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## **The Mechanism Underlying the Association of School Climate and Reading Achievement: The Mediating Role of Intrinsic Motivation and Reading Self-Concept in the Greek Context**

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**Abstract.** The association between school climate and students' achievement is currently well-documented in international literature. However, the relevant studies, that contemplate the underlying mechanisms of this association, are sparse. Therefore, the present study's purpose is to confirm the mediating effects of intrinsic motivation and reading self-concept in the association of school climate and reading achievement. Further, due to the amassing evidence of gender-related individual differences in academic achievement, this study also examines whether the underlying mechanisms toward academic achievement are varying as a function of gender. The data of  $N=6,403$  Greek adolescent students were extracted from the Program of International Student Assessment (PISA) for further analyses. Structural equation modeling (SEM) was conducted to examine both mediating and moderating effects. The results indicate that there is a positive indirect effect of school climate on reading achievement via intrinsic motivation and self-concept. Additionally, structural equivalence via multigroup SEM (MGSEM) showed that gender does not moderate the structural regressive relations; that is, the regression coefficients did not vary as a function of gender. These findings are discussed within the framework of improving educational practices.

**Keywords.** Intrinsic motivation, School community, School climate, Reading achievement, Structural equation modeling, Multigroup structural equation modeling, Structural equivalence, Measurement equivalence, Mediation analysis, Moderation analysis.

### **1. Introduction**

Both school climate, academic self-concept, and intrinsic motivation are thought of as three important constructs for students' academic achievement (cf., Chiu & Klassen, 2009; Cohen,

McCabe, Michelli, & Pickeral, 2009; Retelsdorf, Köller, & Möller, 2014; Thapa, Cohen, Guffey, & Higgins-D'Alessandro, 2013). The first theoretical concept (i.e., school climate) has been characterized as a multidimensional construct. In other words, the school climate is considered as the psychosocial impact of the institutional environment on the individuals inside the schools. It subsumes dimensions of teaching/ instructional practices, social values, the aims and the scope of the schools, as well as all the interpersonal relationships (Cohen, McCabe, Michelli, & Pickeral, 2009; Thapa, Cohen, Guffey, & Higgins-D'Alessandro, 2013). According to OECD (2019a), researchers do not concede on generally acceptable indicators of school climate, however, the most prevalent dimensions of school climate pertain to (a) safety, (b) teaching and learning, (c) school community, and (d) institutional environment. In parallel, the second aforementioned term refers to a set of hierarchical, but interrelated, theoretical constructs. That is, according to Byrne and Shavelson (1986) self-concept proceeds from a higher-level construct of general self-concept about oneself, proceeds through academic self-concept, and culminates in domain-specific theoretical structures about self-concept, for example, of language, mathematics, and other academic areas. Self-concept is usually formed through significant interaction with the environment and important others. It is also noted that self-concept shares many properties with the familial construct of self-efficacy but is not overlapping with self-efficacy (Bong & Skaalvik, 2003). Finally, intrinsic motivational beliefs refer to the interest, the value (Pintrich, 1999), or to the enjoyment of a specific task (Isen & Reeve, 2005).

To date, many empirical studies have examined the predictive effects of various dimensions of school climate, academic self-concept, and intrinsic motivation on students' achievement (e.g., Chiu & Klassen, 2009; Dulay & Karadağ, 2017; Marinak & Gambrell, 2010; Retelsdorf, Köller, & Möller, 2014). However, few studies have examined the underlying mechanisms that lead from school climate to academic achievement and specifically reading achievement (e.g., Fan & Williams, 2018; Mercer, Nellis, Martínez, & Kirk, 2011). Additionally, the international literature (OECD, 2019a) has identified the existence of a gender gap in achievement, but the relevant studies of the underlying mechanism of the association between school climate and academic achievement have not considered how the gender may moderate the relations among the constructs under study. Thus, the current study aims at addressing these shortcomings.

