

Effects of Classroom Activities on Affective State—A Comparison of Third and Fifth Graders

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Abstract

We analysed the influence of classroom activities on children's affective states. Children perform many different activities in the course of an ordinary school day, some of which may trigger changes in their affective state and thus in the availability of their cognitive resources and their degree of motivation. To observe the effects of two such activities (listening to a text and performing a dictation) on affective state, according to grade, we asked 39 third graders and 40 fifth graders to specify their affective state at several points in the day. Results showed that this state varied from one activity to another, and was also dependent on grade level. Third graders differed from fifth graders in the feelings elicited by the activities. The possible implications of these findings for the field of educational psychology and children's academic performance are discussed.

Keywords: emotion, affective state, children, classroom activities, cognitive resources

1. Introduction

The likelihood of a close relationship between affective states and cognitive processes is a major point of agreement among many of the researchers who study the genesis and role of emotions (Barrett, 2009; Frijda, 2009; Izard, 2007; Russell, 2003; Scherer, 2009). Learning is one of the most important cognitive activities we perform, and can be influenced by the nature of the individual, the task or the context. Furthermore, emotions and feelings are present in everyday life events and, therefore, in all classroom activities. As our affective state can sometimes influence how we process information, reason, or interact with others (Blanchette & Richards, 2010), it is essential to understand the multitude and variability of the affective states and emotions that occur in the course of classroom activities, as they could have important implications for teaching practice.

Analyses of the literature on emotion in the classroom show that while some studies have focused on the impact of anxiety on performance (Barrett & Heubeck, 2000; Ma, 1999; Papay, Costello, Hedl, & Spielberger, 1975), others have explored the role of affect, emotion or mood (Efklides & Volet, 2005; Linnenbrink, 2006; Pekrun & Frese, 1992; Pekrun, Goetz, Titz, & Perry, 2002; Schutz & Pekrun, 2007). Currently, researchers are attempting to identify the relationship between affective state and academic achievement (Deci & Ryan, 2002; Dweck, 2002; Immordino-Yang & Damasio, 2007) and between affective state and teaching practice (Buff, Reusser, Rakoczy, & Pauli, 2011; Csikszentmihalyi, 1990; D'Mello & Graesser, 2011, 2012; Huk & Ludwigs, 2009; Linnenbrink, 2006; Meyer & Turner, 2006; Schutz & Pekrun, 2007).

The past fifteen years have seen an increasing number of studies attempting to analyse the impact of emotion on learning (Ainley, Hidi, & Berndorff, 2002; Baker, D'Mello, Rodrigo, & Graesser, 2010; Calvo & D'Mello, 2011; D'Mello, Craig, & Graesser, 2009; Linnenbrink & Pintrich, 2002; Pekrun et al., 2002; Rodrigo & Baker, 2011; Schutz & Davis, 2000; Woolf, Burleson, Arroyo, Dragon, Cooper, & Picard, 2009). By contrast, investigations of the emotions elicited among students by classroom activities remain very much in the minority (Ainley, Corrigan, & Richardson, 2005; Efklides & Petkaki, 2005; Sansone & Thoman, 2005). The complexity and diversity of school situations mean that many factors can disrupt, modify or enhance the learning process (Järvenoja & Järvelä, 2005; Pintrich, 2000). For this reason, researchers have been exploring a broad range of emotions in students. According to Pons, Hancock, Lafortune, and Doudin (2005), and Schutz and Pekrun

(2007), this emerging area of research requires both theoretical and pragmatic reflection. One way of advancing this reflection is to conduct studies in schools.

For Pekrun (1988), affect is one of the most crucial components of human activities. It has a lasting effect and plays a central role in learning situations. Again according to Pekrun (2006), there are two explanations for the crucial role played by emotion in the educational context: (1) emotions can affect the interest, commitment, success and personal development of students; and (2) emotions make an important contribution to the healthy psychological development and well-being of children. Consequently, it is important to clarify the influence of students' affective state in the context of different school experiences, as well as the determinants of these feelings (Järvenoja & Järvelä, 2005; Wosnitza & Volet, 2005).

1.1 Motivation, Emotion and Classroom Activities

Ainley, Corrigan, and Richardson (2005) analysed the emergence of emotion and interest in 13-year-old students during a text reading exercise. First, participants were asked to choose the text they wanted to read from four texts displayed on a computer screen. Each of these texts came in four parts, and before reading each part of the text, students were asked to assess their feelings and whether they wished to continue reading. Results showed a strong link between interest in a portion of text and the desire to continue reading. Conversely, a lack of interest in a portion of text provoked boredom among students, who frequently interrupted their reading. In the same line of research on interest, motivation and classroom activities, Ainley and colleagues (Andrews, Ainley, & Frydenberg, 2004; cited by Ainley, 2006) postulated that a lack of interest could be responsible for a decrease not just in students' motivation, but also in their performance on the educational activities they were asked to undertake. They therefore asked students in Grades 7-10 to imagine either that they were going to do a maths test or else that they had won a fortnight's holiday to the destination of their choice. The students then had to rate the intensity of their interest in each of these scenarios on a scale ranging from 1 (*Bored*) to 5 (*Interested*) and express the type and intensity of the affect they experienced while imagining the scenarios by choosing specific emotion icons (angry, anxious, relieved, hopeful, proud, happy, hopeless and shameful) and indicating the degree to which they felt each emotion, on a scale ranging from 1 (*Not at all*) to 5 (*A lot*). Results showed that the classroom activity attracted more boredom than interest, and a considerably more negative emotional experience compared with winning a two-week holiday. The affects most frequently expressed in connection with the maths test were the negative ones of anxiety, anger and hopelessness, while joy was the affect most frequently expressed in relation to the holiday. Nonetheless, the students also reported several positive affects for the maths test, such as hopefulness and happiness, indicating a certain ambivalence. Thus, the holiday scenario induced relatively limited feelings, restricted to positive affect, and a great deal of interest, while the maths test scenario attracted a wider range of feelings but far less interest.

The emotions experienced by students can also modify their access to the attentional resources needed to perform classroom activities. When Sarason (1984) studied the impact of anxiety on schoolwork, he showed that this negative emotional state influences students' concentration and attention. More specifically, he claimed that experiencing anxiety in an assessment situation can trigger intrusive, interfering thoughts that diminish attention and the efficiency with which the task is performed. For their part, Alexander, Jetton, and Kulikowich (1995), and Lepper and Henderlong (2000) found that by eliciting positive emotions, which promote interest, they were able to increase the attention displayed by students and their capacity for memorisation.

