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Reading and writing: what is the relationship with anxiety and depression?

Paola Bonifacci · Lucia Candria · Silvana Contento

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Abstract Learning can be considered a function of synthesis in which both cognitive functioning and the domain of affectivity convey. The aim of the present study was to investigate how specific literacy skills, i.e., reading and writing, relate to two main dimensions of negative affectivity, i.e., anxiety and depression. Study 1 was conducted on third grade children (72), while Study 2 focused on first grade children (43). Two groups of participants selected because they had been deemed 'at risk' for the development of anxiety or depression and a control group were compared in reading and writing tasks, which included both word and non-word lists. The assessment included also the evaluation of Verbal, Nonverbal and Composite IQs. Results indicated that children 'at risk' for depression made more spelling errors in dictation of words in comparison to the control group. No differences emerged in reading tasks or with reference to the group of children 'at risk' for anxiety.

Keywords Reading · Writing · Anxiety · Depression · Learning

School learning is a complex process. Although it is based on specific cognitive competences, it develops in interaction with other factors, for example learning contexts, personal experience, social competences and affective development. Greater attention to the relationship between emotional and cognitive states might allow for a more in-depth knowledge of the learning process and of the factors that can hinder its development, making it possible to lessen the gap between cognitive and affective research areas which have remained in opposition for too (Stein & Young, 1992).

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It has been consistently demonstrated that Specific Learning Disabilities (SLD) are the result of specific alterations within the cognitive domain. A diagnosis of SLD cannot be undertaken in the presence of severe emotional disturbances (Hammill, 1990). Despite this precise cognitive basis, a substantial number of studies have reported emotional alterations in children with SLD. In their literature review, Rock, Fessler, & Church (1997) report that the incidence of comorbidity between learning disabilities and emotional disorders has been described as varying between 24% and 54%. Some authors have suggested that children with LD might be at a greater risk for developing mental disorders because they tend to have lower self-esteem (Stevenson & Romney, 1984) and higher external locus of control (Bladow, 1982). They also resulted as being less accepted by peers (LaGreca & Stone, 1990) and more anxious (Murray, 1978) than subjects without LD. In the same vein, a number of studies have reported that children with SLD had higher scores in depression scales (Bender & Wall, 1994; Newcomer, Barenbaum, & Pearson, 1995; Maag, Behrens, & DiGangi, 1992; Maag & Reid, 1994; Wright-Stawderman & Watson, 1992; Boetsch, Green, & Pennington, 1996).

There is, however, no consensus in the literature on the higher incidence of emotional disturbances in subjects with SLD. Some studies have failed to find differences in the emotional profile of subjects with and without SLD (Lamm & Epstein, 1992; Jorm, Share, Matthews, & McLean, 1986; Miller, Hynd, & Miller, 2005). Others have found only marginal differences in female participants but not in males (Heath & Ross, 2000). Still others have emphasized the fact that the degree of the differences observed was not of a sufficient magnitude to place subjects with learning difficulties in the clinical range for a major affective disorder (Maag & Reid, 2006). Moreover, neither particular personality characteristics (Porter & Rourke, 1985) nor behavioral problems (Fuerst, Fisk, & Rourke, 1989; Tsatsanis, Fuerst, & Rourke, 1997) have been found across different groups of children with learning disabilities.

There is also disagreement as to how to distinguish between primary and secondary causes within these profiles of associated cognitive-emotional difficulties. Various hypotheses have been proposed. Some authors have suggested that the presence of learning difficulties may lead to psychopathological outcomes, the consequence of repeated academic failures or low self-esteem (Epstein & Cullinam, 1984; Meyer, 1983). Conversely, others have suggested that an altered emotional experience may impede a proper investment of cognitive resources in the learning process (Spreen, 1989). Within the literature dedicated to the influences of emotional disturbances on cognitive functioning, the majority of studies have been developed in the frame of the Information-Processing paradigm (review in Vasey, Dagleish, & Silverman, 2003), with particular attention to the influences of anxiety and depression on attention and memory.

It is, however, worth pointing out that most of the studies seem to adopt a confirmatory approach, either by examining the incidence of affective problems in subjects diagnosed with learning disabilities or by investigating the effect of manifested emotional disturbances on cognitive functioning.

