

**Examining Student Engagement as a Mediator Between Academic Intrinsic Motivation
and Academic Performance**

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PSB3E-BT15: Bachelor Thesis

Group 10

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June 21, 2024

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Abstract

As undergraduate graduation rates continue to remain low in the Netherlands, the need to deepen our understanding of what predicts academic success beyond the Grade Point Average (GPA) has become apparent. Rather than relying solely on GPA as an admissions criterion, researchers have highlighted the potential in investigating the predictive power of psychosocial factors, such as intrinsic motivation and engagement to predict academic success. Previous research has already identified that intrinsic motivation is positively associated with academic performance, but whether engagement mediates this relationship still remains unanswered. This paper aims to examine whether and how student engagement acts as a mediator in the relationship between academic intrinsic motivation and academic performance. We postulate that academic intrinsic motivation is positively related to student engagement, which in turn is positively related to academic performance, thus mediating this relationship. We investigate this relationship by utilising a convenience sample of Dutch Psychology students and cross-sectional survey design. Our sample consists of 653 participants, of whom around 70% were of Dutch or German nationality. Our findings do not support our mediation model, and in doing so indicate the possibility of further variables moderating the relationship between academic intrinsic motivation and academic performance. Specifically, our findings suggest that student engagement does not mediate the relationship between academic intrinsic motivation and academic performance. We discuss the theoretical and practical implications of our findings for promoting academic success.

Keywords: academic intrinsic motivation, academic performance, student engagement

Examining Student Engagement as a Mediator Between Academic Intrinsic Motivation and Academic Performance

According to the Organisation for Economic Co-operation and Development (OECD) undergraduate graduation rates continue to remain low at a staggering 71 percent as of 2022 (Organisation for Economic Co-operation and Development, 2022, Focus on tertiary education, para. 3). This raises the question whether commonly used admission criteria such as Grade Point Averages (GPA) and standardised aptitude tests suffice in predicting student success. Some researchers have highlighted the importance of investigating the role psychosocial factors may play in predicting academic performance. Nonetheless, there is a research gap that currently exists in the field of educational psychology regarding the predictive power of psychosocial factors in predicting academic performance (Martinez et al, 2019). The purpose of this study is to begin to fill this gap by examining student engagement and academic intrinsic motivation in relation to predicting academic performance. Academic performance among students in academic and higher vocational education is commonly expressed by the Grade Point Average (GPA). This score consists of the mean of grades from weighted courses (Richardson et al., 2012). Predicting academic performance is of great significance for students and parents (Cabrera & La Nasa, 2000), educational institutions (Adelman, 2006) and policy makers (Hauser & Johnston) alike, not only as a tool for college admissions, but as a means to predict graduate employment and occupational status (Strenze, 2007).

Previous research has already identified that intrinsic motivation is positively associated with academic performance, such that the more intrinsically motivated the student, the better the academic performance (Khalaila, 2015). A positive association has also been established between engagement and academic performance (Schaufeli et al., 2002), as well as between motivation and engagement (Singh et al., 2022). Moreover,

engagement has been found to mediate the relationship between intrinsic motivation and science achievement (Lee et al., 2016).

While Lee et al. suggest engagement to mediate the relationship between intrinsic motivation and science achievement, the question still remains as to whether student engagement also mediates the relationship between academic intrinsic motivation and academic performance. In the present research we aim to gain a deeper understanding of the relationship between academic intrinsic motivation and academic performance by investigating engagement as a potential mediator.

Intrinsic Motivation

Intrinsic motivation refers to behaviours that are performed out of interest and for the purpose of self-competence and fulfillment. The term originates from self-determination theory, which posits that motivation can be differentiated into intrinsic and extrinsic motivational subtypes. It follows that intrinsically motivated behaviours are inherently volitional and autonomous, while extrinsically motivated behaviours, thus behaviours motivated by external outcomes, can be both autonomous or controlled (Ryan et al., 2017). In the academic context, intrinsic motivation manifests itself in students finding meaning in their academic activities and seeking learning opportunities beyond what is compulsory. Extrinsically motivated students on the other hand may opt to complete academic task in order to achieve good grades (Kotera et al., 2021). Research has identified that intrinsic motivation is associated with meaningfulness (Utvær, 2014), increased academic performance (Khalaila, 2015), wellbeing (Bailey & Phillips, 2016) and life satisfaction (Locke & Latham, 2004).

Intrinsic Motivation and Academic Performance

Research has found that intrinsic motivation is associated with better academic performance, such that the more intrinsically motivated the student, the better the academic

performance (Khalaila, 2015). Indeed, intrinsically motivated students find meaning in their academic activities and pursue learning opportunities beyond the classroom (Kotera et al., 2021). In comparison to extrinsically motivated students, intrinsically motivated individuals tend to be more persistent in overcoming challenges and reaching academic success (Adamma et al., 2018).