Other research has shown that negative emotions can increase cognitive load, thus bringing about variations in cognitive resources and academic performances. More precisely, negative emotions such as sadness, hopelessness and sorrow are responsible for mobilising or increasing the demand for cognitive resources (Fartoukh, Chanquoy, & Piolat, 2014a). This resource mobilisation could decrease students' performances during classroom activities that already place high demands on attentional resources (Meinhardt & Pekrun, 2003). For example, in the case of a written composition exercise, Fartoukh, Chanquoy, and Piolat (2012) demonstrated the effects of emotions induced by the composition theme on the length of the texts produced by fourth and fifth graders. Students produced shorter texts when the emotional content was negative than when it was neutral or positive. In addition, when the emotional content was positive or negative, their orthographic (grammatical) performances were less predictable. A similar effect of affective state on performance has been observed in a dictation exercise. The induction of a negative (or positive) affective state in fifth graders caused a higher number of spelling errors, compared with the neutral condition (Cuisinier, Sanguin-Bruckert, Bruckert, & Clavel, 2010; Fartoukh, Chanquoy, & Piolat, 2014b). Thus, the positive or negative emotions that are engendered by the composition theme or have been previously induced can have an impact on students' performances on the

traditional classroom exercises of writing and dictation. All these studies therefore suggest that the relationship between emotion, information processing and the attentional resources required for cognitive functioning is a complex one. According to Panksepp, “emotional values interpenetrate with cognitive activities” (2000, p. 253).

These complex interactions are even more difficult to study in schoolchildren who, in addition to improving their performance on classroom activities, also have to learn to identify and harness their emotions. According to Pons, Harris, and de Rosnay (2004), children’s emotional development, which has been widely studied (for reviews, see Harris, 2000; Manstead, 1994; Pons, Harris, & de Rosnay, 2000; Saarni, Mumme, & Campos, 1998), takes place in stages between the ages of 3 and 11 years. More specifically, between 7 and 11 years, changes in their understanding of the role and the effects of emotions help children to realise that the same event can trigger very different emotions, and that these emotions can be regulated. Most studies have examined how emotions and motivations influence students’ cognitive functioning, but it is also necessary to control how different classroom activities can generate different emotional experiences, while looking at how these activities are themselves regulated or modified by these emotional experiences (Sansone & Thoman, 2005).

1.2 Aims and Hypotheses

The present study explored changes in the affective state of students in Grades 3 and 5 brought about by two very frequent classroom activities: listening to a text read out to them by an adult, and a dictation. Teachers regularly read texts to children, in order to give them examples to follow, improve their understanding of the texts, or hone their literary sensibilities. This reading is also often used to prepare students for a dictation featuring content taken from the text. The dictation exercise itself is used to improve children’s spelling skills, encourage them to think about grammar and spelling, and assess their performance.

We set out to test the following hypotheses:

- (1) Older students (e.g., fifth graders) express different feelings from younger students (e.g., third graders) because of their greater emotional development. We therefore predicted that the students’ feelings would vary in terms of intensity and diversity according to their grade level (Pons et al., 2004);
- (2) Performing a dictation has a negative impact on affective state (Cuisinier et al., 2010; Fartoukh et al., 2014b). Given that a dictation can be perceived of as an assessment exercise, owing to the difficulty of mastering spelling (Fayol, 2008), we predicted that it would generate a more negative affective state than listening to a text being read out (Ainley, 2006; Efklides & Petkaki, 2005);
- (3) Finally, in an exploratory way, older students (e.g., fifth graders) should react more strongly, in terms of their negative feelings, than younger students (e.g., third graders) to classroom activities that are negatively perceived. We therefore predicted that the fifth graders’ feelings during the two activities would be more intense than those of the third graders.

2. Method

2.1 Participants

The participants were 79 children attending a primary school in Southeast France: 39 third graders (mean age: 8; 11 years, range: 8; 5-9; 6 years, 19 girls and 20 boys) and 40 fifth graders (mean age: 11; 1 years, range: 10; 6-12; 3 years, 22 girls and 18 boys). None of them had learning disabilities or other special needs. All the children took part on a voluntary basis, and written informed consent was obtained from all their parents.

2.2 Materials

In order to administer activities similar to those that are commonly encountered in the classroom (i.e., listening to a text read out by an adult and performing a dictation featuring content drawn from that text), we chose a text and a dictation that were adapted to primary school children (text was neutral in terms of its emotional content, Cuisinier et al., 2010). The text was about a promenade in the mountain, and a farm nearby. The text reading took about 5 minutes, and the dictation lasted 10 minutes. During the reading, children had to listen quietly, whereas during dictation, children had to listen then to write the dictated text.

To gauge the intensity of the children’s affective state, we asked them to rate nine items (“Right now I feel *Joyful/Glad/Happy/Proud/Sad/Uncomfortable/Worried/Nervous/I am Bored*”) on a 5-point scale (see Appendix A) ranging from 1 (*Not at all*) to 5 (*Extremely*). This method (Efklides & Petkaki, 2005; Pekrun, 2006) is easy to implement in the classroom. However, it is based on the assumption that participants can accurately verbalise their affective state. It is therefore useful to add a nonverbal scale that is easier for children to understand and which allows the experimenter to obtain comparable and complementary observations (Brenner, 2000; Larsen &

Fredrickson, 1999). For this reason, we also asked the children to assess their affect on a smiley face 5-point Likert scale taken from Burkitt and Barnett (2006). This scale features five faces, ranging from 1 = 😞 to 5 = 😊 (see Appendix A).

2.3 Procedure

Data were collected in four classes at the beginning of the school day by the same experimenter. The children were not informed of the succession of tasks, and were simply told that they would have to answer a questionnaire about their affective state several times. After a short presentation of the two self-report measures (9-item intensity scale and smiley face scale), the first measurement of affective state was conducted. Immediately afterwards, the experimenter read the text out to half of the participants, while the other half performed the dictation, in order to counterbalance the order of the activities. A second measurement of affective state was then performed. After that, the groups switched around and either performed the dictation or listened to the text. This was followed by a final measurement of the children's affective state.

3. Results

3.1 Verbal Affective State Intensity Scale

To gauge the effects of activity sequence and grade level on the children's affective state, we performed a 2 (grade level: 3 vs. 5) x 2 (activity sequence: listening then dictation vs. dictation then listening) x 3 (time of measurement: before activities vs. after first activity vs. after second activity) x 9 (Items: *Joyful* vs. *Glad* vs. *Happy* vs. *Proud* vs. *Sad* vs. *Uncomfortable* vs. *Worried* vs. *Nervous* vs. I am *bored*) analysis of variance (ANOVA) with repeated measures on the last two factors. The dependent variable was the rating (1-5) for each of the nine items on the 5-point verbal scale (see Appendix B).

