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Metacognitive beliefs, self-confidence and primary learning environment of sixth grade students

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ABSTRACT

Metacognition is an integral component of a self-regulated approach to learning. The present study examined the relationships between academic self-efficacy and perceptions of one's own competence in memory and reasoning abilities, and their role in predicting the Self-confidence trait. The study also aimed to determine the role of key classroom factors (goal orientation and self-efficacy with the teacher) in predicting self-beliefs, the Self-confidence trait and academic achievement in Year 6 students ($N = 177$). EFA and Path analysis were used to determine these relationships. The hypothesised path model was tested in a simultaneous fashion of the entire system of variables to determine whether or not hypothesised relationships were consistent with data. The results suggest that academic self-efficacy and metacognitive competency beliefs define a broad factor—Metacognitive Beliefs—which serves as a key predictor of Self-confidence. Mastery goal-orientation and self-efficacy with teacher predicted Metacognitive Beliefs and, indirectly, Self-confidence. Students with stronger Metacognitive Beliefs were less engaged in self-handicapping behaviours. Known common factors—intelligence, gender and a proxy for SES, school fees—were controlled for. The present study has important implications for both metacognitive theory and educational practice.

1. Introduction

Metacognition refers to the executive processes involved in reflecting on one's own thinking—'thinking about thinking' (Flavell, 1979). Metacognition, along with cognition and motivation, is one of the three fundamentals of self-regulated learning (Efklides, 2006; Schraw, Crippen, & Hartley, 2006). It enables students to navigate effectively and to take control of the learning process (Paris & Winograd, 1990; Stankov & Lee, 2008). Metacognition does not occur in isolation—there are contextual factors that contribute to its development and influence the extent of its use (Garner, 1990; Pressley & Gaskins, 2006). The present study aims to determine a link between key aspects of the typical classroom environment, such as goal-orientation and self-efficacy with a teacher, and metacognitive beliefs and self-confidence in children.

Most theories distinguish between knowledge about cognition and metacognitive experiences (Brown, 1987; Efklides, 2008; Nelson & Narens, 1994; Schraw & Dennison, 1994; Veenman & Elshout, 1999). Knowledge of cognition refers to the information one has about tasks, as well as strategies, goals and beliefs that one has about one's own thinking (Flavell, 1979). A subset of such beliefs, namely academic self-efficacy (individual's judgments of his or her competence to perform academic tasks; Schunk, 1991) and perceptions of one's own competence in memory and reasoning abilities (Kleitman & Stankov, 2007), is one focus of this research. Both academic self-efficacy and metacognitive self-concept are measures of beliefs that reflect knowledge of oneself as a learner, beliefs inherently linked to the broad 'knowledge of cognition' aspect of metacognition. Thus, we expect (Hypothesis 1) that these beliefs will converge to define a broad construct—metacognitive beliefs (see also Kleitman, 2008, for a review).

Metacognitive experiences comprise judgments, feelings and thoughts people make during on-task performance (Efklides, 2001, 2006; Flavell, 1979). They include the feeling of confidence that is another focus of this research. In this research, we used immediate online markers of confidence level that students assigned to their performance (Efklides, 2001, 2006; Flavell, 1979) using three aptitude tests: mathematics, vocabulary, and reading. Immediately after answering a question, participants are asked to rate how confident they feel that they have answered a question correctly (see Fig. 1).

In adults, these on-task confidence judgments have high internal consistency (Kleitman & Stankov, 2007) and robust test–retest estimates (Jonsson & Allwood, 2003). There is strong evidence showing individual differences in confidence ratings. That is, relationships between confidence ratings from a broad battery of cognitive tests reflecting diverse cognitive abilities (e.g., Gf, Gc, Gv, general opinions) are consistent and high enough to define a strong Self-confidence factor which is meaningfully related to, yet is independent of intelligence, relevant accuracy of

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[1] The study reported in this manuscript was conducted at the University of Sydney. The data can be obtained by writing to the first author.

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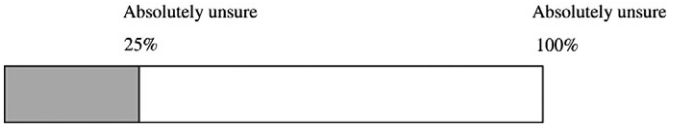

Fig. 1. Confidence rating scale. *Note*: the participants could draw the line anywhere in the unshaded section of the rectangle. A mark near 25% indicated that they felt absolutely unsure, or guessed, and a mark closer to the other end of the rectangle (100%) indicated that they were absolutely sure of their answer.

performance and personality factors when factor analytic methods are used (see Pallier et al., 2002; Stankov, 1999; Stankov & Kleitman, 2008 for reviews).[2]

Kleitman and Moscrop (2010) investigated the generality of the Self-confidence factor across different achievement domains (Maths and Vocabulary) and Raven's Progressive Matrices (RPM) Test with children in Grades 4 and 6 ($N = 197$). As with adults, reliability coefficients for confidence ratings for these tests were high (.84–.96). The results of the CFA determined that a distinct general Self-confidence factor emerged, exclusively defined by the high loadings of the confidence scores from all three cognitive tests. Thus, Self-confidence exists as a stable construct both within a test and across cognitive tests, in children as young as nine years of age.

