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Learners' Reading Metacognition and Summary Writing Skills Nested in Psychological and Sociocultural Factors

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Abstract

This paper investigates the relationship between secondary school students' reading metacognition and summary writing skills—which represent a part of their academic language skills—within a network of psychological and sociocultural factors consisting of positivity, tolerance and respect, resilience, and culture and cooperation. We used data from the 2018 OECD's Programme for International Student Assessment (PISA) database (n = 612,004) from 79 countries. We conducted a series of confirmatory factor analyses (CFA) to validate the variance and covariance structure of the tests and questionnaires used. Next, we performed structural equation modeling (SEM) to investigate the effect of the predictors on reading metacognition and summary writing skills. A significant relationship was found between sociocultural factors, reading metacognition, and summary writing skills. We propose that it is essential to consider how a student's background, experiences, and school curriculum determine how these indicators present themselves in each student and affect their academic language performance.

Keywords: reading metacognition, summary writing skills, academic language performance, student background and experience, confirmatory factor analysis, structural equation modeling

The main aim of this study is to investigate the effects of psychological and sociocultural indicators on children's academic language performance. Jensen (2009) speaks of the significance of environmental factors in shaping a child's learning ability, memory, and therefore academic language performance. Using the 2018 Programme for International Student Assessment (PISA) data, we sought to determine how students' respective backgrounds affect their reading test scores. While not specifically designed for L2 reading, PISA can offer valuable insights into the linguistic literacy skills that have broader implications for language acquisition and educational policy. The assumption we make is that each measured indicator has an effect on students' academic language performance particularly reading, whether that is to a small or large

extent. In what follows, we provide a review of the factors that have been shown to impact students' academic language performance. These consist of various cultural factors, and several facets of positive psychology, and other variables that vary according to the learning environment.

This study defines metacognition as the ability to gauge one's own level of intellectual mastery of any given content through planning, monitoring, and evaluation. The metacognitive strategies evaluated in PISA 2018 are three: summarizing and understanding a text, memorizing, and assessing the quality and credibility of sources included in the texts. These factors affect students' reading metacognition, and therefore their academic performance (Ferrara & Panlilio, 2020). Hence, we find that it is worthwhile to investigate these variables in particular. It is important that mastering metacognitive strategies as measured by PISA is crucial for both L1 and L2 readers, directly impacting their reading comprehension and academic success. Thus, this study would also offer a lens through which to scrutinize variables germane to L2 reading proficiency.

Literature Review

In this study, we examined the relationship between multiple constructs: Global Citizenship, Exposure to Culture, Cultural Curiosity, Positive Psychology, Resilience, Compassion, Meaning of Life, Respect, and Cooperation versus Competition. In the following sections, we will synthesize the extant literature on the constructs that are directly or indirectly related to the targeted constructs in the present study.

Global Citizenship

According to the 2018 PISA Assessment and Analytical Framework (AAF) (OECD, 2019), a student that possesses global citizenship is one who displays global competence, mindedness, understanding, and interconnectedness by way of being aware of and caring about global issues, and valuing cultural diversity. Babich and Smith (2021) posit that globalized learning can better occur when schools incorporate internalization in their curricula. Educational internationalization to them involves the discussion of, and the incorporation of international cultures. Babich and Smith (2021) delimited three main tenets encapsulating the need for educational internationalization, namely, idealism, instrumentalism, and educationalism. The idealism tenet arises from the belief that educational internationalization promotes students' desire for global justice and fairness. The instrumentalism tenet delineates the practicality of promoting educational internationalization. This includes increasing the likelihood of global economic prosperity by creating a more effective labor force. The educationalism tenet is in line with what we are trying to investigate in this paper, which is the effect of enhancing students' global citizenship on academic performance. Babich and Smith (2021) and Brace (2011) argued that educational internationalization improves, and makes more holistic, the academic experience of both students and teachers through increased exposure to different cultures. In particular, the existing literature states that exposure to different cultures not only enhances one's resilience, but also one's ability to understand real-world issues (Boix Mansilla & Wilson, 2020). We believe that these constructs are also highly relevant to L2 reading and especially pertinent in multi-

linguistic settings, where both L1 and L2 users coexist. Therefore, an investigation into these constructs would offer valuable insights that cater to the complexities faced in both L1 and L2 reading pedagogy.