The main effect of activity sequence was not significant, $F(1, 75) < 1$. The mean intensity ratings were similar regardless of the order in which the children performed the activities ($M_{\text{listening then dictation}} = 2.25$ and $M_{\text{dictation then listening}} = 2.21$). This factor did not interact with the other variables. On the strength of these results, we decided to remove the activity sequence factor from subsequent analyses.

The main effect of grade level was significant, $F(1, 75) = 18.04$, $MSE = 3.78$, $p < .0001$. The third graders provided higher mean intensity ratings than the fifth graders (2.35 vs. 1.99). The main effect of item was also significant, as mean intensity ratings varied considerably with item, $F(8, 600) = 102.52$, $MSE = 2.11$, $p < .0001$. When grade and time of measurement were combined, children provided higher mean intensity ratings for positive items than for negative ones, $F(1, 75) = 174.44$, $MSE = 9.22$, $p < .0001$ (positive items: $M_{\text{happy}} = 3.27$, $M_{\text{joyful}} = 3.11$, $M_{\text{proud}} = 2.73$, $M_{\text{glad}} = 3.45$; negative items: $M_{\text{worried}} = 1.36$, $M_{\text{nervous}} = 1.28$, $M_{\text{sad}} = 1.19$, $M_{\text{uncomfortable}} = 1.31$, $M_{\text{bored}} = 1.81$). Only the interactions between grade level and item, $F(8, 600) = 13.31$, $MSE = 2.11$, $p < .0001$, item and time of measurement, $F(16, 1200) = 8.20$, $MSE = 0.47$, $p < .0001$, and grade level, time of measurement and item, $F(16, 1200) = 3.33$, $MSE = 0.47$, $p < .0001$, were significant. To clarify these interactions, separate analyses were conducted for positive and negative items.

3.1.1 Positive Items

The effect of Grade level was significant for all the positive items: *Happy*, $F(1, 75) = 19.77$, $MSE = 3.09$, $p < .0001$ (3.77 vs. 2.76), *Joyful*, $F(1, 75) = 30.62$, $MSE = 2.69$, $p < .0001$ (3.70 vs. 2.52), *Proud*, $F(1, 75) = 11.20$, $MSE = 4.19$, $p < .0001$ (3.18 vs. 2.29), and *Glad*, $F(1, 75) = 28.40$, $MSE = 2.79$, $p < .0001$ (4.03 vs. 2.88). The mean intensity ratings were systematically higher for the third graders than for the fifth graders. The effect of time of measurement was also significant for all the items. More specifically, while the mean intensity ratings for the *Happy* item did not vary significantly after listening to the text, $F(1, 75) = 3.16$, $MSE = 0.39$, $p = .08$ ($M_{\text{before activities}} = 3.51$ and $M_{\text{after listening}} = 3.33$), they decreased significantly after performing the dictation, $F(1, 75) = 11.38$, $MSE = 0.79$, $p < .01$ ($M_{\text{before activities}} = 3.51$ vs. $M_{\text{after dictation}} = 2.97$). Similarly, for the *Joyful* item, while the mean intensity ratings did not vary significantly after listening to the text, $F(1, 75) = 1.91$, $MSE = 0.78$, $p = .17$ ($M_{\text{before activities}} = 3.33$ and $M_{\text{after listening}} = 3.14$), they decreased significantly after performing the dictation, $F(1, 75) = 12.48$, $MSE = 0.75$, $p < .0001$ ($M_{\text{before activities}} = 3.33$ vs. $M_{\text{after dictation}} = 2.84$). By contrast, for the *Proud* item, the mean intensity ratings decreased significantly both after listening to the text, $F(1, 75) = 11.70$, $MSE = 0.75$, $p < .01$ ($M_{\text{before activities}} = 2.99$ vs. $M_{\text{after listening}} = 2.51$), and after performing the dictation, $F(1, 75) = 3.95$, $MSE = 0.82$, $p < .05$ ($M_{\text{before activities}} = 2.99$ and $M_{\text{after dictation}} = 2.70$). Similarly, for the *Glad* item, the mean intensity ratings decreased significantly both after listening to the text, $F(1, 75) = 6.99$, $MSE = 0.78$, $p < .01$ ($M_{\text{before activities}} = 3.78$ vs. $M_{\text{after listening}} = 3.41$), and after performing the dictation, $F(1, 75) = 22.14$, $MSE = 0.66$, $p < .001$ ($M_{\text{before activities}} = 3.78$ and $M_{\text{after dictation}} = 3.17$).

The interaction between grade level and time of measurement was significant for both the *Happy* item, $F(2, 150) = 4.42$, $MSE = 0.53$, $p < .02$, and the *Glad* item, $F(2, 150) = 5.09$, $MSE = 0.767$, $p < .01$. In the case of the *Happy* item (see Figure 1), neither listening to the text, $F(1, 75) < 1$, nor performing the dictation, $F(1, 75) = 1.25$, $MSE = 0.63$, $p = .26$, had a significant effect on the third graders' mean intensity ratings. By contrast, for the fifth graders, listening to the text significantly decreased their mean intensity ratings, $F(1, 75) = 4.14$, $MSE = 0.39$, $p < .05$, as did performing the dictation, $F(1, 75) = 24.50$, $MSE = 0.63$, $p < .0001$.

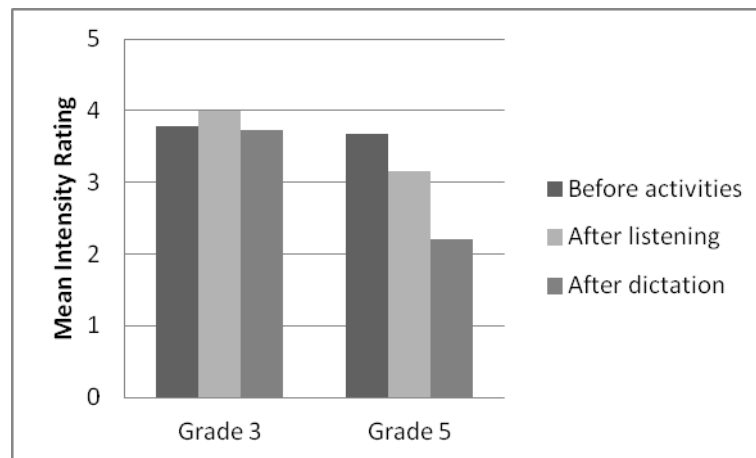


Figure 1. Interaction between grade level and time of measurement for the *Happy* item

In the case of the *Glad* item (see Figure 2), for the third graders, listening significantly decreased their mean intensity ratings, $F(1, 75) = 7.06$, $MSE = 0.78$, $p < .01$, whereas performing dictation had no effect, $F(1, 75) = 3.69$, $MSE = 0.66$, $p = .06$. For the fifth graders, listening had no significant effect, $F(1, 75) = 1.15$, $MSE = 1.15$, $p = .28$, whereas performing the dictation significantly decreased the mean intensity ratings, $F(1, 75) = 22.56$, $MSE = 0.66$, $p < .0001$.