### *1.2. Literature Review*

Admittedly, many empirical studies have found a positive effect of various dimensions of school climate on academic achievement (for an overview see Wang & Degol, 2016). For instance, the study by Konold et al. (2018) drawing a sample of 68,951 students showed that school climate, which was conceptualized as authoritative school climate, was positively affecting students' academic achievement. Similar results were found from a qualitative perspective, that is, the study by Barksdale et al. (2019) showed that classroom climate was positively associated with achievement. Further, the findings of Shindler et al. (2016) corroborate with these of other studies and provide evidence of strong associations between school climate and students' achievement. School climate has also been known to affect students' self-concept either in positive or negative ways, however, few studies have examined the way in which school climate influences students' self-concept (Haynes, Emmons, & Ben-Avie, 1997).

On the other hand, academic self-concept and specifically reading self-concept has also been found to significantly predict reading achievement. According to the developmental perspective, reading self-concept usually undergoes development in the early stages of schooling, that is, reading self-concept usually develops in the first two classes (Chapman & Tunmer, 1997). To date, many studies have connected this aspect of academic self-concept with academic achievement related to reading. For example, the large-scale longitudinal study of Malanchini et al. (2017) showed with a sample of 13,825 twins that both reading-related self-concept and enjoyment of reading were reciprocally related to twins reading comprehension scores. Moreover, evidence of a positive association between reading self-concept and reading achievement comes from the cross-national study by Lafontaine et al. (2019), which used the data of 48 countries from PIRLS 2011 and examined the factorial structure, the within-country level and country-level correlations of academic self-concept (i.e., conceptualized as perceptions of competence and difficulty) and reading achievement. Specifically, Lafontaine et al. (2019) found that within-country self-concept was positively related to reading achievement, that is, higher scores on self-concept scales result in greater scores on reading achievement tests. One other line of research contemplates the reciprocal relations between reading self-concept and reading performance. For example, the longitudinal research by Retelsdorf et al. (2014) used a sample of 1,508 secondary school students and found that self-concept and reading achievement are mutually reinforcing constructs, that is, self-concept increases reading performance and reading performance, in turn, further reinforces reading self-concept.

The third variable of interest in this study is intrinsic motivation, which usually refers to subjects' perceptions of interest, enjoyment, and value of the task (Isen & Reeve, 2005; Pintrich, 1999; Tarchi, 2017). Empirical research has shown the beneficial effect of intrinsic motivation on reading achievement. For instance, Lau and Ho (2015) using a sample of 4,837 Hong Kong secondary school students found that dimensions of intrinsic motivation positively influence participants' performance in standardized reading assessments. Dissimilar evidence, though, is apparent in Tarchi (2017). In other words, Tarchi (2017) found that reading-related motivation did not contribute uniquely to reading competence. Despite the findings of Tarchi (2017), the majority of the empirical findings seem to favor a positive and statistically significant relation between intrinsic motivation and reading achievement.

Despite the abundance of evidence regarding the positive associations of reading self-concept, intrinsic motivation, and school climate with reading achievement, the studies, though, that have examined the underlying processes from school climate toward reading achievement are few. Among these, the most pertinent to this study's aims is the research by Fan and Williams (2018) and that by Wang and Eccles (2013). The first study using a sample of 14,639 10<sup>th</sup> graders showed that intrinsic motivation and self-efficacy beliefs are intervening variables in the association of various school climate dimensions (i.e., interpersonal relations, safety, and clarity of organizational climate), reading and mathematics performance. Regarding the second study, it was shown that the effects of the aspects of school context on school engagement were mediated by academic self-concept and subjective task value.