Mediating Role of Engagement

Engagement is defined as a positive state of fulfillment (Hallberg & Schaufeli, 2006), in which an individual displays strong identification and enthusiasm for the task at hand (Bakker et al., 2008; Maslach et al., 2001) and puts in the work to successfully pursue academic activities (Singh et al., 2022). Engagement can be further conceptualised as a tripartite construct, encompassing vigour, dedication and absorption. The term vigour refers to mental flexibility, resoluteness and willingness to put in effort in order to achieve one's goals. Dedication refers to being committed to - and experiencing meaning and enthusiasm for one's tasks. The term absorption highlights the experience of complete immersion in one's task, in which individuals will often have trouble disengaging from their task and lose their sense of time (Schaufeli et al., 2002).

Previous research has found engagement to be positively associated with academic performance, such that engaged students are more academically involved and successful (Schaufeli et al., 2002). Furthermore, a study by Martinez et al. identified engagement as a potential predictor of academic performance. Specifically, they showed that engagement promotes the building of psychological resources, which in turn facilitates academic performance (Martinez et al., 2019). Not only does engagement promote academic performance, but research has identified a cyclical quality to learning, such that this increased academic performance further promotes engagement (Wäschle et al., 2014).

However, while there has been empirical support for the presence of a positive association between engagement and academic performance, some studies have produced results that showed this relationship to be non-significant (Lei et al., 2018). For instance, a study produced a non-significant correlation between the emotional engagement of students and their English and Math achievement (Shernoff, 2010). Moreover, another study found the correlation between cognitive engagement and academic achievement to be weak (Appleton et al., 2006). These conflicting findings are further exemplified a study highlighting that student engagement did not predict the GPA in African-Americans (Shernoff & Schmidt, 2008). As research findings on the relationship between student engagement and academic performance remain ambiguous, this leaves said relationship open to further investigation. Researchers point to the use of small samples and lack of meta-analyses in an attempt to explain this inconsistency in research findings (Lei et al., 2018).

Further findings suggest the presence of a positive association between academic motivation and engagement and found student motivation to be an antecedent of student engagement. Specifically, positive components of motivation are adaptive and positively related to engagement, whereas negative components of motivation are maladaptive and negatively related to engagement (Singh et al, 2022). A case study revealed that academic intrinsic motivation specifically may assist engagement in learning activities, such that intrinsically motivated students are more engaged and learn better (Saeed & Zyngier, 2012), yet further research is necessary to confirm this.

Interestingly, research has already shown that engagement takes on a mediating role in the relationship between intrinsic motivation and science achievement. However, the proposed mediation model focuses only on science achievement as an indicator of achievement and does not include different indicators of achievement (Lee et al, 2016). The potential mediating effect of engagement on the relationship between intrinsic motivation

and academic performance as broader construct still remains open to further empirical examination which will be reflected in the present research.

This study aims to gain a deeper understanding of the relationship between academic intrinsic motivation and academic performance by introducing student engagement into the model. We propose that student engagement plays a mediating role between academic intrinsic motivation and academic performance. We hypothesise that the effect of academic intrinsic motivation on academic performance is mediated by student engagement, such that academic intrinsic motivation is positively related to student engagement which in turn is positively related to academic performance. By adding student engagement as a mediating variable to our model, we expand on a novel mechanism in the field of educational psychology. We use a convenience sample and a cross-sectional survey in order to accomplish the aims of our study. The independent variable is defined as academic intrinsic motivation and the dependent variable is defined as academic performance.

Method

Participants

The present study utilised a cross-sectional research design. The participants were obtained via a convenience sample which consisted of $n = 742$ Psychology students at the University of Groningen in the Netherlands. A total of 89 participants were excluded from the sample in sequential steps for various reasons, namely not fully completing the survey ($n = 74$), failing the instructed response items ($n = 12$), admitting to not have answered honestly ($n = 2$), or reporting an insufficient English level ($n = 1$). The final total sample pool ($n = 653$) consisted of 25.3% men ($n = 165$), 74.4% women ($n = 486$), and 0.3% of participants who preferred not to state their biological sex as assigned at birth ($n = 2$). The mean age of the participants was 20, ranging from 17 to 35. The nationalities were distributed as follows: 52.5% were Dutch ($n = 343$), 21.5% were German ($n = 140$), and 26% were of another

nationality (n = 170). The highest level of education obtained was indicated based on the International Standard Classification of Education (ISCED), where 87.4% of participants (n = 571) achieved upper secondary education or Highschool, 0.9% achieved post-secondary vocational education (n = 6), 1.7% achieved short cycle higher education (n = 1), 5.1% held a Bachelor's degree (n = 33), 0.3% held a Master's degree (n = 2) and 4.6% were unsure of their education level (n = 30).

