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The relationship between school achievement and creativity at different educational stages

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ABSTRACT

This article examines the relationship between creative abilities and school achievement as measured by using both standardized achievement tests and GPA in Polish primary, middle and high school students. A total of 1106 students were examined (242 lower primary school, 155 upper primary school, 448 middle school and 261 high school students). Multilevel regression models demonstrated the positive, yet weak relationship between school achievement and creativity. There was also evidence that this relationship differed depending upon educational stage and which school achievement measure was used, with a stronger relationship existing with achievement tests than for GPA. Intelligence and motivation served as other moderators.

1. Introduction

The purpose of this article was to identify the relationship between creativity and school achievement while controlling for several moderator variables. The literature of educational psychology has identified three main areas of school achievement conditions: student characteristics, teacher impact and school properties (Hattie, 2009). The first and broadest area concerning students and their characteristics accounts for the greatest degree of variance in school achievement. It includes numerous and internally diverse dimensions such as personality (Chamorro-Premuzic & Furnham, 2003; Poropat, 2009), cognitive abilities (Chamorro-Premuzic & Furnham, 2006; Deary, Strand, Smith, & Fernandes, 2007) motivation (Gottfried, 1985), self-esteem and academic self-concept (Marsh & Hau, 2004; Marsh, Seeshing, & Yeung, 1997) and socio-economic factors (Johnson, McGue, & Iacono, 2007; Sackett, Kuncel, Arneson, Cooper, & Waters, 2009). Significantly less space in the literature is dedicated to the relationship between creativity and academic achievement (e.g., Freund & Holling, 2008; Marjoribanks, 1976; Yamamoto, 1967).

The results of research illustrate that the correlation values between creativity and school achievement are highly diverse. They range from negative correlations, $r = -0.07$ (Vijetha & Jangaiah, 2010), to strong positive ones, $r = 0.66$ (Tan, Mourgues, Bolden, & Grigorenko, 2013). In addition, when applying Grade Point Average (GPA) (Dhatrak & Wanjari, 2011), the strength of the relationship with creativity is lower than in case of external standardized tests (Dollinger, 2011). There are also important cultural differences and differences in educational systems—Pakistani research results indicate, for example, the existence of a negative relationship (Tatlah, Aslam, Ali, & Iqbal, 2012), whereas the correlations obtained in US studies are moderate and positive (Matthew & Stemler, 2013).

Existing research reports are questionable for three reasons. First, the available studies typically involve small, non-random test samples, providing local results that cannot be broadly generalised (e.g., Palaniappan & Persekutuan, 2008;

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Vijetha & Jangaiah, 2010). Secondly, studies describing these relationships have usually been carried out without controlling for any moderators, which may have a significant impact on the nature of the obtained relations (i.e., Naderi, Abdullah, Aizan, Sharir, & Kumar, 2009, 2010). Thirdly, there is a noticeable lack of systematic studies examining the relationship between the level of creativity and school achievement at different stages of education (i.e., Mervosh Gollmar, 2000; Niaz, De Nunez, & De Pineda, 2000; Popov, 1992).

The current study is an attempt to address these deficits in existing research. This study includes the stages of primary, middle, and high school, thus allowing for an analysis of the creativity-school achievement relationship at all levels of education. In addition to identifying the level of creativity and students' school achievements, the study controlled for their intelligence, motivation and gender. With regard to the research sample selection, a random selection of students was chosen in the primary and high schools and only in the middle school was deliberate sampling used.

School achievement is defined as the level at which the students have attained their own educational goals, and is usually measured by continuous assessment and achievement tests (Ward, Stoker, & Murray-Ward, 1996). Creativity, in turn, is understood as a potential for future creative work, a feature of every human being, manifested in particular ways of perceiving and solving problems (Craft, 2005; Runco, 2003) associated with both cognitive components (creative skills) and personal-motivational factors (Urban, 2005).