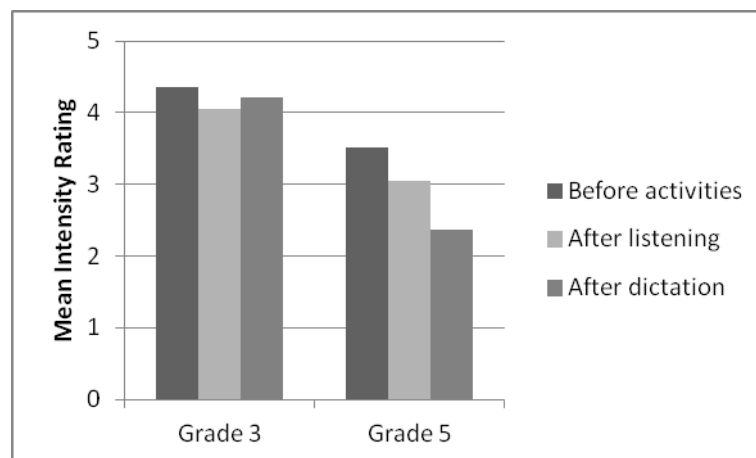


Figure 2. Interaction between grade level and time of time of measurement for the *Glad* item

3.1.2 Negative Items

The effect of grade level was only significant for the *I am bored* item, $F(1, 75) = 4.44$, $MSE = 3.89$, $p < .04$, with higher intensity ratings by the fifth graders than by the third graders (2.08 vs. 1.54). The effect of time of measurement was significant for the *Worried*, *Nervous* and *I am bored* items. More specifically, for the *Worried* item, while the mean intensity ratings did not vary significantly after listening to the text, $F(1, 75) < 1$ ($M_{\text{before activities}} = 1.23$ and $M_{\text{after listening}} = 1.21$), they increased significantly after performing the dictation, $F(1, 75) =$

12.82, $MSE = 0.52$, $p < .0001$ ($M_{\text{before activities}} = 1.23$ vs. $M_{\text{after dictation}} = 1.65$). For the *Nervous* item, the mean intensity ratings did not vary significantly after listening to the text, $F(1, 75) = 1.99$, $MSE = 0.17$, $p = .16$ ($M_{\text{before activities}} = 1.15$ and $M_{\text{after listening}} = 1.24$), but they did increase significantly after performing the dictation, $F(1, 75) = 11.88$, $MSE = 0.32$, $p < .0001$ ($M_{\text{before activities}} = 1.15$ vs. $M_{\text{after dictation}} = 1.46$). For the *I am bored* item, the mean intensity ratings increased significantly after listening to the text, $F(1, 75) = 7.53$, $MSE = 0.72$, $p < .01$ ($M_{\text{before activities}} = 1.58$ vs. $M_{\text{after listening}} = 1.95$), and also increased after performing the dictation, $F(1, 75) = 6.06$, $MSE = 0.59$, $p < .02$ ($M_{\text{before activities}} = 1.58$ and $M_{\text{after dictation}} = 1.88$). Finally, there were no significant effects for the *Sad* item.

The interaction between grade level and time of measurement was significant for the *I am bored* item, $F(2, 150) = 4.98$, $MSE = 0.57$, $p < .01$ (see Figure 3). Neither listening to the text, $F(1, 75) < 1$, nor performing the dictation, $F(1, 75) < 1$, had an effect on the mean intensity ratings provided by the third graders. By contrast, for the fifth graders, listening to the text significantly increased the mean intensity ratings, $F(1, 75) = 12.27$, $MSE = 0.72$, $p < .01$, and performing the dictation had the same effect, $F(1, 36) = 14.56$, $MSE = 0.59$, $p < .0001$.

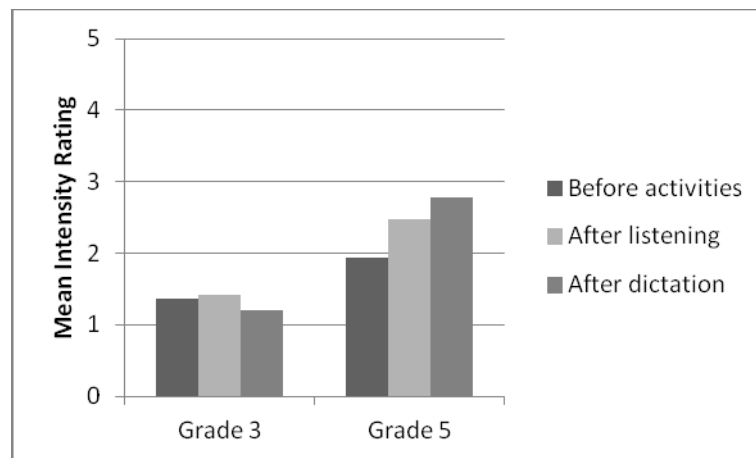


Figure 3. Interaction between grade level and time of measurement for the *I am bored* item

3.2 Nonverbal Scale

To observe the effects of activity and grade level on the children's affective state, we performed a 2 (grade level) x 2 (activity sequence) x 3 (time of measurement) ANOVA with repeated measures on the last factor. The dependent variable was the score (from 1 = 😞 to 5 = 😊) on the nonverbal scale (see Appendix B).

There was a significant effect of grade level, $F(1, 75) = 22.43$, $MSE = 1.45$, $p < .0001$, as mean ratings were higher (i.e., more positive) in third grade than in fifth grade (4.31 vs. 3.56). The effect of time of measurement was also significant, $F(2, 150) = 14.28$, $MSE = 0.34$, $p < .0001$, for although mean ratings did not change significantly after listening to the text, $F(1, 75) = 3.87$, $MSE = 0.38$, $p = .06$ ($M_{\text{before activities}} = 4.17$ and $M_{\text{after listening}} = 3.97$), they did change after performing the dictation, $F(1, 75) = 12.98$, $MSE = 0.27$, $p < .0001$ ($M_{\text{before activities}} = 4.17$ vs. $M_{\text{after dictation}} = 3.67$). Finally, the interaction between grade level and time of measurement was significant, $F(2, 150) = 7.87$, $MSE = 0.34$, $p < .0001$ (see Figure 4). For the third graders, neither listening to the text, $F(1, 75) = 1.13$, $MSE = 0.38$, $p = .28$, nor performing the dictation, $F(1, 75) = 1.24$, $MSE = 0.37$, $p = .26$, had an effect on their mean ratings. By contrast, for the fifth graders, although listening to the text again had no significant effect, $F(1, 75) = 2.96$, $MSE = 0.38$, $p = .08$, performing the dictation had a negative effect on their mean ratings, $F(1, 75) = 37.30$, $MSE = 0.237$, $p < .0001$.