Global Citizenship is one such tenet that is dependent on one's exposure to different cultures. A global citizen is characterized as valuing cultural diversity (OECD, 2018) and respecting human dignity (Boix Mansilla & Wilson, 2020), and achieving such skills can result from building one's understanding of other cultures through increased exposure. Following this initial exposure is higher self-efficacy to interact appropriately within intercultural interactions. It should be noted, however, that despite the fact that subjects' responses to the 2018 PISA assessment suggest certain levels of global citizenship, their intercultural adeptness can only truly be measured in cross-cultural interactions that take place outside the classroom (Omar & Salih, 2021). This is specifically true about the characteristics of a globally competent student as one who is able to comprehend and take the initiative to attempt to solve global issues (Boix Mansilla & Jackson, 2011; OECD, 2017). In their study of the incorporation of a global competence model of education in Chinese schools, Boix Mansilla and Wilson (2020) highlighted the importance of avoiding an ethnocentric approach when creating a curriculum with the goal of cultivating global competence. In other words, how global citizenship is defined differs across cultural contexts. For example, qualities of conscientiousness, resilience, positivity, and integrity were listed as key markers of a globally competent student by the Chinese teachers in Boix Mansilla and Wilson's (2020) study. Their Western peers on the other hand, did not list any of these qualities, listing instead, inquisitivity, open-mindedness, humility, and fervor as qualities that make up a global citizen.

Overview of the Theoretical Framework

Since reading, writing and metacognition have close dependencies with language users' worldview, we anticipate that there is a relationship between global citizenship and these constructs. In particular, global citizenship entails having global literacy, defined as having the knowledge, skills, and perspectives to navigate real-world issues. Having such skills provides for enhanced reading comprehension and writing skills, especially in subjects such as social studies. In all, it may be said that the triangulation of language use, cultural exposure, and global literacy positions individuals for heightened academic and global competencies. Another closely related concept is exposure to culture, which will be discussed next.

Exposure to Culture

Iskhakova's (2018) study of cultural exposure (CE) and its effects on academic performance, and one's ability to navigate intercultural interactions, highlights that greater CE leads to greater cultural intelligence (CQ). CQ refers to a person's ability to successfully operate and handle themselves in cross-cultural exchanges (Earley & Ang, 2003). According to the 2018 PISA report, CE occurs when multicultural examples are incorporated into lesson plans and when there is cultural diversity within the learning environment (OECD, 2019). Greater CE leads to the inculcation of greater intercultural sensitivity and the building of stronger intercultural relationships (OECD, 2019) among students, and also between students and teachers. Greater CE

benefits both students and teachers alike, as found by Salih and Omar (2021), which serves to enrich the learning environment as a whole.

Wu et al's (2021) study of the effects of cross-cultural exchange on the relationship between reading and writing among EFL (English as a foreign language) learners can be referred to in order to determine the effects of greater cultural exposure (CE) on reading and writing performance. Through these exchanges, with constructivism as an underlying principle, the EFL students in their study build knowledge, rather than uncritically take in information (Wu et al, 2021). In terms of reading and writing performance, Wu et al (2021) contended that through intercultural exchange, EFL students' ability to better discern their own reading comprehension skills and to collect their thoughts in a more cohesive manner is enhanced. For example, Wu et al's (2021) study investigated the effects of intercultural interaction between Taiwanese EFL students and American students on the former's reading and writing. The researchers found that the learners were able to better discern when to use certain vocabulary and also to minimise incorrect grammar use. In other words, the students were better able to accurately estimate their reading and writing abilities, helping them to manage their expectations and take the necessary steps towards improving both sets of skills. Their metacognition improved. On top of improving their writing outcomes, EFL learners also experienced an increase in their intercultural sensitivity, indicating the positive role of CE in nurturing language learners' reading and writing skills.

Likewise, in Brace's (2011) study which aimed to better understand the relationship between teachers' cultural competence and their students' academic performance, it was found that students from minority cultural groups in schools were more likely to fare worse than their "White" counterparts in academic assessments. One reason for this discrepancy included the biased and negative misgivings teachers had of minority students (Ford et al, 2006; Lyman & Villani, 2004). Importantly, cultural dissonance may be possible reason for this discrepancy, and refers to the mismatch between the dominant culture and the minority students' own cultures (Brace, 2011). In particular, there may be a lack of ongoing discourse about cultural dissimilarities within the classroom and subsequently, a distinct lack of effort to understand students' backgrounds and individual needs resulting in teachers having lower expectations of these students in terms of academic achievement (Brace, 2011). These non-expectations may then internalized by the students, leading to less-than-desirable grades (Brace, 2011). In particular, students of "colour[1]" are often burdened with stereotype threat whereby feelings of inadequacy are induced as a result of negative stereotypes of intellectual inferiority being linked with to their "racial[2]" group, thus negatively affecting these students' academic performance (Good et al, 2003). Brace (2011) suggests that schools and their administration need to be attuned to students' cultural differences building the curriculum around these differences rather than requiring students to assimilate. It is through such a nurturing environment that students will then be motivated to achieve higher grades (Brace, 2011).

[1] This term is placed in quotation marks to acknowledge its widespread use in some literature.

[2] The notion of "race" and its associated derivatives may lack scientific basis (see Wells, 2002, for alternative terminologies). The inclusion of this word in this paper should not be interpreted as authors' endorsement of the underlying ideologies associated with it.

