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School-related stress and cognitive performance: A mood-induction study

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ABSTRACT

Previous research indicates that mood can have both negative and positive effects on students' cognitive processes, and that school-related stressors may negatively impact on academic performance. However, little is known about the role of negative mood specifically originating from stressful situations experienced in the school setting in children's cognitive performance. This study aims to assess 1) the effect of viewing a film clip of a school-related stressor on students' mood, and to test whether a positive guided imagery (PGI) can reduce it; 2) the effect of a mood-induction procedure (MIP) and PGI on basic academic performance; 3) if students with different degrees of school adaptation perform differently after experiencing the MIP and PGI. Participants were 205 students (103 girls) aged between 8 and 13 years, recruited in primary and lower secondary schools in Northern Italy. Participants were randomly assigned to two groups undergoing: 1) only MIP, and 2) MIP followed by PGI. Students completed mood questionnaires and a basic processing speed math task before and after the mood induction. In addition, they were asked to report on their school anxiety, school stress manifestation, and quality of the student–teacher relationship via self-report questionnaires. Both the MIP and the PGI proved to be effective. Students' basic academic performance significantly decreased in the MIP group, but not in the PGI group. Participants with higher school adaptation were more affected by the MIP and PGI compared to children with lower school adaptation. The discussion addresses the significance of these results for theory on the effects of mood on students' learning as well as for practice in educational settings.

1. Introduction

School-related stress is a widespread phenomenon that has been shown to negatively affect students' academic performance (Kaplan, Liu, & Kaplan, 2005; Kenny, Gallagher, Alvarez-Salvat, & Silsby, 2002) and emotional well-being (e.g., Reijntjes, Kamphuis, Prinzie, & Telch, 2010), as well as to contribute to school failure or even dropout (de Anda et al., 2000). School-related stress is often caused by dysfunctional interactions with peers and repetitive judgments that can be particularly distressing during pre-adolescence. At this age, the school environment is valued as the most significant, and therefore sources of stress within this context may be especially evocative and disruptive (Teicher, Samson, Sheu, Polcari, & McGreenery, 2010).

Moreover, everyday educational experience and research indicate that intense negative emotions, such as anxiety and fear of examinations or depression (Pekrun, Goetz, Titz, & Perry, 2002; Valiente, Swanson, & Eisenberg, 2012), can have potent adverse effects on cognitive processing and impair learning performance (Hascher, 2010; Hidi, 1990). There is a growing interest in, and knowledge about, the interplay of mood, emotions, and academic performance (e.g., D'Mello & Graesser, 2012; Pekrun, 2005, 2009; Pekrun, Goetz, Frenzel, Barchfeld, & Raymond, 2011; Strain, Azevedo, & D'Mello, 2013). One way to study the effects of such emotional states on students' academic performance is to investigate how a stressful academic event can induce a specific mood, which in turn affects students' performance and learning. Although increasing empirical attention has been devoted to the influence of individuals' normal mood variations on the ability to think, comprehend, and solve problems (e.g., Bohn-Gettler & Rapp, 2011; Brand, Reimer, & Opwis, 2007; Mitchell & Phillips, 2007), few studies have investigated this phenomenon within the school context (e.g., Efklides & Petkaki, 2005). Furthermore, while research has shown that academic emotions influence students' learning and achievement (Broughton, Sinatra, & Nussbaum, 2013; Dettmers et al., 2011; Pekrun, Elliot, & Maier, 2009; Pekrun, Goetz, Daniels, Stupnisky, & Perry, 2010; Wosnitza & Volet, 2005), to our knowledge there are no studies investigating the effect of a mood variation induced by a typical source of distress experienced within the school context on cognitive performance.

In this study, we seek to examine whether viewing a film clip of a school-related potential stressor (e.g., being questioned by the

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teacher in front of the class, or getting a bad grade in a test) induces a negative mood in students, and whether such a mood negatively affects basic academic performance. Moreover, we test whether a positive guided imagery (PGI) after the mood-induction procedure (MIP) helps students feel better and improve their performance. This knowledge may inform the design of appropriate educational programs aimed at reducing the effects of negative mood originating from school-related stressors on students' cognitive performance through simple classroom management skills.

Another important question is whether the relation between mood and cognitive processing is linear (Efklides & Petkaki, 2005; Hascher, 2010; Pretz, Totz, & Kaufman, 2010). Recent studies indicate that the link between school-related stress and academic performance is moderated by a number of individual and contextual variables (Kaplan et al., 2005), including the learners themselves and the way they adapt to the school context (Mitchell & Phillips, 2007). Here, we examine whether it is possible to identify subgroups of students based on their degree of school adaptation, and if these subgroups differ in their susceptibility to the effect of mood induction on basic academic performance.

1.1. Effects of mood on cognitive performance

In recent years, empirical evidence has shown that students experience a wide range of discrete positive and negative emotions in the classroom, such as enjoyment, pride, anxiety, anger, helplessness, and boredom (e.g., Dettmers et al., 2011; Goetz, Frenzel, Pekrun, Hall, & Lüdtke, 2007; Nett, Goetz, & Hall, 2011). Furthermore, the influence of emotion on learning has been empirically investigated through experimental studies based on mood induction (Mitchell & Phillips, 2007; Nadler, Rabi, & Minda, 2010; Phillips, Smith, & Gilhooly, 2002b), which addressed the effects of mood on information processing.

