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The influence of academic vocabulary knowledge on school performance

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ABSTRACT

While academic language is often assumed to impact children's school success, evidence for this claim is still limited. One reason is the lack of empirically sound test measures for academic language that are based on clear conceptualizations. In a study with 173 German fourth graders we investigated whether academic vocabulary knowledge predicts children's performance in school beyond general vocabulary knowledge, employing newly developed tasks to assess academic vocabulary. Analyses reveal that academic vocabulary rather than general vocabulary predicts grades in four subjects, controlling for age, gender, language background, and nonverbal cognitive abilities. These results support the claim that already in primary school academic language proficiency significantly influences academic careers.

1. Background

1.1. Language demands in school and school performance

It has been suggested that with school entry language demands on children increase and go beyond everyday language, for instance within textbooks or oral and written instructions. These language sources may, among other things, contain new words rarely used on the playground and not common in all of the children's homes. This potential linguistic challenge needs to be taken seriously, since it has been shown frequently that learning processes, knowledge acquisition, and active participation in school rely on language skills to a substantial extent (e.g., Holler, 2007; Hohm, Jennen-Steinmetz, Schmidt, & Laucht, 2007; Preston et al., 2010).

Results from large international comparison studies on school performance advert to the prominent role of language for school success (PIRLS 2011: Bos, Tarelli, Bremerich-Vos, & Schwippert, 2012a; Mullis, Martin, Foy, & Drucker, 2012b; TIMSS 2011: Bos, Wendt, Köller, & Selter, 2012b; Mullis, Martin, Foy, & Arora, 2012a; Martin, Mullis, Foy, & Stanco, 2012). Results repeatedly revealed that children who hardly speak the instructional language at home, scored lower in tests of reading competence (PIRLS 2006, 2011), mathematics, and sciences (TIMSS, 2011) than their classmates in almost all participating countries. The impact of language competence across school subjects is frequently highlighted, including disciplines such as mathematics (Abedi, Hofstetter, Baker, & Lord, 2001; Gürsoy, Benholz, Renk, Prediger, & Büchter, 2013; Martiniello, 2008), and social studies (Cho & Reich, 2008; Short, 1994, 2002; Townsend, Filippini, Collins, & Biancarosa, 2012).

The requirement of an advanced command of language for school success is also officially defined in many countries, including the United States (e.g., NCSS: Adler, 2010; © Common Core State Standards Initiative, 2015) and Germany (Standing Conference of Ministers of Education in the Federal Republic of Germany, resolution 15th of October 2004): Children are supposed to become able to communicate about complex concepts and models as well as to formulate arguments and solutions for problems. However, it is frequently assumed that these types of process-related competencies rely on a *particular* kind of language, the *language of schooling* or *academic language* (Bailey, Butler, LaFramenta, & Ong, 2001; Gogolin, 2006, 2007; Gogolin, Lange, Michel, & Reich, 2013; Schleppegrell, 2001; Townsend et al., 2012). Compared to a general, everyday language that is used in daily routines and contexts, academic language is characteristic for

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academic contexts, cognitively more demanding and composed of more complex lexical and grammatical structures. Academic language may specifically enable children to participate in academic discourses and facilitate learning – not only in language subjects, but in most disciplines (Haag, Heppt, Stanat, Kuhl, & Pant, 2013; Townsend et al., 2012).

Despite a large amount of theoretical work on the notion of academic language, there is a lack of empirical work both regarding a clear conceptualization, and its relationship to school achievement (e.g., Ahrenholz, 2010; Townsend et al., 2012). In particular, it is still unclear whether there is a *differential impact* (especially a differential predictive impact) of academic language knowledge on school success as compared to general language knowledge. One reason for the lack of these kinds of empirical studies, in particular for the German language, is that there are no standardized diagnostic instruments for assessing academic language in primary school children available yet.

For the present study, newly developed tasks for measuring academic vocabulary knowledge in the German language have been employed.[3]. The goal of the study is to contribute to an empirical foundation and a more profound understanding of the specific impact of academic vocabulary knowledge on school performance. By taking into account general vocabulary knowledge as well as further student characteristics, specific difficulties that children from different family backgrounds may experience can additionally be evaluated. This is important for the development of scientifically sound language support.

