li> <li>• Work engagement: 1 or 2, 3, 4</li> <li>• Burnout: 1 or 2, 3 or 4</li> </ul>
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*Note.* The scores on the components for the profiles found (e.g., the score labels of high, low, moderate etc.) are the scores reported by the respective authors in the original research articles. If labels were not given for all of the types of motivation used in detecting the profiles in the original research articles, I inspected the profile plots and reported a score label. For the column titled “Most Favourable to Least Favourable Profile for Outcome or Predictor Variables Tested”, if profiles are separated by a comma, they significantly differed on that variable; if the profiles are separated by “or”, they did not significantly differ on that variable. AMS = Academic Motivation Scale; PLOC = Perceived Locus of Causality.

Ratelle et al. (2007) identified essentially the same three profiles in the first two high school samples, and labelled these controlled (low intrinsic motivation and identified regulation, high introjected and external regulation, high amotivation), moderate-autonomy-controlled (moderate intrinsic motivation and identified regulation, moderate introjected and external regulation, low amotivation), and high autonomy-controlled (high intrinsic motivation and identified regulation, high introjected and external regulation, low amotivation).

Ratelle et al. (2007) identified three profiles in the third sample of college students, and labelled these pure autonomous (high intrinsic motivation and identified regulation, low introjected and external regulation, low amotivation), low autonomy-controlled (low to moderate intrinsic motivation, identified, introjected and external regulation and amotivation), and high autonomy-controlled (present in the first two samples). The pure autonomous profile and the low autonomy-controlled profile were not found in the first two samples.

It is important to note that the actual profile plots do not entirely match the descriptions of the profiles given by Ratelle et al. (2007). For example, in the controlled profile Ratelle et al. described intrinsic motivation and identified regulation to be low and introjected and external regulation and amotivation to be high. However, identified regulation was actually experienced at a moderate level and introjected regulation was rather low in both Samples 1 and 2. This emphasizes the importance of describing the different types of motivation individually when examining the profiles and not lumping them together under the rubric of 'autonomous' or 'controlled' regulation. Individual motivation types might not always covary in a way predicted by theory.

Ratelle et al. (2007) also examined how the motivational profiles related to various outcome variables. In the first sample, students' academic adjustment and their academic persistence were assessed. Academic adjustment was measured by the students' level of school satisfaction, school anxiety, and distraction at school. Academic persistence was measured by whether students were still enrolled in high school one year after the other questionnaires were completed. Students in the high autonomy-controlled group had the highest level of academic adjustment and persistence, followed by those in the moderate autonomy-controlled group, and then those in the controlled group; all

differences were significant. In the second sample, students' academic achievement (i.e., their grades) and their rates of absenteeism (i.e., the number of missed school periods) were assessed. Students in the controlled motivational profile had the lowest level of academic achievement and the highest rate of absenteeism, compared to those in either the high or moderate autonomy-controlled motivational profile; no other differences were found.

In the third sample, students' academic achievement (i.e., their grades) and their academic persistence (i.e., if students were still enrolled one year later) were assessed. In regards to students' academic achievement, students in the pure autonomous group and those in the high autonomy-controlled group outperformed those in the low autonomy-controlled group; no other differences were found. In regards to academic persistence however, students in the pure autonomous group were the most persistent, followed by those in the high autonomy-controlled group, and then those in the low autonomy-controlled group; all differences were significant.

In another study, Boiché et al. (2008) used cluster analysis to detect motivation profiles in two samples of junior and senior high school students from France. The samples consisted of 210 and 215 students, respectively. Boiché et al. examined students' motivation towards a 10 week gymnastics cycle in a mandatory physical education class. Participants' motivation was assessed during the first class of the gymnastics cycle with adapted items from a combination of measures. The measures were the Academic Motivation Scale (Vallerand et al., 1989), the Sport Motivation Scale (Brière, Vallerand, Blais, & Pelletier, 1995) and the Perceived Locus of Causality Scale (Goudas, Biddle, & Fox, 1994).

Boiché et al. (2008) used six motivation types to detect the profiles: intrinsic motivation to know and to accomplish, intrinsic motivation to experience stimulation, identified, introjected, and external regulation and amotivation. Boiché et al. used the three subtypes of intrinsic motivation (to know, to accomplish, and to experience stimulation) distinguished by Vallerand et al. (1992, 1993) but combined the intrinsic motivation to know and to accomplish subtypes into one subtype due to an extremely high correlation found between the two subtypes in a pilot study.



Boiché et al. (2008) identified three profiles in Sample 1, and labelled these self-determined (high intrinsic motivation and identified regulation, moderate introjected regulation, low external regulation, and low amotivation), moderate (moderate intrinsic motivation, identified, introjected and external regulation and amotivation) and non self-determined (low intrinsic motivation and identified regulation, low introjected regulation, high external regulation and high amotivation). The profiles were similar in Sample 2, except that external regulation and amotivation were moderately-high instead of high in the non self-determined profile.

Boiché et al. (2008) also examined how the motivational profiles related to achievement-related outcomes. For Sample 1, students' performance in gymnastics was measured in the last class of the program. Students in the self-determined profile had the highest level of performance, followed by those in the moderate profile, and then those in the non self-determined profile; all differences were significant. For Sample 2, students' performance in gymnastics was measured in the first and last class of the program, their effort during the middle of the program was assessed and their final grade in the course was obtained. The same pattern of results found in Sample 1 was found in Sample 2 for all the outcome variables with the exception that the self-determined profile and the moderate profile did not significantly differ for the effort variable.

In a third study to be described, Liu et al. (2009) used cluster analysis to detect motivation profiles in a sample of 767 junior high school students from Singapore. Students' motivation towards project work was measured by an adapted version of the Perceived Locus of Causality scale (Goudas et al., 1994). Liu et al. used five motivation types to detect the profiles: intrinsic motivation, identified, introjected, and external regulation and amotivation. They extracted four profiles which they labeled low self-determined/high controlled (extremely low intrinsic motivation and identified regulation, average introjected regulation, high external regulation, and extremely high amotivation), high self-determined/low controlled (extremely high intrinsic motivation and identified regulation, low introjected regulation, extremely low external regulation, and extremely low amotivation), low self-determined/low controlled (low intrinsic motivation and identified regulation, extremely low introjected and external regulation, and low amotivation), and high self-determined/high controlled (high intrinsic motivation and

identified regulation, extremely high introjected regulation, high external regulation, and average amotivation).

Liu et al. (2009) also compared the four profile groups on the extent they felt they learned communication skills, problem-solving skills and collaborative skills during project work and their level of enjoyment and perceived value of project work, metacognitive strategies employed during project work, and basic needs satisfaction. Students in the high self-determined/low controlled profile and the high self-determined/high controlled profile scored significantly higher on metacognition strategies employed and on each of the perceived skills learned than the low self-determined/high controlled profile and the low self-determined/low controlled profile. The only other difference found was for metacognition strategies employed and communication skills learned; participants in the high self-determined/low controlled profile scored significantly higher than the high self-determined/high controlled profile.

Basic needs satisfaction and enjoyment and perceived value of project work were experienced at a significantly higher level for participants in the high self-determined/low controlled profile, followed by those in the high self-determined/high controlled, low self-determined/low controlled, and low self-determined/high controlled profiles; all differences were significant.

More recently, Graves et al. (2015) used latent profile analysis to detect work motivation profiles in a sample of 321 managers from the United States. Participants' work motivation was assessed with the Motivation at Work Scale (Gagné et al., 2010). Graves et al. used four motivation types to detect the profiles: intrinsic motivation, identified, introjected and external regulation. The authors found six profiles which they labelled, self-determined (high intrinsic motivation and identified regulation, moderately-low introjected regulation, and low external regulation), moderately-high (moderately-high intrinsic motivation, identified, introjected and external regulation), high internal (high intrinsic motivation and identified regulation, high introjected regulation, average external regulation), moderately-low internal (moderately-low intrinsic motivation and identified regulation, moderately-low introjected regulation, and average external regulation), low internal (low intrinsic motivation and identified regulation, low introjected regulation, and average external regulation), and very-low internal (very-low

intrinsic motivation and identified regulation, very-low introjected regulation, and average external regulation).

Graves et al. (2015) also examined how the profiles found related to participants' level of affective organizational commitment, job satisfaction, turnover intentions, and their promotability rated by their boss. Higher levels of job satisfaction and affective commitment were found for the self-determined profile compared to the other profiles, except for the high internal profile; no difference was found between the self-determined and the high internal profile. Higher levels of job satisfaction were observed for the high internal profile compared to the moderately-high profile. For affective commitment, there was no difference between the high internal profile and the moderately-high profile. Higher levels of both job satisfaction and affective commitment were found for the high internal profile compared to the moderately-low internal, low internal and very low internal profiles. Overall, higher levels of both job satisfaction and affective commitment were found for the moderately-high profile compared to the moderately-low internal, low internal and very low internal profile. Higher turnover intentions were observed for the very low internal profile compared to the self-determined, high internal and moderately-high profiles; no other differences were found. Managers' promotability did not differ across the profiles detected.

In another fifth study, in de Wal et al. (2014) used latent profile analysis to detect motivation profiles in a sample of 2360 Dutch high school teachers. Teachers' motivation towards teacher professional learning was assessed by an adapted version of the Academic Self-regulation Questionnaire (Ryan & Connell, 1989) that was translated into Dutch. Teacher professional learning consists of reading, work-related training, experimenting, reflecting, and collaborating with colleagues to improve lessons and/or to improve school development. in de Wal et al. (2014) used four motivation types to detect the profiles: intrinsic motivation, identified, introjected and external regulation. The authors found four profiles which they labelled, extremely autonomous (extremely high intrinsic motivation and identified regulation, medium introjected regulation and low external regulation), moderately motivated (medium-high intrinsic motivation and identified regulation, medium-low introjected regulation and external regulation), highly autonomous (high intrinsic motivation and identified regulation, medium introjected

regulation, and low external regulation), and externally regulated (medium-low intrinsic motivation and identified regulation, low introjected regulation, and medium external regulation).

in de Wal et al. (2014) also examined how the motivational profiles related to self-report measures of teacher professional learning activities performed at work. Teachers who performed the most teacher professional learning activities were in the extremely autonomous profile, followed by the high autonomous profile, moderately motivated profile and externally regulated profile; all differences were significant with the exception that the high autonomous profile did not significantly differ from the moderately motivated profile for collaborating with colleagues to improve the lessons and school development.

Finally, Van den Broeck et al. (2013) used cluster analysis to detect motivation profiles in three employee samples. Samples 1, 2 and 3 consisted of a representative sample of 1797 Belgium employees, 287 employees from a public service organization in Belgium and 270 employees from a private service organization in the Netherlands, respectively. The profiles were detected using only the two dimensions of autonomous and controlled motivation. Four items measuring autonomous motivation and four items measuring controlled motivation were created for this study and used in all three samples. The items were said to be based on Gagné and colleagues' (2010) Motivation at Work Scale. Van den Broeck et al. (2013) found the same four profiles in all three samples: high autonomy-high controlled, high autonomy-low controlled, low autonomy-high controlled, and low autonomy-low controlled.

Van den Broeck et al. (2013) also examined how the motivational profiles related to well-being outcomes. In Sample 1, well-being was assessed by the variables of job satisfaction, work-enthusiasm, and strain. In samples two and three, participants' well-being was assessed by job satisfaction, work engagement (i.e., vigor and dedication), and burnout (i.e., emotional exhaustion and cynicism). For all three samples and for all of the outcome variables a general pattern emerged; more favourable outcomes were experienced for the high autonomy-low controlled and the high autonomy-high controlled profiles than the low autonomy-high controlled and the low autonomy-low controlled profiles. For the majority of the time, no other differences were found; if differences were

found they would conflict across samples. The more specific results can be found in Table 1. These results emphasize the importance of experiencing autonomous motivation in order to have favourable outcomes, and that it is possible to still experience these outcomes even when controlled motivation is also present.

It is important to note the zero-order correlations found by Van den Broeck et al. (2013) between autonomous and controlled motivation and the outcome variables. Autonomous motivation was related to the outcome variables as expected; positively to job satisfaction, enthusiasm, and engagement and negatively to strain and burnout. However, some of the correlations found between controlled motivation and the outcomes variables are against what self-determination theorists would predict.

In Sample 1, controlled motivation was negatively associated with job satisfaction, but in Sample 3, it was positively associated with job satisfaction. Furthermore, in Sample 2 controlled motivation was not significantly correlated with job satisfaction. However, in the profile analysis it was revealed that if autonomous motivation was present, the level of for example job satisfaction was not changed by the presence or absence of controlled motivation; both of these profiles (high autonomy-high controlled and high autonomy-low controlled) were higher in job satisfaction than the profiles without autonomous motivation. Likewise, it was also shown that in the absence of autonomous motivation, the level of job satisfaction was not affected by the presence or absence of controlled motivation; both of these profiles (low autonomy-high controlled and low autonomy-low controlled) were both lower in job satisfaction than the profiles with autonomous motivation. All that mattered was the presence of autonomous motivation. Thus, if the person-centered approach is not used, the correlation results with the composite scores (or the individual types of motivation) may be misleading. Since the different types of motivation can be present at the same time, it is important to determine how the different combinations of the types of motivation relate to important outcomes.