Actually, most of the studies investigating the relationship between learning disabilities and emotional aspects have been carried out on children diagnosed with

disturbances in one of the two areas (cognitive versus emotional). In these cases, it is likely that the 'core' deficit in one area led to the development of secondary symptoms in the other area. Moreover, there is high heterogeneity in the sampling procedures, as some studies have been conducted on children with generalized learning problems (Porter & Rourke 1985; Tsatsanis et al., 1997) while others have been conducted on children diagnosed for Specific Learning Disabilities, principally dyslexia (Miller et al., 2005), with consequent differences in the cognitive domains involved.

To straighten out this complex relationship, it would be worthy to give more detailed and operative specifications of what types of learning processes and emotional aspects are considered. In the emotional domain, the construct of negative affectivity (Watson & Clark, 1984; Clark & Watson, 1991; Malcarne & Ingram, 1994) can be useful to define a frequently observed range of emotional alterations in childhood. It refers to the frequent association of anxiety traits and depressive moods and depicts a condition that fluctuates on a continuum and does not necessarily correspond to a psychopathological state. In the cognitive domain, alterations in abilities such as reading and writing form the basis of the most common profiles of SLD. Measurements of these abilities can furnish more detailed information regarding the cognitive components involved. Studies involving adults underline how depression can influence coding, stimulus processing, quality of recall and cognitive style (Gotlib, Gilboa, & Sommerfeld, 2000). The principal studies investigating the influences of anxiety and depression on specific cognitive processing in developmental-age suggest that anxiety is principally associated with attentive biases (Taghavi, Neshat-Doost, Moradi, Yule, & Dalgleish, 1999; Vasey, Daleiden, Williams, & Brown, 1995; Vasey, El-Hag, & Daleiden, 1996), while depression generally results in mnestic bias relative to negatively valenced information (Neshat-Doost, Taghavi, Moradi, Yule, & Dalgleish, 1998). To our knowledge, there is a lack of studies investigating how anxiety and depression might influence skills crucial to the first steps of literacy acquisition such as reading and writing.

The present study aimed to investigate whether or not negative affectivity interferes with the acquisition of reading and writing skills in a sample of children who were situated at the upper bounds of negative affectivity, either in the anxiety or depression dimensions, within a non-pathological population. Children included in the present study were not referred either for emotional disturbances or for learning disabilities. The results of the study could constitute an original contribution to the understanding of the onset of the relationship between cognition and emotion within the framework of the learning process. Starting from the assumption that learning and emotion are strongly connected, we were interested in evaluating whether or not the first steps of literacy acquisition are related to mild emotional disturbances in the frame of negative affectivity, i.e., in the dimensions of depression and anxiety. The research had its origins in a wider screening activity aimed at the early identification of learning difficulties and was articulated in two studies. The first was an exploratory study conducted on a group of children attending the third grade of primary school. The data that emerged in the first study led to our curiosity as to whether or not it would be possible to identify the same

trend in younger children attending first grade. Methods and results of the two studies will be explained separately, followed by a general discussion.

Study 1

Method

Participants

Our study[1] was conducted during a screening activity involving 201 children attending the third grade at primary schools in centrals regions of Italy (83 females, 116 males; mean age 8 years, 6 months; min: 8.3 max: 9.4). None of the participants had been referred to the services responsible for identifying learning disabilities or emotional disturbances. The children's parents gave their written consent for participation. From the initial sample we selected three groups (see below Characteristics of the group) for a total of 72 participants.

Materials

Each participant received the following tests:

- Questionario Scala d'Ansia per l'Età Evolutiva [Anxiety Questionnaire for Developmental Age] (Busnelli, Dall'Aglio, & Faina, 1974). The questionnaire is composed of 45 items, which require a response on a three-point Likert scale. Split-half reliability coefficients ranged from .63 (males) to .57 (females). Raw scores were transformed into z scores on the basis of Italian norms.
- *Children's Depression Inventory* (CDI-Kovacs, 1988). The questionnaire is a self-evaluation scale composed of 27 items made up of three-sentence choices. The wide range of areas investigated includes mood disorders, ability to take pleasure, vegetative functions, self-esteem and social behavior. The questionnaire gives a total score of depression and furnishes cut-off scores based on Italian norms.
- *Wechsler Intelligence Scale for Children–Revised* (Wechsler, 1974). Each child's general cognitive ability was assessed using the complete form of the WISC-R, which furnishes scores for verbal (VIQ), performance (PIQ) and Full Scale IQ (FSIQ).
- *Batteria per la Valutazione della Dislessia e della Disortografia Evolutiva* [Battery for the assessment of Dyslexia and Dysortography in Developmental Age] (Sartori, Job & Tressoldi, 1995). This battery of tests is divided into nine subtests geared towards assessing subject abilities in terms of the reading process, which we grouped in three profiles:

[1] Both studies were carried out according to the ethical guidelines laid down by A.I.P. (Associazione Italiana di Psicologia).