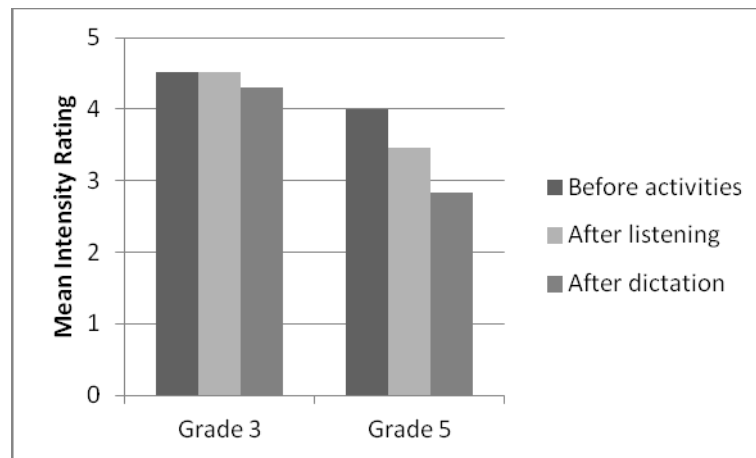


Figure 4. Interaction between grade level and time of measurement for the nonverbal scale

To summarise, the results show the following:

- An interaction between grade level and time of measurement for the verbal scale (*Happy*, *Glad*, and *I am bored* items) and for the nonverbal scale. For the *Happy* and *I am bored* items, the third graders' mean intensity ratings did not vary significantly during the activities, whereas the fifth graders' did. For the *Glad* item, the third graders' mean intensity ratings only changed after listening to the text, whereas the fifth graders' ratings only changed after performing the dictation. For the nonverbal scale, the third graders' mean intensity ratings did not vary significantly during both activities while the fifth graders' mean ratings varied negatively when performing the dictation.

- A main effect of grade level on the verbal scale (all the positive items, plus the negative *I am bored* item) and the nonverbal scale. In the case of the positive items and the nonverbal scale, the third graders' mean intensity ratings were higher than those of the fifth graders, whereas the opposite was observed for the negative item.

- Finally, a main effect of time of measurement on both verbal (all the positive items and on the negative *Worried*, *Nervous* and *I am bored* items) and nonverbal scales. More specifically, performing the dictation decreased the mean intensity ratings of all the positive items, and increased those of the negative *Worried*, *Nervous* and *I am bored* items. Furthermore, after the pupils had listened to the text, their ratings for the *Proud* and *Glad* items decreased, whereas their ratings for the *I am bored* item increased. For the nonverbal scale, children's mean ratings only changed significantly after performing the dictation.

4. Discussion

The role and impact of emotions in the classroom are now central concerns for many researchers in developmental and educational psychology. Although it is generally acknowledged that context (worse or better for learning), task difficulty, engagement or involvement and peer interactions that typically occur in the classroom influence the affective state of learners (Ekflides & Petkaki, 2005; Sansone & Thoman, 2005), little information is yet available as to how this state varies across classroom activities according to grade level. It is therefore essential to attempt to determine the effects that common classroom activities can have on children's affective state.

The present study attempted to analyse changes in affective state in the classroom. To this end, third and fifth graders performed two traditional school curriculum activities: listening to a text read out by an adult and performing a dictation. In parallel, they were asked to rate how they were feeling at three different points (before the two activities, after listening to the text and after the dictation) on a 5-point intensity scale featuring nine items and a nonverbal scale featuring five sad-smiley faces.

Our first hypothesis predicted an effect of grade level on affective state, reflecting the development of emotional understanding in children (Pons et al., 2004). As fifth graders are older than third graders, we expected their expression of affective state to be different. This hypothesis was validated, as results showed a developmental effect where the mean ratings provided by the third graders were higher than those of the fifth graders for the positive items in the intensity scale (*Happy*, *Joyful Proud* and *Glad*) and higher (i.e., more positive) for the

nonverbal scale. By contrast, for the negative *I am bored* item, the mean intensity ratings provided by the fifth graders were higher than those provided by the third graders. In line with the findings reported by Pons et al. (2004), these first results indicate that, between the ages of 7 and 11 years, children achieve a greater awareness of their affective state in a given situation and are able to implement better emotional control. In fifth grade, the last level of primary school in France, pupils are prepared for their forthcoming transition to secondary school. In addition, their classroom activities are geared towards promoting greater autonomy and more critical thinking. Older children may feel less enthusiastic about these two activities, being more accustomed to them, and will inevitably have experienced more disappointments in their academic performance.

Our hypothesis that classroom activities have an effect on children's affective state was also validated. Compared with the baseline measure, children in both grades expressed changes in their affective state after listening to the text and performing the dictation. More specifically, we observed a significant decrease in the mean ratings of all the positive items, as well as in the nonverbal rating. This decrease sometimes came after listening to the text (*Proud* and *Glad* items) and always came after performing the dictation (all positive items and nonverbal rating). For the negative items, the dictation had the effect of increasing the mean ratings of the *Worried*, *Nervous* and *I am bored* items, whereas we observed an increase for the *I am bored* item after the pupils had listened to the text. Thus, overall, performing the dictation seemed to bring about greater variations in the children's affective state than listening to a text. These results, in line with previous studies (Cuisinier et al., 2010; Efklides & Petkaki, 2005; Fartoukh et al., 2014b), indicate that participating in a common classroom activity (e.g., listening to a text) has a slight effect on pupils' affective state. Moreover, if that activity is performing a dictation -an exercise often used as an assessment tool, it has a particularly negative effect on affective state. This observation is reminiscent of Ainley's (2006) finding that assessment activities can reduce students' positive affect and increase their negative affect.