Cultural Curiosity

Cultural Curiosity according to the OECD (2019), is when an individual is interested in learning about cultures other than their own. Often, this curiosity cannot flourish in educational settings where ethnocentric world views are propagated. Ethnocentrism in education is where the teaching curriculum is based solely on a single culture's norms and values, ignoring other cultures' points of view (Banks, 2012). Oftentimes, the perspective that is taken to be the end-all-be-all is the Western European perspective, favored over other cultures that may exist in a given society. Similar to our argument in the previous section on exposure to cultures, this ethnocentrism serves to solidify the idea that a certain culture is superior to others. Yousef et al (2014) find that cultural familiarity in the topic of the reading material makes it easier for English as a Second Language (ESL) students to understand and process academic texts. In other words, as the learner's content schema increases, their ability to comprehend the material likely improves (Bernhardt, 2005).

Positive Psychology (PP)

Seligman's (2018) PERMA hypothesis helps us to understand how the constructs we have identified in this paper may affect academic performance (reading cognition and summary writing skills). PERMA stands for positive emotion (P), engaging in acts that play to one's strengths (E), building positive interpersonal relationships (R), discerning meaning in doing things that do not just benefit oneself (M), and being aware of one's accomplishments and achievements (A). Drawing parallels between this hypothesis and the constructs in our study, compassion falls under "P" while respect falls under the "R" component. Resilience is similar to the "E" and "A" whereby resilience is built by being able to regulate one's emotions and also process difficult situations in a healthy way by realizing the means with which one is able to overcome obstacles. Meaning of life is similar to the "M" in PERMA. These components are discussed and situated in the extant literature below.

Resilience

We will be using "grit" and resilience interchangeably in this paper, given the overlapping definitions that they hold. Gao et al (2019) defined grit as a person's tenacity and devotion to achieving a specific long-term goal. Similarly, examples of the 2018 PISA Assessment test items indicating resilience include those that measure a student's commitment to achieving a particular goal and their ability to adjust their behavior in the face of unexpected events. Gao et al (2019) found that there exists a positive relationship between grit and foreign language performance (FLP) among middle school students. Higher levels of grit were also found to boost foreign language enjoyment (FLE), thus indirectly improving FLP, and the overall classroom environment. Grit was also found to benefit students across cultures, while its effects are moderated by the quality of the classroom environment.

Self-regulated learning (SRL) is a concept that helps us to understand how resilience impacts reading metacognition. It is the repetitive and structured learning process of an individual shaped by their consistent moderation of behavior, emotions, and cognition to fulfill an aim (Boekaerts, 2011; Wolters, 2003), and is crucial in maximizing reading comprehension skills and

achievements (Yusuf, 2011; Zimmerman et al, 2011). Reading metacognition is defined as the ability to actively process what one is reading, making links to existing knowledge, and rethinking their previous understandings of a particular subject (Nixon, 2021).

The Simple View of Reading (SVR) theory posits that reading consists of comprehension and decoding, whereby Reading Comprehension (RC) = Decoding (D) x Linguistic Comprehension (LC) (Joshi, 2019). LC serves as a foundation for reading comprehension, as it provides exposure to spoken language, which is fundamental for developing language skills. When language learners listen to spoken language, they engage in extracting meaning through button-up and top-down processing. These skills are also fundamental to reading comprehension, as reading also involves similar cognitive processes. Hence, both decoding and comprehension are required for reading comprehension (Joshi, 2019). With reference to our own constructs, RC is comparable to reading metacognition, while D (Decoding) is a component of summary (or integrated) writing. We do not, however, have a construct that can be paralleled with LC, since the 2018 PISA test did not have an audio component due to logistical constraints (OECD, 2019).

In their investigation of the links between mindfulness, resilience, and academic performance, Vidal-Meliá et al (2022) found that resilience is a moderating factor in determining how mindfulness affects academic performance. To be mindful is to be cognizant of one's present situation and being immersed in the "now," rather than being stuck in the past or overthinking about the future (Vidal-Meliá et al, 2022). In an academic context, students who are mindful are more aware of present capital at their disposal (Vidal-Meliá et al, 2022) to deal with obstacles along their academic journeys. A student who is able to practice mindfulness is likely to be more resilient and able to bounce back from academic failure, assessing the resources available to them and how to utilize them to improve.

Similar to the idea of playing to one's strengths and being aware of one's successes (Seligman, 2018), self-efficacy is the faith we have in our capacity to overcome obstacles and achieve our goals (Akhtar, 2008). Those with a higher level of self-efficacy are both more likely to succeed and to move on from the failure (Ackerman, 2018). Students who have high self-efficacy are better able to cope with hardship and are more committed to their academics (Chemers et al, 2001). In terms of reading proficiency, self-efficacy is both a result of succeeding in this domain, and the formula to their continuing success (Ackerman, 2018).

Compassion

Dutton et al (2006) define compassion as being aware of, empathizing, and reacting to someone else's suffering, eliciting behavior aimed at reducing that person's pain. Estrada et al (2021) emphasize that taking action is a distinguishing factor from simply empathizing with another. A positive correlation has been found to exist between having compassion and academic commitment (Estrada et al, 2021). Similar to the construct of resilience, compassion acts as a mediating factor in the relationship between mindfulness and academic engagement, and subsequently, achievement (Miralles-Armenteros et al, 2021). According to Fredrickson's (2004) Broaden-and-Build Theory, compassion allows for enhanced creative cognitive processing, and therefore greater academic achievement.