From the studies reviewed above, there are five common profiles found in this research: a primarily autonomous (A) profile (e.g., Boiché et al., 2008; Graves et al. 2015; in de Wal et al., 2014; Liu et al., 2009; Ratelle et al., 2007; Van den Broeck et al., 2013), a primarily controlled (C) profile (e.g., Boiché et al., 2008; Liu et al., 2009; Graves et al., 2015; in de Wal et al., 2014; Ratelle et al., 2007; Van den Broeck et al.,

2013), and three combination profiles that have both autonomous and controlled forms of motivation, namely, a high autonomy-controlled (A-C) profile (e.g., Graves et al., 2015; Liu et al., 2009; Ratelle et al., 2007; Van den Broeck et al., 2013), a moderate A-C profile (e.g., Boiché et al., 2008; Graves et al., 2015; in de Wal et al., 2014; Ratelle et al., 2007), and a low A-C profile (e.g., Liu et al., 2009; Ratelle et al., 2007; Van den Broeck et al., 2013).

Overall, the most favourable outcomes tend to be found for the A-profile, followed by the three combination profiles, and then the C-profile (e.g., Boiché et al., 2008; Graves et al. 2015; in de Wal et al., 2014; Liu et al., 2009; Ratelle et al., 2007; Van den Broeck et al., 2013). Whether significance is found between the profiles differs depending on the type of outcome being examined (i.e., well-being outcomes vs. performance-related outcomes); this will be discussed further within the current study's hypotheses.

### **The Current Study**

The current study has two main objectives. The first objective is to examine students' academic motivation profiles in two samples (H1). The second objective is to examine how the profiles detected relate to well-being outcomes (H2a) and adaptive student behaviours (H2b).

The majority of past research has examined well-being from the perspective of the hedonistic tradition, in which well-being is viewed as the absence of physical and psychological symptoms (Deci & Ryan, 2008). Consistent with this tradition I included a number of measures of hedonic well-being and ill-being. However, there has been a movement towards viewing health as more than the absence of illness (Seligman & Czikszentmihalyi, 2000); that is, examining well-being from the perspective of the eudaimonic tradition (Deci & Ryan, 2008). Moreover, the focus of the eudaimonic tradition is on "living well or actualizing one's human potentials...well-being is not so much an outcome or end state as it is a process of fulfilling or realizing one's daimon or true nature" (Deci & Ryan, 2008, p. 2). Eudaimonic well-being has been measured as the extent to which an individual lives a eudaimonic 'lifestyle' using Waterman et al.'s (2010) Questionnaire for Eudaimonic Well-being and Ryff's (1989) Psychological Well-being Scales. However, for purposes of this study I was interested in measuring

eudaimonic well-being as a perception of personal growth and development. Therefore in addition to the two eudaimonic well-being lifestyle measures, I included a measure of personal growth and development which was developed for this study. The Personal Growth and Development Scale measures participants' perceptions of growth and development on the eudaimonic dimensions present in the Questionnaire for Eudaimonic Well-Being (Waterman et al., 2010) and the Psychological Well-Being Scales (Ryff, 1989) in a specific context. To my knowledge, there are no measures to date that assess this crucial component for understanding and fostering eudaimonic well-being. I also included a measure of basic psychological needs satisfaction because self-determination theory theorizes that higher levels of well-being and more autonomous forms of motivation are experienced because of the satisfaction of the three basic psychological needs (Ryan and Deci, 2000).

H1 entails predicting what profiles will be found. The five profiles commonly found in the small number of studies that have tested self-determination theory using the person-centered approach were included in H1. Similar to the majority of past research, the profiles will be detected with the different types of motivation (no composite scores), specifically, intrinsic motivation, identified, introjected, and external regulation, and amotivation will be used. The subtypes of intrinsic motivation distinguished by Vallerand et al., (1992, 1993) will not be examined separately in the profile analysis due to the points raised earlier about the high correlations found between the subtypes in previous research, and that the original self-determination theorists, Deci and Ryan (1985, 2000), do not make this distinction. Support for the notion that the different types of motivation can be experienced at the same time would be supported by the detection of a high A-C profile or a moderate A-C profile.

(H1) The following five profiles will be found in the current study: A-profile (high intrinsic motivation and identified regulation, low introjected and external regulation, and low amotivation), C-profile (low intrinsic motivation and identified regulation, high introjected and external regulation and high amotivation), high A-C (high intrinsic motivation and identified regulation, high introjected and external regulation, and low to moderate amotivation), moderate A-C (moderate intrinsic motivation and identified

regulation, moderate introjected and external regulation, and low to moderate amotivation), and low A-C (low intrinsic motivation and identified regulation, low introjected and external regulation, and moderate amotivation).

H2a entails predicting which profiles in H1 will be more favourable on well-being outcomes. Self-determination theory (Deci & Ryan, 1985, 2000; Ryan & Deci, 2000) predicts that higher levels of well-being will be experienced when higher levels of autonomous forms of motivation are experienced because one's basic psychological needs are satisfied. The theory also predicts that lower levels of well-being will be experienced when higher levels of controlled forms of motivation are experienced because one's basic psychological needs are thwarted. Thus the profiles with more autonomous forms of motivation are predicted to have higher levels of well-being than the profiles with more controlled forms of motivation. Since the theory does not offer any predictions about the effects of individuals experiencing both autonomous and controlled forms of motivation concurrently, evidence from previous profile studies were used to make more specific predictions about which profiles will be more favourable.

The following evidence from previous studies was used to hypothesize how the predicted profiles in H1 will relate to well-being outcomes. First, the A-profile and the high A-C profiles were shown to be the most favourable profiles for well-being related outcomes (Graves et al., 2015; Liu et al., 2009; Ratelle et al., 2007; Van den Broeck et al., 2013). Second, two studies conducted in academic contexts (Liu et al., 2009; Ratelle et al., 2007) showed that the A-profile was more favourable on well-being outcomes than the high A-C profile and two studies conducted in work contexts (Graves et al., 2015; Van den Broeck et al., 2013) showed that the two profiles did not significantly differ. Since the current study will be using student samples, the A-profile was predicted to be more favourable on well-being outcomes than the high A-C profile. Third, almost all of the applicable studies that were reviewed showed that individuals in the high A-C profile and/or the moderate A-C profile had significantly higher levels of well-being than those in the low A-C profile and/or the C-profile (Liu et al., 2009; Ratelle et al., 2007; Van den Broeck et al., 2013). Fourth, two studies (Graves et al., 2015; Ratelle et al., 2007) showed that the high A-C profile was more favourable on well-being related outcomes than the



moderate A-C profile, and one study showed that the two profiles did not significantly differ. Therefore, there is more evidence that the high A-C profile will be significantly more favourable on well-being outcomes than the moderate A-C profile. Lastly, one study in an academic context (Liu et al., 2009) showed that the low A-C profile was more favourable on well-being outcomes than the C-profile and one study in a work context (Van den Broeck et al., 2013) showed that the two profiles did not significantly differ. Since the current study will be using student samples, it is hypothesized that higher levels of well-being will be experienced by those in the low A-C profile compared to those in the C-profile.

(H2a) The highest level of well-being will be experienced by those in the A-profile, followed by those in the high A-C profile, moderate A-C profile, low A-C profile, and the C-profile; all differences are theorized to be significant. Well-being will be measured by the outcomes of eudaimonic well-being, positive and negative affect, physical illness symptoms, engagement, burnout, and basic needs satisfaction.

H2b entails predicting which profiles in H1 will be more favourable for adaptive student behaviours. Self-determination theory (Deci & Ryan, 1985, 2000; Ryan & Deci, 2000) predicts that higher levels of performance will be experienced when higher levels of autonomous forms of motivation are experienced because one's basic psychological needs are satisfied. The theory also predicts that lower levels of performance will be experienced when higher levels of controlled forms of motivation are experienced because one's basic psychological needs are thwarted. Thus the profiles with more autonomous forms of motivation are predicted to have higher levels of performance than the profiles with more controlled forms of motivation. Since the theory does not offer any predictions about the effects of individuals experiencing both autonomous and controlled forms of motivation concurrently, evidence from previous profile studies were used to make more specific predictions about which profiles will be more favourable.

The following evidence from previous studies was used to hypothesize how the predicted profiles in H1 will relate to adaptive student behaviours. First, all the applicable

studies that were reviewed showed that the A-profile, the high A-C profile and/or the moderate A-C profile were the most favourable profiles on performance-related outcomes (Boiché et al., 2008; in de Wal et al., 2014; Liu et al., 2009; Ratelle et al., 2007). Second, there are four examples (Boiché et al., 2008 (Samples 1 and 2); in de Wal et al., 2014; Liu et al., 2009) that showed that the A-profile is more favourable on performance-related outcomes than the high A-C profile or the moderate A-C profile, and there are four examples (Boiché et al., 2008 (Sample 2); in de Wal et al., 2014; Liu et al., 2009; Ratelle et al., 2007) that did not show a difference between the A-profile and the high A-C profile or the moderate A-C profile. Therefore, since there was an equal number of instances of both cases (even across contexts), no prediction will be made for whether or not the A-profile and the high A-C profile or the moderate A-C profile will significantly differ on performance-related outcomes. Third, one study showed that participants in the high A-C profile did not significantly differ on performance compared to those in the moderate A-C profile. Fourth, in all the applicable studies that were reviewed, the high A-C profile or the moderate A-C profile were more favourable on performance-related outcomes than the low A-C profile and the C-profile (Boiché et al., 2008; in de Wal et al., 2014; Liu et al., 2009; Ratelle et al., 2007) Lastly, one study showed that the C-profile and the low A-C profile did not significantly differ on performance-related outcomes (Liu et al., 2009).

(H2b) Higher levels of adaptive student behaviours will be experienced by those in the A-profile, the high A-C profile and the moderate A-C profile compared to those in the low A-C profile, and the C-profile; no other differences will be found with the exception that no prediction is made for the difference between the A-profile and the high A-C profile or the moderate A-C profile.

## **Method**

### **Participants**

I collected data for two consecutive years; the data from February 2014 and April 2015 will be referred to as Sample 1 and Sample 2, respectively. For Samples 1 and 2, the participants were undergraduate students from the University of Western Ontario who

were enrolled in an introductory psychology course. All participants had to be enrolled in the introductory psychology course and be fluent in English to be eligible to participate. All participants were compensated with a research participation credit for the course.

Sample 1 consisted of 271 participants. These participants completed the study online at their own convenience. One participant failed to complete the study, and 29 participants failed to correctly answer at least six out of eight validity check items embedded in the questionnaire (see below). Therefore, the final sample consisted of 241 participants. This sample consisted of 91 males and 150 females. Their ages ranged from 17 to 26 years ( $M = 18.48$ ,  $SD = .90$ ); three participants did not disclose their age.

Sample 2 consisted of 304 participants. Three participants were removed because they failed to complete the study. Out of the 301 participants remaining, 264 of the participants completed the study in-lab; either in paper and pencil (29 participants) or on a computer (235 participants). Whether students completed the study in paper and pencil or on a computer was dictated by the availability of the computer lab, and the participants' availability to complete the study. The remaining 37 participants completed this study online at their own convenience. The decision to complete the study in-lab or at their own convenience was up to the participant.

Twelve participants did not correctly answer at least five out of six validity checks and therefore were removed from the sample. Furthermore, three participants were removed for completing the survey in less than 10 minutes; completing the survey in less than 10 minutes was deemed impossible to achieve if all of the items were actually read. The final sample consisted of 286 participants, including 124 males and 162 females. Their ages ranged from 18 to 28 years ( $M = 18.64$ ,  $SD = 1.01$ ); two participants did not disclose their age.

## **Measures**

**Validity check items.** Participants in Samples 1 and 2 were informed at the beginning of the survey that “There will be some validity check items in this questionnaire to ensure that you are completing the survey to the best of your ability. When you come across these items, please follow the instructions in the question.” The validity check items had the same format for Samples 1 and 2 (e.g., Please choose

disagree for this item). There were eight validity check items for Sample 1 and six validity check items for Sample 2.

**Academic motivation.** Participants in both samples completed the Academic Motivation Scale (See Appendix A; Vallerand et al., 1992, 1993) to assess their reasons for attending university. The stem for this measure is “Why do you go to University?” This measure has five subscales: amotivation (e.g., Honestly, I don't know; I really feel that I am wasting my time in school),  $\alpha_{S1} = .87$ ,  $\alpha_{S2} = .85$ ; external regulation (e.g., Because with only a high-school degree I would not find a high-paying job later on),  $\alpha_{S1} = .86$ ,  $\alpha_{S2} = .81$ ; introjected regulation (e.g., To prove to myself that I am capable of completing my university degree),  $\alpha_{S1} = .87$ ,  $\alpha_{S2} = .83$ ; identified regulation (e.g., Because eventually it will enable me to enter the job market in a field that I like),  $\alpha_{S1} = .78$ ,  $\alpha_{S2} = .71$ ; and intrinsic motivation (e.g., Because I experience pleasure and satisfaction while learning new things),  $\alpha_{S1} = .94$ ,  $\alpha_{S2} = .91$ . Vallerand et al. (1992, 1993) break down the intrinsic motivation subscale further into three categories: to know, to accomplish, and to experience stimulation. However, in Samples 1 and 2, all of the intrinsic motivation items were used to represent an overall intrinsic motivation construct. This was done because, as discussed previously the three subtypes of intrinsic motivation have been found to be highly correlated and the original self-determination theorists, Deci and Ryan (1985, 2000) do not make this distinction. This measure has a total of 28 items; 12 items for the intrinsic motivation subscale and four items for each of the remaining subscales. Participants rated the stated reasons for attending university on a 5-point Likert-type response scale ranging from 1 (*does not correspond at all*) to 5 (*corresponds exactly*). Higher scores on each subscale indicate higher levels of that specific type of motivation.

