



Full Length Article

Is doing your homework associated with becoming more conscientious? ☆



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ABSTRACT

Research has shown that sustained homework effort enhances academic performance and that students' conscientiousness is a powerful predictor of students' homework effort. But does homework—as homework proponents claim—in turn also influence the development of conscientiousness over time? In the present study, we examined whether students' homework effort in two subjects (i.e., mathematics and German) was associated with inter-individual differences in students' development of conscientiousness in the early years of adolescence. Bivariate change models with a total of $N = 2760$ students revealed that homework effort and conscientiousness were systematically related over time (Grade 5 to Grade 8). Most importantly, students who invested more effort in their homework showed more positive development in conscientiousness.

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1. Introduction

Conscientiousness refers to a family of related personality traits that include the qualities of having self-control and being responsible to others, hardworking, orderly, and rule abiding (Roberts, Lejuez, Krueger, Richards, & Hill, 2014). Conscientiousness appears to be one of the most influential trait domains, as it predicts physical health (Hampson, Goldberg, Vogt, & Dubanoski, 2007; Moffitt et al., 2011), the onset of Alzheimer's disease (Wilson, Schneider, Arnold, Bienias, & Bennett, 2007), and longevity (Kern & Friedman, 2008). Conscientiousness also predicts outcomes such as relationship quality, the duration of relationships, and occupational attainment (Roberts, Kuncel, Shiner, Caspi, & Goldberg,

2007). And, in the case of school, conscientiousness is the most important factor aside from cognitive abilities when it comes to school performance (Poropat, 2009). Succinctly, conscientiousness is a personality trait that promotes better health, wealth, relationships, and school success.

Given the importance of conscientiousness, it is becoming increasingly common for institutions and the public to want to understand how to foster it (Roberts et al., 2014). Conscientiousness falls into the category of “non-cognitive” factors that are now acknowledged as complementary to but just as important as cognitive ability in determining human capital outcomes, such as educational attainment and occupational success (Almlund, Duckworth, Heckman, & Kautz, 2011). Accordingly, most parents and societies are invested in having their children become adults who are responsible, hardworking, and have appropriate self-control.

It is often assumed that childhood is the right time to develop conscientiousness (Heckman, 2012), and that school provides an ideal environment to foster conscientiousness and its constituent elements, such as industriousness or grit. Homework is one of the most widely used practices through which children are seen as learning the lesson that hard work pays off (e.g., Cooper, Robinson, & Patall, 2006; Epstein & Van Voorhis, 2001; Trautwein, Niggli, Schnyder, & Lüdtke, 2009). Presumably, then,

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homework should be one mechanism through which children learn to be more conscientious. Despite the intrinsic connection between homework and conscientiousness, to our knowledge there has never been a longitudinal study of children in which changes in the two constructs have been tracked simultaneously over time. In the current study, we report data from a four-wave longitudinal study where both students' homework effort and conscientiousness were assessed. Moreover, in addition to the typical self-report assessment of conscientiousness, our study also contains parent ratings of conscientiousness, allowing us to test not only whether self-perceptions of conscientiousness change, but also whether outside observers note the changes related to increases in homework effort.

1.1. Students' homework effort and conscientiousness

In most countries around the world, students spend a substantial amount of time working on homework in subjects like mathematics or language. Typically, more homework is assigned in higher grades than in lower grades, and several literature reviews suggest that homework is associated with achievement gains. For instance, a highly influential meta-analysis by Cooper et al. (2006) summarized a variety of studies and provided empirical support for homework effects on students' achievement. Similar results were found in a more recent meta-analysis (Fan, Xu, Cai, He, & Fan, 2017) and a study by Falch and Rønning (2012), which found that homework effects are largely consistent across data from 16 OECD countries, even though cross-country differences do exist (see also Dettmers, Trautwein, & Lüdtke, 2009).