Our third hypothesis predicted an age- and activity-related change in affective state. Although the interactions were not significant for six of the nine items in the verbal intensity rating scale, they were significant for two positive items (*Happy* and *Glad*) and one negative item (*I am bored*). They were also significant for the nonverbal ratings. These results indicate that there is a change in pupils' perceptions of events in the classroom between Grades 3 and 5 that is reflected in their self-reported affective state. The younger children seemed to be less affectively reactive to the nature of the classroom activities and did not really experience boredom, whereas the older children felt less happy, less glad and more bored during the activities, especially after the dictation. Again, these results could be explained by the fact that fifth graders, because of their age and their development, begin to express their affective state more efficiently.

To our knowledge, this is the first study to demonstrate grade-related interactions between classroom activity and affective state. The affective state of the third and fifth graders varied greatly from one activity to the other when it was assessed in the early morning. The latter point could be regarded as one of the limitations of our study. Future studies could thus assess affective state in relation to school activities performed at different times of the day and/or compare assessments made at different times in the day in order to observe the effect of this factor on student ratings. A second limitation could be the 5-point intensity rating scale used in this study. It would seem that not all the items in this self-report tool are relevant for studying affective state in the classroom, as the mean ratings produced by our participants did not differ according to time of measurement. One possibility would be to use just the items that yielded significant results in this study or else to use other self-report tools such as the Positive and Negative Affect Schedule for Children (PANAS-C; Laurent et al., 1999). In addition, in accordance with the vision of Scherer and Davidson (2003), further research on emotions in the world of education is needed, in order to improve measures of emotional experience to introduce more accurate devices, such as those used in psychophysiology and neuroscience (electro dermal sensor temperature, blood pressure), to probe students' emotions. A third limitation concerns the activities used in this study. More research is needed to find out whether our results can be generalised to other grade levels and, above all, to other activities (arithmetic, reading, writing, tests, etc.).

Despite these limitations, our results confirm the need to take the emotion variable into account in the field of educational psychology. Some activities in the classroom may elicit negative or positive emotional changes, which could hamper any subsequent activities. Indeed, the positive or negative emotions that are engendered by the school activities can have an impact on students' performances on traditional classroom exercises (Cuisinier et al., 2010; Fartoukh et al., 2014b). In parallel, having failed an exercise leads to apprehend it and to have a negative emotional feeling for similar activities. Thus, the study of emotions in the school context can enhance our knowledge not just of the underlying problems, but also of their possible solutions (Schultz et al., 2006). One

of them concerns the sequence of activities, which could be designed based on the emotional feelings they provoke. Another one could consist in decreasing the negative emotional feeling generated by some activities (in making them more pleasant, more interesting...).

Finally, the present study highlighted that the affective state of pupils performing certain classroom activities undergoes grade-related changes, emphasising the importance of identifying and understanding students' emotional state during classroom activities.

References

- Ainley, M. (2006). Connecting with learning: Motivation, affect and cognition in interest processes. *Educational Psychology Review*, 18, 391-405. <http://dx.doi.org/10.1007/s10648-006-9033-0>
- Ainley, M., Corrigan, M., & Richardson, N. (2005). Students, tasks and emotions: Identifying the contribution of emotions to students' reading of popular culture and popular science texts. *Learning and Instruction*, 15(5), 433-447. <http://dx.doi.org/10.1016/j.learninstruc.2005.07.011>
- Ainley, M., Hidi, S., & Berndorff, D. (2002). Interest, learning and the psychological processes that mediate their relationships. *Journal of Educational Psychology*, 94(3), 546-561. <http://dx.doi.org/10.1037/0022-0663.94.3.545>
- Alexander, P. A., Jetton, T. L., & Kulikowich, J. M. (1995). Interrelationship of knowledge, interest, and recall: Assessing a model of domain learning. *Journal of Educational Psychology*, 87, 559-575. <http://dx.doi.org/10.1037/0022-0663.87.4.559>
- Baker, R., D'Mello, S., Rodrigo, M., & Graesser, A. (2010). Better to be frustrated than bored: The incidence and persistence of affect during interactions with three different computer-based learning environments. *International Journal of Humane Computer Studies*, 68(4), 223-241.
- Barrett, L. F. (2009). Variety is the spice of life: A psychological construction approach to understanding variability in emotion. *Cognition & Emotion*, 23(7), 1284-1306. <http://dx.doi.org/10.1080/02699930902985894>
- Barrett, S., & Heubeck, B. G. (2000). Relationships between school hassles and uplifts and anxiety and conduct problems in Grades 3 and 4. *Journal of Applied Developmental Psychology*, 21, 537-554. [http://dx.doi.org/10.1016/S0193-3973\(00\)00053-8](http://dx.doi.org/10.1016/S0193-3973(00)00053-8)
- Blanchette, I., & Richards, A. (2010). The influence of affect on higher level cognition: A review of research on interpretation, judgement, decision making and reasoning. *Cognition & Emotion*, 24, 561-595. <http://dx.doi.org/10.1080/02699930903132496>
- Brenner, E. (2000). Mood induction in children: Methodological issues and clinical implications. *Review of General Psychology*, 4(3), 264-283. <http://dx.doi.org/10.1037/1089-2680.4.3.264>
- Buff, A., Reusser, K., Rakoczy, K., & Pauli, C. (2011). Activating positive affective experiences in the classroom: "Nice to have" or something more? *Learning and Instruction*, 21(3), 452-466. <http://dx.doi.org/10.1016/j.learninstruc.2010.07.008>
- Burkitt, E., & Barnett, N. (2006). The effects of brief and elaborate mood induction procedures on the size of young children's drawings. *Educational Psychology*, 26(1), 93-108. <http://dx.doi.org/10.1080/01443410500341049>
- Calvo, R., & D'Mello, S. (Eds.). (2011). *New perspectives on affect and learning technologies*. New York: Springer. <http://dx.doi.org/10.1007/978-1-4419-9625-1>
- Csikszentmihalyi, M. (1990). *Flow: The psychology of optimal experience*. New York: Harper and Row.
- Cuisinier, F., Sanguin-Bruckert, C., Bruckert, J. P., & Clavel, C. (2010). Les émotions affectent-elles les performances orthographiques en dictées? *L'Année Psychologique*, 110, 3-48. <http://dx.doi.org/10.4074/S0003503310001016>
- Deci, E., & Ryan, R. (2002). The paradox of achievement: The harder you push, the worse it gets. In J. Aronson (Ed.), *Improving academic achievement: Impact of psychological factors on education* (pp. 61-87). Orlando, FL: Academic Press. <http://dx.doi.org/10.1016/B978-012064455-1/50007-5>
- D'Mello, S., Craig, S., & Graesser, A. (2009). Multi-method assessment of affective experience and expression during deep learning. *International Journal of Learning Technology*, 4, 165-187.

