Self-determination, engagement, disaffection, and academic performance: a mediational analysis

ABSTRACT

The present study examined the role of behavioral engagement and disaffection as mediators between self-determination and academic performance. Participants were 545 secondary students (53.4% girls) aged 12 to 19 years. Variables were assessed in the Spanish language classroom over a nine-month period. Students estimated their self-determination, and students’ teachers completed measures of student engagement, disaffection, and performance. Structural equation models corroborate the hypotheses: the types of self-determination differentially predicted engagement, disaffection, and performance, and were progressively more adaptive the higher autonomy; behavioral engagement and disaffection predicted performance and partially mediated the relationships between self-determination and performance. The implications of these findings for current theory and educational intervention are discussed.

RESUMEN

El presente estudio examina el papel del compromiso conductual y la desafección como mediadores entre la autodeterminación y el rendimiento académico. Participantes 545 alumnos de secundaria (53.4% chicas) con edades entre 12 y 19 años. Las variables se evaluaron en clase de lengua española durante nueve meses. Los alumnos estimaron su autodeterminación y sus profesores contestaron los cuestionarios de compromiso, desafección y rendimiento. Los modelos de ecuaciones estructurales confirmaron las hipótesis: las modalidades de autodeterminación predijeron, de forma diferencial, el compromiso, la desafección y el rendimiento, siendo más adaptativas cuanto mayor era
su grado de autonomía; el compromiso conductual y la desafección predijeron el
rendimiento y medieron parcialmente la relación entre autodeterminación y
rendimiento. Se termina discutiendo las implicaciones de estos resultados para la teoría
y la intervención educativa.

Motivation has been identified as a key factor to explain learning and academic
performance. Among the numerous models of motivation, self-determination theory has
proved to be one of the most relevant (Deci & Ryan, 2000; Núñez, Martín-Albo, &
Navarro, 2005). A construct closely related to motivation is engagement (Skinner,
Kinderman, Connell, & Wellborn, 2009b). Both, motivation and engagement, determine
to a large extent achievement across the academic life span (Martin, 2009).

The authors of self-determination theory (SDT) distinguish different forms of
motivation according to the degree of self-determination, self-regulation, and autonomy
(Deci & Ryan, 2000; Moreno, González, & Chillón, 2009; Núñez et al., 2005; Reeve,
2012; Ryan & Deci, 2002, 2009). Amotivated students lack the drive to act thus their
behavior is not-self-determined. Extrinsic motivation is defined as behavior driven by
reasons external to the individual, and various types have been described: external
regulation is defined as motivation driven by the need to achieve an external goal, to
avoid punishment or to fulfil the expectations of others; introjected regulation refers to
actions that are undertaken to avoid feelings of guilt or anxiety; identified regulation
occurs when one acknowledges and accepts the implicit value of an act and performs it
though it may be unpleasant; integrated regulation involves an individual assimilating certain goals and values as their own. Intrinsic motivation refers to the personal desire to do things that one feels are interesting and because they satisfy personal needs of autonomy and competence.

Academic performance has been positively related to intrinsic motivation and identified regulation, and was negatively related to amotivation and external regulation (Deci & Ryan, 2000; Ratelle, Guay, Vallerand, Larose, & Senécal, 2007; Reeve, 2012; Ryan & Deci, 2009; Vallerand et al., 1993; Wormington, Corpus, & Anderson, 2012). However, the results for introjected regulation remain inconsistent i.e., the correlation between introjected regulation and academic performance was not significant in high school (Ratelle et al., 2007, Study 2) or at college (Ratelle et al., 2007, Study 3; Vallerand et al., 1993), but positive in high school (Wormington et al., 2012).