### *1.3. The Current Study*

As can be seen, the majority of studies have focused on pertinent mediating effect (e.g., Barksdale et al., 2019; Lau & Ho, 2015; Lafontaine et al., 2019) but usually they do not consider the complex interfaces among the intervening factors of intrinsic motivation and reading self-concept in the associations of the aspects of the superordinate school climate theoretical

structure and reading achievement. Another line of research (e.g., Malanchini et al., 2017; Retelsdorf et al., 2014) has focused entirely on longitudinal reciprocal and developmental effects between self-concept and reading achievement without taking into consideration the possible mediating effect of intrinsic motivation between the association of school climate and achievement. Finally, the relevant mediation studies have only included intrinsic motivation as a mediating variable (e.g., Fan & Williams, 2018) and have not considered academic self-concept. Additionally, it is noted that the study of Wang and Eccles (2013) was concerned with the mediating effect of self-concept between the relation of school context and students' school engagement and has not included students' achievement in the equations. In sum, the present study is among the first ones, to the best of our knowledge, to examine specific indirect effects of school climate, which is conceptualized as a school community, via both intrinsic motivation and reading self-concept on reading achievement. It is noted that the superordinate construct of school climate is operationalized in this study as school community because the majority of prior findings have considered only school climate indicators such as teacher-student relations (e.g., Shindler et al., 2016), authoritative school structure (e.g., Konold et al., 2018), and classroom climate (e.g., Barksdale et al., 2019). Therefore, the following research questions and subsequent research hypotheses are formulated based on the abovementioned theoretical and empirical framework.

RQ1: Do intrinsic motivation and reading self-concept mediate the relation of school climate and reading achievement in adolescent students?

RQ2: Does gender moderate the direct and indirect effects of school climate on reading achievement?

It is hypothesized that positive and statistically significant direct effects of school climate on intrinsic motivation and reading self-concept would be observed (Hypothesis 1). In turn, direct effects stemming from intrinsic motivation and reading self-concept toward reading achievement are expected (Hypothesis 2). Finally, due to the overwhelming divergence of reading achievement scores between female and male students (OECD, 2019a), it is expected that gender will moderate the underlying processes that lead from school climate toward academic achievement (Hypothesis 3).

## 2. Method

### 2.1. Participants and Dataset

The present study utilizes the Greek dataset from the seventh cycle of the Program of International Student Assessment (PISA) of the Organization of Economic Cooperation and Development (OECD).  $N=6,403$  adolescent, 15-year old secondary school students comprise the current study's sample. The current cycle of PISA assessed students from 37 participating OECD countries and 42 cooperating countries (OECD, 2019b). Overall, the international survey examined both cognitive skills (e.g., reading comprehension, reading fluency, mathematics, etc.) and students' perspectives. PISA can provide rich information about both the educational and psychosocial conditions that affect students. In the present study, the contextual questionnaire database and the cognitive database were connected to extract the responses of Greek adolescent students. The total sample is evenly distributed across gender groups with  $N=3178$  (49.6%) female and  $N=3225$  (50.4%) male participants. To compensate for the complex survey sampling design, specially designed sampling weights for students were included in all analyses (Heeringa, West, & Berglund, 2010).

## 2.2. Measures

All measures, which were utilized in the current study, were developed and administered by OECD. However, it is noted that OECD implements Item Response Theory (IRT) modeling to validate both cognitive and contextual instruments (see OECD, 2019b). Despite this, in the present study, the Classical Test Theory (CTT) (McDonald, 1999) was utilized to examine the validity and reliability of contextual measures.

### 2.2.1. School Climate- School Community Scales

According to OECD (2019a), school community comprises conceptual indicators such as student co-operation and competition, students' sense of belonging in the schools, and parental involvement in school activities. Students' competition subscale comprised four items with a Likert-type scoring scheme ranging from 1 "Not at all true" to 4 "Extremely true". Higher scores on this subscale reflect greater student competition in the target school. Cronbach's coefficient of internal reliability for this scale was  $\alpha = .81$  and McDonald's (1999) coefficient omega total also reached acceptable reliability levels with  $\omega = .85$ . Students' cooperation subscale also comprised four items with a Likert-type scoring scheme ranging from 1 "Not at all true" to 4 "Extremely true". This subscale's reliability was also meritorious with  $\alpha = .88$  and  $\omega = .90$ . Sense of belonging consisted of six items with a Likert-type scoring scheme ranging from 1 "Strongly agree" to 4 "Strongly disagree". Reverse scoring was applied as necessary so that all items were scored in the same meaningful direction. This subscale displayed acceptable reliability with  $\alpha = .79$  and  $\omega = .87$ . Finally, to represent parental involvement, the "parents' emotional support" scale was selected. This scale comprised three items also with a Likert-type scoring scheme ranging from 1 "Strongly disagree" to 4 "Strongly agree". Reliability coefficients indicated acceptable levels of inter-item covariances with  $\alpha = .85$  and  $\omega = .83$ . To examine the psychometric properties of these scales, the data were subjected to second-order confirmatory factor analysis (CFA-Rindskopf & Teed, 1988). The factor loadings of the second-order CFA are presented in Table 1. The CFA results showed excellent model fit with  $\chi^2(df=113)=1018.596$ ,  $p < .001$ , CFI = .963, TLI = .955, RMSEA = .048, SRMR = .038. McDonald's (1999) coefficient omega hierarchical was  $\omega_h = .87$ , which indicates that the second-order structure was an appropriate modeling choice.