Measures

Academic Intrinsic Motivation

The variable of academic intrinsic motivation was assessed by utilising certain items from the subscales of the 28-item self-perceived Academic Motivation Scale, namely items intrinsic motivation to know, to experience stimulation and toward accomplishment (Vallerand et al., 1992). Since we investigated academic intrinsic motivation as a unitary concept, all items of the three mentioned subscales were used, resulting in 12 items. The scores of all items were computed into one final mean score in accordance with research conducted by Nawa & Yamagishi (2021). The scale questions the participants about why they attend university or college and provides them with different statements. An example of an item is 'Because I experience pleasure and satisfaction while learning new things'. The participants were asked to rate statements using seven-item Likert scales, spanning from 1 (does not correspond at all), 2 (corresponds very little), 3 (corresponds a little), 4 (corresponds moderately), 5 (corresponds enough), 6 (corresponds a lot) and finally, 7 (corresponds exactly). In the current sample, the items used demonstrated high internal consistency reliability ($\alpha = .85$).

Engagement

We measured engagement using all items of the nine-item self-report scale The Utrecht Work Engagement Scale for Students (UWES-9S) by Carmona-Halty et al. (2019).

The questionnaire includes three aspects of engagement, namely vigour, dedication and absorption. Despite its three-factor composition, the scale has been reported to hold appropriate psychometric properties. The participants were provided with statements such as ‘When I’m doing my work as a student, I feel bursting with energy’. Their responses were measured on a seven-item Likert-type scale, which ranged from 0 (never) to 6 (always/every day), with the middle points being 1 (almost never/ a few times a year or less), 2 (rarely, once a month), 3 (sometimes/a few times a month), 4 (often/ once a week), 5 (very often/ a few times a week). The UWES-9S showed high reliability in our sample ($\alpha = .91$).

Academic Achievement

To measure Academic Achievement, we used the *Grade Point Average* (GPA) of the Psychology students of the University of Groningen by gaining access to students' grades obtained in the current study year. The GPA ranged from 1 to 10 (1 being the lowest grade and 10 being the highest grade, with a minimum passing grade of 5.5).

Procedure

The ethical committee of the Faculty of Behavioural and Social Sciences approved the study at the University of Groningen. Through the use of archival data, the survey was performed using an online questionnaire via Qualtrics, which was presented to participants in English. We recruited participants through advertisements placed on campus and various social media platforms such as WhatsApp as well as via the first-year SONA-practicum pool. All participants' involvement in this research was voluntary, and they had the right to refuse to partake in the study at any time. Furthermore, participants who were part of the SONA-practicum pool received SONA credits as compensation, while those who were not received financial compensation for their participation. The completion of the survey took approximately 20 minutes. Prior to the start of the survey, participants were informed about

the goal of the study, the procedure and the consequences of participating in this study.

Furthermore, they were informed about the confidentiality of their data and their right to an informed consent.

Participants responded to several components of the survey starting with demographic questions regarding their study year, biological sex as assigned at birth, nationality, and highest completed level of education. The next part of the survey focused on cognitive, motivational and behavioural aspects related to academic performance including engagement and academic intrinsic motivation via the two previously mentioned questionnaires. In addition to our two questionnaires, the archival data also included other questionnaires such as the Five-Dimensional Curiosity Scale (Kashdan et al., 2018). Subsequently, we asked some additional questions about mental health diagnoses as well as medication and substance use. At the end of the survey, we asked participants to indicate if they had completed the survey truthfully and with a thorough understanding of the English language, gave them the opportunity to leave a comment and debriefed them.

