Optimal academic experience: Exploring the relationship between motivation and flow.

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ABSTRACT

This study explores the factors that elicit and sustain the optimal academic experience. Flow operationalizes this experience and is studied in relation to motivation. More self-determined types of motivation are expected to have higher correlations with the flow experience, with autonomy acting as a moderator. Results are theoretically underpinned by self-determination theory and cognitive evaluation theory. Congruent with engagement research this study has implications for successful educational outcomes such as learning, achievement, continued motivation, commitment, performance, increased skills and maximal chances for school completion. Flow has often been studied in special populations such as dancers, athletes and scientists. This study investigates how flow is experienced and supported in the higher education environment.

"How optimism and hope affect life, what constitutes wisdom, and how talent and creativity come to fruition (Seligman & Csikszentmihalyi, 2000, p. 5)," are just a few of the questions that Positive Psychology tries to answer. Studying these positive individual traits goes toward building a strength-based model of flourishing. Human strengths are important for an individual to thrive, but so are the ways in which they are supported. Positive Psychology also extends to studying the optimal working environment, communities and education. Besides individual traits, valued subjective experiences are also of interest (Seligman & Csikszentmihalyi, 2000). Engagement and flow are subjective experiences which outline academic strengths in the educational domain.

Engagement has been defined as a behavior in which a person brings in their personal self during the performance of a task (Kahn, 1990). Student engagement has been linked to important educational outcomes such as learning and achievement, successful school completion, continued motivation, commitment and performance (Shernoff et al, 2003).

The flow experience is engaging in that it is described as total involvement in an activity that one is completely absorbed in. Engagement and flow are also related in other ways. Interestingly both Kahn (1990), and Csikszentmihalyi cite alienation as the opposite to engagement and flow respectively. Flow and engagement have been used as examples of self-directed behavior (Kahn, 1990), flow has also been used as an example of engagement (Steele & Fullagar, 2009), and flow has even been studied as an operationalization of engagement (Mills & Fullagar, 2008). Concentration, interest and enjoyment are measures of engagement and these constructs experienced together are typical of the flow experience (Shernoff et al. 2003). Engagement is affected by the challenge and skill of the activity which

correlates with the flow experience where high challenge is matched to the skills of the individual. The relevance of an activity is also important for the experience of engagement to occur. Clear goals are important for the flow experience and intuitively the relevance of an activity would be a key determinant in goal setting. (Ryan & Deci, 2000, Csikszentmihalyi, 1999).

As research has shown, engagement has important educational outcomes and is akin to the flow experience. Therefore flow is a useful lens through which to look at educational research and contribute to engagement research.

Flow is the brainchild of Mihaly Csikszentmihalyi and he describes it as an optimal experience where high challenge is matched to the skills of the individual. There is a clear goal in mind and feedback is received from the activity itself (how well you are playing a sport) or from an internal measure (I am ironing more than yesterday). People engaging in a flow activity experience a distorted sense of time and a loss of self-consciousness because they are so involved. The experience is intrinsically rewarding, "worth doing for its own sake" (Csikszentmihalyi, 1999, p. 46). It has even been experienced as entering a different reality where performance is effortless (Csikszentmihalyi, 1999; Moneta, 2004; Nakamura & Csikzentmihalyi, 2003; Sobel, Dava & Omni, 1995).

The most comprehensive description of flow outlines nine component states: challenge-skill balance; action-awareness merging; clear goals; unambiguous feedback; total concentration on the task at hand; sense of control; loss of self consciousness; transformation of time; and the autotelic experience.

The *challenge-skill balance* refers to the perceived challenge (experienced as an opportunity to perform an action or achieve a goal) balanced with perceived skills to meet the desired outcome.

Action-awareness merging is experienced as total absorption, engagement and involvement in the activity to the extent that one feels one with the activity. Performance is described as effortless and spontaneous.

Clear goals, objectives and performance preparation and planning are necessary for the flow experience to occur. Clarity of purpose and absolute focus ensue during the flow experience.

Unambiguous feedback is clear and immediate. This feedback is processed continually and seamlessly, guiding performance.

Total concentration on the task at hand is definitive of the flow state. There are no extraneous thoughts or distractions. Clarity and satisfaction are experienced, leading to mastery of skills.

A *sense of control* describes the feeling of empowerment during the flow state which occurs when outside opinion is no longer considered, loss of self consciousness ensues.

Deep concentration leads to the experience of *transformation of time*. Hours may pass without notice or time may slow or even stop in the realm of flow experience.

The *autotelic experience* is intrinsically rewarding and the enjoyment this optimal experience affords is continually sought after (Jackson & Eklund, 2004).

Flow research has been done on scientists, artists and athletes, but Czikszentmihalyi (1999), does not exclude seemingly trivial activities from having flow potential. The meaning derived from this experience can deepen over time, which could be why Csikszentmihalyi undertook creativity in later life studies. Besides creativity and later life studies, research on the flow state has also studied the arts and literature. Most flow research has studied play in a broad sense, which includes rock climbers, chess players, basketball players and social dancers. There is not much research done on social interactions, in addition involvement in religious practices has also been studied (Nakamura & Csikzentmihalyi, 2003). Flow research has made large contributions to studies in the work domain, but there has been a comparatively small contribution in the educational domain.

Flow is a source of motivation in that it is enjoyable and leads to higher levels of achievement in the sports arena. Not surprisingly studies in other arenas have also looked at the relationship between motivation and flow. Studies cite motivation as a precursor to flow. Evidence also shows that highly motivated individuals experience more instances of flow. As intrinsic motivation involves participating in an activity for its own sake it is not surprising that a positive link between intrinsic motivation and flow has also been established (Demerouti, 2006; Jackson, 1996; Kowal & Fortier, 1999; Mills & Fullagar, 2008; Ryan & Deci, 2000).

Most reviewed studies use Self-determination theory (SDT) to operationalize motivation because it outlines types of motivation within intrinsic and extrinsic motivation by their degree of self determination. The theory of SDT also takes into account that people are motivated to act for varying reasons (Ryan & Deci, 2000). The intrinsic types of motivation are the most self-determined and are performed for the satisfaction gained from the activity, extrinsic motivation (motivation due to outside pressure) lies at the lower end of the self-

determination scale. Amotivation is characterized by the absence of motivation (Ryan and Deci, 2000).

Intrinsic Motivation

The most self-determined type of intrinsic motivation is *knowledge*, followed by *accomplishment* and *stimulation*.

Intrinsic Motivation – Knowledge describes an activity that is undertaken because the process of learning and exploration is enjoyable. This is the most self-determined type of motivation.