**Needs satisfaction.** In Sample 1, participants' basic psychological needs satisfaction was measured by Johnston and Finney's (2010) revised version of Gagné's (2003) Basic Needs Satisfaction in General Scale (See Appendix B). In Sample 2, participants' basic psychological needs satisfaction was measured by the original Basic Needs Satisfaction in General Scale (See Appendix C; Gagné, 2003). Both of these measures have the three subscales: autonomy need satisfaction (e.g., I feel like I am free to decide for myself how to live my life),  $\alpha_{S1} = .66$ ,  $\alpha_{S2} = .62$ ; competence need

satisfaction (e.g., People I know tell me I am good at what I do),  $\alpha_{S1} = .67$ ,  $\alpha_{S2} = .71$ ; and relatedness need satisfaction (e.g., I really like the people I interact with),  $\alpha_{S1} = .82$ ,  $\alpha_{S2} = .81$ . Both measures use a 7-point Likert-type response scale ranging from 1 (*not at all true*) to 7 (*very true*). For both measures, higher scores indicate that the participants' basic needs are more satisfied. For present purposes, the scores on the subscales were combined into a composite score reflecting overall basic psychological needs satisfaction ( $\alpha_{S1} = .86$ ,  $\alpha_{S2} = .87$ ).

The difference between Johnston and Finney's (2010) revised measure and Gagné's (2003) original measure is that the revised measure has four items removed from the autonomy subscale and one item removed from the relatedness subscale. Johnston and Finney (2010) showed that their revised measure has better psychometric properties than the original measure. However, a decision was made to use the Gagné's (2003) original measure for Sample 2 because more researchers use it and it has more items in the autonomy subscale. The Cronbach alpha for the autonomy subscale was below .70 in Sample 1 and the researchers wanted to see if the original autonomy subscale would improve this. However, the Cronbach alpha did not improve in Sample 2 with the original measure.

There are 16 items in total in Johnston and Finney's (2010) revised measure used in Sample 1; three, six, and seven items for the autonomy, competence and relatedness subscales, respectively. There are 21 items in total in Gagné's (2003) original measure used in Sample 2; seven, six, and eight items for the autonomy, competence and relatedness subscales, respectively.

**Eudaimonic Well-being.** In Samples 1 and 2, two measures were filled out to assess the participants' level of eudaimonic well-being: Waterman and colleagues' (2010) Questionnaire for Eudaimonic Well-being (See Appendix D), and a new measure developed for this study titled the Personal Growth and Development Scale (See Appendix E). In Sample 1, participants also completed a revised version of Ryff's (1989) Psychological Well-being Scales (See Appendix F) with three items per subscale. In Sample 2, participants completed a version of Ryff's (1989) scales with nine items per subscale (See Appendix G). These measures are described in more detail below.

**Questionnaire for eudaimonic well-being.** The Questionnaire for Eudaimonic Well-being (Waterman et al., 2010) is unidimensional and has 21 items. Participants rated their responses on a 5-point Likert response scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). A sample item is as follows: “I believe I have discovered who I really am.” Higher scores reflect higher levels of eudaimonic well-being. The Cronbach alpha for the full measure was .78 for Sample 1 and .80 for Sample 2.

**Psychological well-being scales.** There are 14-, nine-, and three-item subscales available for Ryff’s (1989) Psychological Well-being Scales. For Sample 1, participants filled out a revised version of Ryff’s (1989) Psychological Well-being Scales that has three-items for each of the six subscales for a total of 18 items. A decision was made to choose three-items for each subscale from the total pool of items since the original three-item subscale seemed to not cover the breadth of each subscale construct. For Sample 2, participants filled out the established Ryff’s (1989) Psychological Well-being Scales with nine items for each of the six subscales for a total of 54 items. The six subscales are: autonomy (e.g., I have confidence in my opinions, even if they are contrary to the general consensus),  $\alpha_{S1} = .45$ ,  $\alpha_{S2} = .80$ ; environmental mastery (e.g., I am quite good at managing the many responsibilities of my daily life),  $\alpha_{S1} = .68$ ,  $\alpha_{S2} = .78$ ; personal growth (e.g., I am the kind of person who likes to give new things a try),  $\alpha_{S1} = .71$ ,  $\alpha_{S2} = .57$ ; positive relations with others (e.g., People would describe me as a giving person, willing to share my time with others),  $\alpha_{S1} = .53$ ,  $\alpha_{S2} = .69$ ; purpose in life (e.g., I have a sense of direction and purpose in life),  $\alpha_{S1} = .54$ ,  $\alpha_{S2} = .69$ ; and self-acceptance (e.g., I like most aspects of my personality),  $\alpha_{S1} = .75$ ,  $\alpha_{S2} = .87$ . For present purposes, the scores on the subscales were combined into a composite score reflecting overall psychological wellbeing ( $\alpha_{S1} = .83$ ,  $\alpha_{S2} = .92$ ). Participants rated their level of agreement with the items on a 6-point Likert response scale ranging from 1 (*strongly disagree*) to 6 (*strongly agree*). Higher scores indicate higher levels of psychological well-being.

**Personal growth and development scale.** Participants’ level of growth and development in the context of university was assessed by the Personal Growth and Development Scale, a measure developed specifically for the present research. The Questionnaire for Eudaimonic Well-Being (Waterman et al., 2010) and the Psychological Well-Being Scales (Ryff, 1989) arguably measure the extent to which an individual lives

a eudaimonic lifestyle. However, I wanted to assess participants' perceptions of growth and development on the eudaimonic dimensions present in the Questionnaire for Eudaimonic Well-Being and the Psychological Well-Being Scales in the context of university. To my knowledge, there are no measures to date that assess this crucial component for understanding and fostering eudaimonic well-being.

The stem for this measure is "My university experience so far has..." There are eight subscales in this measure: autonomy (e.g., given me the strength to stand up for what I believe),  $\alpha_{S1} = .81$ ,  $\alpha_{S2} = .78$ ; environmental mastery (e.g., taught me how to manage my life more effectively),  $\alpha_{S1} = .83$ ,  $\alpha_{S2} = .76$ ; intense effort in the pursuit of excellence (e.g., help me to enjoy the experience of being challenged),  $\alpha_{S1} = .83$ ,  $\alpha_{S2} = .80$ ; perceived development of one's best potential (e.g., helped me move closer to realizing my full potential),  $\alpha_{S1} = .88$ ,  $\alpha_{S2} = .89$ ; positive relations with others (e.g., taught me how to develop meaningful relationships with others),  $\alpha_{S1} = .88$ ,  $\alpha_{S2} = .86$ ; self-acceptance (e.g., helped to make me more comfortable with who I am.),  $\alpha_{S1} = .82$ ,  $\alpha_{S2} = .73$ ; self-discovery (e.g., helped me get closer to who I truly am as a person),  $\alpha_{S1} = .89$ ,  $\alpha_{S2} = .86$ ; and sense of purpose and meaning in life (e.g., encouraged me to discover what gives meaning to my life),  $\alpha_{S1} = .85$ ,  $\alpha_{S2} = .85$ . For present purposes, the scores on the subscales were combined into a composite score reflecting overall personal growth and development ( $\alpha_{S1} = .98$ ,  $\alpha_{S2} = .96$ ). This measure has a total of 39 items with four to six items per subscale. A 7-point Likert response scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*) is used in this measure. Higher scores indicate higher levels of personal growth and development.

**Affect.** In Sample 1, the Positive and Negative Affect Schedule (See Appendix H; Watson, Clark, & Tellegen, 1988) assessed participants' positive affect (e.g., "I feel excited"),  $\alpha_{S1} = .90$ , and their negative affect (e.g., "I feel distressed"),  $\alpha_{S1} = .88$ . There is a total of 20 items in this measure (10 items per subscale). Participants rated their general feelings during the current academic year on a 5-point Likert-type response scale ranging from 1 (*very slightly to not at all*) to 5 (*extremely*). Higher scores reflect higher levels of positive or negative affect.

**Physical illness symptoms.** In Sample 1, participants' physical illness symptoms during the current academic year were measured by the Physical Health Questionnaire

(See Appendix I; Schat, Kelloway, & Desmarais, 2005; Spence, Helmreich, & Pred, 1987). This measure has four subscales: sleep disturbance (e.g., How often have you woken up during the night?),  $\alpha_{S1} = .82$ ; headaches (e.g., How often have you experienced headaches?),  $\alpha_{S1} = .90$ ; gastrointestinal problems (e.g., How often have you suffered from an upset stomach (indigestion)?),  $\alpha_{S1} = .87$ ; and respiratory infections (e.g., How often have you had minor colds (that made you feel uncomfortable but didn't keep you sick in bed or make you miss work/school)?),  $\alpha_{S1} = .80$ . For present purposes, the scores on the subscales were combined into a composite score reflecting overall physical illness ( $\alpha_{S1} = .90$ ). There are 14 items in this measure; with four items in each of the first two subscales and three items in each of the last two subscales. Participants rated their responses on a 7-point Likert-type response scale ranging from 1 (*not at all*) to 7 (*all the time*). Higher scores indicate higher levels of physical illness symptoms.

**Burnout.** In Sample 1, participants' level of burnout was assessed by an adapted version of the Oldenburg Burnout Inventory (See Appendix J; Demerouti, 1999; Demerouti, Mostert, & Bakker, 2010). The original measure was adapted for a student population. There are two subscales in this measure: disengagement (e.g., I always find new and interesting aspects in my school work),  $\alpha_{S1} = .72$ ; and exhaustion (e.g., When I engage in school work, I usually feel energized),  $\alpha_{S1} = .76$ . For present purposes, the scores on the subscales were combined into a composite score reflecting overall burnout ( $\alpha_{S1} = .84$ ). This measure has a total of 16 items (8 items in each subscale). Participants indicated their level of agreement on a 4-point Likert response scale ranging from 1 (*strongly agree*) to 4 (*strongly disagree*). Higher scores reflect higher levels of burnout.

**Engagement.** In Sample 1, participants' level of engagement was measured by the student version of the Utrecht Work Engagement Scale (See Appendix K; Schaufeli, Salanova, González-Romá, & Bakker, 2002). This measure has three subscales: vigor (e.g., I can continue studying for very long periods at a time),  $\alpha_{S1} = .82$ ; dedication (e.g., My studies inspire me),  $\alpha_{S1} = .75$ ; and absorption (e.g., It is difficult to detach myself from studies),  $\alpha_{S1} = .82$ . For present purposes, the scores on the subscales were combined into a composite score reflecting overall engagement ( $\alpha_{S1} = .92$ ). There is a total of 17 items in this measure with six, five, and six items per subscale, respectively. This



measure employs a 7-point Likert-type response scale ranging from 1 (*never*) to 7 (*always*). Higher scores indicate higher levels of student engagement.

**Adaptive student behaviour.** In Sample 1, participants' level of adaptive student behaviour was assessed by the Student Behaviours Questionnaire that was developed for this study (See Appendix L). This measure has 21 items and utilizes a 5-point Likert-type response scale ranging from 1 (*never*) to 5 (*always*). There is also a non-applicable (N/A) response option. A sample item is "When I don't understand something in class, I raise my hand and ask". Higher scores reflect higher levels of adaptive student behaviours. The internal consistency for the complete measure is  $\alpha = .76$ .

### **Procedure**

All of the participants signed up for the study through the university's psychology research participant pool website. For Sample 1, the participants gave their informed consent online and completed the survey online at their own convenience. For Sample 2, participants completed the study in-lab or online. The in-lab participants arrived at either a computer lab or a small conference room; these participants provided their informed consent and filled out the survey on a computer or in paper and pencil. The online participants in Sample 2 gave their informed consent online and completed the survey online at their own convenience. All of the participants in Samples 1 and 2 were debriefed after they completed the survey. The entire study took approximately 45 minutes.

### **Analyses**

As a first step, I performed a confirmatory factor analysis (CFA) on the Academic Motivation Scale (AMS; Vallerand et al., 1992, 1993) to determine if the data adequately fit the measure's proposed factor structure. Next, I performed multiple CFAs with the AMS (Vallerand et al., 1992, 1993) and each of the other measures to test the distinctiveness of the variables. For example, I conducted a CFA with the AMS and the Positive and Negative Affect Schedule (Watson et al., 1988) and another CFA with the AMS and the Utrecht Work Engagement Scale (Schaufeli et al., 2002) and so on.

Next, I performed latent profile analyses (LPA) on Samples 1 and 2 to detect the naturally occurring latent motivation profiles. I followed the LPA procedure implemented by Meyer, Kam, Goldenberg, and Bremner (2013) and I performed the LPA using the

robust maximum likelihood estimator in MPlus 6.12 (Muthén & Muthén, 1998-2009). I used an iterative process to determine the optimal number of profiles; a two-profile solution was examined first and then an additional profile was added consecutively until the model did not run or specification errors occurred.

