



The Janus-faced nature of time spent on homework: Using latent profile analyses to predict academic achievement over a school year



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ABSTRACT

Homework time and achievement are only modestly associated, whereas homework effort has consistently been shown to positively predict later achievement. We argue that time spent on homework can be an important predictor of achievement when combined with measures of homework effort. Latent profile analyses were applied to a longitudinal data set with 1915 eighth-grade students who had been surveyed on their homework behavior in French as a second language. There were three main findings. First, based on their values for homework time and homework effort, five distinct learning types were identified: *fast learner*, *high-effort learner*, *average student*, *struggling learner*, and *minimalist*. Second, latent transition analyses confirmed that these learning types were stably identified over time. Third, longitudinal analyses predicting Time 2 academic achievement indicated that time spent on homework can be associated with positive (as in the *high-effort learner*) and negative (as in the *struggling learner*) outcomes.

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1. Introduction

In homework research, studying homework time is the most prominent approach. However, the results regarding the association between students' homework time and achievement are inconsistent (e.g., Cooper, Robinson, & Patall, 2006). Consequently, homework effort has been considered as an alternative measure of homework behavior. It has been found that homework effort is positively related to academic achievement (e.g., Trautwein & Lüdtke, 2007). When comparing homework time and effort, homework effort seems to be the construct with greater predictive power for students' academic achievement (e.g., Trautwein, 2007).

Despite the inconsistent pattern of results regarding achievement outcomes, we will argue in the present article that homework

time is an important variable in homework research, especially when combined with measures of homework effort. More specifically, we claim that high amounts of time spent on homework can either reflect a conscientious working style (which is associated with favorable achievement outcomes) or an inefficient working style (which is associated with less favorable achievement outcomes). To this end, we simultaneously considered indicators of effort and homework time. Latent profile analysis (LPA) is an ideal approach to test our predictions as this analysis uses several indicators to yield "learning types."

The study had four major goals. First, we explored whether specific learning types could be identified when investigating the interplay of homework time and effort. We conducted a re-analysis of data of students from three Swiss cantons who were questioned on their homework behavior regarding the subject French as a second language. We expected to find at least four different learning types characterized by high/low values on homework effort/time. Second, we explored the stability of these learning types, assuming that they were sufficiently stable over time. Third, we investigated the validity of the yielded learning types by

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investigating their differences in emotional, cognitive, and agentic engagement as well as amount of homework attempted. Fourth, we explored the association between the learning types and academic achievement, expecting that homework time — depending on how it was combined with homework effort — would be associated with either favorable or unfavorable outcomes.

1.1. Homework time

The most important reason for assigning homework is to increase students' achievement (e.g., [Trautwein, Schnyder, Niggli, Neumann, & Lüdtke, 2009](#)). Based on theoretical accounts, such as [Carroll's \(1963\)](#) model of school learning, in the vast majority of studies a positive association was expected between homework time and academic achievement.

However, the empirical association between homework time and academic achievement seems inconsistent. In their meta-analysis, [Cooper et al. \(2006\)](#) reported 69 correlations between homework time and academic achievement found in distinct studies, ranging from $r = -.25$ to $r = .65$ ([Cooper et al., 2006, p. 37](#)). The average effect was $r = .24$ (fixed effects model), leading [Cooper et al. \(2006\)](#) to a somewhat positive assessment of homework effects. In a recent meta-analysis that examined homework effects identified in 68 samples using vote counting, the findings were less impressive: 42 negative, 43 non-significant, and 45 positive effects were found for the association of homework time and students' achievement ([Hendriks, Luyten, Scheerens, & Slegers, 2014](#)). Giving rise to further questions regarding the generalizability of a positive homework–achievement association, [Dettmers, Trautwein, and Lüdtke \(2009\)](#) showed differential associations between homework time and achievement in the 40 countries participating in the Program for International Students Assessment (PISA) 2003 study ([OECD, 2004](#)).

Next to the overall unsuccessful attempt to identify a consistent association between homework time and achievement, some theoretical considerations shed doubt on the positive homework–achievement association. The measure of homework time might also capture off-task behavior (e.g., [Karweit & Slavin, 1981](#)). Large amounts of time spent on homework might thus not per se display engaged learning time, even if it might reflect the active use of time for some students (e.g., [Trautwein & Köller, 2003](#)). Unless studies exploring the association between homework time and achievement differentiate between the different meanings of homework time, they may not paint a very conclusive picture of homework effects.