The analysis of student engagement has been approached from different perspectives. Traditionally, three components have been identified (Appleton, Christenson, & Furlong, 2008; Fredricks, Blumenfeld, & Paris, 2004; González, 2010; Martin, 2009; Skinner, Kinderman, & Furrer, 2009a): behavioral (e.g., effort), emotional (e.g., enthusiasm), and cognitive (e.g., learning strategies). According these authors, behavioral engagement is defined as interactions with the academic context that are active, constructive, and persistent. Some indicators of behavioral engagement are attention, effort, and persistence. Usually, engagement was accompanied by emotions such as enthusiasm, interest, enjoyment, and satisfaction (Salanova, Martínez, Bresó, Llorens, & Grau, 2005; Salanova, Schaufeli, Martínez, & Bresó, 2009; Skinner et al., 2009a, b). Conversely, at the other pole of the scale to engagement we find burnout (Durán, Extremera, Rey, Fernández-Berrocal, & Montalbán, 2006; Manzano,
2004; Salanova et al., 2005, 2009), disengagement (Green, Martin, & Marsh, 2007; Martin, Anderson, Bobis, Way, & Vellar, 2012; Stephan, Caudroit, Boiché, & Sarrazin, 2011) or disaffection (González, 2010; Skinner, Furrer, Marchand, & Kinderman, 2008; Skinner et al., 2009a, b). Behavioral disaffection has been typically operationalized in terms of lacking effort, distraction, passivity, and lacking persistence. This behavior was often associated to frustration, stress, resignation, sadness, and apathy.

Academic performance was positively associated to effort, persistence, and engagement (Fenollar, Román, & Cuestas, 2007; Martin & Liem, 2010; Miñano, Castejón, & Gilar, 2012; Salanova et al., 2005, 2009; Skinner et al., 2008, 2009b, 2012; Valle et al., 2003). On the contrary, burnout, disengagement, and disaffection were negatively correlated to academic achievement (Green et al., 2007; Martin & Liem, 2010; Salanova et al., 2005, 2009; Skinner et al., 2008, 2009a; Stephan et al., 2011).

Relating self-determination and engagement

Intrinsic motivation and identified regulation positively correlated with persistence and engagement in elementary students (Assor, Vansteenkiste, & Kaplan, 2009; Skinner et al., 2008, 2009b, 2012), and in undergraduates (Vansteenkiste, Simons, Lens, Sheldon, & Deci, 2004). The inverse was observed for external regulation. As for introjected regulation, the findings were inconsistent i.e., correlations with behavioral engagement in elementary education (Skinner et al., 2009b), and with academic persistence in college (Ratelle et al., 2007, Study 3) were not significant; however, introjected regulation positively correlated with effort in elementary education.
(Ryan & Connell, 1989) and concentration in college (Vallerand et al., 1993), but also positively correlated with distraction in high school (Ratelle et al., 2007, Study 1).

Recent research has applied structural equation modelling to examine the role of indicators of engagement and disengagement as mediators between motivation and performance, especially in university students. Persistence and learning strategies mediated the effects of goals on academic achievement (Valle et al., 2003). Engagement and burnout mediated the relations between self-efficacy and performance (Salanova et al., 2005) and between social facilitators and performance (Salanova et al., 2009). Effort and learning strategies mediated the effects from goal orientations on academic achievement in undergraduates (Fenollar et al., 2007) and in secondary students (Miñano et al., 2012).

However, to our knowledge, no study has analyzed behavioral engagement and disaffection as mediators between different modalities of self-determination and academic performance, even though the relationships between these variables have been included in diverse theoretical proposals. Thus, Vallerand (1997) outlines some consequences or outcomes of self-determination such as effort, persistence, and performance. Furthermore, Appleton et al. (2008), Fredricks et al. (2004), Reeve (2012), and Skinner and Pitzer (2012) posit that diverse indicators of engagement (e.g., behavioral engagement and disaffection) act as mediators between facilitators of engagement (i.e., motivation) and learning outcomes (i.e., academic performance). Empirical findings previously summarized underpin this model.