Increasingly it has been recognised that student creativity is a key skill that merits strengthening during the course of their education (Chien & Hui, 2010). The relationship between creativity and school achievement is complex and merits further investigation. It would be ideal if school achievement and creativity went hand in hand. Often, however, despite the need for the development of creativity, educational systems and curricula focus on developing more specific and narrower skills of students, thus ignoring this particular need (Wilson, 2008), and possibly resulting in differences both in terms of creativity, as well as in its objective evaluation. The study of the relationship between school achievement and creativity, complemented by a series of intermediate variables, can yield two-fold benefits; firstly, it expands the existing range of knowledge in this area, and secondly, by indirectly contributing to the improvement of educational practices, it leads to a strengthening of students' creative potential.

2. The relationship between school achievement and creativity

It is possible to identify putative reasons for both positive and negative relationships between creativity and school achievement. One of the arguments in favor of a positive relationship could stem from cognitive correlates of both school achievements and creativity. The relationship between intelligence and creativity ranged from $r = 0.10$ (Batey & Furnham, 2006; Wallach & Kogan, 1965) to $\beta = 0.22$, or about $r = 0.27$ (Silvia, 2008). Similarly, the overall effect size obtained in the meta-analysis by Kim (2005) was low, at the level of $r = 0.17$ (95% CI = 0.17–0.18). However, these older studies may be biased, and as a result, the reported effect sizes may be underestimated, for example, due to too small sample size in the meta-analytical study (as in the case of Kim, 2005). In recent studies by Silvia and Beaty (2012) and Nusbaum and Silvia (2011) the identified effect sizes of fluid intelligence and creativity reached $\beta = 0.49$ and $\beta = 0.45$ respectively, which significantly exceeded the results obtained in previous studies.

Reported relationships with creativity in previous studies, however, were usually moderate. In contrast, relationships with school achievement were much stronger (for example in the study of Deary et al. (2007), the intelligence-school achievement correlation reached $r = 0.81$).

It is worth noting that the intensity of the relationship depends on both the type of intelligence as well as on the way of measuring educational achievements (cf. Karwowski, 2013b, p. 131). Achievements are more strongly associated with crystallized than with fluid intelligence. In the case of GPA, the relationship with crystallized intelligence takes a value of around $r = 0.23$ (Diseth, 2010), and for standardized achievement tests, a value of $r = 0.37$ (Colom & Flores-Mendoza, 2007). Fluid intelligence, however, correlates with the school GPA to a weaker degree, $r = 0.15$ (Gralewski & Karwowski, 2012) and a comparison with the results of international achievement tests, illustrates that the correlation reaches slightly higher values, ranging from $r = 0.24$ to $r = 0.41$ (Karwowski & Dziedziewicz, 2012).

There is evidence, moreover, that intelligence is related to both the level of pupils' educational achievements and their creativity (Day, Hanson, Maltby, Proctor, & Wood, 2010; Rindermann & Neubauer, 2004). This suggests there may be a positive link between creativity and school achievement. Effective use of divergent thinking should go hand in hand with school achievement (Feldhusen, Treffinger, & Elias, 2006; Feldhusen, Treffinger, Mondfrans, & Ferris, 1971).

Another reason why both positive and negative relationships may be expected between creativity and school achievement may stem from their associations with personality. Relationships between openness and creativity varied from $r = 0.18$ (Silvia, Nusbaum, Berg, Martin, & O'Connor, 2009; Walker & Jackson, 2014) and up to $r = 0.64$ (Hoseinifar et al., 2011) in the case of openness-originality correlations when the overall level of creativity was used. Weaker, but still positive and statistically significant relationships at the level $d = 0.24$ occurred between openness and school achievements (Poropat, 2009). A positive relationship between school achievement and conscientiousness (De Fruyt & Mervielde, 1996), and, at the same time, negative links between conscientiousness and creativity (cf. Batey, Furnham, & Safiullina, 2010; Furnham & Nederstrom, 2010; Silvia et al., 2009; Walker & Jackson, 2014) may lead to an anticipated negative relationship between school achievement and creativity.

There is also a classic link between creativity and intrinsic motivation (Amabile, 1985) and between intrinsic motivation and school achievement (Gottfried, 1985). People who are predominantly intrinsically motivated, as opposed to those who