Intrinsic Motivation – Accomplishment is less self-determined than the previous type of motivation. An activity is motivated by the satisfaction and feeling of accomplishment garnered from participating in a task.

Intrinsic Motivation – Stimulation is the least self-determined type of intrinsic motivation where an activity is undertaken to provide excitement, sensory pleasure and enjoyment.

Extrinsic Motivation

Extrinsic motivation refers to participapation in an activity for some seperable outcome (Ryan and Deci, 2000).

The extrinsic motivation types ranging from most self-determined to least self-determined are: identified regulation; introjected regulation; and external regulation. Finally amotivation will be discussed.

Extrinsic Motivation – Identified Regulation describes the most self-determined type of extrinsic motivation. It is not unlike intrinsic motivation in that an activity has importance and value for the self and this value is internalized.

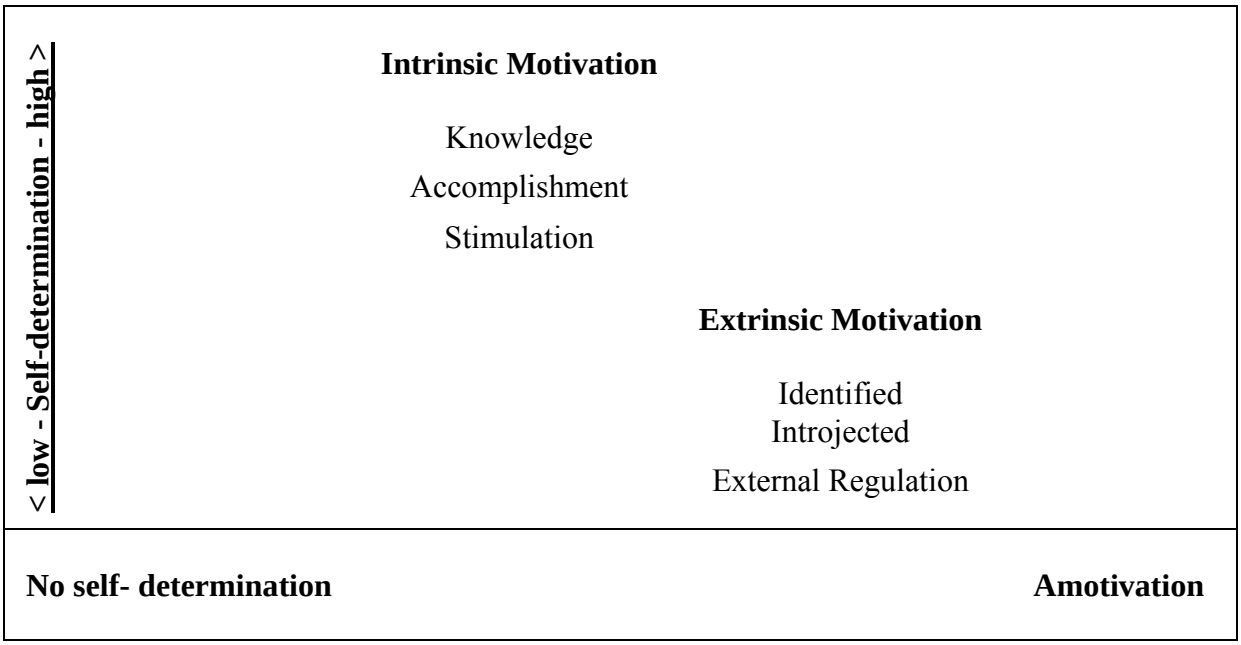
Extrinsic Motivation – Introjected Regulation describes the actions of the individual that are motivated externally. The goal is partially internalized, but behaviour is driven by guilt and obligation.

Extrinsic Motivation – External Regulation is the least self-determined type of motivation. Behaviour is driven by outside factors like gaining rewards and avoiding of punishment.

Amotivation

Amotivation describes a state where motivation is not present. Amotivation assumes an external locus of control. Taking the self-determination theory into account, this external sense of autonomy would curtail flow experiences (Figure 1. presents these motivation types graphically).

Figure 1: Intrinsic Motivation, Extrinsic Motivation and Amotivation on a self-determination continuum.



The definition of motivation has changed over time. Four forms of motivation were originally proposed by Deci and Ryan (2000). Vallerand (1992), further detailed these through use of a hierarchy. Ryan and Deci (2000) detailed extrinsic motivation further. Evidence was found by Ryan and Connell (1989) that these different types of motivation have an underlying continuum. Ryan and Deci (2000) outlined one type of intrinsic motivation operationalized as intrinsic regulation and the same extrinsic motivational types outlined above. Some studies use *autonomous motivation* to describe intrinsic, integrated and identified regulation because of their similarity in the degree to which they are self determined. Introjected regulation and external regulation are both experienced as externally controlled behaviours, although introjected regulation is partially internalized it is not experienced as emanating from the self. For this reason some studies study these two types of extrinsic motivation together as *controlled motivation* (Mills & Fullagar, 2008; Ryan & Deci, 2000; Vallerand et al, 1992).

The study by Mills and Fullagar (2008), on the relation between flow and motivation in architecture students uses the underlying motivational structure of SDT. Flow was experienced more often by architecture students with more self-determined forms of intrinsic motivation, but not for extrinsic motivation. Kowal and Fortier (1999), found that swimmers who swam because they enjoyed the activity (self-determined motivation), reported the most

flow experiences, while swimmers who were not motivated in a self determined manner (extrinsic motivation) reported few flow experiences. They also found that in line with SDT perceptions of autonomy, competence and relatedness were positively correlated to flow. In earlier research looking at managers, clerical workers and blue collar workers, motivation was explained better by activity than flow, although motivation was found to be high in flow activities (Csikszentmihalyi et al, 1983). In contrast intrinsic motivation has been found to be unrelated to flow (Mannel, Zuzanek & Larson, 1988) and motivation has been found to be unrelated to flow in sports (Stein, Kimiecik, Daniels & Jackson, 1995).

In the available research, few studies have examined the relation between flow and motivation in the educational domain. The studies examining this relation in other domains have not yielded consistent results. This points to a need to do such a study in the educational domain. The study looking at the relation between motivation and flow in architecture students is not generalizable to other faculties because the specific sample type. The inconsistent relation between intrinsic and extrinsic motivation and flow may point to the need to identify moderating factors (Mills & Fullagar, 2008).