- D'Mello, S., & Graesser, A. (2011). The half-life of cognitive-affective states during complex learning. *Cognition & Emotion*, 25(7), 1299-1308. <http://dx.doi.org/10.1080/02699931.2011.613668>
- D'Mello, S., & Graesser, A. (2012). Dynamics of affective states during complex learning. *Learning and Instruction*, 22, 145-157. <http://dx.doi.org/10.1016/j.learninstruc.2011.10.001>
- Dweck, C. (2002). Messages that motivate: How praise molds students' beliefs, motivation, and performance (in surprising ways). In J. Aronson (Ed.), *Improving academic achievement: Impact of psychological factors on education* (pp. 61-87). Orlando, FL: Academic Press. <http://dx.doi.org/10.1016/B978-012064455-1/50006-3>
- Efklides, A., & Petkaki, C. (2005). Effects of mood on students' metacognitive experiences. *Learning and Instruction*, 15, 415-431. <http://dx.doi.org/10.1016/j.learninstruc.2005.07.010>
- Efklides, A., & Volet, S. (2005). Emotional experiences during learning: Multiple, situated and dynamic. *Learning and Instruction*, 15, 377-380. <http://dx.doi.org/10.1016/j.learninstruc.2005.07.006>
- Fartoukh, M., Chanquoy, L., & Piolat, A. (2012). Effects of emotion on writing processes in children. *Written Communication*, 29(4), 391-411. <http://dx.doi.org/10.1177/0741088312458640>
- Fartoukh, M., Chanquoy, L., & Piolat, A. (2014a). Mood induction in children: Effect of the affective valence of a text on phonological working memory. *Advances in Cognitive Psychology*, 10(3), 113-118. <http://dx.doi.org/10.5709/acp-0162-z>
- Fartoukh, M., Chanquoy, L., & Piolat, A. (2014b). Influence d'une induction émotionnelle sur le ressenti émotionnel et la production orthographique d'enfants de CM1 et de CM2. *L'Année Psychologique*, 114(2), 251-288. <http://dx.doi.org/10.4074/S0003503314002036>
- Fayol, M. (2008). Les apports de la psychologie. In M. Fayol, & J.-P. Jaffré (Eds.), *Orthographe* (pp. 121-227). Paris: PUF.
- Frijda, N. H. (2009). Emotions, individual differences and time course: Reflections. *Cognition & Emotion*, 23(7), 1444-1461. <http://dx.doi.org/10.1080/02699930903093276>
- Harris, P. L. (2000). Understanding emotion. In M. Lewis, & J. Haviland-Jones (Eds.), *Handbook of emotions* (2nd ed., pp. 281-292). New York: The Guilford Press.
- Huk, T., & Ludwigs, S. (2009). Combining cognitive and affective support in order to promote learning. *Learning and Instruction*, 19(6), 495-505. <http://dx.doi.org/10.1016/j.learninstruc.2008.09.001>
- Immordino-Yang, M. H., & Damasio, A. R. (2007). We feel, therefore we learn: The relevance of affective and social neuroscience to education. *Mind, Brain and Education*, 1(1), 3-10. <http://dx.doi.org/10.1111/j.1751-228X.2007.00004.x>
- Izard, C. E. (2007). Basic emotions, natural kinds, emotion schemas, and a new paradigm. *Perspectives on Psychological Science*, 2(3), 260-280. <http://dx.doi.org/10.1111/j.1745-6916.2007.00044.x>
- Järvenoja, H., & Järvelä, S. (2005). How students describe the sources of their emotional and motivational experiences during the learning process: A qualitative approach. *Learning and Instruction*, 15, 465-480. <http://dx.doi.org/10.1016/j.learninstruc.2005.07.012>
- Larsen, R. J., & Fredrickson, B. L. (1999). Measurement issues in emotion research. In D. Kahneman, E. Diener, & N. Schwarz (Eds.), *Well-being: Foundations of hedonic psychology* (pp. 40-60). New York: Russell Sage.
- Laurent, J., Catanzaro, S. J., Joiner, T. E., Rudolph, K. D., Potter, K. I., Lambert, S., ... Gathright, T. (1999). A measure of positive and negative affect for children: Scale development and preliminary validation. *Psychological Assessment*, 11, 326-338. <http://dx.doi.org/10.1037/1040-3590.11.3.326>
- Lepper, M. R., & Henderlong, J. (2000). Turning "play" into "work" and "work" into "play": 25 years of research on intrinsic versus extrinsic motivation. In C. Sansone, & J. M. Harackiewicz (Eds.), *Intrinsic and extrinsic motivation: The search for optimal motivation and performance* (pp. 257-307). San Diego, CA: Academic.
- Linnenbrink, E. A. (2006). Emotion research in education: Theoretical and methodological perspectives on the integration of affect, motivation, and cognition. *Educational Psychology Review*, 18(4), 307-314. <http://dx.doi.org/10.1007/s10648-006-9028-x>