Table 1: Factor loadings and Item Wordings for the "School Community" Scale

| Item   | Factor Loadings ( $\lambda$ ) |      |     |    |      |
|--|-------------------------------|------|-----|----|------|
|  | I                             | II   | III | IV | V    |
| Students' Competition Subscale   |                               |      |     |    |      |
| 1. Students seem to value competition.   | .704                          |      |     |    | .088 |
| 2. It seems that students are competing with each other.                           | .815                          |      |     |    | .102 |
| 3. Students seem to share the feeling that competing with each other is important. | .780                          |      |     |    | .098 |
| 4. Students feel that they are being compared with others.                         | .624                          |      |     |    | .078 |
| Students' Cooperation Subscale   |                               |      |     |    |      |
| 5. Students seem to value cooperation.   |                               | .773 |     |    | .347 |
| 6. It seems that students are cooperating with each other.                         |                               | .830 |     |    | .373 |

|   |      |      |
|---|------|------|
| 7. Students seem to share the feeling that cooperating with each other is important | .880 | .396 |
| 8. Students feel that they are encouraged to cooperate with others.                 | .757 | .340 |
| <b>Sense of Belonging Subscale</b>  |      |      |
| 9. I feel like an outsider (or left out of things) at school                        | .666 | .382 |
| 10. I make friends easily at school   | .460 | .264 |
| 11. I feel like I belong at school  | .633 | .363 |
| 12. I feel awkward and out of place in my school                                    | .755 | .433 |
| 13. Other students seem to like me  | .470 | .269 |
| 14. I feel lonely at school   | .737 | .423 |
| <b>Parental Emotional Support Subscale</b>  |      |      |
| 15. My parents support my educational efforts and achievements                      | .777 | .479 |
| 16. My parents support me when I am facing difficulties at school                   | .869 | .536 |
| 17. My parents encourage me to be confident   | .782 | .482 |

*Note: I- Students' Competition Subscale; II- Students' Cooperation Subscale; III- Sense of Belonging Subscale; IV- Parental Emotional Support Subscale; V- Second-order School Community Factor; Item wordings were retrieved from <http://www.oecd.org/pisa/data/2018database/>*

### 2.2.2. Intrinsic Motivation- Reading Enjoyment Scale

Intrinsic motivation comprised five items with a Likert-type scoring scheme ranging from 1 “Strongly disagree” to 4 “Strongly agree”. Higher scores on this scale reflect greater levels of intrinsic motivation in reading. The data were subjected to confirmatory factor analysis (CFA) with one-factor specification. After the incorporation of two between-errors covariances, the CFA results indicated excellent model fit, i.e.,  $\chi^2$  (df=3)= 86.178,  $p < .001$ , CFI= .987, TLI=.956, RMSEA=.075, SRMR=.023. Item wordings and factor loadings are presented in Table 2.