Mood is a dispositional state that lasts for several minutes or hours (Mitchell & Phillips, 2007) as compared to emotions, which may typically last for seconds or even fractions of a second (Lazarus, 1994; Watson & Clark, 1994). Mood provides a background to our everyday activities (Alpert & Rosen, 1990) and is usually less intense compared to emotions (Pekrun, 2006; Pekrun & Linnenbrink-Garcia, 2014). More importantly, several authors have emphasized that a meaningful differentiating feature of moods might be that they are diffuse and global as opposed to specific (Ekkekakis, 2012; Frijda, 2009). That is, when referring to an elicited mood we do not assess a specific, narrowly defined state, but the role of broad dimensions that are theorized to underlie a global domain of content (mood) characterized by a number of different emotions, which may be more or less present and intense.

Children at a young age are already aware that emotional or mood states can significantly enhance or impair performance in cognitively demanding tasks (Amsterlaw, Lagattuta, & Meltzoff, 2009). However, the literature on the effects of everyday normal mood variations on children's cognitive performance is still controversial (e.g., Mitchell & Phillips, 2007). Most of the extant research on the mood–cognitive functioning link concerns the effects of abnormal mood, such as clinical depression or anxiety disorders. However, normal mood fluctuations have also been found to benefit (e.g., Isen, Shalker, Clark, & Karp, 1978), impair (e.g., Phillips et al., 2002b), or have no effect on (e.g., Phillips, Bull, Adams, & Fraser, 2002a) different aspects of cognition.

Studies on negative mood induction show that adults in a negative emotional state perform significantly worse on tasks measuring creativity, flexible thinking, problem solving, and memory than those induced into positive emotional states (Brand et al., 2007; Davis, Kirby, & Curtis, 2007; Fredrickson, 2001; George & Zhou, 2007). That is, negative mood is associated with a reduction in cognitive functioning (Oaksford, Morris, Grainger, & Williams, 1996), which may be explained by a reduction of information processing capacity (Ellis & Ashbrook, 1988; Oaksford et al., 1996). According to Eysenck's influential Processing Efficiency Theory (PET; Eysenck & Calvo, 1992), a negative mood state can be characterized by the experience of high anxiety, which involves task-irrelevant thoughts (e.g., self-preoccupation and worry). These thoughts interfere with working memory by draining resources and leading to significant decrements in test performance, especially when the task being performed is complex and attentionally demanding.

Within the school context, students experience a wide range of stressors which can elicit a number of different emotions embedded in the broad dimension of negative mood. It is well-known that one of the main stress-related outcomes is the presence of anxiety, a negative mood state that occurs in anticipation of a perceived threat (Barlow, 1991). We aim at investigating whether such an emotional state reduces students' academic performance in a basic math task, as has been documented in the literature addressing the relationship between anxiety and cognitive performance (see Eysenck, 1992, for a review).

In relation to positive mood, there is some evidence that it might influence cognitive control (Rowe, Hirsh, & Anderson, 2007). For example, positive mood has been shown to facilitate a broader focus of attention. Individuals in a positive mood state can recall more words than those in a negative mood state (Isen et al., 1978), and generate more uses of a particular object (Phillips et al., 2002a). Furthermore, positive-mood induced adults have been found to show a greater degree of cognitive flexibility compared with neutral and negative-mood subjects (Nadler et al., 2010). On the other hand, there is evidence that positive affective states are associated with increased distractibility (Dreisbach & Goschke, 2004) and impaired storage capacity (Martin & Kerns, 2011). Hence, positive mood may hinder or facilitate cognitive processes. However, following the behavioral research and therapy literature (e.g., Keogh, Bond, & Flaxman, 2006), it can be hypothesized that the use of a PGI (Sapp, 1994) may change mood from negative to positive/neutral and thus increase students' performance in a cognitive task.

1.2. School-related stress and cognitive performance

School makes up a significant part of a child's life and provides a context in which demands for academic and social performance are placed on students, who are constantly being evaluated by their teachers, parents, and peers. Within this context, both achievement and social interactions with peers and teachers may be perceived by students as sources of stress (Murberg & Bru, 2004). There is a vast literature investigating the effects of social interactions at school on psychological and academic functioning (e.g., Gini & Pozzoli, 2009). Yet, only few studies have examined the effects of achievement-related stressors on students' cognitive and emotional well-being. These works report that early adolescents' school-related stress negatively affects academic performance in both the short- and the long-term (Kaplan et al., 2005).

Following the transactional model of stress (Lazarus & Folkman, 1984), the importance of both individual appraisal processes and perceptions of the psychosocial school class environment as predictors of students' well-being and academic performance have been emphasized (Luiselli, Putnam, Handler, & Feinberg, 2005; Torsheim, Aaroe, & Wold, 2001; Torsheim & Wold, 2001). However, few studies have focused on individual differences moderating the stressor–cognitive performance link (see Compas, Connor-Smith, Saltzman, Harding Thomsen, & Wadsworth, 2001; Grant et al., 2006, for reviews). In other words, not all students may be equally susceptible to the effects of mood originating from school-related stressors on academic functioning.

Among the potential moderating variables, we propose that students' adaptation to school as indexed by school anxiety, school