Design and Statistical Data Analysis

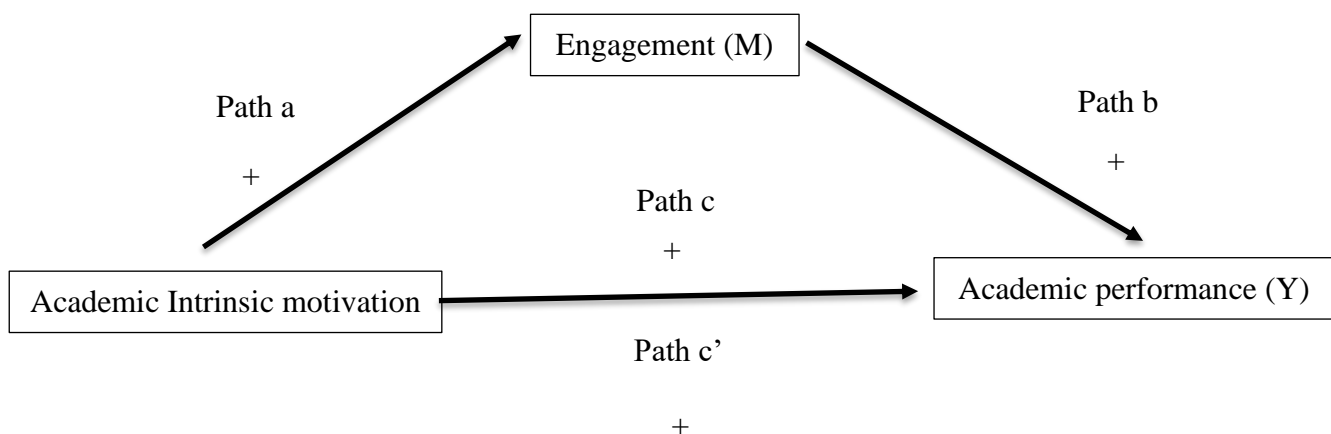
We performed the statistical data analyses using the 29th version of the IBM Statistical Package for the Social Sciences (SPSS). Our mediation model consisted of academic intrinsic motivation as a predictor variable, academic performance as an outcome variable and student engagement as a mediating variable between the two.

Before the data analysis, we performed the mediation assumption checks necessary when using PROCESS for SPSS, see the preliminary analysis for further details. Furthermore, we utilised the heteroscedasticity consistent regression estimate by Davidson-MacKinnon as performed by Garcia Pimenta et al. (2024). Once the assumption checks were supported, the mediation analysis was initiated.

Initially, direct mediation was performed via PROCESS by utilising the bootstrap method with a 95% confidence interval (Hayes, 2022). Moreover, all analyses used a two-tailed significance ($\alpha = .05$). In total, the effect sizes for three mediation effects were reported (see Figure 1). Firstly, the indirect effect ab was tested which required 5000 bootstrap resamples. Path a indicated the significant correlation between academic intrinsic motivation and engagement, whereas path b stood for the significant association between engagement and academic performance. Secondly, the direct effect of the association between academic intrinsic motivation and academic performance via path c was performed. Lastly, the total effect of path c' was tested, taking into consideration both the indirect and the direct path. In order to gain further insight into the previously mentioned mediation effects, each simple linear regression between both academic intrinsic motivation and academic performance, engagement and achievement, as well as between academic intrinsic motivation and engagement was reported. Finally, a simple linear regression was performed between engagement and the demographic variables. In case of significant correlations, possible explanations of these were explored through a correlation analysis.

Figure 1

The Mediation Model with Engagement as a Mediator in the Relationship between Academic Intrinsic Motivation and Academic Performance including paths, with '+' Indicating Positive Correlation



Results

Preliminary Analysis

As some participants' data on GPA were missing ($n = 58$), we thus attempted to replace these missing data via multiple imputation. We evaluated the missing data using a graphical assessment of the Chi square versus Mahalanobis distance plot (see Appendix A, Figure 1A), as well as the non-random missingness of the data, as shown by the significant Little's MCAR test (Arifin, 2015). Since approximately 10% of the GPA data was missing, 10 imputations were computed for each missing score, ranging from 1 to 10. In addition, we used other significant predictors of GPA, namely age and social curiosity to perform the computation. In total, 580 GPA scores were computed and separated into 10 different imputed samples. All computed GPA scores showed a pooled mean of 6.77, which is identical to the mean of the obtained GPA scores. Thus, the computed GPA scores seem to accurately mimic the original data. We then chose a random sample out of the computed samples to perform the data analysis. We performed statistical analyses on both the original and a random imputed dataset, which produced similar results in both cases, thus highlighting that our findings were not impacted by missing data.

After obtaining our final dataset, we checked that the mediation assumptions when using PROCESS for SPSS were met. Specifically, we tested for homoscedasticity, normality, linearity, independence of residuals, outliers and a non-significant interaction of predictor and mediator. We obtained a scatterplot that indicated that the residuals were equally distributed, which shows that the homoscedasticity assumption was also met (see Appendix A, Figure 2A). In testing for normality, we obtained PP-plots that followed a straight line, indicating that the normality assumption was met (see Appendix A, Figure 3A). Furthermore, the test for linearity was significant against the .05 cut-off score, highlighting the presence of linearity between academic intrinsic motivation and academic performance,

as well as student engagement and academic performance. In addition, we obtained a Durbin-Watson statistic of 1.959, indicating independence of the regressors. A Cook's distance value below 1 identified the absence of any outliers or influential observations. Moreover, no significant relation was to be found between the mediator and the predictor (see Appendix B, Table 1B). As none of the above-mentioned assumptions were violated, we can conclude that our results are meaningful.