Moderating factors that have been studied include perceived freedom, goal orientations, perceptions of competence and confidence, and the need for achievement. Conscientiousness has been found to moderate the relationship between flow and work performance. The need for achievement, individual self-regard and engagement have also been linked to flow experiences (Demerouti, 2006). SDT has been used to identify moderators in the relationship between motivation and flow in a study of architectural student's subjective experiences (Mills & Fullagar, 2008).

SDT gives us the theoretical background to understand the underlying determinants of motivation and therefore flow though such concepts as autonomy (Kowal & Fortier, 1999). SDT looks at the social-contextual factors that bring out and support intrinsic motivation which is seen as an evolved propensity (Ryan et al, 1997 as cited in Ryan and Deci, 2000). Through research three innate psychological needs have been postulated to facilitate self-motivation. Satisfaction of these needs leads to proactive and engaged behaviour. The needs that support and enhance self motivation are competence, autonomy and relatedness. If these needs are not met, individuals are passive, alienated and their sense of well-being suffers.

Flow research has found a positive relation between perceptions of confidence and experience of the flow state. Athletes who had higher perceptions of competence experienced flow more often. In line with SDT theory, a study on swimmers found that perceptions of

autonomy, competence and relatedness were positively correlated to flow (Kowal & Fortier, 1999).

Autonomy, especially has garnered research attention. This is in line with Cognitive Evaluation Theory (CET), a sub-theory of SDT. CET postulates that a sense of autonomy must precede feelings of competence in order to facilitate or enhance intrinsic motivation. The third basic need outlined by SDT, that of relatedness may not be necessary for intrinsic motivation to occur when an activity is performed individually, although a secure relational base may be (Ryan & Deci, 2000). Since CET postulates that competence cannot be experienced without autonomy and the need for relatedness may not be necessary in an individually performed academic activity, it is not surprising that autonomy has garnered much research attention.

In research on student engagement when an activity that is challenging, demands skill, and is relevant to the individual it may foster perceptions of competence and autonomy, this in turn increases intrinsic motivation. Autonomy has played a significant role in engagement research. It was found to be a significant factor in student controlled versus teacher controlled activities. Another study found that professor support had significant direct effects for autonomy and role clarity on flow. This is consistent with previous studies in other contexts. (Kahn, 1990; Nakamura & Csikzentmihalyi, 2003; Ryan & Deci, 2000; Shernoff et al, 2003).

Autonomy was found to moderate the relation between motivation and flow in architecture students (Mills & Fullagar, 20008).

Studies on student engagement have been linked to positive educational outcomes. As flow can be studied as an operalization of engagement and epitomizes optimal experience in various domains including education it is suprising that very few educational studies have used flow to study the academic experience. The flow experience has many implications for successful educational outcome as it has been linked to increased skills and engagement, continued motivation and performance, maximal chances for school completion, and a sense of commitment and belonging. Concentration, interest, positive emotional response, perception of competence, autonomy, esteem, intrinsic motivation and commitment have also been linked to the flow experience (Kahn, 1990; Mills & Fullagar, 2008; Nakamura & Csikzentmihalyi, 2003; Ryan & Deci, 2000; Shernoff et al., 2003).

More than 200 studies in the educational domain have been done using SDT as a basis for research. SDT looks at motivation which is integral to achievement, as a multidimentional contruct differing in terms of quality. Reasons for motivation have an impact on quality of motivation and different types of motivation have distinct outcomes (Guay, Ratelle and

Chanal, 2008). After a review of the literature in the educational domain Guay, Ratelle and Chanal (2008), concluded that motivation as outlined by the SDT theory is integral to identifying how students excel in school.

A deeper understanding of the relation between student motivation and flow can be used to encourage positive student outcome to excel, experience well-being and encourage the most suitable type of motivation. The inconsistency of results on the relation between flow and motivation, need clarification.

Few studies have looked at student motivation as postulated by the Self-Determination Theory, and even fewer have looked at it with regards to the flow experience. The outcomes, qualities and affect associated with the flow experience show potential for educational intervention and application.

Self-determination is not only an important tool for understanding the relationship between different types of motivation and flow, but also postulates the motivational determinants that precede flow. It also looks at the consequences of adopting different levels of motivation and the outcomes of such motivation such as the flow experience. Substantial research has shown that intrinsic motivation and self-determined extrinsic motivation, the most self-determined forms of motivation, lead to positive affect and health-promoting behaviours. On the other hand non-self-determined extrinsic motivation and amotivation have negative consequences such as drop out behaviour. More research is needed to examine this relation in an educational setting. SDT is a comprehensive theory for the examination of this relation in that it outlines types and levels of motivation (Kowal & Fortier, 1999).

Perceptions of competence and autonomy show increase in affect, enjoyment, esteem and intrinsic motivation which is described as "the natural inclination toward assimilation, mastery, spontaneous interest, and exploration" (Ryan & Deci, 2000, p.70)'. I also propose that autonomy is most likely to be a moderating variable due to previous research, SDT and CET.

Moderating factors such as autonomy have been shown to give us a deeper understanding of this relation as well as being linked to qualities that are inherently motivating (Mills & Fullagar, 2008).

Studies on flow and motivation have yielded unclear results as to which types of motivation are more correlated with flow. Flow theory postulates that intrinsic motivation should have higher correlations with flow, but some studies have also shown correlations for

some types of extrinsic motivation and only for extrinsic motivation. The study of architectural students cannot be generalized to the educational domain in general because of sample size and specificity of participants (Mills & Fullagar, 2008). The varying results obtained may be due to the changing definition and I propose the definition of autonomous and controlled motivation which encompasses the self-determined types of motivation. For these reasons I propose:

H1: Flow will show higher correlations to autonomous motivation.

H2: Flow will not be correlated with controlled motivation.

Motivation is theorized to lie on a continuum to the degree that it is self-determined. This has implications for the validity and reliability of the measure. The study involving architectural students has demonstrated that each level of motivation incrementally adds variance to the flow experience (Mills & Fullagar, 2008), but this needs to be established for a more varied sample in order to make results generalizable to other academic contexts. Therefore I propose:

H3: Motivation will incrementally explain flow according to its level of self-determination.

Cognitive evaluation theory (CET) is a subtheory of SDT, and outlines social and environmental factors that support versus forestall intrinsic motivation. CET postulates that a sense of autonomy must precede feelings of competence in order to facilitate or enhance intrinsic motivation. It is perhaps for this reason that most studies have concentrated on the need for autonomy and not that of competence. SDT also postulates that extrinsic motivation lies on a continuum that varies in its relative autonomy. The third basic need outlined by SDT, that of relatedness may not be necessary for intrinsic motivation to occur when an activity is performed individually, although a secure relational base may be (Ryan & Deci, 2000).