Table 2: Factor Loadings of the “Intrinsic Motivation in Reading” Scale

| Item  | Factor Loadings ( $\lambda$ ) |
|---|-------------------------------|
| 1. I read only if I have to                     | .606                          |
| 2. Reading is one of my favorite hobbies.       | .529                          |
| 3. I like talking about books with other people | .474                          |
| 4. For me, reading is a waste of time           | .682                          |
| 5. I read only to get information that I need   | .709                          |

*Note: Items were reverse-scored as appropriate. Item wordings were retrieved from <http://www.oecd.org/pisa/data/2018database/>*

### 2.2.3. Academic Self-Concept- Reading Self-Concept of Competency

Reading self-concept of competency comprised three items with a Likert-type scoring scheme ranging from 1 “Strongly disagree” to 4 “Strongly agree”. Higher scores on this scale reflect greater levels of intrinsic motivation in reading. The data were subjected to confirmatory factor analysis (CFA) with one-factor specification, however, as the scale comprised three

items, the measurement model was fully saturated (i.e., just-identified) and goodness-of-fit indices cannot be calculated. The factor loadings of the three items are presented in Table 3.

Table 3: Factor Loadings and Item Wordings for the “Reading Self-Concept” Scale

| Item  | Factor Loadings ( $\lambda$ ) |
|---|-------------------------------|
| 1. I am a good reader.                      | .733                          |
| 2. I am able to understand difficult texts. | .530                          |
| 3. I read fluently.                         | .757                          |

Note: Item wordings were retrieved from <http://www.oecd.org/pisa/data/2018database/>

#### 2.2.4. Reading Achievement Composite Score

OECD (2019b) used a computer-administered reading task comprising 245 items. Some items were human-scored and some were automatically scored by computer. Items were evaluated with multiple-choice, binary, and open-ended response formats. OECD (2019b) utilized Item Response Theory modeling to extract a latent trait score (i.e., factor score) for each student based on his/her ability and the items’ difficulty parameter. This composite factor score has interval scaling psychometric properties with a range of R=612.421, M=461.391, SD=96.44, Skewness= -.067, Kurtosis=-.323. Scoring reliability (i.e., inter-rater reliability) of  $\rho=98$  was observed for the new reading items, and for the trending reading items, the reliability was  $\rho=98.6$ .

#### 2.3. Statistical Analyses

Assessment of the psychometric properties of the measures via confirmatory factor analyses (CFA) was carried out with the Robust Maximum Likelihood (MLR) estimator, which corrects the non-normality of the indicators (see Rhemtulla, Brosseau-Liard, & Savalei, 2012). Pre-processing of the data was carried out with SPSS 23 (IBM Corp., 2015). Structural equation modeling was conducted via the statistical language and environment R (R Core Team, 2018). Reliability coefficients, including McDonald’s (1999) coefficient omega total, which shows the total reliability of the instrument by also considering the factorial structure of the items, were calculated with the *Psych* package (Revelle, 2018). McDonald’s (1999) coefficient omega hierarchical was calculated with the *semTools* (Jorgensen et al., 2019) package interfacing with the *Lavaan* package. Confirmatory factor analyses (CFA) and structural equation modeling (SEM) were carried out with the *Lavaan* package (Rosseel, 2012).

### 3. Results

It is noted that in the present study values equal to/ greater than .90 in CFI and TLI are deemed acceptable. RMSEA and SRMR values less than .08 are also indicative of acceptable model fit, but values less than .06 are considered as desirable, according to Hu and Bentler’s (1999) cut-off criteria for goodness-of-fit indices. At the beginning of the analyses, a latent correlation matrix, that describes the latent associations among the theoretical constructs under study, is presented in Table 4. It is noted that reading achievement is included in the confirmatory factor analysis (CFA) as an observed covariate. The goodness-of-fit indices for the CFA were suggesting a meritorious fit of the model-implied covariance matrix to the corresponding sample covariance matrix, i.e.,  $\chi^2$  ( $df=286$ ,  $N= 4722$ ), =1982.570,  $p<.001$ , CFI= .949, TLI= .942, RMSEA= .041 90% CI[.040; .043], SRMR= .044.