An initial descriptive analysis revealed the means and standard deviations of all three variables, as well as the correlations between the variables and p-values (see Table 1). The correlation between the variables, respectively, was significant, and ranges from weak to strong correlations. Specifically, analyses revealed a significant and weak positive correlation between academic intrinsic motivation and academic performance, $r = .133$, $p < .001$. Moreover, there is a significant, strong positive correlation between academic intrinsic motivation and student engagement, $r = .623$, $p < .001$. Student engagement and academic performance show a significant and weak positive correlation, $r = .107$, $p = .006$.

Table 1

*Pearson (r) Correlations, p-values and Descriptive Statistics
of Academic Intrinsic Motivation, Engagement, and
Academic Performance*

Variable	<i>M</i>	<i>SD</i>	1. IM	2. UWES	3. GPA
1. IM	4.74	.94			
<i>r</i>					.133
<i>p</i>					< .001
2. UWES	4.65	.94			
<i>r</i>			.62		
<i>p</i>			< .001		

Table 1 (continued)

Variable	<i>M</i>	<i>SD</i>	1. IM	2. UWES	3. GPA
3. GPA	6.78	1.17			
<i>r</i>				.107	
<i>p</i>				.006	

Note. N = 653, M = mean, SD = standard deviation, GPA = Grade Point Average, UWES = Utrecht Work Engagement Scale for Students, IM = Intrinsic Motivation Subscale of Academic Motivation Scale

Hypothesis Analysis

We tested our hypothesis of interest, namely that student engagement mediates the relationship between academic intrinsic motivation and academic performance, through multiple steps. We conducted a simple mediation analysis using ordinary least squares path analyses (PROCESS Macro for SPSS, 2013) via the bootstrapping method to test for the direct, indirect and total effects of student engagement on the relationship between academic intrinsic motivation and academic performance. Our analyses revealed a statistically significant total effect ($B = 0.166$, $SE = 0.048$, $t = 3.496$, $p = 0.001$, $CI = [0.073, 0.259]$, $c_{cs} = 0.133$), indicating that academic intrinsic motivation has a significant positive effect on GPA/academic performance (path c). Moreover, we found the indirect effect of academic intrinsic motivation on academic performance via student engagement to be non-significant, as the confidence interval we obtained included zero, $B = 0.032$, $Boot SE = 0.040$, $CI = [-0.050, 0.109]$. Thus, we did not find support for our mediation hypothesis that student engagement mediates the relationship between academic intrinsic motivation and academic performance.

The non-significant indirect effect may be explained by the non-significance of the direct effect of student engagement on academic performance (path b), $B = 0.051$, $Boot SE =$

0.065, $CI = [-0.077, 0.178]$, indicating that student engagement does not have a significant unique effect on academic performance. Consequently, the remaining variance to be explained between student engagement and academic performance may be subject to the interference of further variables and more complex than previously anticipated.

Discussion

This study aimed to examine whether and how student engagement acts as a mediator in the relationship between academic intrinsic motivation and academic performance. We hypothesised that academic intrinsic motivation is positively related to student engagement, which in turn is positively related to academic performance, thus mediating this relationship. We did not find empirical support for our mediation hypothesis. Our findings suggest that students' engagement did not affect the relationship between academic intrinsic motivation and academic performance, however, students higher in academic intrinsic motivation did achieve greater academic performance.

There are a number of possible explanations as to why we did not find support for our mediation hypothesis in our study. For instance, gender may have acted as a moderator in the relationship between student engagement and academic performance or in the relationship between academic intrinsic motivation and academic performance. Previous research has identified that gender may influence the relationship between engagement and academic performance. Specifically, gender appears to be a significant moderator in the relationship between behavioural and cognitive engagement and academic performance, with females showing larger effect sizes than males. Namely, the more female participants were in the sample, the stronger the correlations between engagement and academic performance. Conversely, the more male participants in the sample, the weaker the correlations were (Lei et al., 2018). Furthermore, research points to gender differences also being at play in regards to academic intrinsic motivation and academic performance.

Accordingly, research findings suggest male students report higher levels of intrinsic motivation and lower academic performance, as compared to female students who report lower levels of intrinsic motivation and higher academic performance (Wu et al, 2020). However, another study suggests that females show higher levels of intrinsic motivation as do males, whereas males show higher level of extrinsic motivation than females do (Adamma et al., 2018). While findings remain ambiguous, it was not a goal of our study to understand the intricacies of these gender differences, thus further research on gender differences regarding academic intrinsic motivation, student engagement and academic performance is necessary.

In addition, the method in which student engagement was reported in our study may have moderated the relationship between student engagement and academic performance. We investigated student engagement using self-report measures in our study and obtained non-significant direct effect of student engagement on academic performance. Indeed, previous research has found other-reported engagement to produce significantly larger effect sizes than self-reported engagement in the relationship between student engagement and academic performance (Lei et al., 2018). Consequently, if we had made use of other-reported engagement measures, our findings may have produced larger effect sizes for the relationship between student engagement and academic performance. Given that our study used self-report measures and our sample held an overrepresentation of female participants, it is reasonable to suspect these two factors to interfere in the relationship between student engagement and academic performance.