The Self-confidence factor is pertinent to test-taking behaviour and learning outcomes, even after controlling for intelligence (Kleitman & Moscrop, 2010) and other key factors (Stankov & Lee, 2008). That is, Self-confidence, although relating positively to intelligence, still makes a unique contribution to the prediction of standardised school grades, in addition to the child's fluid intelligence, gender, age and family dynamics (Kleitman & Moscrop, 2010). In adults, a small, yet statistically significant incremental validity of the confidence scores was apparent above and beyond the relevant accuracy scores in predicting performance on the TOEFL test (Stankov & Lee, 2008). These findings support a 'mixed model', which posits a predictive validity of metacognitive factors on school and learning achievement that is incremental to intelligence (Van der Stel & Veenman, 2010).

1.1. Outcome measures: different aspects of academic achievements

In the present investigation, we bring together different strands of metacognitive, educational and differential psychology research, that have not yet been considered in combination, to enhance our understanding of two key metacognitive features—metacognitive beliefs and self-confidence—within the learning environment. In addition, we will also consider two other well-established measures of academic achievement, accuracy of performance on aptitude test (reading comprehension, vocabulary and mathematics), and the reported tendencies towards self-handicapping. These *purposeful* tendencies involve 'creating impediments to successful performance on tasks that the individual considers important' (Urdan, 2004, p. 251). Such behaviours include procrastination or staying up late before an exam. Most of our hypotheses will be explicitly formulated with respect to the two novel outcome measures of (a) metacognitive beliefs and (b) self-confidence. However, considering the nature of the constructs under investigation and research outcomes already available in the literature, similar hypotheses are assumed for the other two outcome variables—we expect positive predictions for (c) accuracy of academic performance (e.g., Kleitman & Moscrop, 2010), and negative predictions for (d) self-handicapping (we outline a model below and in Fig. 2; we label our predictions as 'a'–'d' accordingly).

1.2. Predictors

1.2.1. Metacognitive beliefs

There are strong theoretical links between metacognitive knowledge and metacognitive experiences (e.g., Efklides, 2008). Empirical results support this suggestion: the metacognitive beliefs and specific academic self-concept/-efficacy judgments predict a significant proportion of variance for self-confidence, after controlling for accuracy of performance (Efklides & Tsiora, 2002; Kleitman & Stankov, 2007; Kröner & Biermann, 2007). Similarly, metacognitive beliefs positively predict accuracy of performance on the different cognitive tests (Kleitman, 2008). Although never examined, metacognitive beliefs should provide a buffer against self-handicapping tendencies. Self-handicapping strategies are purposeful and they are deliberately used to avoid the appearance of incompetence, as they enable students to deflect attention from their ability if they perform poorly (Urdan, 2004). Thus, children with high levels of self-beliefs should be less likely to self-handicap. Accordingly, we expect that higher metacognitive beliefs will correspond to higher levels of: b) confidence; c) accuracy of academic performance; and lower levels of d) self-handicapping tendencies, incrementally to other factors (Hypothesis 2 b, c, d; see Fig. 2 below).

1.2.2. Early social environment

One important external influence in children is their early social environment, including their relationships with parents and teachers. The theoretical origins for this view stem from Vygotsky (1978), who proposed that development occurs through the gradual internalisation of social activities. Thus, children develop the capacity for self-regulation through interactions with others who are more knowledgeable than themselves. These others act as 'metacognitive mentors' (Stright, Neitzel, Sears, & Hoke-Sinex, 2001, p. 456) who initially provide metacognitive information for children, until the child can take responsibility for his/her own executive functions.

1.2.2.1. Parents. A nurturing caregiver–child relationship allows the child to explore their world, leading to the development of internal working models that 'promote exploratory competence, self-effectance, and self-esteem' (Moss & St-Laurent, 2001, p. 863). In adults, retrospective reports of high levels of maternal overprotection during childhood *negatively* predicted Self-confidence (Want & Kleitman, 2006). In children, high levels of maternal care predict higher levels of Self-confidence (Kleitman & Moscrop, 2010).

1.2.2.2. Teachers. Similarly, a positive relationship with teachers has a positive influence on the learning habits and academic aspirations of children (Burchinal, Peisner-Feinberg, Pianta, & Howes, 2002; Murdock & Miller, 2003; Wentzel, 2002). Although the nature of the relational bond is different between parent–child and teacher–child interactions, the essence of the relationship is the same: caring, closeness, warmth and open communication (e.g. Crosnoe, Burchinal, Keating, Friedman, & Clarke-Stewart, 2010; Crosnoe, Johnson, & Elder, 2004). Self-efficacy beliefs with teacher refer to how competent a student feels about communicating with and relating to their teacher (Schunk, 1989). In Hypothesis 3 (a, b, c, d), we expect that feelings of competence in relating to the teacher will be positively related to three of the outcome measures—a) metacognitive beliefs, b) self-confidence, c) accuracy of academic performance, and negatively to d) self-handicapping (see Fig. 2 below).

1.2.3. Perceived classroom environment

Achievement goal theory defines goal orientation as the student's *perception* of their own classroom environment, as a single learning environment does not provide a common experience for all students

[2] We will use the term confidence judgments/ratings/levels to index on-line confidence scores that people assign to indicate how confident they feel about their answers. These confidence ratings for all test items are averaged to give an overall confidence score on a test. We will refer to the Self-confidence construct to index a broad psychological trait that cuts across diverse cognitive domains.