Meaning of Life

Mason's (2017) study on sense of meaning and academic performance utilized data collected from the results of the Purpose in Life (PIL) Test (Crumbaugh & Maholick, Citation1981). It was found that meaning and academic performance are directly correlated (Mason, 2017). To find meaning in life is defined as the ability to realize that there is a purpose in life to maintain a sense of hope in times of trouble, as well as the ability to plan and work towards key objectives (Frankl, 2008; Steger, 2012). To lack a sense of meaning is to be at higher risk of psychological turmoil, and thus a higher risk of suffering academically (Frankl, 2008; Nelson & Low, 2011).

Administering the same PIL test in his study of the effects of meaning in life on students' abilities to cope with various life stressors, Makola (2017) found that test subjects with higher PIL scores adopted coping strategies that were more efficacious than those of their peers who scored lower. Makola (2017) thus posits that sense of meaning is a moderating factor in the relationship between the presence of stressors and academic performance. On the other hand, Makola (2017) emphasizes the role of education in inspiring this sense of meaning, hence suggesting the mutually constitutive nature of the relationship between meaning and academic performance.

Respect

The construct of respect involves not just the acceptance of another individual, but appreciation of their innate value. The 2018 PISA test items under the construct of respect focus on respect for other cultures, and human dignity. With reference to the previous review of cultural exposure (CE) and cultural curiosity, the presence of both has a positive impact on the levels of respect an individual has. Hence, in order to enhance respect, a similar approach to increasing intercultural sensitivity within an educational context should be taken through increased CE.

Schotte et al's (2021) study of how teachers' cultural beliefs impact students' academic performance demonstrates that an environment of respect is crucial to optimizing students' academic performance. Teachers' expectations and their ability to recognise and take cultural differences (Aronson & Laughter, 2016; Banks, 2004; Gay, 2002) within their classrooms into account, do affect their students' academic performance. To elaborate on this, respect for cultural diversity is compromised when schools impose assimilation on students from minority cultural groups, relaying the message that their cultural identity is not valued, thus limiting their academic engagement, and performance (Derks et al, 2007).

Cooperation versus Competition

Pesout and Nietfeld's (2020) investigation on how cooperation versus competition affects academic metacognition found that when placed in a cooperative learning environment, students displayed higher levels of reading comprehension relative to those placed in a competitive learning environment. Academic metacognition enables readers to monitor where they are in a text and also how well they comprehend it thus far (Ferrara & Panlilio, 2020). Cooperation, or positive social interdependence, occurs when a student is only able to attain their objectives when other students have successfully done their part (Pesout & Nietfeld, 2020). However,

injecting elements of inter-group competition into an academic setting has been found to make up for the inadequacies of a purely cooperative environment (Rosol, 2013; Tauer & Harackiewicz, 2004).

Competition, or negative social interdependence, is when a student is only able to achieve success at the expense of other students' own success (Pesout & Nietfeld, 2020). Contrary to students placed under cooperative conditions, students' text engagement was negatively related to their reading comprehension in competitive learning environments (Pesout & Nietfeld, 2020). Furthermore, competition has been found to reduce long-term commitment to a task (Staiano et al, 2012). Competition results in weak cognitive processing (Schiefele et al, 2012), a consequence of being exposed to excessive cognitive content (Nebel et al, 2016). Nonetheless, positive outcomes have also been found to result from a moderate amount of competition. For example, Nebel et al (2016) posit that competition breeds social comparison, which can enhance one's ability to stay on top of things. This increased ability to make value judgements has proven to increase the efficacy of metacognitive monitoring, and thus increase academic performance (Pesout & Nietfeld, 2020). Competition has also been found to enhance learning experiences via heightened perceived challenge and acute task engagement (Plass et al, 2013; Vandercruysse et al, 2013).

Having reviewed the key psychological constructs in our framework, we now move on to reading metacognition and summary writing constructs.

Reading Metacognition, and Integrated and Summary Writing

Reading metacognition is crucial to the improvement of writing caliber. Spivey and King (1989) highlight the importance of reading metacognition in more efficacious use of texts, more intricate planning, and the optimisation of writing quality. Need for Cognition (NfC) describes the intrinsic motivation to persist in completing the task of the Integrated Writing task (IW—see description below) while metacognition is more about the ability to do so. As such, NfC is comparable to our construct of summary writing and reading metacognition since the test items used in the PISA instrument ask students about the processes that they take in reading a piece of text. Specifically, the test items seek to determine if students are proactive in their reading, if they attempt to ensure that the parts they have picked out are relevant to the question requirements, and if they make attempts to decode the content of the text in order to accurately summarize it. Students with NfC are more likely to apply greater cognition in reflecting on the question requirements, thus making more logical deductions, and drawing from general knowledge (Cheong et al, 2022). Sample reading tests items of PISA are available from the following link: https://www.oecd.org/pisa/test/.