- Basic Abilities (letters and numbers sound, grapheme discrimination, lexical decision);
- Reading Efficiency (reading of words, non-words and words with irregular accentuation);
- Comprehension (meaning and correction of homophones).

The remaining three subtests were: dictation tasks of words, of non-words and of homophones.

For basic abilities and reading efficiency, both accuracy and speed parameters were collected and transformed into *z* scores based on Italian norms for grade levels, while for comprehension and writing tasks the test gives norms for accuracy, transformed for each task into *z* scores based on Italian norms for grade level. Test–retest reliability coefficients ranged from .56 for reading accuracy to .77 for reading speed. Concurrent validity with other standardized measures of reading ability was estimated at .74.

Characteristics of the groups

From our initial group, we extracted those children with scores higher than 2 standard deviations (SD) in one of the two scales of anxiety scale or depression, and we matched them with a randomly selected control group (through SPSS 12.0 cases casual selection) with anxiety and depression scores within the average range. We excluded children who had both anxiety and depression scales higher than 2 SD because they could have caused confusion in reading the results and they were too few (4 participants) to create a separate group. It is worth pointing out that the condition of the children we define, as depressed or anxious children cannot really be considered pathological because these children were not referred to specialist care for these problems. During individual feedback sessions parents of these children generally confirmed that the condition was mild. These children are, therefore, best defined as being 'at risk' for developing more stable conditions of negative affectivity.

The three groups we analyzed were composed as follows:

– Depressed Group: 22 children with a score higher than 2 SD on the CDI,
– Anxious Group: 13 children who scored higher than 2 SD in the anxiety scale,
– Control Group: 37 children with scores of anxiety and depression within the average range.

Procedure

Assessment of reading skills and cognitive functioning was carried out individually for each child in a quiet room in their school during school hours. Tests assessing writing skills and anxiety and depression were administered in small groups of about 10 children.

Results

Multivariate Analyses of Variance (MANOVAs) were run with Group as independent factor (Depressed, Anxious, Controls) and, in turn, Reading Accuracy (basic abilities, reading efficiency and comprehension), Reading Speed (basic abilities, reading efficiency) and Writing Accuracy (word task, non-word task, homophone task) as dependent measures. No significant differences emerged within the three groups in Reading Accuracy scores ($F_{(6,136)} = 1.168$, p = n.s.). Nor did the analysis ran on Reading Speed (basic competence and reading efficiency) reveal any significant differences among groups ($F_{(4,138)} = 0.49$, p = n.s.).

As far as accuracy in writing tasks is concerned, a main effect of Group emerged ($F_{(6,136)} = 2.87$, $p < .05$). ANOVAs conducted for each writing task showed an effect of Group only in Word task ($F_{(2,71)} = 4.59$, $p < .05$) and Homophone task ($F_{(2,71)} = 7.79$, $p < .01$), but not in the Non-word writing task ($F_{(2,71)} = 1.48$, p = n.s.). Bonferroni post-hocs showed that the Depressed Group had higher error rates compared to the control group both in writing words ($p < .05$) and non-words ($p < .01$). In Table 1, mean scores for each task are reported by group.

Controlling for cognitive functioning, a MANOVA run with Group as independent factor and IQs (verbal, performance) as dependent measures showed a main effect of Group ($F_{(4,138)} = 3.29$, $p < .05$) with univariate analyses showing an effect of group in verbal ($F_{(2,71)} = 5.73$, $p < .01$) but not performance ($F_{(2,71)} = 0.24$, p = n.s.) IQs. Bonferroni post-hocs showed that the Depressed Group had a lower VIQ (mean = 101.9 ± 14) in comparison to the Control group (mean = 114 ± 13.3) ($p < .05$) with no differences in comparison to the Anxious group (mean = 110.4 ± 11.7).