I used the sample-adjusted Bayesian information criterion (SABIC; Sclove, 1987), the bootstrapped likelihood ratio test (BLRT; McLachlan & Peel, 2000), the number of participants in each profile and the posterior probabilities of each profile to assess the profile solutions found in both samples. For a group of nonhierarchical models, the SABIC assists in choosing the profile solution with the greatest level of fit and fewest parameters. The BLRT assesses whether or not a profile solution with  $k$  profiles is better than the profile solution with  $k - 1$  profiles. A significant BLRT value at the  $p < .05$  level signifies that the profile solution with  $k$  profiles is better than the profile solution with  $k - 1$  profiles. The posterior probabilities indicate the model-estimated probability that each individual has of belonging to each profile. These probabilities should be large for the profiles to which individuals are assigned and low for non-assigned profiles.

The recommendations given by Nylund, Asparouhov, and Muthén (2007) and Lubke and Muthén (2005) will be used to choose the best profile solution for both samples. Nylund et al. state that the best profile solution ought to have the smallest SABIC and BLRT, and the BLRT should be significant. Furthermore, Nylund et al. (2007) suggest that each profile should contain at least five percent of the total sample, and the solution should have optimal posterior probabilities, indicating that the profiles are clearly defined. Lubke and Muthén (2005) recommend that when choosing the best profile solution, another point to consider is the relevant theory. Thus, the distinctiveness of the profiles will also be considered and this will be accomplished by examining the means of the different types of motivations for each profile in the solutions.

Lastly, I used the Wald Test of Mean Equality to test how the different profiles found relate to the outcome variables. A chi-square value and its level of significance are given for an overall test of significance and for each pairwise comparison of the profiles in the optimal solution.

## Results

The means, standard deviations, and reliabilities of the variables and the correlations between the variables can be found in Table 2 for Sample 1 and Table 3 for Sample 2. For both samples, the Cronbach alphas of all the measures were above .70. Therefore, each of the measures has good internal consistency.

For Sample 1, intrinsic motivation was significantly positively related to identified and introjected regulation, not significantly related to external regulation, and significantly negatively related to amotivation. The correlation between intrinsic motivation and introjected regulation was higher than the correlation between intrinsic motivation and identified regulation. Identified regulation was significantly positively related to introjected regulation and external regulation, and was significantly negatively related to amotivation. The correlation between identified regulation and introjected regulation was only slightly higher than the correlation between identified regulation and external regulation. Introjected regulation was significantly positively related to external regulation and not significantly related to amotivation. External regulation was not significantly related to amotivation.

The same pattern of results emerged for Sample 2 with the following exceptions. The correlation between identified regulation and introjected regulation was slightly smaller than the correlation between identified regulation and external regulation. Both introjected regulation and external regulation were significantly negatively related to amotivation. For both samples, the pattern of correlations somewhat fits the simplex pattern, but there are some clear deviations. Most notably, the correlation between intrinsic motivation and introjected regulation was higher than the correlation between intrinsic motivation and identified regulation in both samples; the correlation between intrinsic motivation and introjected regulation should have been smaller. Also, the correlation between identified regulation and introjected regulation was either only slightly larger (Sample 1) or it was actually slightly smaller (Sample 2) than the correlation between identified regulation and external regulation; the correlation between identified regulation and external regulation should have been smaller.

For Sample 1, intrinsic motivation, identified and introjected regulation were significantly positively related to adaptive student behaviours, engagement, positive

Table 2

*Descriptive Statistics and Correlations for Sample 1*

Variables	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7
1. Intrinsic motivation	3.32	0.84	(.94)						
2. Identified regulation	4.19	0.67	.506***	(.78)					
3. Introjected regulation	3.77	0.92	.606***	.459***	(.87)				
4. External regulation	4.35	0.69	.065	.425***	.401***	(.86)			
5. Amotivation	1.50	0.76	-.181**	-.231***	-.109	.069	(.87)		
6. SBQ	2.81	0.51	.397***	.172**	.206**	-.077	-.195**	(.76)	
7. Burnout	2.42	0.40	-.502***	-.313***	-.269***	.092	.466***	-.358***	(.84)
8. Engagement	3.12	0.87	.606***	.416***	.370***	.056	-.347***	.506***	-.654***
9. Physical Symptoms	3.37	1.11	.003	.002	.045	.119	.241***	.028	.416***
10. Positive Affect	3.39	0.74	.605***	.436***	.496***	.049	-.317***	.470***	-.661***
11. Negative Affect	2.65	0.82	-.110	-.063	.009	.157*	.360***	-.116	.561***
12. PWB	4.26	0.59	.402***	.285***	.221**	-.088	-.332***	.410***	-.503***
13. QEWB	3.47	0.43	.514***	.304***	.286***	-.105	-.274***	.456***	-.528***
14. PGDS	5.20	0.99	.541***	.402***	.414***	.060	-.275***	.438***	-.511***
15. BNS	5.18	0.77	.342***	.335***	.344***	.046	-.356***	.313***	-.464***

*Note.* SBQ = adaptive student behaviours; PWB = Ryff's psychological well-being scales; QEWB = Waterman et al.'s questionnaire for eudaimonic well-being; PGDS = personal growth and development; BNS = basic need satisfaction.

N = 238-241 for the descriptives. N = 239-240 for the correlations. N = 221-241 for the reliabilities.

\* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ .

Variables	8	9	10	11	12	13	14	15
1. Intrinsic motivation								
2. Identified regulation								
3. Introjected regulation								
4. External regulation								
5. Amotivation								
6. SBQ								
7. Burnout								
8. Engagement	(.92)							
9. Physical Symptoms	-.199**	(.90)						
10. Positive Affect	.686***	-.155*	(.90)					
11. Negative Affect	-.282***	.531***	-.248***	(.88)				
12. PWB	.463***	-.234***	.540***	-.463***	(.83)			
13. QEWB	.550***	-.178**	.555***	-.353***	.687***	(.78)		
14. PGDS	.578***	-.124	.679***	-.314***	.518***	.593***	(.98)	
15. BNS	.439***	-.191**	.552***	-.468***	.649***	.508***	.589***	(.86)

Table 3  
*Descriptive Statistics and Correlations for Sample 2*

Variables	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8	9
1. Intrinsic motivation	3.08	0.79	(.91)								
2. Identified regulation	4.12	0.71	.430***	(.71)							
3. Introjected regulation	3.44	1.00	.582***	.491***	(.83)						
4. External regulation	4.13	0.77	.101	.559***	.413***	(.81)					
5. Amotivation	1.47	0.74	-.271***	-.436***	-.188**	-.134*	(.85)				
6. PWB	4.14	0.52	.243***	.213***	.033	-.054	-.372***	(.92)			
7. QEWB	3.57	0.43	.294***	.182**	.030	-.087	-.314***	.692***	(.80)		
8. PGDS	5.30	0.88	.507***	.337***	.280***	.026	-.434***	.563***	.528***	(.96)	
9. BNS	5.12	0.73	.310***	.329***	.152*	.032	-.408***	.767***	.495***	.594**	(.87)

*Note.* PWB = Ryff's psychological well-being scales; QEWB = Waterman et al.'s questionnaire for eudaimonic well-being; PGDS = personal growth and development; BNS = basic need satisfaction.

N = 284-286 for the descriptives. N = 284-286 for the correlations. N = 242 – 285 for the reliability analysis.

\* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ .

affect, eudaimonic well-being (i.e., Psychological Well-being Scales (Ryff, 1989), Questionnaire for Eudaimonic Well-being (Waterman et al., 2010), and the Personal Growth and Development Scale), and basic needs satisfaction. Intrinsic motivation, identified and introjected regulation were also significantly negatively related to burnout, and not significantly related to physical illness symptoms or negative affect. External regulation was significantly positively related to negative affect and not significantly related to any of the other outcome variables. Amotivation was significantly positively related to burnout, physical illness symptoms and negative affect, and it was significantly negatively related to adaptive student behaviours, engagement, positive affect, eudaimonic well-being, and basic needs satisfaction.

For Sample 2, intrinsic motivation and identified regulation were significantly positively related to eudaimonic well-being and basic needs satisfaction. Introjected regulation was significantly positively related to the Personal Growth and Development Scale and basic needs satisfaction. However, introjected regulation was not significantly related to Ryff's (1989) Psychological Well-being Scales or Waterman and colleagues' (2010) Questionnaire for Eudaimonic Well-being. External regulation was not significantly related to any of the outcome variables and amotivation was significantly negatively related to eudaimonic well-being and basic needs satisfaction.

### **CFAs**

The results of the CFA of the AMS (Vallerand et al., 1992, 1993) revealed that for both samples, the model fit statistics indicate that the data fit the hypothesized factor structure adequately (see Table 4). Also, the correlations among the factors are similar in pattern to the raw scores and are reported in Table 5 and Table 6 for Samples 1 and 2 respectively. In addition, for Sample 1, the standardized factor loadings of the items ranged from .595 to .865 and all of the items significantly loaded on their respective latent factors at  $p < .001$ . The loading of .595 (item 3) was the only standardized factor loading below .600. The majority of the loadings were in the .700 range. For Sample 2, the standardized factor loadings of the items ranged from .533 to .858, and all of the items significantly loaded on their respective latent factors at  $p < .001$ . There were a total of five loadings in the .500 range (items 1, 3, 4, 11, and 18). The majority of the loadings were in the .700 range. Overall, the standardized factor loadings found also indicate that

Table 4

*CFA AMS Model Fit Statistics*

	$\chi^2$	df	CFI	TLI	SRMR	RMSEA	RMSEA 90% C.I.
Sample 1	*775.13	340	.894	.882	.065	.073	.066-.080
Sample 2	*1007.80	340	.840	.822	.073	.083	.077-.089

Note.  $\chi^2$  = Chi-square test of model fit; df = degrees of freedom; CFI = comparative fit index; TLI = Tucker Lewis index; SRMR = standardized root mean square residual; RMSEA = root mean square error of approximation; C.I. = confidence interval.

\* $p < .001$ .

Table 5

*CFA AMS Correlations Between the Factors for Sample 1*

Variables	1	2	3	4
1. Intrinsic motivation				
2. Identified regulation	.595			
3. Introjected regulation	.683	.550		
4. External regulation	.100	.552	.474	
5. Amotivation	-.222	-.263	-.128	.066

Table 6

*CFA AMS Correlations Between the Factors for Sample 2*

Variables	1	2	3	4
1. Intrinsic motivation				
2. Identified regulation	.531			
3. Introjected regulation	.669	.617		
4. External regulation	.126	.743	.461	
5. Amotivation	-.320	-.512	-.267	-.190



the data fit the hypothesized factor structure of the AMS adequately. I therefore proceeded with the next step of the analyses.

The multiple CFAs that were conducted with the AMS and each of the other variables revealed that for both samples the fit statistics were adequate for each CFA performed. For both samples, the standardized factor loadings of the items significantly loaded on their respective latent factors at  $p < .001$  with the following exceptions. For Sample 1, two items from the revised Psychological Well-being Scales (Ryff, 1989), three items from the Questionnaire for Eudaimonic Well-being (Waterman et al., 2010), one item from the Oldenburg Burnout Inventory (Demerouti, 1999; Demerouti et al., 2010), one item from the Utrecht Work Engagement Scale (Schaufeli et al., 2002), and four items from the Student Behaviours Questionnaire were not significant. Also for Sample 1, three items from the Questionnaire for Eudaimonic Well-being (Waterman et al., 2010), one item from the Oldenburg Burnout Inventory (Demerouti, 1999; Demerouti et al., 2010), and one item from the Student Behaviours Questionnaire were significant at the  $p < .01$  level. For Sample 2, one item from the Psychological Well-being Scales (Ryff, 1989) was not significant. Also for that same measure, one item was significant at the  $p < .01$ , and one item was significant at the  $p < .05$  level.

Overall, for both samples, the CFA model fit statistics indicate that the data adequately fit the model for each comparison and almost all of the items significantly loaded on their latent factors. Therefore, in general, the AMS subscales are distinguishable from one another and from the measures to be used as outcomes in subsequent analyses.

### **LPA**

The SABIC and BLRT model fit statistics can be found in Table 7 for Samples 1 and 2. For both samples, the SABIC value decreases for every profile successively added. For both samples, the BLRT value is significant for each profile solution tested and it decreases for the majority of the profiles successively added. In Sample 1, the BLRT value increases for the five-profile solution and the seven-profile solution. In Sample 2, the BLRT value increases for the seven-profile solution.

Even though the SABIC and BLRT model fit statistics provide valuable information, it is also important to consider the percentage of participants from the total

Table 7  
*LPA Model Fit Statistics*

	Sample 1		Sample 2	
	SABIC	BLRT	SABIC	BLRT
2-Profile	2061.49	250.71***	2138.32	459.308***
3-Profile	1940.98	134.40***	1982.64	170.59***
4-Profile	1862.98	123.85***	1872.11	125.44***
5-Profile	1782.67	153.44***	1778.71	108.31***
6-Profile	1710.06	86.50***	1726.66	100.47*
7-Profile	1666.28	136.31***	1673.70	121.174***

*Note.* SABIC = Sample-adjusted Bayesian Information Criterion; BLRT = Bootstrapped Likelihood Ratio Test

(2 times the log likelihood difference).