Therefore, bearing in mind the theoretical assumptions and previous findings, we formulated the following hypotheses: (a) the greater degree of self-regulation of a type of motivation, the greater would be the positive association with engagement and
performance, and the negative nexus with disaffection; (b) engagement and disaffection would significantly predict performance and mediate the relationships between self-determination and performance.

The rationale underlying this study took into account the low level of reading competence among Spanish students, though it plays a vital role in academic performance (Archambault, Eccles, & Vida, 2010). According to PISA 2009 Report (INEE, 2011), print reading competence significantly correlated with competence in digital reading $(r = .83)$, mathematics $(r = .83)$, and sciences $(r = .88)$. The mean score for reading competence for Spanish 15-year old students (mean = 481) was statistically similar to that of Italy or Greece and somewhat lower than those for Portugal, France, and the OECD average (OECD, 2010). Moreover, 20% of Spanish students were under level 2 in reading competence, a level considered to be the threshold required for lifelong learning at school, and for social and professional development (INEE, 2010). The promotion of reading competence skills and strategies is one of the main objectives of the subject of Spanish language, as acknowledged by the PISA Report.

**Method**

**Participants**

The sample consisted of 545 students (53.4% girls), aged 12 to 19 years (mean age = 15.15 years; SD = 1.8), studying compulsory (7th to 10th grade; n = 267) and post-compulsory (11th to 12th grade; n = 278) secondary education in different urban schools in the northwest of Spain.


Measures

Self-determination. The adapted Spanish version (Moreno et al., 2009) of the Perceived Locus of Causality (PLOC) Scale (Goudas, Biddle, & Fox, 1994) was applied. The stem for all items was “I take part in Spanish language class …”, and the questionnaire consisted of a total of 16 statements, four for each of the following forms of motivation: external regulation, introjected regulation, identified regulation, and intrinsic motivation. The students scored the degree to which they agreed (from 1 = totally disagree to 7 = totally agree) with each of the reasons. A confirmatory factor analysis revealed a good fit for a four-factor solution: $\chi^2 (98, N = 545) = 153.2, p < .001; \chi^2/df = 1.56; CFI = .95; RMSEA = .032$.

Engagement and disaffection. To assess these constructs, the Engagement versus Disaffection with Learning: Teacher Report (Skinner et al., 2008) was administered. The Spanish language teachers assessed each student’s behavioral engagement and disaffection in the classroom. The Behavioral Engagement subscale consists of five items that evaluate the students’ attention, effort, and persistence (e.g., “In my class, this student does more than required” or “In my class, this student works as hard as he/she can”). Analogously, the Behavioral Disaffection subscale consists of five items assessing distraction in class, absence of persistence, and lack of effort (e.g., “When we start something new in class, this student doesn’t pay attention” or “When faced with a difficult assignment, this student doesn’t even try”). In both subscales, teachers scored the students’ behavior on a scale ranging from 1 (not at all true for this student) to 5 (very true for this student). A confirmatory factor analysis indicated good fit for a two-
factor solution: $\chi^2 (34, N=545) = 50.6, p < .033; \chi^2/df = 1.49; CFI = .97; RMSEA = .030.$

The Spanish version of these subscales was designed using the cross-cultural scale translation procedure (Brislin 1986).

*Academic performance.* Performance was assessed using the student’s final grade in Spanish language. Scoring ranged from 1 (very deficient) to 10 (excellent). The pass mark was a score $\geq 5$.

*Procedure*

Data were obtained over a nine-month period: students responded to the self-determination scale in October; teachers completed the engagement and disaffection scales in April and communicated the final grade in June. All students freely volunteered to participate in the study and written authorization was obtained from the schools and parents. Students completed their questionnaires in their classrooms during school hours.