Table 4: Latent Correlation Matrix

| Latent Variable                      | 1. | 2.      | 3.      | 4.      |
|--------------------------------------|----|---------|---------|---------|
| 1. School climate (school community) | 1  | .364*** | .465*** | .334*** |
| 2. Intrinsic motivation              |    | 1       | .440*** | .394*** |
| 3. Reading Self-Concept              |    |         | 1       | .351*** |
| 4. Reading Achievement (composite)   |    |         |         | 1       |

*Note: \*\*\*significant interfactor correlation at  $p < .001$ ; Intersubject correlations are error-free correlations among latent variables.*

Next, the regression paths were introduced to the measurement model. The structural model was specified as follows. First, the reading achievement score (composite) was regressed on the mediators, and the exogenous, second-order school community factor. Intrinsic motivation and reading self-concept were specified as correlated mediators that were regressed on the second-order school community factor. The SEM model was specified as shown in Figure 1. As can be seen from a visual inspection of Figure 1, both specified mediating latent variables were, indeed, statistically significant mediators; that is, the second-order school climate factor was positively affecting intrinsic motivation and reading self-concept. Both of the mediating variables had a statistically significant effect on reading achievement. However, partial mediation was established because school climate had also a significant, and not neglectable, direct effect on reading achievement. The structural coefficients and the direct, indirect, and total effects are elaborated on in Table 5.