The Integrated Writing (IW) task, as a general writing construct, is the summarization of multiple academic texts, requiring one to make comparisons across different texts. Cheong et al's (2022) investigation of the part that NfC plays in determining IW performance helps us to understand how metacognition alone is not enough for one to score well.

The Present Study

In the operationalization phase, we focused on reading metacognition, a fundamental construct that is closely linked to summary writing. A notable void in the existing body of the literature is that studies on IW performance have primarily focused on university students, thereby overlooking the secondary school students. Our interest in secondary learners emanates from the conviction that early interventions can set the trajectory for later academic success in integrated writing tasks. The secondary school period is argued to be a key period during which students are introduced to and made to develop their reading and writing language use skills (Cheong et al, 2022). In addition, the datasets used in previous research are typically small and restricted to one or several countries and regions, thereby limiting the generalizability of the findings. A third limitation of the previous research is lack of attention to the network of sociocultural and psychological factors that influence students' academic language performance. To address these gaps, the present study seeks to investigate how the various sociocultural and psychological indicators impact academic performance among secondary school students, using a large dataset collected from 79 countries.

Method

Data Source

The data analyzed in this paper was drawn from a larger population of PISA test-takers, comprising item-level test scores of 612,004 international test candidates aged 15 from 79 participating countries who took the 2-hour PISA test in 2018 (n_{female} = 304,958 (49.8 %); n_{male} = 307,044 (50.2 %)).

Instruments

Overall, eight instruments were used in this study, namely the questionnaires investigating compassion, cooperation, cultural curiosity, exposure to cultures, global citizenship, positivity, reading metacognition, and summary writing (see Figure 1 for a representation of the relationship among these constructs). The aim of the test was to measure students' competency in the comprehension, utilization, assessment, contemplation of, and negotiating of, texts, to fulfill one's ambitions, expand one's knowledge and potential, and to effectively partake in society (OECD, 2019). The features of the student sample for which these instruments were developed are discussed in the previous section.

The 2018 PISA assessment involved presenting the students with tasks based on various text-based scenarios, of varying difficulty levels. The variables were measured using different assessment strategies. For example, global citizenship was measured using a background questionnaire which sought to determine how well-versed students were in global issues, and how culturally competent they were (OECD, 2019).

Data Analysis

We used AMOS, Version 26 (Arbuckle, 2022), to analyze the data using confirmatory factor analysis (CFA) and structural equation modeling (SEM) analysis. For parameter estimation, we used maximum likelihood, as the observed variables were normally distributed, according to their skewness and kurtosis coefficients which ranged between -2 and +2 and -7 to +7, respectively (Field, 2015; Kline, 2015). We fitted a total of 13 separate CFA models to the data as can be cumulatively seen in Figure 1. For clarity, the model presented in Figure 1 also includes standardized estimates of the paths (represented by arrows arrows) that link different constructs in the model. This included Cooperation (four items), Cultural Curiosity (four items), Exposure to Cultures (ten items), Global Citizenship (six items), Reading Metacognition (four items), Summary Writing (four items), Resilience1 (four items), Resilience2 (three items), Respect 1 (four items), Respect 2 (five items), Compassion (five items), Meaning of Life (five items), and Positive Psychology (five items).

Next, we aggregated the CFA models into a theory-driven SEM analysis to determine the impact of different latent variables on reading metacognition and summary writing skills. As suggested in Figure 1, several links may exist among the different latent variables that affect reading metacognition and summary writing. Overall, this model comprised a total of 388 parameters of which 186 were fixed (for parameter estimation) and with 202 distinct parameters to be estimated (n = 612,004).

Figure 1 also delineates how latent variables are measured through each of the PISA test items, in other words, the observed variables used in this study. For example, the ToleranceRespect1 and 2 latent variables, which are separate subscales of ToleranceRespect are measured by four and five items, respectively, as represented by rectangles. Each item also has an error of measurement represented by a small circle which is linked to the items by means of an arrow. ToleranceRespect receives an impact, or support, from the Positivity latent variable which is indicated by four subscales: Compassion, Meaning of Life, Positive Psychology, and Resilience. The impact of ToleranceRespect on Summary Writing and Reading Metacognition latent variables is represented by two one-headed arrows running from ToleranceRespect to these latent variables. Similarly, CultureCooperation consists of four subscales and exerts an impact on Summary Writing and Reading Metacognition.

We estimated the comparative fit index (CFI) and Tucker-Lewis index (TLI) values, which should be $\geq .90$ (Bentler & Bonett, 1980) and desirably ≥ 0.95 (Hair et al, 2010); degrees of freedom (df); and the root mean square error of approximation (RMSEA; Steiger & Lind, 1980) (desirable RMSEA $\leqslant 0.8$) (Hair et al, 2010; Zhu et al., 2019).