*Outline of data analyses*

Statistical analysis initially determined the reliability coefficients, the descriptive statistics, and the correlations using the SPSS.15 statistical package. Confirmatory factorial analysis (CFA) was then undertaken to confirm the fit of the measurement model using the AMOS.17 software (Arbuckle, 2008). Finally, a series of structural
equation analyses (SEM) was performed to contrast the proposed mediational model. The model fit in both analyses (CFA and SEM) was evaluated by the following indices (Byrne, 2010): the \( \chi^2 \) statistic, the \( \chi^2/df \) indicator, the adjusted goodness of fit index (AGFI), the comparative fit index (CFI), the root mean square error of approximation (RMSEA), and the standardized root mean square residual (SRMR).

SEM was used to assess assumptions on the relationships between variables. These analyses offer several advantages over other methods (Tomarken & Waller, 2005) i.e., they allow for the analysis of statistically non-normal data; enable theoretical knowledge to be introduced into model specification; can test phenomena assessing multiple endogenous and exogenous variables; and they take into account the role of mediating variables.

According to Wu and Zumbo (2008), the most frequent procedure in mediation analysis consists of four stages. Step 1 is to determine if the independent variable predicts the dependent variable. Step 2 analyzes if the independent variable is related to the mediator. Step 3 examines the effect of the mediator on the dependent variable to determine if it is predicted by both the independent variable and the mediator. Finally, Step 4 compares stages 1 to 3.

**Results**

In terms of correlations two groups of variables can be distinguished: one includes identified regulation, intrinsic motivation, engagement, and performance; and the other, external regulation and disaffection (see table 1). The variables were
positively correlated within each group, and negatively with the variables of the other
group. Introjected regulation positively correlated with all variables.

**Insert Table 1**

*Measurement model*

In order to test the relationship between measured items and latent variables, a
confirmatory factor analysis was performed. Mardia's multivariate kurtosis coefficient
(17.9) exceeded the critical ratio (5.4). Thus, two types of analysis were performed
(Arbuckle, 2006; Byrne, 2010): one for the original sample; the other for the 500
bootstrap samples with a 95% confidence interval. The comparison of the results
obtained by both methods revealed no differences.

The measurement model with covariances among all constructs fit the data well,
\[ \chi^2 (284, N = 545) = 360.2, \ p < .001; \ \chi^2/df = 1.27; \ AGFI = .94; \ CFI = .98; \ RMSEA = .022; \ SRMR = .038. \] The standardized factor loadings were satisfactory (\( \beta \geq .543; \ p < .01 \)).

*Structural mediational model*

Thereafter, a structural equation analysis was performed to corroborate our
initial hypotheses regarding the relationships between variables. No re-specifications of
the initial models were carried out. We display the model fit results of the structural
model in figure 1.
An analysis of the relationship between types of self-determination and performance (the first step proposed by Wu and Zumbo, 2008), revealed the model fit the data fairly well, $\chi^2(110, N = 545) = 176.5, p < .001; \chi^2/df = 1.60; AGFI = .95; CFI = .97; RMSEA = .033; SRMR = .038$. Together, the four types of motivation explained 35% of the variance of performance.

As for the nexus for different types of self-determination to engagement and disaffection (Step 2), the indices revealed the model again fit the data well, $\chi^2(285, N = 545) = 360.23, p < .001; \chi^2/df = 1.26; AGFI = .94; CFI = .98; RMSEA = .022; SRMR = .037$.

The full mediational model (Step 3), illustrated in Fig. 2, showed a very good fit with the data, $\chi^2(305, N = 545) = 408.5, p < .001; \chi^2/df = 1.33; AGFI = .94; CFI = .97; RMSEA = .025; SRMR = .038$.

Finally (step 4), the data obtained from the direct effects in step 1 were compared to the direct effects in step 3. Table 2 shows the effects of self-determination on performance.

In the full mediational model, the direct effects were significant for all modalities of self-determination. Table 2 also highlights that the sum of the indirect
effects (mediated through engagement and disaffection) was significant for external regulation \((-0.097, p < 0.002)\), identified regulation \((0.109, p < 0.006)\), and intrinsic motivation \((0.139, p < 0.002)\); but the sum of indirect effects was not significant for introjected regulation \((0.029, p < 0.287)\). The findings confirmed a partial mediational model. Jointly, the variables under evaluation explained 43% of the variance in academic performance.