In order to verify that the effect in writing tasks was not primarily due to differences in verbal abilities, VIQ was put as covariate in a MANCOVA with Group as independent factor (Depressed, Anxious, Controls) and WritingAccuracy (words, non-words, homophones) as dependent measures. A significant main effect of Group remained ($F_{(6,134)} = 2.02$, $p < .05$) with the depressed group performing significantly worse than the control group in the homophone task ($p < .05$) (Table 2).

Discussion

The purpose of this first study was to evaluate how the main dimensions of negative affectivity, i.e., anxiety and depression, were associated with reading and writing skills. The results indicated a significant difference in writing abilities between participants with high levels of negative affectivity and children whose scores fall within the normal range. This difference was significant only in the case of children with higher scores on the depression scale, who performed worse in writing words and homophones, while no differences emerged for the non-word writing task. Interestingly, the writing task scores obtained by the group with levels of anxiety above the normal range did not differ either from the control or from the depressed groups. In the analysis of reading processes, two variables were considered: accuracy and the speed of reading. There were no significant differences among the

Table 1 Study 1—Mean performance (*z* scores) of children 'at risk' for anxiety, depression and control group on reading and writing tests

	Reading										Writing					
	Basic competence				Lexical competence				Comprehension		Word		Non-word		Homophones	
	Accuracy		Speed		Accuracy		Speed		Accuracy		Accuracy		Accuracy		Accuracy	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Depressed group	−0.09	0.37	−0.13	0.63	0.08	0.74	−0.10	0.90	0.45	0.90	0.79	1.72	0.45	0.97	0.91	1.53
Anxious group	−0.07	0.54	−0.26	0.51	0.08	1.24	−0.32	0.78	0.17	0.48	0.05	0.64	−0.52	0.68	0.52	1.34
Control group	−0.06	0.68	−0.35	0.77	−0.32	0.57	−0.36	0.77	0.15	0.65	−0.17	0.93	0.01	2.10	−0.12	0.65

Table 2 Study 2—Mean performance of children 'at risk' for anxiety, depression and control group on intellectual functioning (standard scores), reading and writing tests (raw scores)

	Intellectual functioning				Reading								Writing			
					Non-words				Words				Non-words		Words	
	Verbal IQ		Nonverbal IQ		Accuracy (errors)		Speed (sec.)		Accuracy (errors)		Speed (sec.)		Accuracy (errors)		Accuracy (errors)	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Control group	94.14	6.94	103.41	8.38	2.36	3.00	51.05	66.19	1.64	2.38	40.77	41.63	1.55	1.71	0.86	1.13
Anxious group	99.33	10.87	107.89	12.68	1.22	2.54	60.56	34.96	1.67	2.45	50.22	27.24	3.11	2.15	1.44	1.01
Depressed group	92.75	19.24	100.88	7.99	2.09	3.33	47.18	22.64	2.09	3.42	45.73	28.62	2.82	2.32	2.45	2.02

groups in any task. Judging from the mean values, the performance levels of all three groups were very similar in terms of basic abilities profiles, while the control group seemed to be slightly more accurate in the reading efficiency profile.

Another dimension analyzed in this study was cognitive functioning, evaluated in both Verbal and Performance components. The data indicated a significant difference in VIQ between the depressed and the control group, with a mean difference of 12.07 points for the control group. However, the differences within groups in writing task remained stable after controls were conducted for IQ as a covariate.

To summarize, findings from this study seem to suggest that writing skills but not reading skills are associated with the dimension of depression within the negative affectivity framework. Moreover, the lexical component (word and homophone tasks) seemed to be most heavily impacted, while more phonologically based abilities such as those involved in the writing of non-words appeared not to be impacted from group to group.

Study 2

Upon consideration of the results obtained in the first study, we decided to attempt to verify whether or not the relationship between depression and writing skills could be detected from the very beginning of literacy acquisition. We therefore decided to conduct a similar investigation on children attending first grade.

Method

Participants

This second study involved 132 participants (60 females, 72 males; mean age: 6 years, 7 months, min: 6.0; max: 7.7) attending the first grade of primary school. As in study 1, none of the participants had been referred to the services responsible for identifying learning disabilities or emotional disturbances. The children's parents gave their written consent for participation.

Materials

The instruments used addressed the same cognitive and affective dimensions as those of Study 1 but were chosen to be appropriate for the age interval considered.

