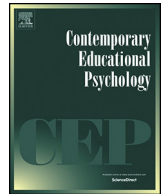




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Attentional bias toward reading in reluctant readers

Thijs M.J. Nielen^a, Suzanne E. Mol^b, Maria T. Sikkema-de Jong^{a,c}, Adriana G. Bus^{a,c,*}^a Department of Education and Child Studies, Leiden University, P.O. Box 9555, 2300 RB Leiden, The Netherlands^b Department of Educational Neuroscience, VU University Amsterdam, Van der Boechorststraat 1, 1081 BT Amsterdam, The Netherlands^c Leiden Institute for Brain and Cognition (LIBC), P.O. Box 9600, 2300RC Leiden, The Netherlands

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ABSTRACT

Is reading subconsciously experienced as a source of threat by reading reluctant (RR) students which may explain their persistent resistance to reading? In four separate studies ($N = 1205$), we used a print exposure checklist to identify RR students in primary education (Grades 4 and 5) and secondary education (Grades 7 and 8) in the Netherlands. The visual dot probe task, commonly used to assess feelings of threat in clinical and health psychology, was applied to reading to test whether RR students indeed selectively attended to reading-related stimuli. Using a meta-analytical approach, we found that RR students scoring zero or below on a print exposure checklist were not only less proficient readers with a more negative attitude toward reading as compared to more enthusiastic readers, but also showed an attentional bias toward reading. The findings corroborate the theory that about 60% of reluctant readers avoid reading because reading is a source of threat to them. As part of promoting reading we need to find ways to make reading a less threatening activity for those students.

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1. Introduction

Reading for pleasure is strongly related to academic and social success (e.g., Gottfried, Schlackman, Gottfried, & Boutin-Martinez, 2015; Mol & Bus, 2011; Notten, 2011; Nielen & Bus, in press; OECD, 2010; Taylor, 2013). Unfortunately, numerous children and adolescents do not read outside school. In a representative sample of Dutch fifteen-year-olds, for instance, half of the adolescents reported that they hardly ever read for enjoyment (OECD, 2010). Due to an accumulation of negative experiences over the course of their school career, reading may become a threatening activity to many students, which may keep them from reading for pleasure. This theory that subconscious negative emotions play a role in students' unwillingness to read has not been experimentally tested yet, whereas insights in these processes may yield a new approach for understanding and preventing the development of reading reluctance.

1.1. Reluctant readers

The term 'reluctant readers' (RR) is widely used in the literature but its definition varies. To some researchers it implies the inability to read, whereas others view reluctant readers as individuals who have a negative attitude toward reading (Goodwin, 1999). We defined reluctant readers as individuals who do not

engage in reading longer stretches of text in their leisure time and avoid free reading in school. This may be because they lack intrinsic motivation as a drive to read (Conradi, Jang, & McKenna, 2014). Research reveals that the desire to avoid reading is one of the characteristics of low motivated readers, who agree with statements as: 'Complicated stories are not fun to read' (Baker & Wigfield, 1999; Wigfield & Guthrie, 1997). It should be mentioned that when referring to reading we do not consider the reading of short texts on websites or social media messages, but reading longer stretches of texts as in informative and narrative books.

In line with the above mentioned findings, we hypothesized that reluctant readers avoid reading because they perceive reading as a source of threat just as clinical groups with anxiety disorders avoid social situations, angry looking persons or other sources of threat (e.g., Beidel & Alfana, 2011; Kase & Ledley, 2007; Kerig & Wenar, 2006). This avoidance may cause a chain of negative effects each time these students are confronted with reading. Due to lack of practice they may increasingly experience difficulties with reading age-appropriate materials (including school books), which will further deepen their negative emotions about reading. In addition, there is evidence suggesting that anxiety has a detrimental effect on reading performance. Prefrontal cortex activity is reduced in anxious people, resulting in a failure to use attentional control mechanisms that are needed to process the text content (Bishop, 2009; Eysenck & Derakshan, 2011; Frewen, Dozois, Joanisse, & Neufeld, 2008). Consequently, students who interpret reading as a source of threat may fail to comprehend and enjoy what they read (e.g., Smallwood & Schooler, 2006; Stern & Shalev, 2013).

* Corresponding author. Department of Education and Child Studies, Leiden University, P.O. Box 9555, 2300 RB Leiden, The Netherlands. Fax: +31 71 527 3619.
E-mail address: bus@fsw.leidenuniv.nl (A.G. Bus).

1.2. Attentional bias

The main aim of this study was to test whether reluctant readers (individuals who do not engage in reading) not only lack reading motivation (Conradi et al., 2014), but also have an emotional resistance toward reading, resulting in increasingly avoiding reading. To test the theory that reluctant readers typically show subconscious negative emotions about reading we developed a task that is similar to tasks used in clinical groups suffering from various anxiety disorders. The so-called *visual dot probe task* is based on the assumption that human beings tend to focus on objects or activities that are interpreted as threatening. From an evolutionary point of view individuals pay greater attention to depictions of sources of threat (Bar-Haim, Lamy, Pergamin, Bakermans-Kranenburg, & van IJzendoorn, 2007; Mathews & MacLeod, 2002). This is adaptive to the environment in the presence of events that imply real danger (a wasp nearby your drink) but not when non-threatening events like reading are interpreted as source of threat.