4. Discussion and conclusions

The present study aimed to assess the differential association between each modality of self-determination and behavioral engagement, disaffection, and academic performance, and to determine if the association between self-determination and performance is mediated by engagement and disaffection. Previously, the results had confirmed the goodness-of-fit of the measurement instruments. In addition, the four-factor structure of the PLOC scale (Goudas et al., 1994) and the two-factor structure of the behavioral engagement and disaffection scale (Skinner et al., 2008) fitted the observed data.

With reference to the first hypothesis, the results agree with the findings of previous research (Deci & Ryan, 2000; Ratelle et al., 2007; Reeve, 2012; Ryan & Connell, 1989; Skinner et al., 2009a; Vansteenkiste et al., 2004; Walker, Greene, & Mansell, 2006). In terms of externally regulated reasons, students participate in Spanish language mainly to avoid problems, because it was their obligation, and to get on well with the teacher. These reasons are associated to high levels of disaffection in class activities (pretending to work, making no effort, daydreaming in class) and less
engagement (attention, participation, effort, persistence, and hard work). Not surprisingly external regulation has been associated to poor performance. The inverse relationship occurred with intrinsically motivated reasons such as the pleasure and satisfaction of learning and to discover new things; as expected, these reasons predicted good academic performance. Analogous relationships were found for identified reasons.

Introjected regulation shares some common characteristics with external regulation and intrinsic motivation. Similar to external regulation, introjected reasons positively predicted high levels of disaffection; however, like identified regulation and intrinsic motivation, introjected reasons also positively predicted engagement in academic tasks. This ambivalence may be explained if one considers the existence of two different types of introjected regulation i.e., approach and avoidance motivations (Assor et al., 2009): introjected approach motivation (where students try to attain and/or maintain high feelings of self-worth, pride or social approval) could explain the power of introjected regulation to predict engagement; and introjected avoidance motivation (where students try to avoid feelings of low self-worth, shame or guilt) could explain the positive nexus with disaffection.

The mediational model proposed has been partially confirmed. The negative association between external regulation and performance can be partially explained as this regulation positively predicted disaffection and negatively engagement; and the presence of disaffection and the lack of engagement anticipate poor academic performance. The inverse relationship was found for identified regulation and in particular for intrinsic motivation: both protected students from disaffection and fostered engagement; low levels of disaffection and high levels of engagement were positively associated to performance. Though the indirect effects on these three types of
regulation were significant, the same was true for direct effects, indicating only partial mediation (Wu & Zumbo, 2008). These findings coincide with the results of other studies that have found engagement mediated the relations between motivational constructs and performance (Fenollar et al., 2007; Miñano et al., 2012; Salanova et al., 2005, 2009; Valle et al., 2003). Again, introjected regulation appears to lie halfway between external regulation and intrinsic motivation: the indirect effects on performance through disaffection were negative whereas other indirect effects through engagement were positive; accordingly, the total indirect effects were limited.

The current findings have practical implications for teachers. As Pianta, Hamre, and Allen (2012) have noted, classroom is one of the most proximate and potentially powerful settings for influencing children and youth. Hence, the number of programmes designed to promote student motivation and engagement in the classroom in line with the findings of the present study. Self-determination theory suggests teachers should enhance the process of internalization so students can advance through the continuum representing the different types of motivation (Ryan & Deci, 2009). Most of the recommendations have highlighted the importance of fostering teacher autonomy-supportive behavior (nurture inner motivational resources, rely on informational language, and acknowledge and accept students’ negative affect), and structure in the classroom (clear and explicit directions, guidance during the lesson, and constructive feedback) (Reeve, 2012; Vansteenkiste et al., 2004).