Therefore of the needs outlined by the SDT, the need for autonomy is likely to play the most significant role in enhancing intrinsic motivation. I therefore propose

H4: The need for autonomy will moderate the relation between flow and autonomous motivation.

DESIGN AND METHOD

Research design

This study is undertaken according to a cross-sectional research design and was undertaken in a cross-cultural academic context. Participants are undergraduate psychology students from the University of Cape Town. Participants will be contacted via email requesting voluntary participation. The variables flow, motivation and autonomy will be assessed electronically using self report measures. These self report measures included the Flow State Scale, the Academic Motivational Scale and a subscale of the Manifest Needs Questionnaire measuring autonomy. The consent form accompanying the self report measures are presented in Appendix A and B. Testing took place at a time and location convenient to the participant, during the allotted 2 week period.

Participants

Undergraduate psychology students from the University of Cape Town in South Africa were elicited as participants in this study. An invitation to participate in the study was sent out to 1570 students of four different courses offered at undergraduate level. The response rate was 17 % and course points were awarded for participation in the study. Of those that completed the questionnaire and filled out demographic information, 46% were first years, 37 % were second years and 17% were third years. There were also more women than men who completed the survey which is characteristic of a population of psychology students (16 % men, 84% women; M age = 20.23 years, SD = 2.40 years). Flow studies mainly use special populations such as scientists, artists, athletes, creative populations, rock climbers, chess players, basketball players and social dancers as study participants. This study explores the flow experiences of a more representative academic population that does not embody special characteristics often paired with the flow experience, such as creativity. Psychology undergraduates although not a typically representative sample, are possibly more akin to students studying mainstream scientific disciplines, than their artistic counterparts and are potentially more representative of tertiary educational students in general. As autonomy is one of the variables that will be explored in this study and an autonomous profile is more likely due to development in a university population, undergraduates are a suitable population (Guay, Ratelle and Chanal, 2008).

Measures

Flow State Scale

The Event Experience Scale (FSS-2) is a version of the Flow State Scale. This scale is a self report measure which assesses flow experience concerning a particular event in the past, postgraduate studies in this case. The FSS-2 measures Csikszentmihalyi's nine component states of the flow experience: challenge-skill balance; action-awareness merging; clear goals; unambiguous feedback; total concentration on the task at hand; sense of control; loss of self consciousness; transformation of time, and the autotelic experience. The scale was originally developed for flow experience in the sports arena but has been successfully used in educational research. The items will need to be reworded to reflect the academic experience. This has been undertaken before in the study with architectural students and the test still shows construct validity. Students will be required to think of activities which they undertook in the course of their studies that they enjoyed or found significant and complete a 36 item questionnaire on these experiences. Students will then indicate the frequency of these thoughts and experiences by answering items such as, 'I had a strong sense of what I wanted to do,' and, 'My attention was focused entirely on what I was doing.' A five point Likert scale will be used for responses ranging from "1" (never) to "5" (always) (Jackson & Eklund, 2004; Mills & Fullagar, 2008).

The Academic Motivation Scale

'Conclusions and recommendations: From this brief overview of SDT educational studies, we can draqw three main conclusions. First, intrinsic and extrinsic motivation can be reliably assessed with the AMS and SRQ_A, whereas amotivation is assessed solely by the AMS' Guay, Ratelle and Chantal, 2008)

This scale is based on SDT which outlines both types and levels of motivation. It assesses dispositional forms of intrinsic and extrinsic motivation, including amotivation. Intrinsic motivation is operationalized as knowledge, accomplishment and stimulation. Extrinsic motivation is operationalized in the types: identified; introjected; and external. Amotivation does not consist of levels as it is an absence of activity or drive to pursue a behaviour.

The Academic Motivational Scale (AMS) was developed for use with students and consists of 28 response statements addressing the reasons why students go to university. Responses are scored on a seven point Likert scale from very strongly agree to very strongly disagree. Examples of items are, "For the pleasure I experience while surpassing myself in my

studies", and "I don't know; I can't understand what I am doing in school" (Vallerand et al, 1992, 1993).

Manifest Needs Questionnaire

The proposed measurement tool for need for autonomy is a 5-item subscale of this scale Items will be altered for suitability in the educational domain. An example of this is the item, "I try to avoid any added responsibilities on my job or in my studies", which will become, "I try to avoid any added responsibilities in my studies." These items are scored on a seven point Likert scale indicating frequency of experience ranging from the response never to always. In internal consistency was established in the study of Architectural students (Mills & Fullagar, 2008; Steers & Braunstein, 1976).

Procedure

The survey including the three measures was posted on the University of Cape Town's online portal, VULA. An email was addressed to Psychology Postgraduate students for the Department of Psychology at the University of Cape Town. This email outlined the value of understanding flow experiences and encouraged students to participate. An informed consent form was accepted electronically before participation in the survey. Participation was voluntary and anonymous and emails were sent out twice over a two week period to encourage participation. After this period the questionnaires were no longer available for completion.

ETHICAL CONSIDERATIONS

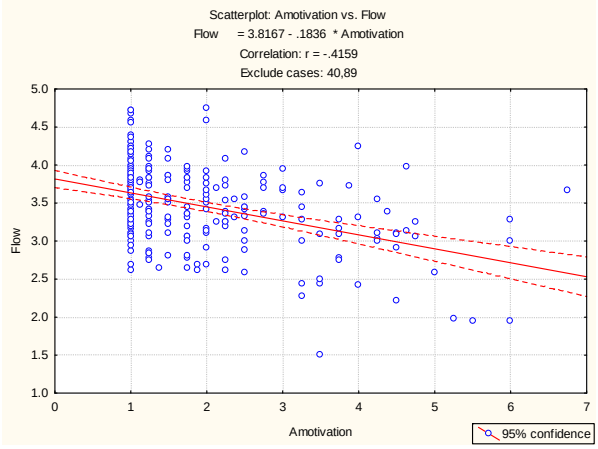
This study is in line with the ethical guidelines as set forth by the Health Professions Council of South Africa for research with human and ethical clearance was obtained from the University of Cape Town (UCT) humanities department. Informed consent was given electronically by participants before taking part in the study. Participant's details and responses were anonymous and confidential and their responses were used for research purposes only. The study did not involve questions other than what would be encountered in normal day to day life.