Each participant received the following tests:

– *Test of Anxiety and Depression* (TAD; Newcomer, Barenbaum & Bryant, 1995). The TAD is a 22-item questionnaire, which requires a response on a five-point Likert scale. During the scoring, 11 items contribute to the definition of an index of depression, while the remaining 11 furnish an index of anxiety. Both indexes are transformed into standardized scores with a mean of 100. In this study, only the self-evaluation version of the test was used.

- *Kaufman Brief Intelligence Test* (K-BIT; Kaufman & Kaufman, 1990). We used an Italian version of the K-BIT (Santinelli, Bonifacci & Contento, in press). The K-BIT comprises Vocabulary and Matrices subtests and yields standardized measures of Verbal (VIQ), Performance (PIQ) and Full Scale IQ (FSIQ).
- COST: un progetto europeo per lo studio della dislessia e la valutazione delle prime fasi di apprendimento della lettura. [Cross-linguistic European project of evaluation first stage of writing learning-Italian Group] (Carriero, Vio, & Tressoldi, 2001). The test was developed within the European Co-operation in the field of Scientific and Technical Research. Word and non-word lists were assembled on the basis of specific criteria common to different countries participating in the research. Reliability and validity data were unavailable at the moment of the study. This test is divided into four lists (two to be dictated and two to be read aloud) made up of mono-syllabic and disyllabic words and non-words with vowel-consonant structure. For the reading test we considered reading times and number of errors. For the writing test we considered the number of errors.

Characteristics of the groups

From our initial group, we extracted children with scores higher than 2 SD in one of the two indices of anxiety or depression on the TAD scale. Considering that in Study 1 the depressed group had lower scores in Verbal IQ, in the present study we decided to match the control group for Verbal IQ. The three groups were composed as follows:

- Depressed Group: 11 children with a score above 2 SD in the depression index of the TAD;
- Anxious Group: 9 children with a score above 2 SD in the anxiety index of the TAD;
- Control Group: 22 children with scores of anxiety and depression within the average range, matched for verbal IQ to the depressed and anxious group.

Procedure

The procedure followed in Study 2 was the same as in Study 1. For this younger sample, however, all of the items of the TAD were read aloud by the experimenter in order to avoid biases due to decoding difficulties.

Results

Multivariate Analyses of Variance (MANOVAs) were ran with Group as independent factor (Depressed, Anxious, Controls) and, in turn, Reading Accuracy (words, non-words), Reading Speed (words, non-words) and Writing Accuracy (words, non-words) as dependent measures. As far as reading measures are

concerned, no main effect of Group emerged, either for Speed ($F_{(4,78)}$ = 0.77, p = n.s.) and Accuracy ($F_{(4,78)}$ = 1.22. p = n.s.) parameters. Conversely, a main effect of Group emerged in writing accuracy ($F_{(4,78)}$ = 2.98, $p < .05$), with Univariate tests showing that differences among groups were significant for the number of errors in writing words ($F_{(2,41)}$ = 4.79, $p < .05$), but not non-words ($F_{(2,41)}$ = 2.71, p = n.s.). Bonferroni post-hocs showed that the Depressed group performed worse than the control group ($p < .05$).

Discussion

The present study, which involved younger children than Study 1, similarly indicated that negative affectivity and literacy skills were related insomuch as children with higher scores in the depression scale scored lower in the writing tasks. Reading ability, on the other hand, seemed to have no relationship to negative affectivity and scores on the anxiety scale did not appear to be related to reading and writing skills. Moreover, it appeared that the relationship between writing and depression has to do, especially, with the lexical abilities involved in writing words. No difference was found, from group to group, in scores pertaining to the writing of non-words.

The confirmation of a relationship between depression and writing abilities might suggest that the two components are reciprocally related from the beginning within a circular relationship, rather than either one being the effect of an alteration of the other.