There are three things to be aware of when considering students' homework. First, the "active ingredient" in homework that drives achievement is homework effort as indicated by active and engaged homework behavior, as opposed to just time spent doing homework (Flunger et al., 2015). A number of empirical studies have shown that homework effort is consistently related to student achievement, whereas findings on the relationship between time spent on homework and academic achievement are more mixed (e.g., Cooper et al., 2006). Regarding the latter, there are some studies showing a positive relation, whereas other studies report null or even small negative effects. The negative effects likely result from the negative link between prior knowledge and time spent on homework, as the time students reportedly spent on homework is "strongly influenced by their prior knowledge" (De Jong, Westerhof, & Creemers, 2000). Second, there is a set of student characteristics that are seen as key determinants of students' homework effort. In particular, students' conscientiousness and related constructs such as self-control, persistence, and achievement goals have emerged as potential predictors of homework effort and therefore higher achievement in terms of test scores or grades (e.g., Duckworth & Seligman, 2005; Elliot, McGregor, & Gable, 1999; Galla & Duckworth, 2015; Trautwein, Lüdtke, Kastens, & Köller, 2006). Consistent with the results on student achievement, it is homework effort rather than time spent on homework that is predicted by students' conscientiousness. For instance, Trautwein and Lüdtke (2007) reported a medium-sized statistically significant relation between conscientiousness and homework effort, but non-statistically significant results for the relation between conscientiousness and time spent on homework. Moreover, conscientiousness has been shown to be particularly important for students' effort in the homework situation, as differences in effort between more and less conscientious students have been found to be more profound in homework as opposed to classwork. Finally, doing homework is not only relevant for students' achievement but is also considered relevant for non-academic outcomes. Epstein and Van Voorhis (2001) identified a variety of non-academic reasons for why teachers assign homework, including

ensuring that everyone participates in learning, promoting parental homework involvement, and developing good personal habits among students. Personal development is achieved by creating situations where students must utilize good time management skills in order to get their work done. Students have to control the amount of time they spend on different tasks, establish work schedules, build study skills (Muhlenbruck, Cooper, Nye, & Lindsay, 2000), and learn to deal with distractions at home (Cooper, Lindsay, & Nye, 2000; Trautwein et al., 2009; Xu & Corno, 1998). This is particularly true in the elementary grades, as teachers are trying to prepare children for the more rigorous assignments that will come later in schooling (Muhlenbruck et al., 2000). Even though all of these educational studies have provided highly relevant findings for the trait of conscientiousness, no study exists that tests the relation between students' homework effort and changes in conscientiousness.

1.2. The development of conscientiousness

An increasing number of studies show that conscientiousness changes during late childhood and early adolescence, although this change does not necessarily follow a linear time trend and diverges from well-known consistent change patterns at older ages (e.g., early adulthood; Roberts, Walton, & Viechtbauer, 2006). Research has shown that children's self-control increases as they move through their preschool and elementary school years, but sometimes decreases again during the transition to adolescence (e.g., Luan, Hutteman, Denissen, Asendorpf, & van Aken, 2017; Soto & Tackett, 2015; Tackett & Durbin, 2017). Denissen, van Aken, Penke, and Wood (2013) highlight the importance of regulative processes for understanding personality development at this age. They argue that regulative strategies need resources and practice, which might be a potential explanation for temporary dips in some aspects of personality maturity. At the same time, however, individual differences in personality traits become more pronounced over childhood and adolescence. Alongside age-related developmental processes, children and young adolescents experience divergent relationships with their social environment, which lead to more pronounced inter-individual differences. For example, youths who spend less time closely supervised by parents have access to quite different learning contexts and gain greater independence in their everyday lives (Caspi, Roberts, & Shiner, 2005; Roberts, Wood, & Caspi, 2008). That is, personality changes quite a lot during childhood and adolescence (Donnellan, Hill, & Roberts, 2015), but not in a systematic way. The years from childhood to young adulthood show higher personality instability compared to other parts of the lifespan, suggesting that personality has a high level of plasticity during this period (Soto & Tackett, 2015).

The idea that students' homework effort can lead to long-lasting changes in students' conscientiousness is guided by recent integrative models of personality traits and personality trait change (Roberts, 2009; Wrzus & Roberts, 2017). The first theoretical perspective on why changes in homework effort may lead to enduring changes in conscientiousness is the sociogenomic model of personality traits (Roberts & Jackson, 2008). According to the sociogenomic model, long-term shifts in states are one of the hypothesized conduits for personality trait change. With regard to the homework-conscientiousness relation, accommodating teachers' demands by studying harder would shift states related to conscientiousness. If these changes in conscientiousness-related states become extended, internalized, and automatic, they can cause changes in conscientiousness in a bottom-up fashion (Magidson, Roberts, Collado-Rodriguez, & Lejuez, 2014; Roberts, 2006). Recent support for the idea that studying might lead to change in a bottom-up fashion comes from a short-term longitudinal study of German high school students, whose conscientiousness increased

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