The visual dot probe task, originally developed by MacLeod, Mathews, and Tata (1986), is commonly used to assess the attentional bias caused by the tendency in clinical samples to focus on sources of threat (e.g., MacLeod & Mathews, 1988; Waters, Kokkoris, Mogg, Bradley, & Pine, 2010). A potentially threatening stimulus and a neutral stimulus (e.g., an angry and a neutral face) are simultaneously displayed after which a visual probe (an arrow or dot) appears on a new screen at the location of the threatening or neutral stimulus. Because anxious subjects focus their attention on sources of threat they respond quicker to probes at the location of threatening stimuli than to probes at the location of neutral stimuli, causing an attentional bias toward the source of threat. In contrast, non-anxious subjects are not specifically focusing on the threatening stimuli and will therefore respond equally fast to probes at the location of threatening and neutral stimuli. Hence, they are not biased toward the potentially threatening stimuli.

There is strong support for the use of the *visual dot probe task* to assess anxiety in clinical and non-clinical samples. Meta-analytical evidence shows that anxious children and adults have an attentional bias toward threat-related stimuli, whereas non-anxious individuals display no attentional bias. In other words, subjects suffering from some form of anxiety typically show an attentional bias toward threatening stimuli (Bar-Haim et al., 2007; Schoth, Nunes, & Lioffi, 2012). This is, to the best of our knowledge, the first study in which the visual dot probe task was adapted to the domain of reading to assess negative emotions about reading.

1.3. Present study

This study aims at testing the following: *To what extent do reading reluctant students have an attentional bias toward reading?* We studied this question in four separate studies. We focused on the higher grades of the Dutch primary school system (9–12 year olds) as well as the first grades of secondary education (11–15 year olds). We focused on this age range because these children vary more in how often they read than younger children in the first grades of primary school (Mol & Bus, 2011). To identify individuals who do not engage in reading (reluctant readers) in our four studies, we focused on pupils who discontinued reading longer stretches of texts as appears from their unfamiliarity with book titles for their age range; for this we used a Title Recognition Test, which is considered to be an unobtrusive measure for reading longer stretches of text (e.g., Stanovich, 2000; Stanovich & West, 1989). The fact that participants are made aware of the presence of fake items in a title recognition test may prevent social desirable answers and, different from reading-frequency questionnaires, the title recognition test does not include ambiguous items or retrospective reports (Mol & Bus, 2011). We validated our selection of reluctant readers by examining whether they

differed from their more enthusiastically reading peers on reading motivation and reading skills.

Because existing literature (e.g., Bradley, Mogg, Falla, & Hamilton, 1998; Waters et al., 2010) is inconclusive about visual dot probe task elements like the qualities of picture stimuli and the duration of presenting picture pairs (500 ms versus 1500 ms), we have built-in checks on the validity of our choices by presenting two versions of the task in one of the studies. In addition, we have tested whether students perceive the reading pictures as related to reading and report both the attentional bias scores for all pictures and with exclusion of pictures that were not clearly related to reading according to the participants.

We expected more reluctant readers and negative emotions about reading in secondary school than in primary school because the attitude toward reading gradually grows more negatively over the course of primary and secondary school (Nielen & Bus, 2013; OECD, 2010). As students in the pre-academic track are known to be better skilled and more engaged readers than students in the pre-vocational track (CITO, 2010; Mol & Jolles, 2014) we expected more reluctant readers and negative emotions about reading in the pre-vocational track. Because girls read more, are better readers and are more motivated to read for pleasure than boys (e.g., Logan & Johnston, 2009; OECD, 2010), we expected that more boys than girls would be reluctant readers and would show an attentional bias toward reading. By meta-analyzing results of the four studies we accounted for possible influences of these background variables and may gain insight in risk groups for reading reluctance.

As tryouts the visual dot probe task was included in the pretest of an intervention study in primary education (study 1) and administered to a relatively small group of boys in the pre-academic track of secondary school (study 4). The promising results were reasons for carrying out more elaborate studies among primary school students (study 2) and students in pre-vocational education (study 3).

2. Method

2.1. Design

In four separate correlational studies, data about an attentional bias (AB) toward reading were collected. In all studies we have used unfamiliarity with popular book titles as indicator of reading reluctance. As scores of zero and below on the Title Recognition Test (TRT) indicated that students were not familiar with any age-appropriate book titles and that they had just been guessing we defined students scoring in this range as reluctant readers. To validate this criterion for selecting reluctant readers we also collected reading attitude and reading skill data in each study. We included a total of 605 students in the upper grades of primary school in studies 1 and 2, and a total of 600 secondary school students in the lower, pre-vocational educational track (VMBO) and the higher, pre-academic educational track (HAVO, VWO) in studies 3 and 4. From the tryouts in primary (study 1) and secondary education (study 4), only a small proportion of students was not at all familiar with book titles (about 10%), indicating that they do not read for pleasure. To compose larger groups of about 50 reading reluctant students in follow-up studies we had to test 450–600 students (studies 2 and 3). An overview of the initial and final number of participants, the grade, age and gender for each study are displayed in Table 1.

2.2. Instruments

2.2.1. Title recognition test

A print exposure checklist was used to measure familiarity with book titles appropriate for students' age range (Stanovich & West, 1989). Participants were asked to check existing titles among a list

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