RESULTS

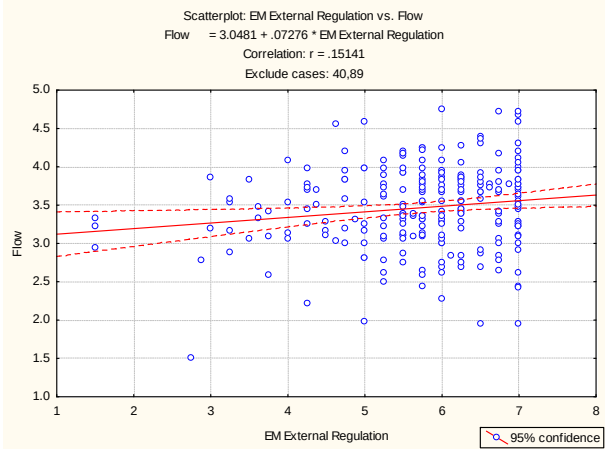
A preliminary inspection of the raw data revealed that it was possible to give more than one response on a Likert scale item. Items that were related on the Likert scale were averaged, such as, 'neither agree nor disagree' and 'slightly agree.' Data with divergent responses such as, 'strongly agree' and 'strongly disagree' were further screened for inconsistent responses. Answers such as 'strongly agree' and 'neither agree nor disagree', to similar items were deemed inconsistent responses. Similar items included items from the flow questionnaire, concerning a course that the participant particularly enjoyed, such as, 'I really enjoyed the experience,' and, 'The experience left me feeling great'. Participants who met the criteria for both inconsistent responses and giving divergent responses on a Likert scale item were excluded. Fourteen cases met these criteria and they were excluded from the sample set leaving 252 participants. As part of the analysis, using a standard predictor for outliers, 9 outliers were identified. Two extreme outliers with standard residual values of greater than -3 (Mahalanobis's D = 6.0, 3.83; Cook's Distance = 0.10, 0.03) were deleted from the dataset respectively, leaving a sample size of 250 participants. The data was relatively linear. On inspecting normality plots, amotivation (p=<.01), the external motivation items (p=<.01), and the intrinsic motivation based on knowledge and on accomplishment (p=<.01) were not normally distributed, but visual inspection did not reveal extreme cases that would case problems in the analysis. The data was also screened for violations of the homoscedascity assumption and the distributions of concern appear in Figure. 2. High intercorrelations can be observed in Table. 1, but the tolerance level is high enough not to violate the assumption of multicolinearity.

Multiple regression analyses was undertaken to examine the relationship between motivation, flow and autonomy. *H1* examines whether flow is more strongly associated with the more self-determined forms of motivation (i.e., intrinsic motivation to know, to accomplish, to experience stimulation, and the most self-determined form of extrinsic motivation). To examine whether the more self-determined types of motivation better explain the variance in flow we computed zero-order correlations. On inspection of the zero-order correlations, intrinsic motivation knowledge (r = .33), intrinsic motivation accomplishment (r = .23), intrinsic motivation stimulation (r = .18), and the most self-determined from of extrinsic motivation (identified) (r = .27), showed significantly positive correlations with flow. Intrinsic motivation and the most self-determined form of extrinsic motivation are positively related to flow. The two least self-determined forms of motivation, extrinsic motivation-introjected (r<.01) and extrinsic motivation by external regulation (r =- .15) show

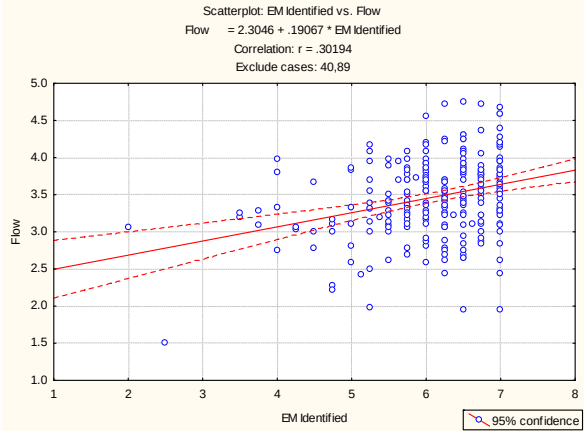
low correlations in comparison. Thus the data seems to support H1, though further analysis will be needed to examine the intricacies of the relationship between motivation and flow.



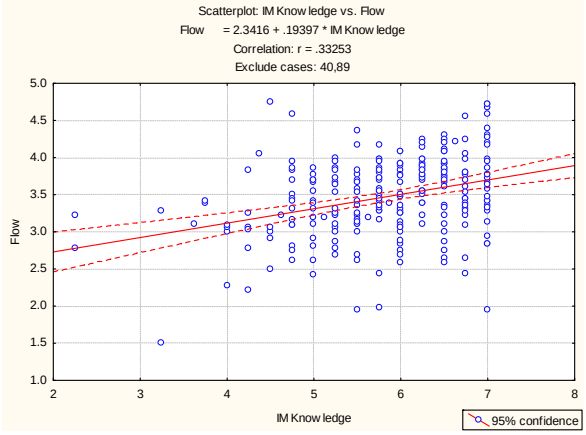
1. Amotivation



2. Extrinsic motivation – external regulation



3. Extrinsic motivation - identified



4. Intrinsic motivation - knowledge

FIGURE 2. *Scatterplots for amotivation, extrinsic motivation – external regulation, extrinsic motivation – identified and, intrinsic motivation – knowledge.*

Evidence for *H2* lies in the significantly strong negative correlation amotivation shows in relation to flow (-.42). Thus *H2* is supported.

H3 explores whether each facet of motivation lying on a self-determination continuum, as postulated by SDT, incrementally adds to the variance explaining flow. We ran a hierarchical regression analysis to test this hypothesis. The motivational types and amotivation where