1.2. The concept of academic language

Various conceptualization approaches can be found across the scientific literature on academic language. Academic language can be characterized as "specialized language (…) of academic settings that facilitates communication and thinking about disciplinary context" (Nagy & Townsend, 2012, p. 92). It is often described in contrast to the more informal everyday, general language (basic interpersonal communication skills, BICS, vs. cognitive academic language proficiency, CALP, Cummins, 1979). Usually, both concepts are not regarded as dichotomous categories, but as a continuum ranging from rather basic grammatical and lexical structures and a high degree of contextual embedding to higher levels of complexity in grammar and vocabulary and a low degree of contextual embedding (Ahrenholz, 2010; Eckhardt, 2008; Gogolin, 2004; Snow, 2010). General language is typically characterized by the availability of social context and a direct reference framework, including non- and para-verbal cues (e.g., chatting with a neighbor). In contrast academic language is conceptually closer to formal, written language and is used to express more abstract contents (e.g., a university lecture or a political statement, Halliday, 1978).

A functional linguistic perspective points out the specific *functions* of academic language in the school context, e.g., comparing, describing, and summarizing (c.f., Bailey & Butler, 2003; Solomon & Rhodes, 1995). Among other characteristics, a general academic vocabulary, an enhanced use of nominalizations, extended nominal and prepositional phrases, long and complex sentences as well as impersonal forms such as passive constructions are postulated as distinctive features of academic language.

Cummins and Bernstein describe to types of code within a language (basic interpersonal communications skill, BICS & cognitive academic language proficiency, CALP, Cummins, 1979; restricted code & elaborated code, Bernstein, 1962) and relate their development to socialization processes and schooling. The Iceberg Model (Cummins, 1984) describes academic and general language competences by depicting the latter one as the tip of the iceberg, that is, on the observable level, and academic language skills as being situated below the surface and therefore being more difficult to detect. Such a view could theoretically explain the often assumed smaller attention to academic language competencies, and resulting challenges in educational contexts (Ehlich, 1995, 1999; Knapp, 1999; Nagy & Townsend, 2012; Townsend et al., 2012). Moreover, the assumptions underlying this illustration may also partly explain why children with migration background, as well as children who grew up in an environment where the prevailing language register is rather restricted, may experience difficulties following texts and instructions in school: The ability to communicate fluently on an everyday language level may mislead to the conclusion that the children's language skills are sufficient to master the language used in school (Skutnabb-Kangas & Toukomaa, 1976). This phenomenon is also referred to as *linguistic facade* (Cummins, 1979) or *hidden language deficiencies* (*verdeckte Sprachschwierigkeiten*, Knapp, 1999). A more recent analysis by Kruckenberg (2012) is in line with this reasoning: She found that the school problems of children from hardly integrated sub-societies in urban agglomerations are due to particular difficulties with the instructional language.

1.3. Characteristics and role of academic vocabulary

Academic vocabulary is regarded as one key element of academic language (Coxhead, 1998, 2000; Schleppegrell, 2004; Townsend et al., 2012). It is less clear, however, which specific role academic vocabulary plays regarding school success. It has been shown repeatedly that children's general vocabulary impacts performance in school (Cunningham & Stanovich, 1997; Durham, Farkas, Hammer, Bruce Tomblin & Catts, 2007; Duncan et al., 2007; Walker, Greenwood, Hart, & Carta, 1994), especially reading comprehension (Carlisle, 2007; McKeown, Beck, Omanson, & Perfetti, 1983; Nagy, 2007, pp. 52–77; Snow & Kim, 2007; Stahl & Fairbanks, 1986). However, there is little empirical work examining the differences between the role of general vocabulary and academic vocabulary.

Understanding which kind of vocabulary influences academic success is essential for raising teachers' awareness and conceptualizing suitable vocabulary training. Moreover, if it is academic vocabulary beyond or even rather than general vocabulary that influences children's school success, this could be one explanation for social and language-background related disparities in children's school performance: It may be academic vocabulary in particular that is not encountered to the same extent by children from different backgrounds.

Commonly, a further differentiation is made to characterize academic vocabulary (Ahrenholz, 2010; Köhne, Kronenwerth, Redder, Schuth, & Weinert, 2015): Technical terms that are specific to a particular discipline (e.g., stethoscope with medicine). It is often assumed that these *domain-specific* terms are introduced more explicitly in class than general academic words since they convey precise meanings in a particular subject (e.g., *hypotenuse*), which are presumably new to children. They are also assumed to be more obviously unknown and difficult, because they tend to originate from Latin or Greek (Nagy & Townsend, 2012). Most important the lack of explicitly introducing academic vocabulary may be a key reason for children's difficulties with understanding it, which again may influence children's school performance (Ehlich, 1995,

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