\* $p < .05$ , \*\*\* $p < .001$ .

sample that are in each profile (see Table 8). For Sample 1, the four-profile solution has one profile with less than five percent of the sample. When comparing the Sample 1 factor score plots for the three- and the four-profile solutions, one of the profiles in the three-profile solution split into two profiles in the four-profile solution that were very similar in shape and judged to not be meaningfully different. Therefore, for Sample 1 the three-profile solution was deemed to be the optimal profile solution.

For Sample 2, the five-profile solution has one profile with less than five percent of the sample. When inspecting the three- and the four-profile solutions for Sample 2, the one profile from the three-profile solution that split into two profiles in the four-profile solution did not differ on any of the outcomes variables (see below). Therefore, due to the results of the outcomes analyses and the fact that a three-profile solution was chosen for Sample 1, the three-profile solution was deemed to be the optimal profile solution for Sample 2.

Taking a look at the posterior probabilities for the three-profile solution for both samples shows that each of the profiles is clearly defined (see Table 9). There was only a maximum chance of 9 percent for Sample 1 and 10 percent for Sample 2 that participants are better suited in a different profile. Overall, the results of the posterior probabilities

Table 8

*Membership for the Profile Models*

	1	2	3	4	5	6	7
Sample 1							
2-Profile	29.05%	70.95%					
3-Profile	14.52%	55.60%	29.88%				
4-Profile	51.45%	2.49%	17.01%	29.05%			
5-Profile	1.66%	16.60%	26.97%	46.89%	7.88%		
6-Profile	2.07%	44.40%	1.66%	17.43%	26.14%	8.30%	
7-Profile	1.66%	18.26%	15.77%	28.22%	7.47%	2.07%	26.55%
Sample 2							
2-Profile	28.67%	71.33%					
3-Profile	26.57%	10.84%	62.59%				
4-Profile	38.81%	40.21%	9.44%	11.54%			
5-Profile	3.50%	7.69%	39.16%	36.36%	13.29%		
6-Profile	2.80%	35.66%	6.64%	30.77%	12.24%	11.89%	
7-Profile	3.50%	31.12%	28.32%	14.69%	7.34%	6.99%	8.04%

Table 9

*Classification Posterior Probabilities for the 3-Profile Model*

	Profile 1	Profile 2	Profile 3
Sample 1			
Profile 1	<b>.95</b>	.05	<.001
Profile 2	.02	<b>.95</b>	.03
Profile 3	<.001	.09	<b>.91</b>
Sample 2			
Profile 1	<b>.90</b>	.01	.09
Profile 2	.05	<b>.95</b>	<.001
Profile 3	.04	<.001	<b>.96</b>

*Note.* Values in bold are the average posterior probabilities associated with the profiles to which individuals were assigned.

were favourable and support the decision to choose the three-profile solution for both samples.

The profile plots of the factor scores for the three-profile solutions can be seen in Figure 1 and Figure 2 for Samples 1 and 2, respectively. The means of the profiles on the Academic Motivation Scale (Vallerand et al., 1992, 1993) for the three-profile solutions can be found in Table 10 and Table 11 for Samples 1 and 2, respectively.

For Sample 1, the three profiles were labeled, weakly amotivated, moderately motivated, and fully motivated. The weakly amotivated profile has scores that are below the mean for intrinsic motivation, identified, introjected and external regulation, and it has a score that is just above the mean for amotivation. The weakly amotivated profile is amotivation dominant but the differentiation across the scores on the different types of motivation is weak. The moderately motivated profile has scores that are close to the mean for all of the different types of motivation. The fully motivated profile has scores that are above the mean for intrinsic motivation, identified, introjected and external regulation, and a score that is below the mean for amotivation.

For Sample 2, the three profiles were labeled, low amotivated, amotivated, and fully motivated. The low amotivated profile has scores that are below the mean for all the different types of motivation; however, the amotivation score is higher but just below the sample mean. The amotivated profile has a score that is well-above the mean for amotivation and it has scores that are below the mean for intrinsic motivation, identified, introjected and external regulation. The amotivated profile is clearly amotivation dominant and the differentiation across the scores on the different types of motivation is strong. The fully motivated profile has scores that are above the mean for intrinsic motivation, identified, introjected and external regulation, and a score that is below the mean for amotivation.

Compared to the fully motivated profile in Sample 1, the fully motivated profile in Sample 2 has lower scores on intrinsic motivation, and identified, introjected and external regulation; both fully motivated profiles have similar amotivation scores. Even

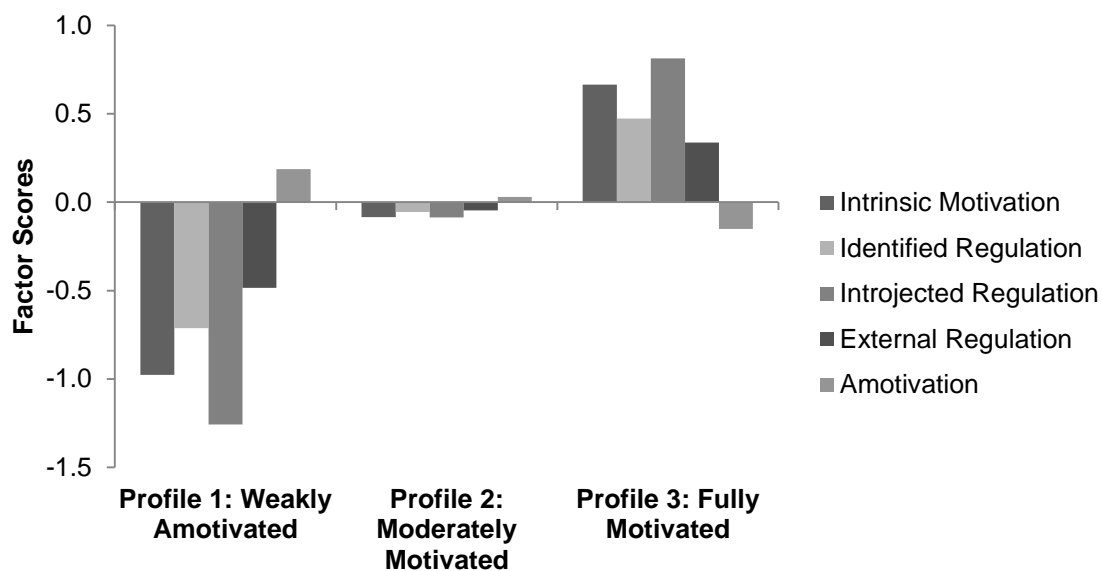


Figure 1. The profile plots of the factor scores for the three-profile solution for Sample 1.

Table 10

Sample 1 Profile Means

	Intrinsic Motivation	Identified Regulation	Introjected Regulation	External Regulation	Amotivation
Profile 1: Weakly Amotivated	2.22	3.32	2.34	3.73	1.68
Profile 2: Moderately Motivated	3.21	4.11	3.67	4.29	1.54
Profile 3: Fully Motivated	4.06	4.75	4.67	4.78	1.33

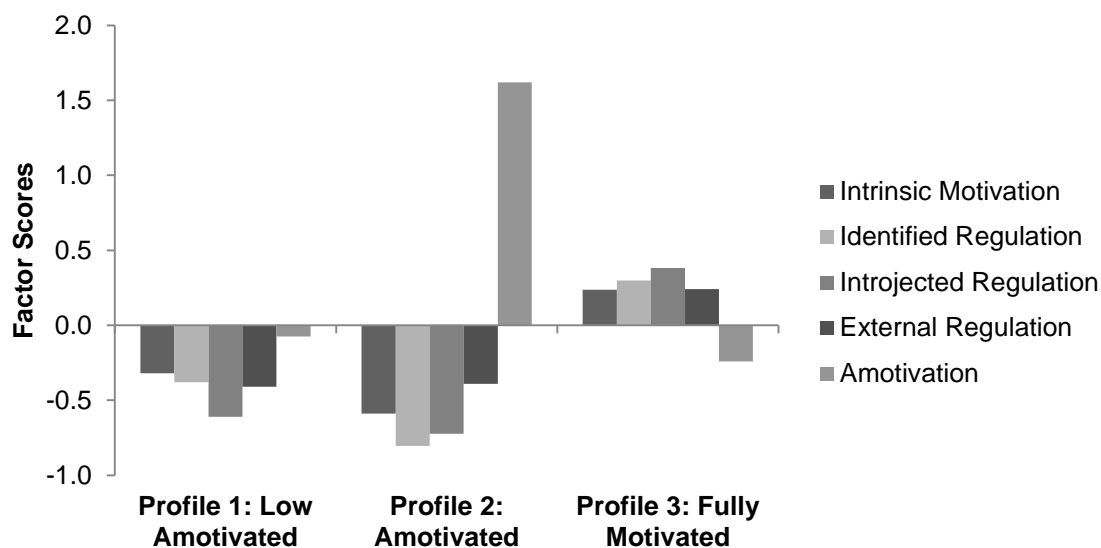


Figure 2. The profile plots of the factor scores for the three-profile solution for Sample 2.

Table 11

Sample 2 Profile Means

	Intrinsic Motivation	Identified Regulation	Introjected Regulation	External Regulation	Amotivation
Profile 1: Low Amotivated	2.68	3.66	2.64	3.46	1.37
Profile 2: Amotivated	2.46	3.10	2.67	3.63	3.14
Profile 3: Fully Motivated	3.36	4.49	3.92	4.49	1.23

though there is a level difference between the two fully motivated profiles, they are similar in shape. Also of note, I want to be clear on the differentiation between the low amotivated profile label and the weakly amotivated profile label. The low amotivated profile label indicates that the scores are below average for all the different types of motivation, and that the score for amotivation is closest to the average. The term “low” reflects the overall elevation (i.e., the average score across indicators) of the profile. The

weakly amotivated profile label indicates that this profile is amotivation dominant (i.e., amotivation has a score that is above the mean and the other types of motivation have scores that are below the mean) and that the differentiation across the scores on the different types of motivation is weak. The term “weakly” reflects the profile’s level of scatter (i.e., the degree of differentiation of the scores on the various indicators).

The profiles that were found are similar in shape but they differ primarily in elevation. In comparison to the predicted profiles in H1, the profiles found are most similar to the high A-C, moderate A-C, and the low A-C profile. However, since the predicted profiles were based on the belief that external regulation and introjected regulation would behave similarly and intrinsic motivation and identified regulation would behave similarly, the profiles found do not support H1. In the profiles that were detected, intrinsic motivation and introjected regulation tend to go together to some extent, as do identified regulation and external regulation.

### **Consequences of Motivation Profiles**

Since the predicted profiles in H1 were not detected, the predictions made in H2 about how the predicted profiles would relate to the outcome variables cannot be tested. However, the profiles found were still tested for how they relate to the outcome variables. Table 12 displays the means of the outcomes for the different profiles, the overall test of significance and the individual mean comparisons using the chi-square statistic.

For Sample 1, the means of the outcomes were all significantly different from each other except for the variables of negative affect and physical illness symptoms (where there were no differences). The fully motivated profile had the best outcomes, followed by the moderately motivated profile and then the weakly amotivated profile. That is, individuals in the fully motivated profile had significantly higher levels of engagement, positive affect, basic need satisfaction, eudaimonic well-being and adaptive student behaviours, and significantly lower levels of burnout than the individuals in the moderately motivated profile and those in the weakly amotivated profile. Individuals in the moderately motivated profile had significantly higher levels of engagement, positive affect, basic need satisfaction, eudaimonic well-being and adaptive student behaviours, and significantly lower levels of burnout than the individuals in the weakly amotivated profile.

Table 12

*Wald Test of Mean Differences on Potential Consequences of Motivation Profiles*

	Weakly Amotivated	Moderately Motivated	Fully Motivated	Overall $\chi^2(2)$
<b>Sample 1</b>				
SBQ	2.59 <sub>a</sub>	2.82 <sub>b</sub>	2.99 <sub>c</sub>	12.69**
Burnout	1.85 <sub>a</sub>	1.59 <sub>b</sub>	1.43 <sub>c</sub>	19.76***
Engagement	2.34 <sub>a</sub>	3.06 <sub>b</sub>	3.61 <sub>c</sub>	36.97***
Physical Symptoms	3.45 <sub>a</sub>	3.33 <sub>a</sub>	3.42 <sub>a</sub>	0.47
Positive Affect	2.59 <sub>a</sub>	3.37 <sub>b</sub>	3.81 <sub>c</sub>	42.06***
Negative Affect	2.68 <sub>a</sub>	2.67 <sub>a</sub>	2.57 <sub>a</sub>	0.69
PWB	3.98 <sub>a</sub>	4.21 <sub>b</sub>	4.52 <sub>c</sub>	19.87***
QEWB	3.18 <sub>a</sub>	3.45 <sub>b</sub>	3.66 <sub>c</sub>	21.38***
PGDS	4.35 <sub>a</sub>	5.11 <sub>b</sub>	5.80 <sub>c</sub>	44.21***
BNS	4.66 <sub>a</sub>	5.12 <sub>b</sub>	5.56 <sub>c</sub>	30.89***
	Low amotivated	Amotivated	Fully Motivated	Overall $\chi^2(2)$
<b>Sample 2</b>				
PWB	4.12 <sub>a</sub>	3.78 <sub>b</sub>	4.22 <sub>a</sub>	15.80***
QEWB	3.56 <sub>ab</sub>	3.36 <sub>b</sub>	3.61 <sub>a</sub>	6.67*
PGDS	5.18 <sub>a</sub>	4.34 <sub>b</sub>	5.52 <sub>c</sub>	38.43***
BNS	5.09 <sub>a</sub>	4.40 <sub>b</sub>	5.26 <sub>a</sub>	27.61***

*Note.* Different subscripts differ at  $p < .05$ .

\* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ .

For Sample 2, the overall pattern found was that the fully motivated profile had the most favourable outcomes, followed by the low amotivated profile and then the amotivated profile. For all of the outcome variables, the overall test of significance was significant. However, not all of the pairwise comparisons of the means were significant. In general, the fully motivated profile and the low-amotivated profile tended to not significantly differ. For the Questionnaire for Eudaimonic Well-being (Waterman et al., 2010), only the amotivated profile and the fully motivated profile significantly differed; the low amotivated profile did not differ from the amotivated profile or the fully motivated profile. For the Psychological Well-being Scales (Ryff, 1989), the amotivated profile significantly differed from the low-amotivated and the fully motivated profile but



the low-amotivated and the fully motivated profile did not significantly differ. For personal growth and development, all comparisons were significant; those in the fully motivated profile experienced the most personal growth and development, followed by those in the low-amotivated profile and then those in the amotivated profile. For basic needs satisfaction, the amotivated profile significantly differed from the low-amotivated and the fully motivated profile but the low-amotivated and the fully motivated profile did not significantly differ.

### **Discussion**

This study had two objectives. The first objective was to examine students' academic motivation profiles in two different samples. After reviewing the literature, it was hypothesized that five profiles would be detected: autonomous, controlled, high A-C, moderate A-C, and low A-C. These profiles were based on the belief that external regulation and introjected regulation would behave similarly, as would intrinsic motivation and identified regulation. The profiles that were detected are most similar to the high A-C, moderate A-C, and low A-C profiles. However, since intrinsic motivation and introjected regulation tended to go together, and to a lesser extent so did identified regulation and external regulation, the profiles found do not support H1.

The second objective was to examine how the motivation profiles detected relate to well-being outcomes and adaptive student behaviours. Since the predicted profiles were not detected, the hypotheses made about how the predicted profiles would relate to the outcome variables could not be tested. Among the profiles found in Sample 1, the fully motivated profile had the best outcomes, followed by the moderately motivated profile and then the weakly amotivated profile. Among the profiles found in Sample 2, overall, the fully motivated profile had the most favourable outcomes, followed by the low amotivated profile and then the amotivated profile.

### **Motivational Profiles**

There are several noteworthy observations in regards to the results of the motivational profile analyses. Overall, the profiles detected differed quantitatively in terms of elevation, rather than qualitatively in terms of shape. Therefore, the results do not provide much support for the benefits of using a person-centered approach. However, three important points can be made from the results of this study for self-determination

theory research. First, the findings suggest that students can experience what have previously been considered to be autonomous forms and controlled forms of motivation at the same time. Although this can be seen to some extent in the correlations among the motivation scales, it becomes even more apparent in this and other recent person-centered studies (e.g., Boiché et al., 2008; Liu et al., 2009; Ratelle et al., 2007).

Second, the findings question the practice of creating autonomous motivation and controlled motivation composites and the use of the RAI. The autonomous motivation composite has been computed by combining intrinsic motivation and identified regulation scores and the controlled motivation composite has been computed by combining external regulation and introjected regulation scores. As noted earlier, the RAI is a formula that has weights applied to the individual types of motivation that are based on the simplex pattern. Looking at the profiles found and the zero-order correlations, overall, intrinsic motivation and introjected regulation tended to go together, and to a lesser extent identified regulation and external regulation tended to go together. These results are against the predicted simplex pattern. Research has also repeatedly found that intrinsic motivation correlates more highly with introjected regulation than identified regulation (e.g., Barkoukis et al., 2008; Blanchard et al., 1997; Fairchild et al., 2005; Ratelle et al., 2007; Vallerand et al., 1989; Vallerand et al., 1993). It has also been found in previous research that identified and extrinsic regulation were more highly associated than introjected and extrinsic regulation (Ratelle et al., 2007). This suggests that there is either an issue with the theory itself or that there is a problem with the measure. Looking specifically at the Academic Motivation Scale (See Appendix A; Vallerand et al., 1992, 1993) used in this study, the introjected items are placed right after intrinsic motivation items that have similar content. For example, an intrinsic motivation item is “because university allows me to experience a personal satisfaction in my quest for excellence in my studies” and an introjected regulation item is “because I want to show myself that I can succeed in my studies.” The intrinsic motivation items refer to satisfaction and enjoyment experienced and the introjected regulation items refer to feelings of self-worth but they both have to do with succeeding in university. Therefore, it seems like there is a measurement issue, particularly with the items for introjected regulation.

Third, the finding that the fully motivated profile was associated with the most favourable outcomes suggests that controlled forms of motivation may not be detrimental if autonomous forms of motivation are also present. While self-determination theory predicts that higher levels of ill-being are associated with higher levels of controlled motivation (Ryan & Deci, 2000) the results of this study suggest that students scoring high on external regulation and introjected regulation might not feel as controlled as implied in self-determination theory. Even though comparisons to an autonomous profile could not be made this is still an important finding.

### **Motivation and Eudaimonic Well-being**

The results of the analyses that examined the relation between motivation and eudaimonic well-being outcomes provide some interesting points of discussion. The different types of motivation were shown to be related to well-being outcomes in both the variable centered and the person centered results. However, the pattern of findings differed somewhat across the eudaimonic well-being measures. As previously discussed, there is a distinction in the well-being literature between the hedonistic tradition and the eudaimonic tradition. The hedonistic tradition emphasizes happiness, namely, “the presence of positive affect and the absence of negative affect” (Deci & Ryan, 2008, p. 1). The eudaimonic tradition is associated with positive psychology (Seligman & Czikszentmihalyi, 2000) and views well-being as more than just the absence of negative affect and experiencing positive affect. Moreover, the eudaimonic tradition focuses on “living well or actualizing one’s human potentials...well-being is not so much an outcome or end state as it is a process of fulfilling or realizing one’s daimon or true nature” (Deci & Ryan, 2008, p. 2). Eudaimonic well-being was measured in the current study by Ryff’s (1989) Psychological Well-being Scales, Waterman and colleagues’ (2010) Questionnaire for Eudaimonic Well-being, and the Personal Growth and Development Scale, which was developed specifically for the present research. The Personal Growth and Development Scale was somewhat differentiated in the variable centered and person centered results from the other two eudaimonic well-being measures. For Sample 2, introjected regulation was positively related to the Personal Growth and Development Scale but it was not significantly related to the other two eudaimonic well-being measures. Also for Sample 2, the Personal Growth and Development Scale was the

only outcome variable that the fully motivated and the low amotivated profiles differed on. The Personal Growth and Development Scale measures one's perceived level of growth and development experienced in the university context, while the other two measures assess one's general lifestyle of eudaimonic well-being. Thus it might be expected that the Personal Growth and Development Scale would be more sensitive to the students' academic motivation state due to the fact that the measure specifically targets one's experience at university. This greater level of discrimination found for the Personal Growth and Development Scale provides preliminary evidence of its ability to assess a unique aspect of eudaimonic well-being.

### **Limitations and Future Directions**

There are a couple of limitations to acknowledge for the current study. First, the sample sizes were modest for purposes of conducting LPA. With larger samples sizes, it might have been possible to detect more and/or more differentiated profiles. Future research should consider using larger sample sizes in the same context to determine if larger sample sizes make a difference in the profiles detected. Second, the cross-sectional design of this study does not allow for the direction of causality between motivation and well-being or adaptive student behaviours to be assessed. Future research should employ longitudinal study designs to examine the direction of causality. Third, the measures used in this study were self-report. Thus there could be some bias present. However, for almost all of the variables it would have been difficult to do otherwise given the nature of the constructs. Future research should include an objective measure of performance along with the adaptive student behaviours measure.

In addition to addressing limitations of the current study, there are a number of other potentially interesting directions for future research. The first would be to examine motivation profiles in other contexts such as the workplace. Autonomous, controlled and autonomous-controlled combination profiles have been found in workplace contexts (e.g., Graves et al., 2015; in de Wal et al., 2014; Van den Broeck et al., 2013). These profiles have been shown to differentially relate to well-being with the controlled profile being the least favourable and the autonomous and combined profiles being the most favourable; for the majority of the time the last two profiles did not significantly differ (Graves et al., 2015; Van den Broeck et al., 2013). If employees can attain higher levels

of well-being when autonomous forms of motivation are experienced, regardless of whether or not controlled motivation is experienced, then interventions should perhaps focus on increasing autonomous forms of motivation. Since there is little research that has tested motivation profiles in the workplace and how they relate to well-being outcomes it would be beneficial to examine this further.

Second, since it was found in this study that favourable outcomes can still be attained when students experience controlled motivation when combined with autonomous motivation, future research could examine how students experience controlled forms of motivation when they also feel autonomously motivated. Qualitative research might reveal that external regulations are not perceived as so controlling if students also experience the benefits and perspective of being autonomously motivated.

Third, I think that the measures used to assess motivation need to be re-examined, in particular, the items for introjected regulation. As discussed previously, the content of the introjected regulation items is very similar to that of the intrinsic motivation items that appear in consecutive order in the measure used for this study. This could be the reason that intrinsic motivation and introjected regulation are so highly correlated.

Fourth, it would be interesting to assess students' motivation during different years of their undergraduate degree and to track their motivation profiles over time to determine their trajectory. Lastly, more research should be conducted using the Personal Growth and Development scale to further investigate its psychometric properties and its usefulness in providing a unique assessment of one's eudaimonic well-being. The greater discrimination of this measure in comparison to the other eudaimonic well-being measures indicates that it may be useful in assessing the development of eudaimonic well-being. This measure could be tested in other contexts such as the workplace to determine possible antecedents and consequences of experiencing growth and development at work.

### **Practical Implications**

The findings of the present research offer some important practical implications. First, one of the major contributions of self-determination theory in a variety of contexts is to demonstrate that it is important to consider not only the degree of motivation but also the type. The findings of this study, combined with those of other person-centred

studies, suggest that recommendations given by self-determination theory that are based on an autonomy continuum may need to be modified to acknowledge that individuals can experience both autonomous and controlled forms of motivation simultaneously.

Furthermore, interpretations of self-determination theory sometimes suggest that in order to attain favourable outcomes, autonomous forms of motivation need to be increased and controlled forms of motivation need to be decreased (Ryan & Deci, 2000). However, in the current study favourable outcomes were found for a profile with both autonomous and controlled forms of motivation. Therefore, those designing interventions should focus more on increasing autonomous forms of motivation and less on decreasing controlled forms of motivation. For example, it may be more beneficial to increase students' interest in the material being taught and/or to emphasize the importance and applicability of the material being taught, rather than striving to decrease students' motivation for doing well on their exams or securing a desirable career. To increase autonomous forms of motivation one should also consider if individuals' three basic psychological needs are satisfied. For example, managers could allow employees to make decisions about how or in what order they complete their work tasks, they could use positive leadership to increase their employees' feelings of competency, and they could encourage positive relationships between co-workers. It is also possible that increasing controlled forms of motivation could be beneficial when autonomous forms of motivation are high. This can be done by providing incentives or making other external consequences more salient. However, individuals' level of autonomous forms of motivation should be monitored to ensure that it is not adversely affected by their level of controlled forms of motivation. If there is a substantial decrease in the level of autonomous forms of motivation when there is an increase in the level of controlled forms of motivation it could be detrimental as the previous profiles studies reviewed consistently showed that a controlled profile was less favourable than the autonomous profile and/or a combined autonomous-controlled profile (e.g., Boiché et al., 2008; Graves et al. 2015; in de Wal et al., 2014; Liu et al., 2009; Ratelle et al., 2007; Van den Broeck et al., 2013). This information could significantly improve the efficiency when planning and implementing interventions targeting performance and well-being in clinical, educational, sport, and work contexts.

Lastly, the concept of growth and development seems to be somewhat distinct from traditional lifestyle measures of eudaimonic well-being and therefore could provide a unique contribution to eudaimonic well-being research. We have yet to my knowledge been able to measure and assess this important aspect of eudaimonic well-being. To be able to do so will enable researchers to determine the antecedents and consequences of personal growth and development within a specific context.