The relationship between student engagement and academic performance may be subject to further moderators, such as social support and the competence of lecturers. Indeed, it has been shown that the lecturer's competence and social support moderate the relationship between engagement and student academic achievement. Specifically, this finding suggests

that students visiting classes held by competent lecturers and receiving social support show a stronger relationship between academic engagement and academic achievement (Ruhendi & Marta, 2022).

Another possible explanation for our findings lies in the proposition that engagement is a multi-dimensional rather than a unidimensional construct. In order to effectively capture engagement as a construct, some researchers emphasise the importance of a multicomponent model of engagement, including cognitive related skills such as study skills (Moreira et al., 2013). We included three aspects of engagement, namely vigour, dedication and absorption to measure student engagement in our study. However, we failed to integrate students' behaviours, emotions and cognitions related to school, as well as academic related skills such as study skills as proposed by Moreira et al. Our lack of use of a multi-dimensional approach to student engagement may have hindered an effective conceptualisation of the construct.

Our research findings bear a number of theoretical implications. We were unable to identify student engagement as a mediator in the relationship between academic intrinsic motivation and academic performance. Furthermore, we identified the effect of student engagement on academic performance while controlling for academic intrinsic motivation to be non-significant. This adds additional complexity to the relationship between academic intrinsic motivation and academic performance, requiring additional investigation and research. Nonetheless, our findings add to the literature not only by identifying the presence of this added complexity, but may also instigate revisions of pre-existing theories such as the hypothesis that engagement is positively associated with academic performance (Schaufeli et al., 2002; Wäschle et al., 2014). Our findings suggest the absence of a positive association between student engagement and academic performance when accounting for academic intrinsic motivation. This reduces some of the ambiguity regarding the relationship between

student engagement and academic performance that currently exists in the field (Lei et al., 2018).

Beyond their theoretical constructs, our research findings can also provide more practical applications, for example in policy making. Although our study did not conclusively show that student engagement affects the relationship between academic intrinsic motivation on academic performance, our results still offer support for the hypothesis that academic intrinsic motivation increases academic performance. This can be a valuable insight for policy makers looking to increase graduation rates in undergraduate students. By directly targeting students' academic intrinsic motivation through educational programmes, policy makers may be able to increase students' sense of interest and fulfillment with their studies and thus their academic success. Consequently, policy makers should be encouraged to develop programmes that directly target the fostering of students' academic intrinsic motivation. In doing so, this would allow an increase in students' academic performance, thus increasing graduation rates. This sense of academic intrinsic motivation in students may be nourished by providing resources such as coaching services or mentorship programmes to students over the course of their studies. In order to foster students' academic intrinsic motivation in the long-term, students should be encouraged by teaching staff to develop and maintain a goal-oriented mindset with set targets, build competences and curiosity.

Limitations and Future Directions

This study has a number of limitations. As this study used a convenience sample, our findings can only be generalised to similar populations of Psychology students and are not generalisable to populations beyond that. Moreover, our sample held an overrepresentation of female participants, and our participants came from predominantly Western backgrounds, with roughly 70% of our participants being of Dutch or German nationality. Furthermore, as

a consequence of this predominance of Dutch and German nationals in our sample, most of our study participants were non-native English speakers. An adequate level of understanding of the English language is an entry requirement for English-taught Psychology Bachelors in the Netherlands. Furthermore, we asked participants to indicate whether they had a sufficient level of understanding of the English language to complete the survey. Nonetheless, bias may have been introduced into our data collection through participants' lacking introspective abilities regarding their language understanding, or their false interpretations of survey items. Besides this language barrier, participants may have differed in how they interpreted the survey items. In addition, our study design was correlational, thus causation cannot be established. Finally, our current findings were obtained via self-report measures. This potentially contributed a number of biases. Participants may have answered out of conforming to social norms rather than speaking their truth. It is also possible that participants lacked introspective abilities and were unable to represent themselves accurately.

Under the necessary financial means, future research could utilise simple random samples to obtain more representative findings. In order to establish causation, this area of research could benefit from utilising an experimental design - if ethically sound - in future research, as well as longitudinal designs. We propose future research to utilise more diverse samples to obtain more representative results, encompassing a wider range of demographic backgrounds. Ideally these samples should arise from contexts that are not predominantly Western, educated, industrialised, rich and democratic. Moreover, it would be of benefit for future research to replicate our findings using native speakers as participants. Instead of utilising self-report measures, it would be advisable to focus on directly observable behaviour.