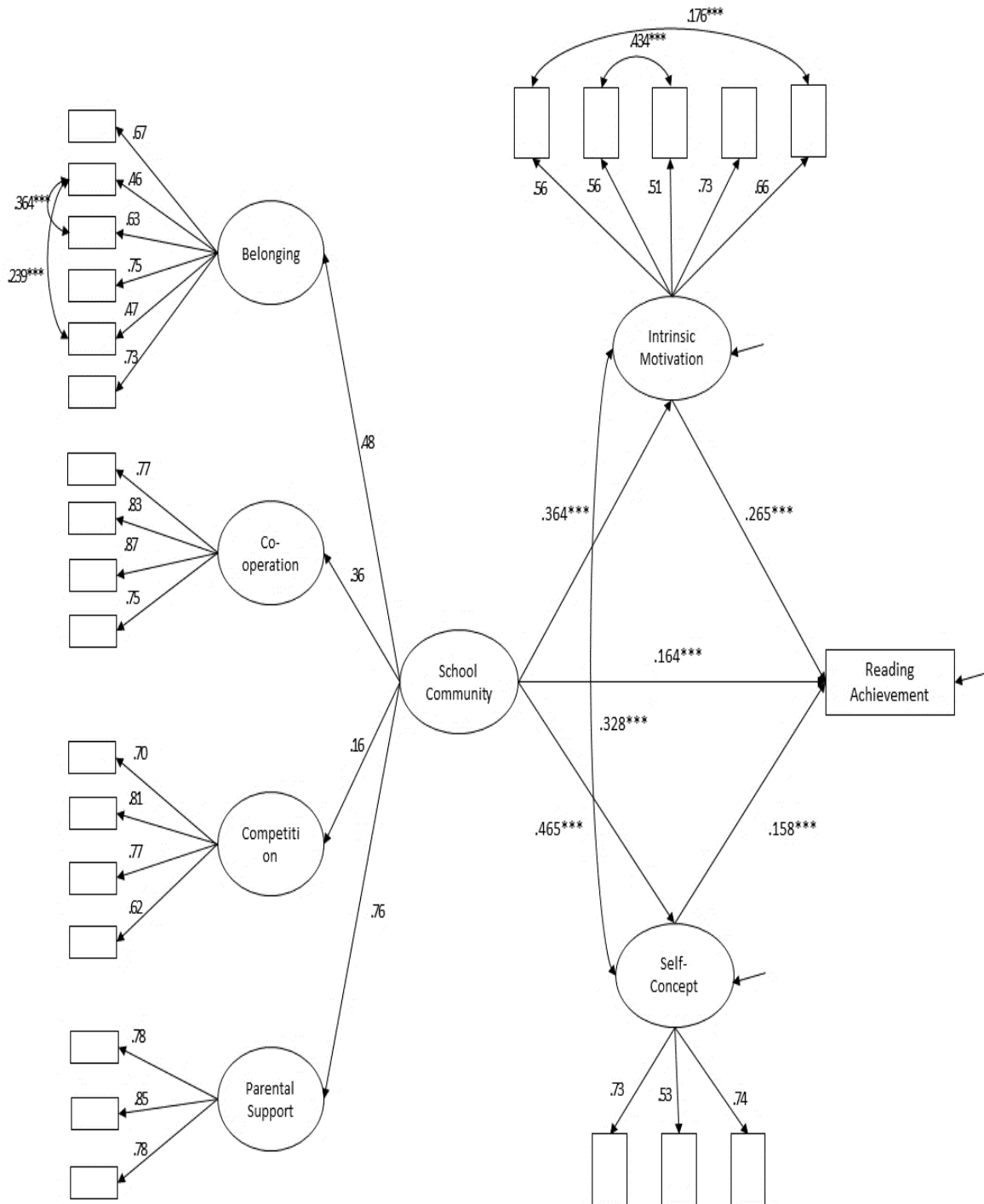


Figure 1: Path Diagram of Multiple Mediation Structural Equation Model “Mediating Effects of Intrinsic Motivation and Reading Self-Concept”

Table 5: Structural Regression Coefficients of the Multiple Mediation SEM Model

| Regression Path   | Unstandardized Coefficient (Std. Error) | Standardized Coefficient $\beta$ | p-Value * |
|---|---|----------------------------------|-----------|
| 1. School climate (school community) → Reading Achievement                        | 53.432 (9.055)                          | .164                             | .001      |
| 2. School climate (school community) → Intrinsic Motivation                       | .660 (.068)                             | .364                             | .001      |
| 3. School climate (school community) → Reading Self-Concept                       | .846 (.069)                             | .465                             | .001      |
| 4. Intrinsic Motivation → Reading Achievement                                     | 47.524 (4.068)                          | .265                             | .001      |
| 5. Reading Self-Concept → Reading Achievement                                     | 28.244 (4.390)                          | .158                             | .001      |
| Indirect Effects  |   |                                  |           |
| 6. School climate (school community) → Intrinsic Motivation → Reading Achievement | 31.369 (3.723)                          | .096                             | .001      |
| 7. School climate (school community) → Reading Self-Concept → Reading Achievement | 23.895 (3.917)                          | .073                             | .001      |
| Total Effects:  | 108.695 (10.014)                        | .334                             | .001      |

*Note: p-Value based on the unstandardized solution*

From a visual inspection of Table 5, the indirect effect of school climate on reading achievement via intrinsic motivation was  $\beta=.096$ ,  $p<.001$ . The counterpart indirect effect via reading self-concept was  $\beta=.073$ ,  $p<.001$ . These beta coefficients may seem rather small but in comparison to previous research (e.g., Fan & Williams, 2018), they are quite higher. The coefficient of determination indicated that the structural model explained 21.5% of the variance in reading achievement with  $R^2=.215$ .

To examine whether the structural regression coefficients vary as a function of gender, structural invariance was examined via a multigroup SEM. Prior to commencing structural equivalence, the equivalence of the full (i.e., pooled) measurement model is a pre-requisite

(Sass & Schmitt, 2013). To establish measurement and structural equivalence, a series of progressively more constrained models is examined. In other words, we proceed from the configural and metric measurement models to a fully constrained structural model. To determine whether the models are invariant, the  $\Delta$  approximate goodness-of-fit ( $\Delta$ AFI) indices are examined in a comparative way. According to Cheung and Rensvold (2002) and Chen (2007), changes in  $|\Delta$ CFI $\leq$ .010 and in  $|\Delta$ RMSEA $\leq$ .015 are indicative of model invariance. A case of model non-invariance (i.e., statistically significant degradation of model fit) would be indicative of the moderating effect of the grouping variable (Sass & Schmitt, 2013), namely gender. The  $\Delta$ AFI for the progressively more constrained models are presented in Table 6.