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## Appendix A

## The Academic Motivation Scale (Vallerand et al., 1992, 1993)

*Instructions.*

*Using the scale below, indicate to what extent each of the following items presently corresponds to one of the reasons why you go to university.*

Does not correspond at all	Corresponds a little	Corresponds moderately	Corresponds a lot	Corresponds exactly
1	2	3	4	5

*Why do you go to university?*

1. Because with only a high-school degree I would not find a high-paying job later on.
2. Because I experience pleasure and satisfaction while learning new things.
3. Because I think that a university education will help me better prepare for the career I have chosen.
4. For the intense feelings I experience when I am communicating my own ideas to others.
5. Honestly, I don't know; I really feel that I am wasting my time in school.
6. For the pleasure I experience while surpassing myself in my studies.
7. To prove to myself that I am capable of completing my university degree.
8. In order to obtain a more prestigious job later on.
9. For the pleasure I experience when I discover new things I have never seen before.
10. Because eventually it will enable me to enter the job market in a field that I like.
11. For the pleasure that I experience when I read interesting authors.
12. I once had good reasons for going to university however, now I wonder whether I should continue.
13. For the pleasure that I experience while I am surpassing myself in one of my personal accomplishments.
14. Because of the fact that when I succeed in university I feel important.
15. Because I want to have "the good life" later on.
16. For the pleasure that I experience in broadening my knowledge about subjects which appeal to me.
17. Because this will help me make a better choice regarding my career orientation.
18. For the pleasure that I experience when I feel completely absorbed by what certain authors have written.
19. I can't see why I go to university and frankly, I couldn't care less.
20. For the satisfaction I feel when I am in the process of accomplishing difficult academic activities.



21. To show myself that I am an intelligent person.
22. In order to have a better salary later on.
23. Because my studies allow me to continue to learn about many things that interest me.
24. Because I believe that a few additional years of education will improve my competence as a worker.
25. For the "high" feeling that I experience while reading about various interesting subjects.
26. I don't know; I can't understand what I am doing in school.
27. Because university allows me to experience a personal satisfaction in my quest for excellence in my studies.
28. Because I want to show myself that I can succeed in my studies

*Survey Key*

- Intrinsic motivation - to know: 2, 9, 16, 23
- Intrinsic motivation – to accomplish: 6, 13, 20, 27
- Intrinsic motivation - to experience stimulation: 4, 11, 18, 25
- Extrinsic motivation – identified: 3, 10, 17, 24
- Extrinsic motivation – introjected: 7, 14, 21, 28
- Extrinsic motivation - external regulation: 1, 8, 15, 22
- Amotivation: 5, 12, 19, 26

## Appendix B

The Revised Basic Needs Satisfaction in General Scale (Gagné, 2003; Johnston & Finney, 2010)

*Instructions.*

*Please read each of the following items carefully, thinking about how it relates to your life, and then indicate how true it is for you.*

- | Not at<br>all true |   |   | Somewhat<br>True |   |   | Very True |
|--------------------|---|---|------------------|---|---|-----------|
| 1                  | 2 | 3 | 4                | 5 | 6 | 7         |
1. I feel like I am free to decide for myself how to live my life
  2. I really like the people I interact with.
  3. Often, I do not feel very competent.
  4. People I know tell me I am good at what I do.
  5. I get along with people I come into contact with.
  6. I pretty much keep to myself and don't have a lot of social contacts.
  7. I generally feel free to express my ideas and opinions.
  8. I consider the people I regularly interact with to be my friends.
  9. I have been able to learn interesting new skills recently.
  10. People in my life care about me.
  11. Most days I feel a sense of accomplishment from what I do.
  12. In my life I do not get much of a chance to show how capable I am.
  13. I feel like I can pretty much be myself in my daily situations.
  14. The people I interact with regularly do not seem to like me much.
  15. I often do not feel very capable.
  16. People are generally pretty friendly towards me.

*Survey Key*

- Autonomy: 1, 7, 13
- Competence: 3R, 4, 9, 11, 12R, 15R
- Relatedness: 2, 5, 6R, 8, 10, 14R, 16

## Appendix C

## Basic Needs Satisfaction in General Scale (Gagné, 2003)

*Instructions.*

*Please read each of the following items carefully, thinking about how it relates to your life, and then indicate how true it is for you. Use the following scale to respond.*

Not at all true			Somewhat True			Very True
1	2	3	4	5	6	7

1. I feel like I am free to decide for myself how to live my life
2. I really like the people I interact with
3. Often, I do not feel very competent
4. I feel pressured in my life
5. People I know tell me I am good at what I do
6. I get along with people I come into contact with
7. I pretty much keep to myself and don't have a lot of social contacts
8. I generally feel free to express my ideas and opinions
9. I consider the people I regularly interact with to be my friends
10. I have been able to learn interesting new skills recently
11. In my daily life, I frequently have to do what I am told
12. People in my life care about me
13. Most days I feel a sense of accomplishment from what I do
14. People I interact with on a daily basis tend to take my feelings into consideration
15. In my life I do not get much of a chance to show how capable I am
16. There are not many people I am close to
17. I feel like I can pretty much be myself in my daily situations
18. The people I interact with regularly do not seem to like me much.
19. I often do not feel very capable
20. There is not much opportunity for me to decide for myself how to do things in my daily life
21. People are generally pretty friendly towards me

*Survey Key*

- Autonomy: 1, 4(R), 8, 11(R), 14, 17, 20(R)
- Competence: 3(R), 5, 10, 13, 15(R), 19(R)
- Relatedness: 2, 6, 7(R), 9, 12, 16(R), 18(R), 21

## Appendix D

## Questionnaire for Eudaimonic Well-being (Waterman et al., 2010)

*Instructions.*

*This questionnaire contains a series of statements that refer to how you may feel things have been going in your life. Read each statement and decide the extent to which you agree or disagree with it. Try to respond to each statement according to your own feelings about how things are actually going, rather than how you might want them to be. Please use the following scale when responding to each statement.*

Strongly disagree	Slightly disagree	Neither agree nor disagree	Slightly agree	Strongly agree
1	2	3	4	5

1. I find I get intensely involved in many of the things I do each day
2. I believe I have discovered who I really am
3. I think it would be ideal if things came easily to me in my life (R)
4. my life is centered around a set of core beliefs that give meaning to my life
5. It is more important that I really enjoy what I do than that other people are impressed by it
6. I believe I know what my best potentials are and I try to develop them whenever possible.
7. Other people usually know better what would be good for me to do than I know myself. (R)
8. I feel best when I'm doing something worth investing a great of effort in.
9. I can say that I have found my purpose in life.
10. If I did not find what I was doing reward for me, I do not think I could continue doing it
11. As yet, I've not figured out what to do with my life (R)
12. I can't understand why some people want to work so hard on the things that they do. (R)
13. I believe it is important to know how what I'm doing fits with purposes worth pursuing
14. I usually know what I should do because some actions just feel right to me.
15. When I engage in activities that involve my best potentials, I have this sense of really being alive.
16. I am confused about what my talents really are (R)
17. I find a lot of the things I do are personally expressive for me.
18. It is important to me that I feel fulfilled by the activities that I engage in.
19. if something is really difficult, it probably isn't worth doing (R)
20. I find it hard to get really invested in the things that I do. (R)
21. I believe I know what I was meant to do in life.

Appendix E  
The Personal Growth and Development Scale

*Instructions.*

*Using the scale provided, click on the most applicable circle for each statement to indicate your level of agreement.*

Strongly Disagree	Disagree	Slightly Disagree	Neither Disagree or Agree	Slightly Agree	Agree	Strongly Agree
1	2	3	4	5	6	7

*My university experience so far has...*

1. taught me how to manage my life more effectively.
2. helped me get closer to who I truly am as a person.
3. helped to make me more comfortable with who I am.
4. given me the strength to stand up for what I believe.
5. taught me how to develop meaningful relationships with others.
6. helped me move closer to realizing my full potential.
7. encouraged me to discover what gives meaning to my life.
8. helped me appreciate my strengths.
9. enabled me to learn more about myself.
10. given me confidence to deal with unforeseen difficulties.
11. helped me to appreciate others' perspectives on issues.
12. help me to enjoy the experience of being challenged.
13. helped me feel good about the experiences that have shaped me.
14. encouraged me to discover new things about myself.
15. helped me feel confident in my decisions.
16. taught me that good things in life don't come easy.
17. helped me feel more positively about working with others.
18. encouraged me to seek out opportunities where I can grow.
19. helped me appreciate what can be achieved with hard work.
20. taught me the value of working hard to meet my goals.
21. helped me identify important goals I want to achieve.
22. helped me realize the importance of being my own person.
23. helped me to better identify what I want to be doing with my life.
24. helped me understand who I am as a person.
25. helped me to improve upon my talents and skills
26. brought me closer to understanding what I want out of life.
27. taught me to work more effectively with other.

28. encouraged me to achieve my best potential.
29. taught me to resist social pressures.
30. helped me realized my purpose in life.
31. taught me to create my own opportunities.
32. helped me to empathize with others
33. helped me acknowledge my limitations.
34. helped me to feel more connected to others.
35. helped me appreciate the value of setting my own direction in life.
36. enabled me to further develop my strengths.
37. made me want to continue learning more about myself.
38. helped me take advantage of opportunities in my surroundings.
39. encouraged me to strive for excellence.

*Survey Key*

- Autonomy: 4, 15, 22, 29, 34
- Environmental mastery: 1, 10, 37, 39
- Intense effort in the pursuit of excellence: 12, 16, 19, 20, 38
- Perceived development of one's best potential: 6, 18, 25, 28, 35
- Positive relations with others: 5, 11, 17, 27, 31, 33
- Self-acceptance: 3, 8, 13, 32
- Self-discovery: 2, 9, 14, 24, 36
- Sense of purpose and meaning in life: 7, 21, 23, 26, 30

## Appendix F

## Psychological Well-Being Scales Revised (3-items per subscale; Ryff, 1989)

*Three-items per scale; items were chosen by the researchers*

*Instructions.*

*The following questionnaire presents a series of statements about your life in general. Please indicate your degree of agreement or disagreement below.*

Strongly disagree	Moderately disagree	Slightly disagree	Slightly agree	Moderately agree	Strongly agree
1	2	3	4	5	6

1. I tend to be influenced by people with strong opinions.
2. I have confidence in my opinions, even if they are contrary to the general consensus.
3. I judge myself by what I think is important, not by the values of what others think is important.
4. In general, I feel I am in charge of the situation in which I live.
5. The demands of everyday life often get me down.
6. I am quite good at managing the many responsibilities of my daily life.
7. I am the kind of person who likes to give new things a try.
8. I think it's important to have new experiences that challenge how you think about yourself and the world.
9. I do not enjoy being in new situations that require me to change my old familiar ways of doing things.
10. Maintaining a close relationship has been difficult and frustrating for me.
11. People would describe me as a giving person, willing to share my time with others.
12. I know that I can trust my friends, and they know they can trust me.
13. I live life one day at a time and don't really think about the future.
14. I have a sense of direction and purpose in life.
15. I enjoy making plans for the future and working to make them a reality.
16. I like most aspects of my personality.
17. For the most part, I am proud of who I am and the life I lead.
18. I envy many people for the lives they lead.

*Survey key*

- Autonomy: 1(R), 2, 3
- Environmental Mastery: 4, 5(R), 6
- Personal Growth: 7, 8, 9(R)
- Positive Relationships: 10(R), 11, 12
- Purpose in Life: 13(R), 14, 15
- Self-Acceptance: 16, 17, 18(R)

## Appendix G

## Psychological Well-Being Scales (9-items per subscale; Ryff, 1989)

*Instructions.*

*The following questionnaire presents a series of statements about your life in general. Please indicate your degree of agreement or disagreement below.*

Strongly disagree	Moderately disagree	Slightly disagree	Slightly agree	Moderately agree	Strongly agree
1	2	3	4	5	6

1. I am not afraid to voice my opinions, even when they are in opposition to the opinions of most people.
2. In general, I feel I am in charge of the situation in which I live.
3. I am not interested in activities that will expand my horizons. (R)
4. Most people see me as loving and affectionate.
5. I live life one day at a time and don't really think about the future. (R)
6. When I look at the story of my life, I am pleased with how things have turned out.
7. My decisions are not usually influenced by what everyone else is doing.
8. The demands of everyday life often get me down. (R)
9. I don't want to try new ways of doing things--my life is fine the way it is. (R)
10. Maintaining close relationships has been difficult and frustrating for me. (R)
11. I tend to focus on the present, because the future nearly always brings me problems. (R)
12. In general, I feel confident and positive about myself.
13. I tend to worry about what other people think of me. (R)
14. I do not fit very well with the people and the community around me. (R)
15. I think it is important to have new experiences that challenge how you think about yourself and the world.
16. I often feel lonely because I have few close friends with whom to share my concerns. (R)
17. My daily activities often seem trivial and unimportant to me. (R)
18. I feel like many of the people I know have gotten more out of life than I have. (R)
19. Being happy with myself is more important to me than having others approve of me.
20. I am quite good at managing the many responsibilities of my daily life.
21. When I think about it, I haven't really improved much as a person over the years. (R)
22. I enjoy personal and mutual conversations with family members or friends.
23. I don't have a good sense of what it is I'm trying to accomplish in life. (R)
24. I like most aspects of my personality.
25. I tend to be influenced by people with strong opinions. (R)
26. I often feel overwhelmed by my responsibilities. (R)
27. I have the sense that I have developed a lot as a person over time.
28. I don't have many people who want to listen when I need to talk. (R)



29. I used to set goals for myself, but that now seems like a waste of time. (R)
30. I made some mistakes in the past, but I feel that all in all everything has worked out for the best.
31. I have confidence in my opinions, even if they are contrary to the general consensus.
32. I generally do a good job of taking care of my personal finances and affairs.
33. I do not enjoy being in new situations that require me to change my old familiar ways of doing things. (R)
34. It seems to me that most other people have more friends than I do. (R)
35. I enjoy making plans for the future and working to make them a reality.
36. In many ways, I feel disappointed about my achievements in life. (R)
37. It's difficult for me to voice my own opinions on controversial matters. (R)
38. I am good at juggling my time so that I can fit everything in that needs to get done.
39. For me, life has been a continuous process of learning, changing, and growth.
40. People would describe me as a giving person, willing to share my time with others.
41. I am an active person in carrying out the plans I set for myself.
42. My attitude about myself is probably not as positive as most people feel about themselves. (R)
43. I often change my mind about decisions if my friends or family disagree. (R)
44. I have difficulty arranging my life in a way that is satisfying to me. (R)
45. I gave up trying to make big improvements or changes in my life a long time ago. (R)
46. I have not experienced many warm and trusting relationships with others. (R)
47. Some people wander aimlessly through life, but I am not one of them.
48. The past had its ups and downs, but in general, I wouldn't want to change it.
49. I judge myself by what I think is important, not by the values of what others think is important.
50. I have been able to build a home and a lifestyle for myself that is much to my liking.
51. There is truth to the saying you can't teach an old dog new tricks. (R)
52. I know that I can trust my friends, and they know they can trust me.
53. I sometimes feel as if I've done all there is to do in life. (R)
54. When I compare myself to friends and acquaintances, it makes me feel good about who I am.