- Linnenbrink, E. A., & Pintrich, P. R. (2002). Achievement goal theory and affect: An asymmetrical bi-directional model. *Educational Psychologist*, 37(2), 69-78. http://dx.doi.org/10.1207/S15326985EP3702_2
- Ma, X. (1999). A meta-analysis of the relationship between anxiety toward mathematics and achievement in mathematics. *Journal for Research in Mathematics Education*, 30, 520-540. <http://dx.doi.org/10.2307/749772>
- Manstead, A. (1994). Children's understanding of emotion. In J. Russell, J.-M. Fernandez-Dols, A. Manstead, & J. Wellenkamp (Eds.), *Everyday conceptions of emotions* (pp. 315-331). Dordrecht: Kluwer.
- Meinhardt, J., & Pekrun, R. (2003). Attentional resource allocation to emotional events: An ERP study. *Cognition & Emotion*, 17, 477-500. <http://dx.doi.org/10.1080/02699930244000039>
- Meyer, D., & Turner, J. (2006). Re-conceptualizing emotion and motivation to learn in classroom contexts. *Educational Psychology Review*, 18(4), 377-390. <http://dx.doi.org/10.1007/s10648-006-9032-1>
- Panksepp, J. (2000). The neurodynamics of emotions: An evolutionary-neurodevelopmental view. In M. D. Lewis, & I. Granic (Eds.), *Emotion, development, and self-organization: Dynamic systems approaches to emotional development* (pp. 236-264). Cambridge, UK: Cambridge University Press.
- Papay, J., Costello, R., Hedl, J., & Spielberger, C. (1975). Effects of trait and state anxiety on the performance of elementary school children in traditional and individualized multiage classrooms. *Journal of Educational Psychology*, 67(6), 840-846. <http://dx.doi.org/10.1037/0022-0663.67.6.840>
- Pekrun, R. (1988). *Emotion, motivation, and personality*. Munich: Psychologie Verlags Union.
- Pekrun, R. (2006). The control-value theory of achievement emotions: Assumptions, corollaries, and implications for educational research and practice. *Educational Psychology Review*, 18, 315-341. <http://dx.doi.org/10.1007/s10648-006-9029-9>
- Pekrun, R., & Frese, M. (1992). Emotions in work and achievement. In C. L. Cooper, & I. T. Robertson (Eds.), *International review of industrial and organizational psychology* (Vol. 7, pp. 153-200). Chichester, UK: Wiley.
- Pekrun, R., Goetz, T., Titz, W., & Perry, R. P. (2002). Academic emotions in students' self-regulated learning and achievement: A program of qualitative and quantitative research. *Educational Psychologist*, 37(2), 91-105.
- Pintrich, P. R. (2000). An achievement goal theory perspective on issues in motivation terminology, theory and research. *Contemporary Educational Psychology*, 25, 92-104. <http://dx.doi.org/10.1006/ceps.1999.1017>
- Pons F., Hancock D., Lafortune L., & Doudin P.-A. (Eds.). (2005). *Emotions in Learning*. Aalborg: Universitetsforlag.
- Pons, F., Harris, P. L., & de Rosnay, M. (2000). La compréhension des émotions chez l'enfant. *Psychoscope*, 21, 29-32.
- Pons, F., Harris, P. L., & de Rosnay, M. (2004). Emotion comprehension between 3 and 11 years: Developmental periods and hierarchical organization. *European Journal of Developmental Psychology*, 1(2), 124-152. <http://dx.doi.org/10.1080/17405620344000022>
- Rodrigo, M., & Baker, R. (2011). Comparing the incidence and persistence of learners' affect during interactions with different educational software packages. In R. Calvo, & S. D'Mello (Eds.), *New perspective on affect and learning technologies* (pp. 183-202). New York: Springer.
- Russell, J. (2003). Core affect and the psychological construction of emotion. *Psychological Review*, 110, 145-172. <http://dx.doi.org/10.1037/0033-295X.110.1.145>
- Sansone, C., & Thoman, D. B. (2005). Does what we feel affect what we learn? Some answers and new questions. *Learning and Instruction*, 15, 507-515. <http://dx.doi.org/10.1016/j.learninstruc.2005.07.015>
- Saarni, C., Mumme, D., & Campos, J. (1998). Emotional development: Action, communication, and understanding. In W. Damon, & N. Eisenberg (Eds.), *Handbook of child psychology: Vol. 3. Social, emotional and personality development* (5th ed., pp. 237-309). New York: John Wiley.
- Sarason, I. G. (1984). Stress, anxiety, and cognitive interference: Reactions to tests. *Journal of Personality and Social Psychology*, 46, 929-938. <http://dx.doi.org/10.1037/0022-3514.46.4.929>

- Scherer, K. R. (2009). The dynamic architecture of emotion: Evidence for the component process model. *Cognition & Emotion, 23*(7), 1307-1351. <http://dx.doi.org/10.1080/02699930902928969>
- Scherer, K. R., & Davidson, R. J. (Eds.). (2003). *Handbook of affective sciences*. London: Oxford University Press.
- Schutz, P., & Davis, H. (2000). Emotions and self-regulation during test taking. *Educational Psychologist, 35*, 243-255. http://dx.doi.org/10.1207/S15326985EP3504_03
- Schutz, P., & Pekrun, R. (Eds.). (2007). *Emotion in education*. San Diego, CA: Academic Press.
- Woolf, B., Burleson, W., Arroyo, I., Dragon, T., Cooper, D., & Picard, R. (2009). Affect-aware tutors: Recognizing and responding to student affect. *International Journal of Learning Technology, 4*, 129-163. <http://dx.doi.org/10.1504/IJLT.2009.028804>
- Wosnitza, M., & Volet, S. (2005). Origin, direction and impact of emotions in social online learning. *Learning and Instruction, 15*(5), 449-464. <http://dx.doi.org/10.1016/j.learninstruc.2005.07.009>

Appendix A

Affective 9-item affective state intensity rating scale

Right now, I feel:

	Not at all	A little	Moderately	A lot	Extremely
Happy					
Worried					
Nervous					
Joyful					
Sad					
Proud					
Uncomfortable					
I am bored					
Glad					

Smiley face 5-point Likert scale from Burkitt and Barnet (2006):



Appendix B

Mean intensity ratings (standard deviations) on the verbal scale ranging from 1 (Not at all) to 5 (Extremely) according to grade level, time of measurement and item.

Grade	Item	Time of measurement		
		Before listening	After listening	After dictation
3	Happy	3.78 (1.13)	4.00 (1.00)	3.73 (0.93)
	Joyful	4.15 (0.83)	4.10 (0.99)	3.84 (1.01)
	Proud	3.63 (1.34)	3.26 (1.28)	3.10 (1.48)
	Glad	4.36 (1.01)	4.05 (1.22)	4.21 (0.71)
	Worried	1.15 (0.37)	1.00 (0.00)	1.36 (0.73)
	Nervous	1.05 (0.22)	1.00 (0.00)	1.10 (0.45)
	Sad	1.15 (0.68)	1.00 (0.00)	1.15 (0.50)
	Uncomfortable	1.15 (0.50)	1.26 (0.56)	1.10 (0.45)
	I am bored	1.36 (1.01)	1.42 (1.26)	1.21 (0.91)
5	Happy	3.68 (1.15)	3.15 (1.25)	2.21 (0.91)
	Joyful	3.36 (1.21)	2.73 (1.04)	2.15 (1.06)
	Proud	2.78 (1.27)	2.26 (1.36)	2.36 (1.25)
	Glad	3.52 (1.26)	3.05 (1.31)	2.36 (1.06)
	Worried	1.31 (0.74)	1.31 (0.58)	1.84 (1.11)
	Nervous	1.26 (0.56)	1.15 (0.50)	1.73 (0.87)
	Sad	1.47 (0.84)	1.31 (0.58)	1.26 (0.73)
	Uncomfortable	1.68 (1.05)	1.36 (0.76)	1.42 (0.76)
	I am bBored	1.94 (1.54)	2.47 (1.34)	2.78 (1.39)

Mean scores (standard deviations) on the nonverbal scale according to grade level and time of measurement

Grade	Time of measurement		
	Before listening	After listening	After dictation
3	4.52 (0.61)	4.52 (0.96)	4.31 (0.74)
5	4.00 (0.74)	3.47 (0.90)	2.84 (0.95)

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