General discussion

Most of the research on the relationship between learning difficulties and emotional disorders has been centred on unidirectional explanations. On the one hand, a number of these studies saw emotional disturbances in people with learning disabilities as being due primarily to repeated academic failures or lower peer acceptance (Maag & Reid, 2006; Valas, 1999). Other studies have suggested that the presence of severe emotional disturbances, such as major depression, may lead to biases in cognitive processing, e.g., memory functions (Paelecke-Habermann, Pohl, & Leplow, 2005). The present work was designed to investigate the relationship between negative affectivity and early literacy skills in a non-pathological population of young children attending primary school. Despite children included in the ‘‘anxious’’ or ‘‘depressed’’ groups obtained relatively high scores either in the anxiety or in the depression scale, their condition has been defined as ‘at-risk’ for the development of affective disturbances rather than properly pathological. This definition was supported by different reasons. First of all, the tests we used (as most of self-administered questionnaires) are not sufficient for themselves to determine a clinical diagnosis. Moreover, these children have never been referred to specialist care for these problems. Finally, during individual feedback sessions, parents of these children generally confirmed that the condition

was mild and did not have severe effects on everyday life activities. Parents were told to monitor the anxiety/depression related behaviors.

Study 1 involved children attending third grade. Usually, by the third grade, the processes of reading and writing have already become, to a certain extent, automatic. Study 2 was carried out on children attending first grade and making their first steps toward literacy acquisition. Convergent results emerged from the two studies. They can be summarized in two main points as follows:

(1) There is no evidence that reading is related to negative affectivity, either anxiety or depression, at least not so far as accuracy and speed parameters are concerned.
(2) There is evidence of a relationship between the tendency to experience negative moods (depression) and the lexical component of writing. Children with higher levels of depression made more errors in writing words, but did not differ from the control group in writing non-words. In Study 1, their VIQ was lower than that of the other two groups, but the differences in writing words remained after including verbal abilities as covariate. In Study 2 the effect of general verbal abilities was controlled matching the samples for VIQ.

As far as reading skills are concerned, our findings that there is no relationship between reading skills and anxiety or depression seem to be in line with the recent work of Miller et al. (2005), who did not find higher levels of internalizing symptoms in children with dyslexia. As Miller and colleagues suggest, the heterogeneity of results must take into account the heterogeneity in sampling procedures adopted in different studies. Studies, which reported higher incidence of emotional disorders usually, included children with more generalized rather than specific disorders (Porter & Rourke, 1985; Tsatsanis et al., 1997, LaGreca & Stone, 1990; Stevenson & Romney, 1984). Reading ability *per se* seems, therefore, not to be specifically related to aspects of negative affectivity. This is supported by most of the literature on reading development, which defines the reading process as specific and highly automatized. The incidence of emotional disorders in children with reading disabilities seems, therefore, to be a secondary effect which can present itself as a result of different factors, such as the severity of the disease, the degree of academic failures, and, most of all, the ability of professionals and parents to follow the child and manage the problem adequately.

Writing ability scores present a different framework. It is important to note that the literature itself does not contain nearly as much research on writing as it does research on reading. Writing is a complex process requiring visual memory, attention, phonological processing, semantic operations, and motor performance. It is therefore less specific and less automatized in terms of reading and it can easily be disturbed by the interference of concurrent cognitive and motor operations (Moretti et al., 2003). According to the capacity theory of writing (McCutchen, 1995, 1996) additional attentional resources are required for the management of low-level activities involved in handwriting.

Our observation that children with a tendency to experience depressed moods made more errors in dictation to spelling tasks might be explained from an attentional hypothesis. Various studies have suggested that the depressive state

impacts cognitive processes that require sustained attention (Danion, Kaufmann-Muller, Grangé, Zimmermann, & Greth, 1995). Writing, like reading but to a greater degree, is one of these. Depressed children might, therefore, possess fewer cognitive resources and achieve lower scores in tasks, which, like writing, require high attentional load. In this vein, Barriga et al. (2002) suggested that attentional problems in children with behavioral and emotional disturbances are a primary factor in determining academic failures. Data from the present study, however, suggested that children with higher levels of depression differ from control children only in writing words but not in writing non-words. This seems to potentially contradict a purely attentional hypothesis, because writing non-words can be seen to require more attentional control than writing words. According to the dual-route model of writing (Barry, 1994), the lexical route is said to deliver the spelling of known or irregular words (as was the case of homophones in Study 1) through the retrieval of lexical knowledge. This route is assumed to be faster and to require lower processing capacities than the non-lexical route, which operates through the application of knowledge of sound to spelling mappings. The non-lexical route is thought to be less automatized and under more strategic control than the lexical route (Rapp, Epstein & Tainturier, 2002; Bonin, Collay, Fayol, & Méot, 2005). Within this framework it is no longer plausible to explain spelling errors in writing words as a result of attentional factors. If attentional factors were really the best explanation, the differences between depressed and not depressed participants would be more evident for non-words. It has to be said that one reason for the absence of a significant difference among groups in non-words might did not emerged because of the difficulty of the task, in which the control group also made more spelling errors.