Table 6:  $\Delta$  Approximate Goodness-of-Fit Indices for Progressively More Constrained Models

| Model                        | CFI  | $ \Delta$ CFI | RMSEA | $ \Delta$ RMSEA |
|------------------------------|------|---------------|-------|-----------------|
| Measurement Model Invariance |      |               |       |                 |
| Configural†                  | .948 |               | .042  |                 |
| Metric††                     | .945 | .003          | .042  | .000            |
| Structural Model Invariance  |      |               |       |                 |
| Equal Latent Covariances     | .944 | .001          | .042  | .000            |
| Equal Regression Paths       | .944 | .001          | .042  | .000            |

*Note: † Equal factor structure and freely estimated covariances and factor loadings*  
 †† *First-order and second-order factor loadings constrained to equal, but freely estimated latent covariances*

From a visual inspection of Table 6, it can be seen that gender moderates neither the structural regression paths nor the latent covariances among constructs. That is, despite the amassing evidence of the much-discussed “gender gap” (see OECD, 2019a), the underlying mechanism from school climate to reading achievement, as elaborated on in the current study, is fully invariant across genders.

#### 4. Discussion

The present study’s purpose was mainly to confirm two hypotheses. Specifically, the first hypothesis (Hypothesis 1) pertained to the confirmation of the direct effects of school climate on intrinsic motivation and reading self-concept. The second hypothesis (Hypothesis 2) referred to the confirmation of the mediating effects of intrinsic motivation and reading self-concept in the association of school climate and reading achievement. One other research hypothesis (Hypothesis 3) was formulated on the basis of the “gender gap” (OECD, 2019a). Haynes et al. (1997) have admitted that few studies have contemplated the association of school climate and academic self-concept. Further, to date, few empirical findings have considered similar underlying mechanisms, as these proposed herein, that interface between school climate and academic achievement (e.g., Fan & Williams, 2018; Wang & Eccles, 2013). Despite the above, this study is among the first, to the best of our knowledge, to consider this specific mechanism with adolescent students. The nationwide representative sample could also be considered as one of the strengths of this study because the findings within pertain most probably to the whole population of Greek adolescents.

Regarding the connections of the current findings with those of prior research, several conclusions can be reached. First, in line with prior empirical findings (cf., Barksdale et al., 2019; Konold et al., 2018; Shindler et al., 2016), we were able to confirm the positive and statistically significant unique contribution of school climate in the form of school community climate in fostering academic achievement and specifically reading achievement. Moreover, by recognizing the sparseness of results concerning the mediating effect of reading self-concept between the bivariate relation of school climate and reading achievement, we hypothesized the existence of an underlying mechanism similar to that which was proposed for academic self-efficacy in the study of Fan and Williams (2018). Particularly, due to the great extent of similarities between academic self-efficacy and academic self-concept of competence (see Bong & Skaalvik, 2003), it is reasonable to assume that self-concept could also play the role of mediator. Regarding the mediating effect of intrinsic motivation, this was entirely expected because prior research results have also indicated the existence of this component of the underlying processes toward academic achievement. It is noted, though, that in the present study a Greek sample was used instead of an American. Therefore, hypotheses 1 and 2 are confirmed.

As far as the last research hypothesis (Hypothesis 3) is concerned, the current results indicate that despite the “gender gap”, that is observed in many types of cognitive assessments (cf., Marinak & Gambrell, 2010; OECD, 2019a), this study suggests that the underlying structure of the processes that proceed from school climate to academic achievement do not differentially function across gender groups. Specifically, we observed across genders that the proposed mechanism (see Figure 1) is universal in the Greek context.

Stemming from these findings are some important, to our opinion, implications for psychoeducational practice. That is, these findings could be indicative of the criteria, which are necessary to be taken into consideration during the planning of educational interventions that aim at improving adolescent students’ literacy levels. Particularly in the Greek context, Greek students’ literacy levels are by far lower than the OECD grand mean (OECD, 2019b), which suggests the need for further improvement of both the educational system and the instructional practices that are common in this context. Therefore, it is recommended that greater emphasis should be placed on both environmental conditions in schools (i.e., school climate) and psychosocial aspects of students’ learning such as intrinsic motivation and reading self-concept.

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