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To get hold of the wrong end of the stick: reasons for poor idiom understanding in children with reading comprehension difficulties.

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Abstract

Purpose: The aim was to identify the source of idiom understanding difficulties in children with specific reading comprehension failure.

Method: Two groups (Ns=15) of 9- to 10-year-olds participated. One group had age-appropriate word reading and reading comprehension; the other had age-appropriate word reading, but poor reading comprehension. Each child completed an independent assessment of semantic analysis skills and two multiple-choice assessments of idiom comprehension. In one, idiomatic phrases were embedded in supportive story contexts; in the other they were presented out of context. Performance on transparent idioms, which are amenable to interpretation by semantic analysis, and opaque idioms, which can only be interpreted by inference from context if the meaning is not known, was compared.

Results: The groups demonstrated comparable semantic analysis skills and understanding of transparent idioms. Children with poor comprehension were impaired in the use of supportive context to aid their understanding of the opaque idioms.

Conclusions: The study identifies poor inference from context as a source of the idiom understanding difficulties in children with poor reading comprehension; there was no evidence that poor semantic analysis skills contributed to their difficulties. Children with poor comprehension should be supported in the use of context to understand unfamiliar figurative language.

WC=200

To get hold of the wrong end of the stick: reasons for poor idiom understanding in children with reading comprehension difficulties.

Idioms are figurative expressions that can often take both a literal and a figurative meaning. The expression 'to get hold of the wrong end of the stick' is a common idiom in British English. In one context it could be used literally and refer to picking up a piece of wood, in another it could be used figuratively to mean a misunderstanding. Children with language difficulties often struggle with idiom comprehension (Kerbel, 1998; Kerbel & Grunwell, 1998). Our focus in this paper is to identify the source of idiom processing difficulties in children with specific reading comprehension difficulties (Cain, Oakhill, & Lemmon, 2005; Levorato, Nesi, & Cacciari, 2004).

Idiomatic expressions are understood in relation to the context in which they are used. For most idioms different scenarios could be used to support the literal and figurative interpretations, although not all idioms can support a sensible literal interpretation. As a result, the skills used to process and understand language in context are thought to be important for the development of idiom understanding (Levorato & Cacciari, 1995). Populations who experience difficulties processing language in context often have poor idiom understanding (Norbury, 2004) and the presence of a supportive context boosts younger and older children's comprehension of idioms (Gibbs, 1987; Nippold & Martin, 1989).

When an idiom is unfamiliar, it may be (partly) understood by analysis of the meanings of the words in the phrase (Nippold & Taylor, 1995). In the example used above, 'wrong' provides a clue to the figurative meaning. Idioms that have a strong overlap between their literal and figurative meanings are generally easier to

understand than those that do not (Gibbs, 1991; Nippold & Rudzinski, 1993; Nippold & Taylor, 1995). These idioms are commonly referred to as transparent and opaque, respectively. Analysis of the internal semantics of the phrase may aid idiom comprehension, particularly for children and adolescents (Nippold, 1998): children and adolescents aged 11, 13, and 17 years find that idioms rated as more familiar and more transparent are easiest to comprehend (assessed with a forced-choice task) (Nippold & Taylor, 1995). There is also evidence that adults engage in literal analysis of the phrase. They are influenced by the transparency of known idioms, taking longer to read nondecomposable (opaque) idioms than decomposable (transparent) items presented in context (Titone & Connine, 1999). Titone and Connine (1999) propose that the longer reading times arise because adults activate both literal and figurative meanings, which are semantically distinct for nondecomposable idioms and, therefore, result in a processing cost for the more opaque expressions.

These two strategies, inference from context and semantic analysis (or the ability to derive alternate meanings of phrases), might aid the acquisition of idiom meanings. Research by Nippold and colleagues indicates that these two strategies continue to aid the processing of idioms in adolescence. In a forced-choice task, 11-, 13-, and 17- year-olds showed better understanding for transparent than for opaque idioms (e.g., Nippold & Taylor, 1995). When asked to write interpretations of idioms, 14 to 17-year-olds provided more accurate responses for idioms presented in meaningful contexts than those presented in isolation (Nippold & Martin, 1989). In younger children, the same effects of transparency and context are evident (e.g., Cacciari & Levorato, 1999) and these two strategies are incorporated into an influential model that seeks to explain how children's competence with all forms of

figurative language develops: the Global Elaboration Model (GEM: Levorato & Cacciari, 1995).