Conclusion

The goal of this study was to investigate the role of student engagement as a potential mediator in the relationship between academic intrinsic motivation and academic performance. We did not find empirical support for our mediation hypothesis, with our findings suggesting that student engagement does not mediate the relationship between academic intrinsic motivation and academic performance. We were unable to make further progress in understanding what might potentially mediate the relationship between academic intrinsic motivation and academic performance. Nonetheless, our findings identified the possibility of further variables moderating the relationship between academic intrinsic motivation and academic performance and reduce some of the ambiguity regarding the relationship between student engagement and academic performance that currently exists in the field. It remains to be known whether and how potential moderators may influence the relationship between student engagement and academic performance. This area of research would benefit from additional studies to further understand the impacts of student engagement on the relationship between academic intrinsic motivation and academic performance. In closing, our findings do indicate support for the hypothesis that academic intrinsic motivation increases academic performance which may be of benefit for policy makers to develop programmes directly targeting students' academic intrinsic motivation to increase academic success, consequently increasing graduation rates.

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Appendix A

Figure 1A

Chi Square on Y-Axis and Mahalanobis Distance on X-Axis

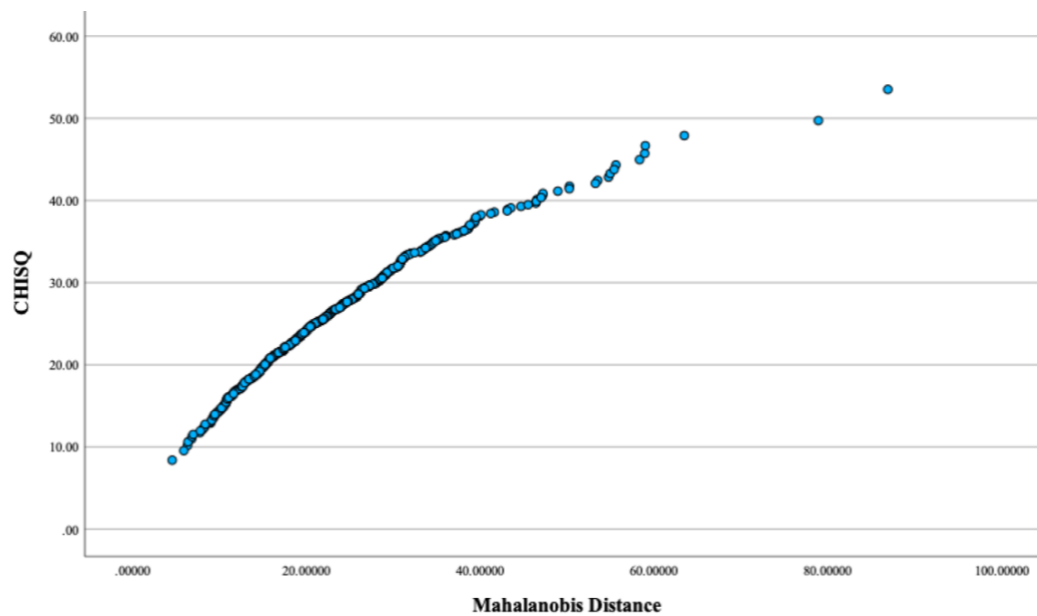


Figure 2A

Scatterplot of Standardized Residuals on Y-Axis and Standardized Predicted Values on X-Axis