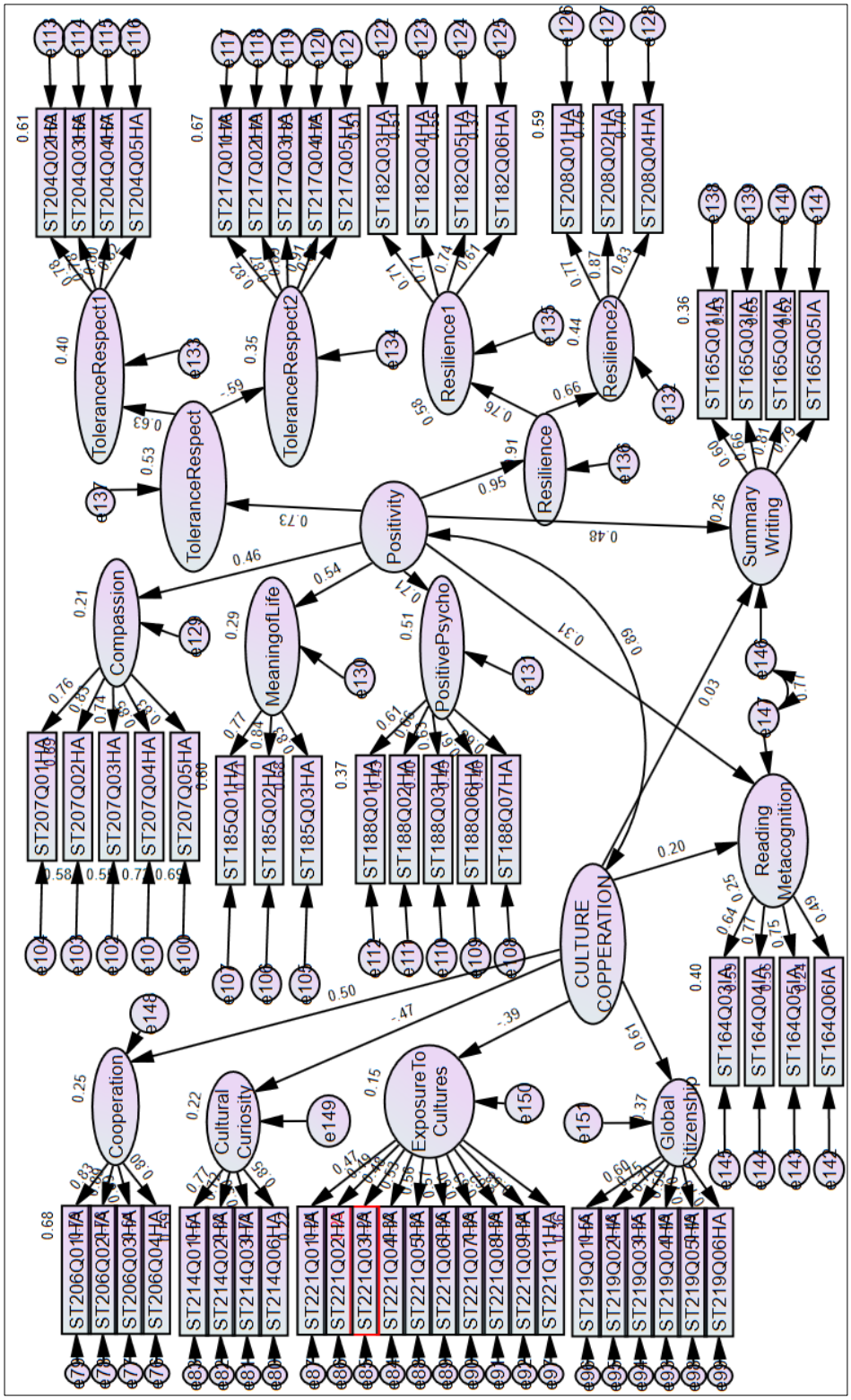

Figure 1

The visual representation of the CFA and SEM models

Note. The one-headed arrows indicate regression paths, and the two-headed arrows represent correlations. The oval shapes represent latent variables or factors, and the rectangles represent indicators or observed variables.

In addition, we computed the standardized and unstandardized path coefficients in the models. Standardized coefficients refer to how strongly a causal variable affects an outcome variable (Lleras, 2005), whereas unstandardized coefficients measure the extent of change in an outcome variable with every one unit of change in the causal variable (Goyal, 2021). From the unstandardized estimate, we derived the standard errors, which represent the precision by which each variable was measured (Hair et al, 2010).

Results

We estimated the internal consistency of each of the latent factors that are represented in Figure 1. The Cronbach's alpha coefficient per each latent factor. See Table 1. All of the alpha coefficients are greater than .7, indicating a high level of internal consistency.