On the other hand, academic engagement is important because it is a relative malleable student characteristic (Reeve, 2012). Likewise, Pianta et al. (2012) assert that the nature and quality of interactions between teachers and children are fundamental to understand student engagement. To promote engagement and reduce disaffection during
learning activities, some of the instructional strategies include providing a rationale (a verbal explanation as to why putting effort) during those lessons that teachers expect students might find uninteresting (Jang, 2008); and giving to students a developmentally calibrated sense of autonomy, control, competence, choice, and structure (Pianta et al., 2012; Reeve, 2012).

Finally, though the hypothesized model of relationships satisfactorily explained the data, we should not overlook that the limitations of this study raise a number of questions and issues that spur the need for further research. First, in terms of measures, the different modalities of introjected motivation (approach and avoidance) described by Assor et al. (2009) were not evaluated, and further research is required to shed light on seemingly inconsistent results related to this modality of self-determination. Likewise, neither other aspects of engagement and disaffection (e.g., cognitive and emotional) were evaluated (Martin, 2009; Skinner et al., 2009a, b); this information would be useful to contrast data obtained on the assessment of behavioral engagement and disaffection. In terms of design, our findings would be enriched by studying the reciprocal relationships between motivation, engagement, and performance throughout several academic years, in line with Archambault et al. (2010).

References


disengagement among middle school students. *Journal of Educational Psychology, 104*, 1-18.


**Table 1**

Descriptive statistics, reliability coefficients, and correlations

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>SD</th>
<th>$\alpha$</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. External R.</td>
<td>3.41</td>
<td>.96</td>
<td>.73</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Introjected R.</td>
<td>3.75</td>
<td>.96</td>
<td>.74</td>
<td>.09</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Identified R.</td>
<td>3.96</td>
<td>1.1</td>
<td>.78</td>
<td>-.12</td>
<td>.16</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Intrinsic M.</td>
<td>3.95</td>
<td>1.0</td>
<td>.81</td>
<td>-.17</td>
<td>.16</td>
<td>.24</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Engagement</td>
<td>2.62</td>
<td>.73</td>
<td>.84</td>
<td>-.21</td>
<td>.31</td>
<td>.30</td>
<td>.39</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Disaffection</td>
<td>2.21</td>
<td>.60</td>
<td>.73</td>
<td>.24</td>
<td>.08</td>
<td>-.23</td>
<td>-.27</td>
<td>-.15</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>7. Performance</td>
<td>6.51</td>
<td>1.8</td>
<td>-</td>
<td>-.28</td>
<td>.21</td>
<td>.37</td>
<td>.41</td>
<td>.48</td>
<td>-.36</td>
<td>-</td>
</tr>
</tbody>
</table>

*Note: $|r| \geq .09 = p < .05; |r| \geq .12 = p < .01.$*
Table 2

Standardized effects of self-determination on academic performance

<table>
<thead>
<tr>
<th>Type of self-determination</th>
<th>Direct effects (p)</th>
<th>Sum (p) (1)</th>
<th>Intervals (1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>External Regulation</td>
<td>-.131 (.005)</td>
<td>-.097 (.002)</td>
<td>-.177, -.051</td>
</tr>
<tr>
<td>Introjected Regulation</td>
<td>.115 (.020)</td>
<td>.029 (.287)</td>
<td>-.025, .098</td>
</tr>
<tr>
<td>Identified Regulation</td>
<td>.137 (.004)</td>
<td>.109 (.006)</td>
<td>.054, .165</td>
</tr>
<tr>
<td>Intrinsic Motivation</td>
<td>.152 (.002)</td>
<td>.139 (.002)</td>
<td>.086, .206</td>
</tr>
</tbody>
</table>

(1) The probability associated to the sum of standardized indirect effects and their respective confidence intervals were estimated using the bias-corrected confidence interval bootstrap test of AMOS.17 (confidence level = 95%; samples = 500).
Figure 1. Structural model illustrating the relationships between variables. All standardized regression weights were significant ($p < .05$). For clarity of presentation, observed indicators were not drawn.