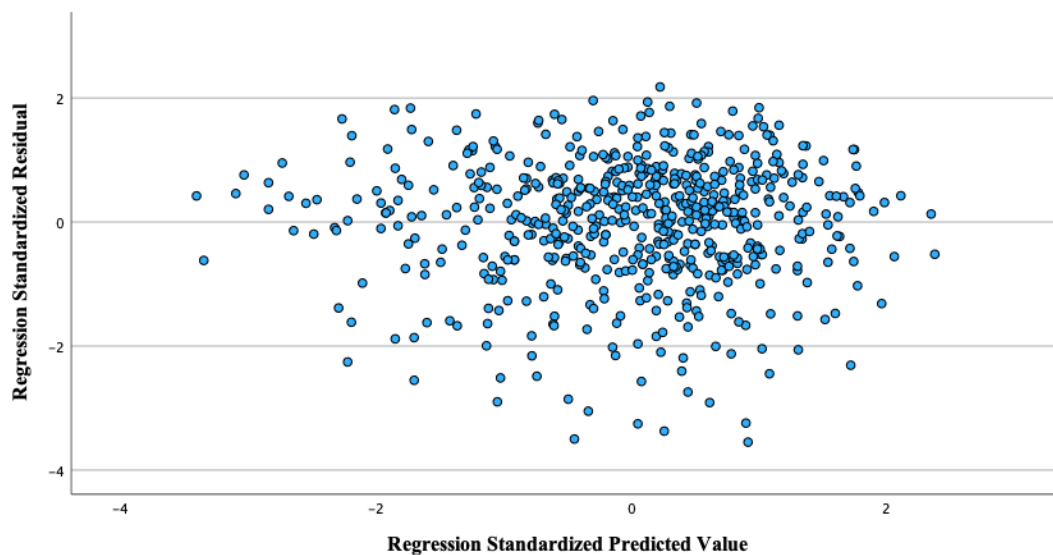
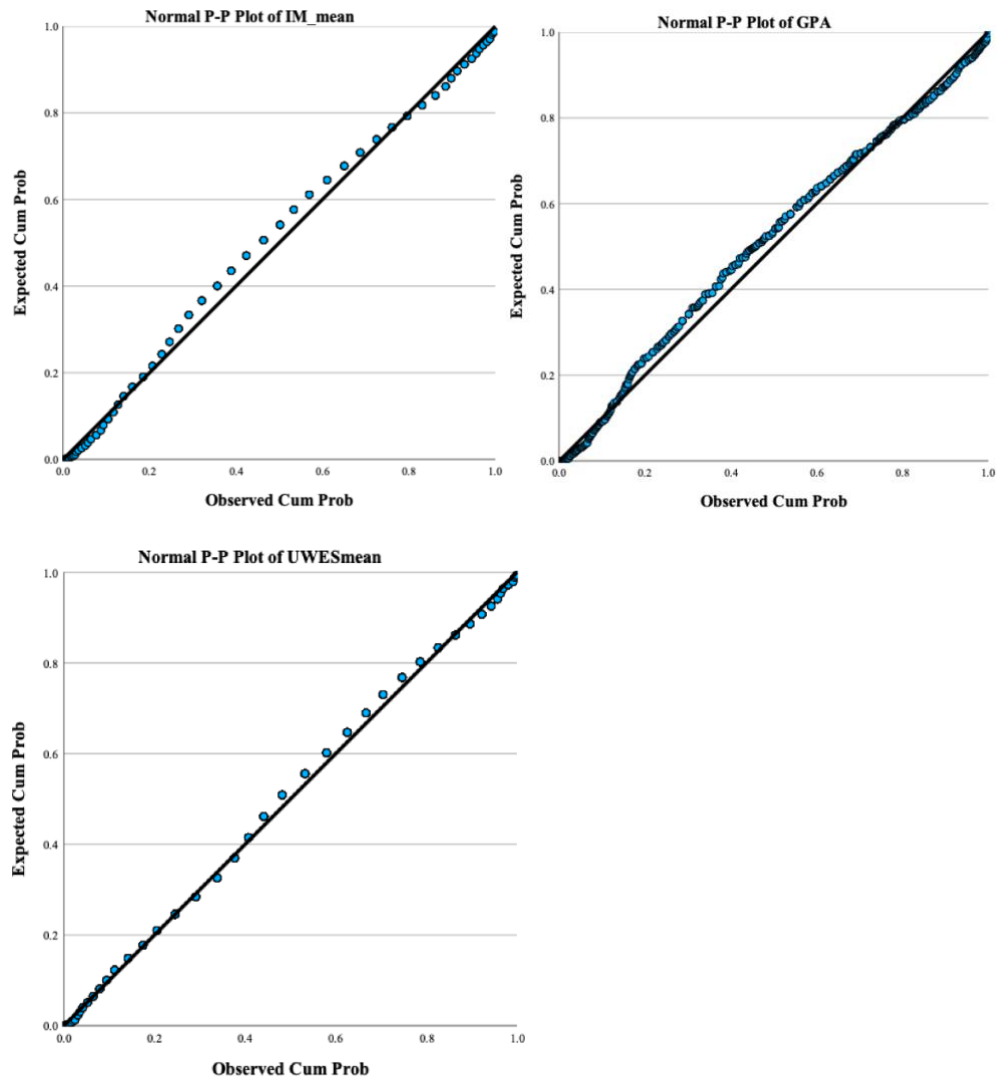


Figure 3A

P-P Plots of Grade Point Average (GPA), Student Engagement & Academic Intrinsic Motivation



Appendix B

Table 1B

Tests for assumptions of linearity, outliers, independence of residuals and a non-significant interaction of predictor and mediator.

<i>Assumption</i>	<i>Variable</i>	
<i>Linearity</i>	<i>Linearity</i>	$p < .05$
	<i>Deviation from Linearity</i>	$p = n.s.$
<i>Outliers</i>	<i>Cook's distance</i>	$M = .002$
<i>Independence of residuals</i>	<i>Durbin-Watson</i>	1.959
<i>Interaction (IM&Engagement)</i>		$p < n.s.$

Note: IM = intrinsic motivation