Alternatively, it may be that depression influences more specifically lexical organization and therefore delays access to word representations during the writing process. It has been consistently demonstrated that people with depressed mood report memory biases for negative words (Blaney, 1986; Bradley, Mogg, & Williams, 1995; Gotlib & Neubauer, 2000; Lim & Kim, 2005). The words included in the lists dictated in Study 1 and 2 were not controlled for emotional valence, but they were generally neutral or near to positive valence. It was therefore not possible to directly test the impact of the valence of the stimuli across the groups, but it is possible to suggest that a tendency to experience negative moods may affect lexical organization from the very beginning of literacy acquisition. This was supported in Study 1 by the observation of a lower VIQ in depressed children, a topic which, to our knowledge, has not been thoroughly investigated in the literature. Verbal IQ was assessed by means of the WISC-R, which comprises a variety of tasks designed to test general knowledge, vocabulary and comprehension. In this case, it is more difficult to assume that the bias is merely a result of the negative valence of the contents.

According to the model proposed by Williams, Watts, MacLeod, & Mathews (1988, 1997) cognitive biases in anxiety and depression might be explained with reference to Graf and Mandler's (1984) distinction between integration and elaboration processes. Williams and colleagues suggested that anxiety is primarily associated with biases in automatic processing, whereas depression is more likely

associated with biases in tasks that require cognitive elaboration. In this vein, various studies reported a dissociation between impaired long-term explicit memory (e.g., free recall) and preserved implicit memory (repetition priming) (Danion et al., 1991; Bazin, Perruchet, De Bonis, & Feline, 1994) Georgieff, Dominey, Michel, Marie-Cardine, Dalery, 1998a; Besche-Richard, Passerieux, Hardy-Bayle, 2002).

Some studies have also found that depressed patients report difficulties in finding the right word (Georgieff, Dominey, Michel, Marie-Cardine, & Dalery, 1998b) and an increased frequency of semantic, but non-phonological, errors. The authors suggested that mild forms of anomia in depression might be due to an alteration in the early stages of lexicalization retrieval. Despite the studies mentioned above have been carried out on adults with severe depressive states, they may shed further light on our data.

It seems, therefore, that our finding lend credence to the idea that children showing a tendency to experience negative moods have, generally, difficulty in retrieving verbal information from long-term memory. Of particular significance, in our opinion is the suggestion that the relationship between a tendency toward depression and problems in lexical organization emerges from the very beginning of literacy acquisition. The relationship between the two components might be reciprocal rather than linked by contrasting unidirectional hypotheses. Children with a tendency to experience negative moods might experience greater difficulties in tasks requiring them to pay attention to meaningful verbal information. The resulting impact on their verbal skills may lead to a decrease in social interaction and lowered academic achievement, which would then contribute to the maintenance of the depressed mood and so on, in a vicious cycle.

On the contrary, from the results of the reading tasks and the writing of non-words, it seems that the influence of affective state on more specific abilities such as sound-spelling correspondences is not significant.

Last but not least, particular consideration should be given to the anxiety dimension within the negative affectivity construct. The reading and writing performances of children with higher scores on the anxiety scales did not differ from the reading and writing scores of the children in the depressed or the control group. A possible explanation is that children with anxiety might constitute a more heterogeneous group depending on the causes of anxiety and the ability of the child to cope with it.

The present investigation should be considered an explorative study of the relationship between negative affectivity and specific skills involved in literacy acquisition. There is a need for more in-depth investigations, which should include the evaluation of specific lexical organization in children with depressive traits and take into account the valence of the stimuli used as well.

The results obtained suggest, however, that pursuing this line of research might contribute to a better understanding of the early relationship between the cognitive and the affective domains and shed further evidence on the view that learning is determined by the interaction of specific cognitive skills as well as emotional conditions.

Finally, we suggest that the inclusion of assessment instruments that consider the affective domain within screening activities aimed at the early identification of

learning difficulties might make it possible to obtain a more complete evaluation of the conditions that surround the disease.

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