entered into the equation in order, from the most self-determined type of motivation to the least self determined type, concluding with amotivation. Flow was entered as the dependant variable and results are presented in Table 2. As we proceeded with our hierarchical regression model, we found that the most self-determined type of intrinsic motivation, intrinsic motivation-knowledge ($\Delta R^2 = .11$, ΔF (1, 264) = 1.20, $p < .01$), added significantly to the variance explained in flow. Although the least self-determined types of intrinsic motivation had strong zero order correlations with flow, the variance they added to the explanatory model was negligible and therefore they did not add significantly to the variance explaining flow. This may be because of the high intercorrelation between the intrinsic motivation items, which is as expected as they are measuring similar constructs (intrinsic motivation-knowledge and intrinsic motivation-accomplishment ($r = .57$), intrinsic motivation-knowledge and intrinsic motivation-stimulation ($r = .61$), and intrinsic motivation-accomplishment and intrinsic motivation-stimulation ($r = .52$)). In fact once all the variables are entered into the model, intrinsic motivation no longer explains significant variance in the relationship between motivation and flow. To counteract the high intercorrelations between the intrinsic motivation items we made a composite of the flow scores and entered the intrinsic motivation composite, the extrinsic motivation scores, from the most self-determined type to the least self-determined type and finally amotivation into a hierarchical regression. The entire model accounted for 23% of the variance explained in flow. Intrinsic motivation as a composite accounted for 8% of that variance, with the two most self-determined forms of extrinsic motivation, extrinsic motivation-identified ($\Delta R^2 = .4$, t (2, 247) = 1.20, $p < .01$), and extrinsic motivation introjected ($\Delta R^2 = .03$, t (2, 247) = 2.54, $p < .01$.). The least self-determined form of extrinsic motivation, the externally regulated type, di not contribute significantly to the model, although amotivation did explain significant variance. Amotivation demonstrated a strong negative relationship with flow ($\Delta R^2 = .03$, t (2, 247) = 2.54, $p < .01$.). In the overall model only, the intrinsic motivation composite, the introjected type of extrinsic motivation and amotivation made significant contributions to the variance explained in flow. The most and least self-determined types of extrinsic motivation did not come up significant in the final model. This may also be due to high intercorrelations between the extrinsic motivation items, such as extrinsic motivation- identified and extrinsic motivation- external (R=54), and extrinsic motivation- external and extrinsic motivation-introjected (R=54). The most self-determined type of extrinsic motivation which Vallerand et al. (1992), describe as being very similar to the intrinsic motivational types did not come up significant. This may be due to moderate intercorrelation between the intrinsic motivation

items and the extrinsic motivational type, identified. These intercorrelation values are: Intrinsic motivation-knowledge (*R*=43); intrinsic motivation-accomplishment (*R*=43); and intrinsic motivation-stimulation (*R*=43), respectively. Therefore *H3* is partially supported in that the intrinsic motivational composite did significantly explain variance in its relationship with flow including the extrinsic and amotivation independent variables in the model. The extrinsic motivation items did not add incrementally to the variance explained according to the self-determination continuum, while amotivation significantly explained variance in the relationship. As part of the hierarchical regression after partialling out the effect of the intrinsic motivation composite, we found that extrinsic motivation-introjected and amotivation significantly explained the relationship. Looking at the significance tests as a whole, the zero order correlation, the first hierarchical regression and the intercorrelations between variables, it appears as if each motivational item does explain variance in the relationship with flow. The most self-determined form of extrinsic motivation has a slightly stronger relationship with flow when compared to the less self-determined types of intrinsic motivation and the least self-determined types of extrinsic motivations have very weak relationships with flow. The hierarchical regression may be affected by intercorrelations between the motivation items and therefore does not mirror the effect displayed by the zero order correlations. Overall the strongest effect, taking both hierarchical regressions into account to be results from instrinsic motivation items on flow, intrinsic motivation-knowledge in particular. It is also noteworthy that in the zero-order correlations as well as in the hierarchical regression where each intrinsic motivation item was entered separately that extrinsic motivation-identified displayed a strong relationship with the flow experience. Amotivation displayed the most consistent strong negative relationship with flow.

Finally we look at the need for autonomy as a possible moderator in the relationship between motivation and flow at low, medium and high levels. As with the analysis for *H*1, *H*2 and *H*3, the moderating effect of autonomy was investigated in much the same way as in the architectural study to provide an accurate replication of the study. The facet measurements of intrinsic motivation were computed into one score and centered along with the data for the need for autonomy. In line with the recommendations in Aiken and West (1991) to reduce problems of multicollinearity, as presented in Mills and Fullagar (2008), three regression lines were computed. The mean was subtracted from each score respectively, and the standard deviation was added to obtain a regression line depicting a high value and

Table 3.
Moderated Multiple Regression Results With Need for Autonomy as the Moderator (N=250)

Variable	*B*	*SE*	β	*ΔR2*
Step 1				*.30***
.Intrinsic motivation	*.17*	*.03*	.30**	
Step 2				.02*
Intrinsic motivation				
Need for autonomy				
Step 3				
Intrinsic motivation	.12	.04	.22	
Need for autonomy	.75	.42	.56**	
Intrinsic motivation x need for autonomy	-.10	.08	-.40	

Note. *p<.05. **p<.01.

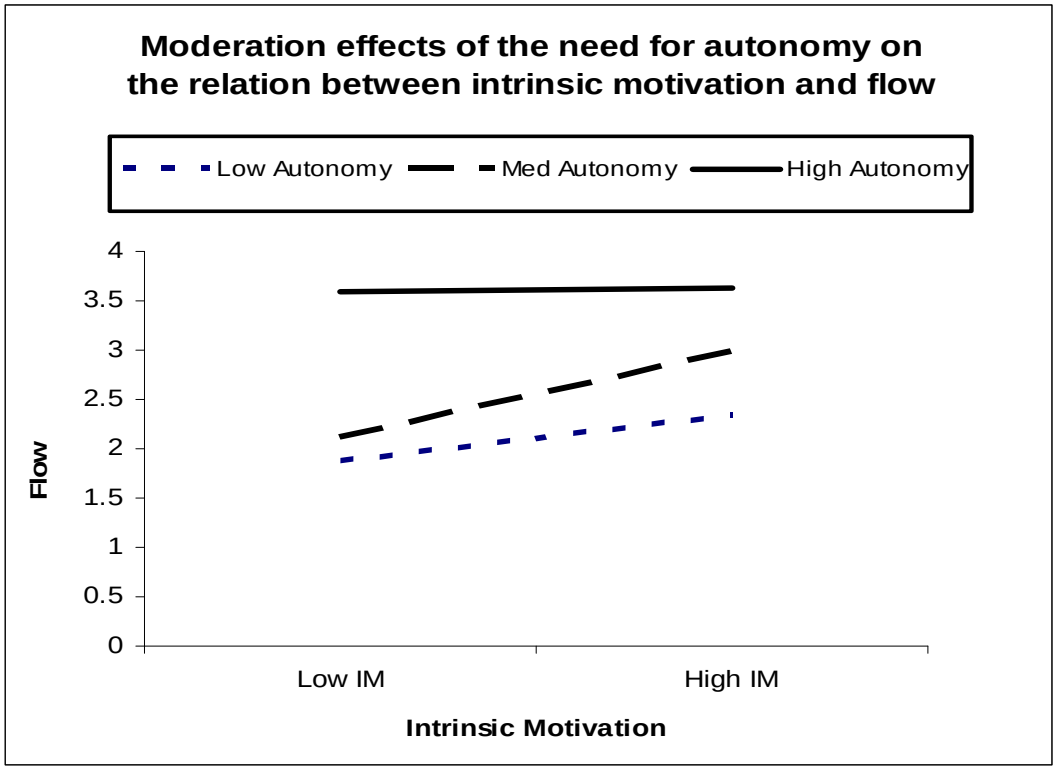


FIGURE 3. Interaction effects of need for autonomy on the relation between intrinsic motivation flow.