Table 1
Reliability Index (Cronbach's Alpha)

Latent factors (dimensions)	Cronbach's Alpha (Reliability Index)
Compassion	0.899
Cooperation	0.912
Cultural Curiosity	0.882
Exposure to Cultures	0.819
Global Citizenship	0.830
Meaning of Life	0.853
Positive Psychology	0.783
Reading Metacognition	0.754
Resilience 1	0.728
Resilience 2	0.861
Summary Writing	0.800
Respect 1	0.874
Respect 2	0.940

Table 2 provides the results of the CFA and SEM analysis. It presents the absolute fit statistics of various constructs. Our results showed that all models were justifiable. For example, the model for reading metacognition has TLI = 0.911, CF1 = 0.982, and RMSEA = 0.088 (0.086 - 0.089). Overall, the results provided evidence supporting the fit of the models. For example, Exposure to Cultures has a TLI of 0.894, the lowest value across all indicators. Bentler and Bonett (1980)

suggest that TLI values greater than .90 show an acceptable fit, a range within which the TLI for Exposure to Cultures does fall into. In addition, all other constructs had TLI values of greater than 0.9, with resilience displaying the highest value of 0.973. Nevertheless, it should be noted that Cooperation exhibits a relatively high RMSEA value of 0.121, despite acceptable TLI and CFI indices. We took this into account the potential effect of Cooperation on the overall fit of the SEM model.

Table 2
CFA and SEM Model Fit Results

CFA	TLI	CFI	RMSEA	RMSEA low and high 90% boundaries	χ^2	df
Compassion	0.951	0.984	0.087	0.086 – 0.088	1411369.079	15
Cooperation	0.932	0.986	0.121	0.119 – 0.122	1306515.751	10
Culture & Cooperation	0.957	0.965	0.032	0.031 - 0.032	3896586.064	276
Exposure to Cultures	0.894	0.936	0.055	0.054 – 0.055	782498.346	45
Positive Psychology	0.949	0.955	0.033	0.033 – 0.033	9242615.830	703
Reading Metacognition	0.911	0.982	0.088	0.086 – 0.089	529651.010	10
Resilience	0.973	0.987	0.049	0.048 – 0.049	1492249.208	28
Respect	0.947	0.969	0.072	0.072 – 0.073	2699947.736	45
Full SEM model	0.932	0.937	0.028	0.028 – 0.028	859702.880	1750

Note. CFI = Comparative Fit Index; RMSEA = Root Mean Square Error of Approximation; TLI = Tucker-Lewis Index; df = Degrees of freedom.

In addition, we computed the path coefficients, standard error, and the *p* values associated with the path coefficients per each path. The path coefficients among the latent variables are presented in Table 3 (see also Figure 1). In this table, exogenous variables refer to independent variables, whereas endogenous variables receive an impact from other exogenous and/or endogenous variables (Kline, 2015). All the paths reached statistical significance ($p < 0.05$), indicating that the postulated relationships among the latent variables existed in the dataset. When comparing standardized coefficients across the various constructs, we realized the following patterns. Resilience was found to have the strongest causal relationship with the Positivity constructs with a standardized estimate or β coefficient of 0.953. This supports our findings that resilience is a marker of global citizenship (Boix Mansilla & Wilson, 2020), and is a moderating factor in determining academic performance (Vidal-Meliá et al, 2022). Positivity was also found to be positively related with both summary writing (β =.479) and reading metacognition (β =.314). However, culture cooperation had a negligible effect on summary writing (β =.030), suggesting

that when cultural cooperation increases by one standard deviation, summary writing is expected to increase by only 0.030 standard deviations. Therefore, the impact of Cultural Cooperation on summary writing is small. However, culture cooperation had a noticeable effect on reading metacognition (β =.20).

Table 3
Path Coefficients in the SEM Model

Exogenous variable	Endogenous variable	Unstandardized Estimate	Standardized estimates (β)	S.E.	P value
Positivity	Resilience	1.174	.953	.006	***
Positivity	Tolerance & Respect	1.000	.726	a	a
Positivity	Positive Psychology	0.945	.714	.005	***
Positivity	Meaning of Life	1.130	.538	.006	***
Positivity	Compassion	1.048	.456	.006	***
Resilience	Resilience 1	1.000	.765	a	a
Resilience	Resilience 2	1.519	.661	.005	***
Tolerance and Respect	Tolerance Respect1	1.000	.629	a	a
Tolerance and Respect	Tolerance Respect2	-1.071	-.593	.006	***
Culture_Cooperation	Cooperation	1.000	.497	a	a
Culture_Cooperation	Cultural_Curiosity	-1.438	-.468	.008	***
Culture_Cooperation	Exposure_To_Cultures	-0.309	-.386	.002	***
Culture_Cooperation	Global_Citizenship	0.899	.605	.005	***
Culture_Cooperation	Summary_Writing	0.090	.030	.026	***
Positivity	Summary_Writing	1.551	.479	.028	***
Culture_Cooperation	Reading_Metacognition	0.497	.196	.023	***
Positivity	Reading_Metacognition	0.868	.314	.024	***

Note. S.E.= standard error; a = fixed for parameter estimation.