#### Survey Key

- Autonomy: 1, 7, 13, 19, 25, 31, 37, 43, 49
- Environmental mastery: 2, 8, 14, 20, 26, 32, 38, 44, 50
- Personal growth: 3, 9, 15, 21, 27, 33, 39, 45, 51
- Positive relations with others: 4, 10, 16, 22, 28, 34, 40, 46, 52
- Purpose in life: 5, 11, 17, 23, 29, 35, 41, 47, 53
- Self-acceptance: 6, 12, 18, 24, 30, 36, 42, 48, 54

## Appendix H

## Positive and Negative Affect Schedule (Watson, Clark, &amp; Tellegen, 1988)

*Instructions.*

*This scale consists of a number of words that describe different feelings and emotions. Read each item and indicate to what extent you felt this way in general during THIS ACADEMIC YEAR.*

Very slightly or not at all	A little	Moderately	Quite a bit	Extremely
1	2	3	4	5

1. Interested
2. Distressed
3. Excited
4. Upset
5. Strong
6. Guilty
7. Scared
8. Hostile
9. Enthusiastic
10. Proud
11. Irritable
12. Alert
13. Ashamed
14. Inspired
15. Nervous
16. Determined
17. Attentive
18. Jittery
19. Active
20. Afraid

*Survey Key*

- Positive affect: 1, 3, 5, 9, 10, 12, 15, 17, 18, 20
- Negative affect: 2, 4, 6, 7, 8, 11, 13, 14, 16, 19

## Appendix I

The Physical Health Questionnaire (Schat, Kelloway, & Desmarais, 2005; Spence, Helmreich, & Pred, 1987)

*Instructions.*

*The following items focus on how you have been feeling physically during THIS ACADEMIC YEAR, Please click on the most appropriate circle for each statement.*

Not at all	Rarely	Once in a while	Some of the time	Fairly often	Often	All of the time
1	2	3	4	5	6	7

Over this current academic year...

1. How often have you had difficulty getting to sleep at night?
2. How often have you woken up during the night?
3. How often have you had nightmares or disturbing dreams?
4. How often has your sleep been peaceful and undisturbed?
5. How often have you experienced headaches?
6. How often did you get a headache when there was a lot of pressure on you to get things done?
7. How often did you get a headache when you were frustrated because things were not going the way they should have or when you were annoyed at someone?
8. How often have you suffered from an upset stomach (indigestion)?
9. How often did you have to watch that you ate carefully to avoid stomach upsets?
10. How often did you feel nauseated (“sick to your stomach”)?
11. How often were you constipated or did you suffer from diarrhea?
12. How often have you had minor colds (that made you feel uncomfortable but didn’t keep you sick in bed or make you miss work/school)?
13. How often have you had respiratory infections more severe than minor colds (such as bronchitis sinusitis, etc.) that “laid you low”?
14. When you have a bad cold or flu, how often does it last longer than it should?

*Survey Key*

- Sleep disturbance: 1, 2, 3, 4(R)
- Headaches: 5, 6, 7
- Gastro-intestinal problems: 8, 9, 10, 11
- Respiratory infections: 12, 13, 14

## Appendix J

Oldenburg Burnout Inventory (Demerouti, 1999; Demerouti, Mostert, & Bakker, 2010)

*Instructions.*

*Below you will find a series of statements with which you may agree or disagree. Using the scale, please indicate the degree of your agreement by selecting the number that corresponds with each statement.*

Strongly agree	Agree	Disagree	Strongly disagree
1	2	3	4

1. I always find new and interesting aspects in my school work.
2. There are days when I feel tired before I arrive at school
3. It happens more and more often that I talk about my school work in a negative way
4. After class, I tend to need more time than in the past in order to relax and feel better
5. I can tolerate the pressure of my classes very well
6. Lately, I tend to think less at school and do my school work almost mechanically
7. I find my school work to be a positive challenge.
8. When I am studying or doing school work, I often feel emotionally drained.
9. Over time, one can become disconnected from this type of academic activity
10. After class/school work, I have enough energy for my leisure activities
11. Sometimes, I feel sickened by my academic tasks.
12. After my classes/school work, I usually feel worn out and weary
13. With regards to my current academic direction, this is the only type of content that I could imagine myself studying.
14. Usually, I can manage the amount of my school work well.
15. I feel more and more engaged in my school work
16. When I engage in school work, I usually feel energized.

*Survey Key*

- Disengagement: 1, 3(R), 6(R), 7, 9(R), 11(R), 13, 15
- Exhaustion: 2(R), 4(R), 5, 8(R), 10, 12(R), 14, 16

*Note. These items were adapted for an academic context.*

## Appendix K

Utrecht Work Engagement Scale – Student Version (Schaufeli, Salanova, González-Romá, & Bakker, 2002)

*Instructions.*

*The following statements are how you feel at school. Please read each statement carefully and indicate how often/frequently you felt this way about your academic work. Some of these items may seem very similar. Regardless, please take your time and answer as best you can to each statement.*

Never	Almost Never	Rarely	Sometimes	Often	Very Often	Always
1	2	3	4	5	6	7

1. It is difficult to detach myself from studies
2. When I'm doing my work as a student, I feel bursting with energy
3. To me, my studies are challenging
4. I feel strong and vigorous when I'm studying or going to class
5. I can continue studying for very long periods at a time
6. My studies inspire me
7. When I get up in the morning, I feel like going to class
8. I feel happy when I am studying intensely
9. I find my studies full of meaning and purpose
10. When I am studying, I forget everything else around me.
11. I am proud of my studies
12. Time flies when I am studying.
13. I am very resilient, mentally, as far as my studies are concerned
14. I am immersed in my studies
15. I am enthusiastic about my studies
16. I get carried away when I am studying
17. As far as my studies are concerned I always persevere, even when things do not go well

*Survey Key*

- Vigor: 2, 4, 5, 7, 13, 17
- Dedication: 3, 6, 9, 11, 15
- Absorption: 1, 8, 10, 12, 14, 16

## Appendix L

## Adaptive Student Behaviours Questionnaire (developed for this study)

*Instructions.*

*Using the scale provided, click on the most applicable circle for each statement to indicate how often you have exhibited each THIS ACADEMIC YEAR. If the statement is not applicable to you, please click on N/A.*

- | Never<br>1 | Almost<br>Never<br>2 | About half of<br>the time<br>3 | Usually<br>4 | Almost<br>Always<br>5 | N/A |
|------------|----------------------|--------------------------------|--------------|-----------------------|-----|
|------------|----------------------|--------------------------------|--------------|-----------------------|-----|
1. I participate in student study groups
  2. When I don't understand something in class, I raise my hand and ask
  3. I skip classes. (R)
  4. I attend extra tutorial sessions offered by my professor or teaching assistant
  5. If I hear about something interesting in class, I look for more information outside of class
  6. I try to get clarification from the professor or teaching assistant about what will and will not be covered on the test
  7. I call or email my professor or teaching assistant when I have questions about the course material
  8. I do extra readings for my courses
  9. I take notes or use a highlighter while doing my course readings
  10. I only study one or two days before a test (R)
  11. I consult with my professor or teaching assistant during his/her office hours
  12. I talk with family and friends about what I have learned in class
  13. I daydream in class (R)
  14. I get annoyed with students who ask questions about things that won't be on the test (R)
  15. I read assigned readings more than once
  16. I prepare detailed notes on lectures and readings for my courses
  17. It bothers me when my professor spends time talking about things that won't be on the test (R)
  18. I text or email friends during class (R)
  19. I complete assignments well before the due date
  20. I help to organize student study groups
  21. I develop a weekly study schedule

## Appendix M

## Departmental Ethics Approval Documentation for Sample 1



Research Ethics

Use of Human Participants - Initial Ethics Approval Notice

Principal Investigator: Prof. John Meyer  
 File Number: 104648  
 Review Level: Delegated  
 Protocol Title: Student engagement and well-being  
 Department & Institution: Social Science/ Psychology, Western University  
 Sponsor: Social Sciences and Humanities Research Council

Ethics Approval Date: January 16, 2014 Expiry Date: April 30, 2014

## Documents Reviewed &amp; Approved &amp; Documents Received for Information:

Document Name	Comments	Version Date
Instruments	Received Nov 6 2013. Measures to be included in the surveys	
Instruments	Received Dec 4 2013. Meyer Lab Survey	
Other	Received Dec 23 2013. Debriefing Form	2013/12/23
Revised Western University Protocol	Received Dec 23 2013	2013/12/23
Recruitment Items	Received Dec 23 2013. Sign Up Description	2013/12/23
Letter of Information & Consent	Received Dec 23 2013	2013/12/23

This is to notify you that The University of Western Ontario Research Ethics Board for Non-Medical Research Involving Human Subjects (NMREB) which is organized and operates according to the Tri-Council Policy Statement: Ethical Conduct of Research Involving Humans and the applicable laws and regulations of Ontario has granted approval to the above named research study on the approval date noted above.

This approval shall remain valid until the expiry date noted above assuming timely and acceptable responses to the NMREB's periodic requests for surveillance and monitoring information.

Members of the NMREB who are named as investigators in research studies, or declare a conflict of interest, do not participate in discussions related to, nor vote on, such studies when they are presented to the NMREB.

The Chair of the NMREB is Dr. Riley Hinson. The NMREB is registered with the U.S. Department of Health & Human Services under the IRB registration number IRB 00000941.



Ethics Officer in Charge for Further Information

Grace Kelly	Vicki Toss	Mina Mokhtari	Erika Basile
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## Appendix N

## Departmental Ethics Approval Documentation for Sample 2


**Western  
Research**
**Research Ethics**
**Western University Health Science Research Ethics Board  
NMREB Delegated Initial Approval Notice**

**Principal Investigator:** Prof. John Meyer  
**Department & Institution:** Social Science/psychology, Western University

**NMREB File Number:** 106297  
**Study Title:** Student Well-Being and Attitudes about University  
**Sponsor:**

**NMREB Initial Approval Date:** March 18, 2015  
**NMREB Expiry Date:** March 18, 2016

**Documents Approved and/or Received for Information:**

Document Name	Comments	Version Date
Instruments	Survey version 1	
Instruments	Survey version 2	
Other	End of survey debriefing information for both survey versions.	
Revised Western University Protocol	Edited, clean PDF version of the revised ethics protocol.	2015/03/05
Advertisement	Sign up description that will accompany the SONA posting for Psych 100 students/ participants to view.	2015/03/05
Revised Letter of Information & Consent	Edited, clean PDF version of the revised Letter of Information	2015/03/05

The Western University Non-Medical Research Ethics Board (NMREB) has reviewed and approved the above named study, as of the NMREB Initial Approval Date noted above.

NMREB approval for this study remains valid until the NMREB Expiry Date noted above, conditional to timely submission and acceptance of NMREB Continuing Ethics Review.

The Western University NMREB operates in compliance with the Tri-Council Policy Statement Ethical Conduct for Research Involving Humans (TCPS2), the Ontario Personal Health Information Protection Act (PHIPA, 2004), and the applicable laws and regulations of Ontario.

Members of the NMREB who are named as Investigators in research studies do not participate in discussions related to, nor vote on such studies when they are presented to the REB.

The NMREB is registered with the U.S. Department of Health & Human Services under the IRB registration number IRB 00000941.



Chair or delegated board member

Ethics Officer to Contact for Further Information

Erika Basile	Grace Kelly	Mina Mekhail	Vikki Tran
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*This is an official document. Please retain the original in your files.*



## Curriculum Vitae

**Name:** Chelsea Vaters

**Post-secondary Education and Degrees:** The University of Western Ontario  
London, Ontario, Canada  
2009 – 2013 B.Sc. (Honours)

**Honours and Awards:** Western Scholarship of Distinction  
2009

**Related Work Experience**

Teaching Assistant  
The University of Western Ontario  
2013-Present

Research Assistant  
The University of Western Ontario  
July 2014-August 2014

Lab Technician  
Intlvac Canada  
May 2010-August 2010

**Publications:**