subtracted to obtain regression line illustrating a low level of motivation and autonomy. Overall the relationship between flow and intrinsic motivation was not dependent on the perceived need for autonomy. While the moderating relationship was not significant (see Table. 3.), visual inspection of the graph in Figure 3. illustrates a similar relation as reported in the Mills and Fullagar (2008), study for low and medium levels of autonomy. Inspection of the graph shows that, although not significant, the relationship between intrinsic motivation and flow was stronger for a medium need for autonomy than for a low need for autonomy. Unexpectedly, a high need for autonomy did not appear to affect the relationship between motivation and flow, therefore *H4* was not supported.

DISCUSSION

This study examines the relation between motivation and flow in the educational context. A review of over 200 educational studies cited the self-determination continuum as proposed by Ryan, Deci (2000) and Vallerand et al. (1992), as the most suitable way to study motivation in the educational context. Therefore as a starting point, we explored whether flow is more strongly associated with the more self-determined forms of motivation. These are sometimes studied as a composite known as autonomous motivation (Guay, Ratelle, & Chanal, 2008). Autonomous motivation includes intrinsic motivation to know (where the process of learning is enjoyable in itself), intrinsic motivation to accomplish (where the sense of accomplishment is the motivational factor) and intrinsic motivation to experience stimulation (where the sensory excitement the activity induces is the motivational factor). Autonomous motivation also includes the most self-determined form of extrinsic motivation, extrinsic motivation-identified, where an external value is internalised and has motivating potential. On the other hand, controlled motivation is a composite of the least self-determined types of extrinsic motivation. Psychology students who were autonomously motivated experienced more flow than those that exhibited controlled motivation, thus *H1* was supported.

We then looked at whether psychology students who were amotivated had flow experiences. Psychology students who lacked intent and drive (amotivated) were least likely to experience flow in their academic studies, thus our second hypothesis was supported. The outcome of both hypotheses are in line with previous research (Mills & Fullager, 2008).

To explore the relationship between motivation and flow in more depth, we looked at all the motivational types in terms of the self-determination continuum. We investigated whether each facet of motivation incrementally explained the flow experience. This hypothesis also goes towards ascertaining the incremental validity of the academic motivational scale in this context. Testing for incremental validity goes one step further in

establishing the suitability of the instrument than just testing for convergent and discriminant validity (Hunsley & Meyer, 2003). Initially, the most self-determined type of motivation, where the process of learning is a source of satisfaction and the most self-determined type of extrinsic motivation, where an external value is internalised where found to significantly explain flow according to the self-determination continuum. The introjected type of extrinsic motivation and amotivation followed suit, but these individuals experienced flow rarely in comparison to the autonomous forms of motivation. Intrinsic motivation for the satisfaction that the activity brings and intrinsic motivation based on sensory stimulation did not explain flow in our sample until we included them with intrinsic motivation for the love of the process of learning as a composite. Although they did contribute to explaining the flow experience, their contribution was negligible. The Mills and Fullagar study (2008), contrasts this in their finding that intrinsic motivation for the satisfaction that the activity culminates in did result in flow experiences. Varying results in the different analysis point to the fact that motivational facets may overlap, or that the relationship between them may be more complex than current research suggests. Individuals who are intrinsically motivated for the love of learning, congruent with previous research, experience flow most often in their academic studies.

Extrinsic motivation due to outside values that have been internalised also has been shown to result in flow experiences in both our research and previous research (Kowal & Fortier, 2000; Mills & Fullagar, 2008). In the study with swimmers they measured extrinsic motivation as one construct and not in varying levels as with this study. It may be surprising that extrinsic motivation is linked to the flow experience, which is known to be intrinsically motivating, but Vallerand et al. (1992), have pointed out that extrinsic motivation, where a value is internalised, is barely distinguishable from intrinsic motivation. An activity can also be engaged in originally for extrinsic reasons, but can then be experienced as intrinsically rewarding. For instance in a study on leisure states in older individuals, leisure activities chosen for extrinsic reasons were more intrinsically motivating, had a challenge-skill balance more indicative of the flow experience and made the individual feel that they were performing at a higher level than leisure states engaged in purely for intrinsic reasons (Mannell, Zuzanek & Larson, 1988).

Overall *H3* was partially supported in that psychology students who were motivated by the process of learning or who had internalized values experienced flow most often in the course of their studies. In both the architecture study and this one intrinsic motivation due to sensory pleasure was not consistently linked to students experiencing flow. This type of

intrinsic motivation does not seem to play an important part in the educational domain as educational pursuits are unlikely to elicit sensory pleasure. In our study, contrasting with the results found in the architecture study, intrinsic motivation for the satisfaction experienced after the activity did not explain flow experience when compared with the strong relationship that intrinsic motivation for the love of learning had with flow. It is doubtful that psychology students do not experience satisfaction in their studies. It is more probable that this motivational type is very similar to intrinsic motivation-knowledge and therefore does not account for flow experiences over and above what the love for the process of learning does. In contrast, students who studied out of guilt or obligation, because of parents expectations or for a reward, had negligible flow experiences as these reasons contrast with intrinsic motivation that is so strongly linked with flow experiences.