1.2. Homework effort: an alternative to homework time

The low association between students' homework time and achievement and the call to broaden the set of variables used in homework research (e.g., [Trautwein & Köller, 2003](#)) has triggered several studies exploring alternative measures to capture students' homework behavior. Most importantly, researchers have begun to study homework effort. Homework effort is defined as the degree to which students seriously work on their homework tasks and comply with their assignments (e.g., [Trautwein & Köller, 2003](#)). Thus, homework effort refers to the amount of homework worked on thoroughly even if students are not able to solve all tasks correctly.

Most studies have found a positive association between homework effort and achievement (e.g., [Natriello & McDill, 1986](#); [Trautwein et al., 2009](#)). Therefore, alongside homework time, homework effort is increasingly considered to be one of the two main facets of homework behavior (e.g., [Trautwein, 2007](#)).

Time on task and effort can be understood as facets of behavioral

engagement (e.g., [Fredricks, Blumenfeld, & Paris, 2004](#)). Students' commitment to a task is defined as students' engagement ([Fredricks et al., 2004](#)). Task engagement can be conceptualized as a 4-component construct, encompassing behavioral, emotional, cognitive, and agentic engagement ([Reeve & Tseng, 2011](#)). Behavioral engagement is understood as involvement in a task (e.g., [Fredricks, et al., 2004](#)). Positive and negative reactions are defined as emotional engagement while working on a task; cognitive engagement embraces the learning strategies applied (e.g., [Fredricks et al., 2004](#)). Agentic engagement refers to students' intentional and proactive contribution to their learning ([Reeve & Tseng, 2011](#)). Students' differences in homework time and effort might be reflected in their emotional, cognitive, and agentic engagement.

Effort has been measured in a variety of ways. [Fredricks et al. \(2004\)](#) pointed to the need to distinguish “between effort that is primarily behavioral, a matter of simply doing the work, and effort that is focused on learning and mastering the material” (p.64). Hence, drawing on engagement theory and the empirical evidence in homework research, several sub-facets can be differentiated regarding homework effort. One facet is homework compliance, which describes students' efforts to solve their homework tasks and to work on them as well as they can. This conceptualization was used, for instance, by [Trautwein et al. \(2009\)](#). Furthermore, effort can be understood as energized behavior which also includes persistence (e.g., [Furrer & Skinner, 2003](#)), as persistence refers to the mastering of difficult tasks ([Hong, Milgram & Rowell, 1999](#)). This facet of effort has also been studied in homework research, thereby focusing explicitly on students' willingness to continue investing time in homework when dealing with difficult tasks (e.g., [Hong et al., 1999](#)).

A third facet of homework effort pertains to the timeliness and regularity of homework completion. Recent studies have indicated that a fair number of students tend to postpone starting their homework and/or fail to work on a regular basis, e.g., they do not seriously work on their assignments until shortly before exams (e.g., [Katz, Eilot, & Nevo, 2013](#)).

1.3. Bringing homework time and homework effort together

Until now, the effects of homework time and homework effort on achievement have always been examined separately. When a direct comparison of the predictive effect has been reported in a study, more positive regression coefficients have been reported for homework effort rather than for homework time (e.g., [Trautwein et al., 2009](#)). Does this mean that homework time is an irrelevant variable once homework effort is also included in a study?

In the present paper, we argue that both constructs should be considered simultaneously instead of relying on just one (also see [Trautwein, Lüdtke, Nagengast & Flunger, in press](#)). We assume that meaningful configurations of homework behavior can be identified, which can be differentiated in terms of different levels of homework time and effort. These learning types might differ regarding achievement, i.e., large amounts of time may be associated with favorable achievement outcomes in a specific combination with homework effort only.

[Fig. 1](#) gives a graphical depiction of four possible “learning types” differentiating between “high” and “low” levels of homework time and effort. (1) The combination of high time investment and high effort might be called the “high-effort learner”. Hence, there might be students who work diligently on their daily homework and deliberately spend a lot of time on it, with great compliance and persistence. These students might learn everything they have to for French via their regular learning style and, therefore, hold low levels in seasonal efforts. (2) Conversely, some

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