Discussion

This study set out to investigate the relationship between sociocultural and psychological indicators and academic language performance, namely reading metacognition and summary writing. We found that positive relationships exist between each variable and academic performance. As Figure 1 demonstrates, global citizenship is closely linked to, and likely enhanced by, greater exposure to cultures and both of these variables, in turn, have a positive

effect on students' language use. These findings have implications for education and language learning. The first implication is that taking cultural factors into account in creating a conducive classroom environments is crucial. This is consistent with previous research which shows that cultural familiarity with educational materials is key in the development of intercultural competence (Salih & Omar, 2021). The second implication is that the material used cannot purely be based on the dominant culture, but ought to reflect the cultural diversity within the society in which the educational institution is based Banks (2012).

We further found that Positivity has a positive effect on cultural tolerance (see Table 3). Compassion, for example, involves taking action to alleviate another person's suffering (Dutton et al, 2006). Respect involves the appreciation of a human being's innate value, regardless of their differences. This respect for human dignity is a form of cultural tolerance. Likewise, cooperation (positive social interdependence) stems from a person's willingness to work towards a goal that is beyond themselves as an individual, which suggests having a sense of meaning (Seligman, 2018). This stresses the significance of disregarding cultural differences to work towards a common goal, hence fostering cultural tolerance.

Specifically, the Culture Cooperation latent variable had a small but significant effect on summary writing and reading metacognition (β = 0.03 and 0.196, respectively, see Table 3 and Figure 1), while Positivity which represents positive psychology had a medium effect (standardized β = 0.479 and 0.314, respectively, see Table 3 and Figure 1). Thus, as hypothesized, the dimensions of positive psychology, do exert a significant collective effect on academic performance represented by reading metacognition and summary writing. This finding is consistent with Vidal-Meliá et al's (2022) and Gao et al's (2019) studies showing a positive nexus between positive psychology and academic performance.

In addition, we found that exposure to culture is significant in impacting academic language performance (Table 3 and Figure 1). Brace (2011) was unable to fully support her argument that cultural competence has a direct bearing on students' academic performance; our results showed that Exposure to Cultures has a significant but weak impact on summary writing and reading metacognition.

The multidimensional model (Figure 1) validated in the present study represents a significant part of the nomothetic span of academic language performance of secondary school students. A nomothetic span is a network of correlated latent constructs that supports the nexus between a target construct with other measures (Embretson, 1998). The relationships between the constructs provide evidence for the validity of the cognitive or sociocultural model being investigated here using SEM (Figure 1). A main take-way from the results of this analysis is that academic language performance, defined here as reading metacognition and summary writing, is influenced by a wide span of latent variables, such as individual differences, socio-cultural influences, cognitive processes, or contextual factors.

This observation further raises important implications regarding the representativeness of test scores as measures of students' academic abilities within such a complex network. Test scores often focus on specific constructs or skills that in many educational contexts are supposed to be direct measurements of academic abilities. However, our findings suggest that academic

language performance is influenced by multifaceted and interrelated factors beyond what is typically captured by traditional assessments. This implies that relying solely on test scores may provide an incomplete picture of students' true academic capabilities.

Gaps and Limitations

While the representation of academic language performance as reading metacognition and writing summary provides indications of two important aspects of students' language ability (Dumont et al, 2016), it falls short of complete representativeness of the construct of academic language performance. For example, previous studies by Joshi (2019) showed that one's listening comprehension skills are pertinent in determining one's reading comprehension skills. However, our study did not investigate this particular aspect as a result of the PISA test's practical limitations (OECD, 2019).

Another limitation is that of the existing literature based on a cursory view of a student's level of resilience, rather than on past experiences and treatments idiosyncratic to each student (Ferrara & Panlilio, 2020). This is applicable to our study wherein we did not take cultural differences across the PISA test takers, all 612,004 of them from 79 countries, into account in our analysis. It is suggested that future researchers take into account this factor when determining the reasons behind the varying levels at which the constructs are present in each student. Despite this, we believe that the results of our study help to provide a helpful framework showing how each of the constructs are related to one another, and also how they affect reading metacognition and summary writing.

Conclusion

Based on the results of this study, we suggest that various institutional reforms be made in academic settings to improve reading performance, and academic performance in general. It is suggested that rather than imposing the dominant culture on students through their teachings, educators should incorporate various cultures, their histories, and their bodies of knowledge (Banks, 2012) into the curriculum to provide all students with the content schema to comprehend academic texts. Schotte et al's study (2021) finds that having teachers undergo cultural sensitivity training improves not only students' academic performance, but also teachers' incentive and confidence to teach in multicultural classroom settings. We suggest that the nature of classroom environments (CE) is crucial in determining how a particular variable presents in a student. Hence, while the existing literature is useful in demonstrating how the constructs such as those found in Figure 1 individually impact academic performance, our study consolidates and establishes links between each construct to determine how they work in tandem to improve academic language performance. Future research could attempt to delineate cultural idiosyncrasies across societies in order to determine the kind of CEs that should be fostered in each country and/or society.

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