When looking at whether levels of autonomy play a role in the relationship between motivation and flow, contrary to expectations, we found that it did not. Although we used a different population to the architecture students in the Mills and Fullagar (2008) study, the similarity of our results pitched this contrary to expectation. According to SDT and the results of the architecture study the effect that motivation had on flow experiences was expected to depend on how autonomous the student perceived themselves to be. Interestingly in leisure studies, freely chosen leisure activities, in which the individual would perceive themselves to be acting highly autonomously, were not linked substantially with either instrinsic motivation or the flow experience. This may be due to factors operating in our sample which may not have been at play in the sample of architecture students. One possibility is that participation based on a reward will result in being motivated for extrinsic reasons. Psychology students often do work that will ultimately be marked and reflect their competence. Evaluation may undermine their intrinsic reasons for being motivated, but not necessarily hamper the flow experience if the student shares the same values as the institution or the lecturer of their course. Autonomy may also operate in a more complex way than just operating at three levels. For instance in the leisure study, activities that were freely chosen, but extrinsically motivated, were most indicative of high flow experiences as they required effort, commitment and obligation. These conditions seem ripe for the optimal challenge-skill balance that drives the flow experience. Although levels of autonomy did not significantly predict flow experiences, the relationship between intrinsic motivation and flow seemed stronger for a medium need for autonomy than for a low need for autonomy. In Kowal and Fortier's, (2000) study on motivation and flow in swimmers, they found that when the competitive nature of the sport was emphasised, participant's perception of autonomy was

undermined. Psychology faculties take on large numbers of students in the undergraduate years and very few in subsequent postgraduate studies. This may create a competitive atmosphere amongst students, thus undermining their perceived autonomy and differing in levels of perceived autonomy from the group of architecture students. This finding is congruent with previous findings where perceived autonomy did not predict motivation at a contextual level. (Kowal & Fortier, 2000; Mannell, Zuzanek & Larson, 1988; Stein, Kimiecik, Daniels & Jackson, 1995)

The Mills and Fullagar study (2008), explored the relationship between motivation and flow in architecture students as they are a creative population that work long hours. Architecture studies have a high potential to be engaging and motivating, and therefore have high flow potential. This is typical of many flow studies where special populations such as scientists, artists, athletes, creative populations, rock climbers, chess players, basketball players and social dancers are likely study participants. This study explores the flow experiences of a more representative academic population that does not embody special characteristics often paired with the flow experience, such as creativity. Psychology undergraduates although not a typically representative sample, are possibly more akin to students studying mainstream scientific disciplines, than their artistic counterparts and are potentially more representative of tertiary educational students in general. Our findings are remarkably similar to the results obtained in the study on architectural student's flow experiences. This is a significant finding in itself since although Czikszentmihalyi (1999), states that a vast array of activities have flow potential, researchers expect flow to be more likely in special populations. This study illustrates that psychology students and perhaps others in the educational domain can experience flow as part of their work or studies.

LIMITATIONS

Due to the small sample size and specificity of participants, results my not be generalizable to other academic contexts. However, in comparison to studies measuring the constructs of motivation and flow, this sample is the most generalizable to academic contexts. The sample was also predominantly female, which may have created biased results. Self report questionnaires are also susceptible to bias although data was scanned for inconsistent results.

DIRECTIONS FOR FUTURE RESEARCH

Autonomy, competence and relatedness, the psychological antecedents of the flow experience may show more pronounced relationships with the flow experience, if measured as state

traits. Flow itself is a situation-specific experience and therefore dispositional measures of flow antecedents as used in this study and the architecture study may not be the most apt ways to measure these contructs (Stein, Kimiecik, Daniels & Jackson, 1995). More research needs to be done on motivation and flow in the educational context, especially in populations more representative of universities and schools. Currently flow research uses the experience sampling method where participant are interrupted during an activity by means of a beeper. This is an ingenious way to measure a situation specific construct and bypasses the limited recall that participants may have of past experiences.

IMPLICATIONS AND CONCLUSION

The motivational types outlined in this study such as the various forms of intrinsic motivation and the most self-determined form of extrinsic motivation are associated with optimal functioning. States of enjoyment, satisfaction, concentration and control are indicative of the flow experience unlike boredom, apathy and anxiety. The less self-determined forms of motivation are associated with negative functioning What is also encouraging is that the most self-determined type of extrinsic motivation is highly correlated with the flow experience. This means that positive outcomes are also linked to internalized values that were not previously associated with the self. Lecturers and professors can therefore successfully motivate students and mentor them by sharing and inculcating values into students. These students although not originally intrinsically motivated can still have optimal academic experiences that are linked to successful school completion and many other positive educational outcomes. (Stein, Kimiecik, Daniels & Jackson, 1995; Guay, Ratelle and Chanal, 2008).

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Appendix A

Email, sent out to students asking for their participation:

Dear Student,

How do we achieve the optimal academic experience? Why do some lose all track of time and self-consciousness while doing their studies and others don't? You can gain one SRPP point and contribute towards research on the optimal academic experience by filling out a 30 minute questionnaire at https://vula.uct.ac.za/direct/eval-assigngroup/729. Questions are about your experience at university and answers are anonymous. Your participation will go towards research on factors determining academic success.

There are no written answers required and your input would be greatly appreciated.

Please complete this by 2026/10/09 12:00:00 AM at the latest.

To fill in the evaluation, go to:

https://vula.uct.ac.za/direct/eval-assigngroup/729

or:

1. Login to Vula at https://vula.uct.ac.za/portal

2. Click on the site tab for PSY1001W, 2009

3. Click on "Course Evaluation"

4. Click on "PSY1001W, 2009" link under "Optimal Experience in Academic Work Questionnaire"

If you have any problems completing the evaluation, please email zaraalyssa@gmail.com.

If you would like to know more about the study or have queries regarding your SRPP points please contact me at zaraalyssa@gmail.com.

Regards,

Zara Vorwerk

Psychology Honours Student

zaraalyssa@gmail.com

Appendix B

Introduction to online study:

A few minutes of your time will further our understanding of how motivation and optimal experience in academic studies are linked. Your answers could help us to understand why when some become involved in their studies they loss track of time and do it purely for enjoyment and others do not. Whatever your experience it would greatly contribute to finding out how studying can be a more enjoyable experience.

Your participation would be greatly appreciated and can help to outline the factors that contribute towards academic success.

What happens in the study?

While participating:

You will be asked about your experience during academic work.
There will be no written answers, just click the box that best matches your experience.
The process should take no longer than 30 minutes.
Your responses are anonymous and confidential.

I have read and understand the above details outlining the purposes of the study. I understand that my participation is entirely voluntary and that I am free to leave at any time. I understand that I do not have to answer anything which makes me feel uncomfortable.

If you decide to participate in this study and have read the above and understood it, then please select, ‘I accept.’

PLAGIARISM DECLARATION

1. I know that plagiarism is wrong. Plagiarism is to use another's work and pretend that it is my own.
2. I have used the APA referencing guide for citation and referencing. Each contribution to, and quotation in this essay/report/project/……. from the work(s) of other people has been contributed, and has been cited and referenced.
3. This essay/report/project/ ……. is my own work.
4. I have not allowed, and will not allow, anyone to copy my work.

Signature: _____

Date: 29 October 2009