The essence of the GEM is that the same processes and strategies that children use to understand language in general, underpin the comprehension of figurative language. For example, comprehension of both literal and figurative language is dependent on understanding individual words and word strings in context; both involve using inference and integration to make links between parts of a text to establish a coherent meaning. Levorato and Cacciari (1995) have used this model to explain why both children with language difficulties and young children often fail to understand idioms. They argue that young children and those with language difficulties process language on a local, word-by-word basis, seeking to understand a piece of text rather than striving for an integrated and coherent meaning of the text as a whole (e.g., Levorato & Cacciari, 1995; Levorato, Nesi, & Cacciari, 2004). As a result, young children and those with language difficulties may fail to detect that the literal sense of an idiom does not fit the context, or they may lack the skills to derive a meaning that is contextually appropriate. To date, the focus has been on the benefits of context, with few studies contrasting transparent and opaque idioms to investigate semantic analysis. However, in one study that did compare transparent and opaque idioms in typically developing children they suggest that the influence of context is felt earlier in development than that of semantic analysis (Levorato & Cacciari, 1999).

In this study we look at idiom comprehension in relation to children's reading comprehension skills. Reading comprehension may fail for different reasons: for example, children with poor word reading skills may struggle to understand the text because their slow and inefficient word reading burdens limited processing

resources (e.g., Perfetti, 1985). In this study, we focus on a different group who have unexpected reading comprehension difficulties: children who develop age-appropriate word reading skills, but have very poor reading (and also listening) comprehension (Cain, Oakhill, & Bryant, 2000a; Stothard & Hulme, 1992). These children, described by Oakhill (1982), comprise approximately 10% of typically developing 8- to 11-year-olds (e.g., Yuill & Oakhill, 1991).

Poor reading comprehenders' language processing difficulties extend to many of the skills essential for adequate text comprehension, such as inference generation and the use of context to resolve anomalies in text (Cain, Oakhill, Barnes, & Bryant, 2001; Oakhill, 1982; Yuill, Oakhill, & Parkin, 1989). Research shows that the population of poor comprehenders is not homogenous: some poor comprehenders have weak semantic or syntactic skills, whilst others show age-appropriate performance on such measures (Cain & Oakhill, 2006; Nation, Clarke, & Marshall, 2004). A consistent finding is the absence of phonological difficulties typically associated with poor word reading (e.g., Cain, Oakhill, & Bryant, 2000b; Catts, Adlof, & Weismer, 2006). Poor comprehenders make an interesting population for the study of idiom processing because they do not have pronounced pragmatic deficits (in contrast to children with Autism Spectrum Disorder, e.g., Norbury, 2004) and they have developed age-appropriate word reading skills, indicating that they do not have a general learning delay. A greater understanding of their idiom comprehension can shed light not only the source of their idiom processing difficulties, but also on the source of their reading comprehension difficulties.

Previous work has shown that children with reading comprehension difficulties are poor on tasks designed to measure idiom comprehension and production: they are less likely than same-age good comprehenders to select the

correct interpretation in a multiple-choice task (Levorato, Nesi, & Cacciari, 2004) and they are less able to complete correctly a fragment of an idiomatic expression (Nesi, Levorato, Roch, & Cacciari, 2006). Both studies found evidence of a literal processing style: poor comprehenders were more likely to select a literal response and were more likely to provide a literal completion for a fragment (see also Nippold, Moran, & Schwarz, 2001, for evidence of the relation between text comprehension and idiom interpretation).

In our own work, we have begun to investigate which processing strategies might underpin the idiom comprehension difficulties of this population. Using an explanation task, we found a relation between reading comprehension and understanding of idioms, in support of the work by Levorato, Nippold and their colleagues (Cain, Oakhill, & Lemmon, 2005). Cain et al.'s study included novel idioms to eliminate confounds of prior knowledge and exposure to the idioms, which are related to age and language level. It also compared performance on transparent and opaque items. When an unknown idiom is presented in a supportive context, an approximate meaning may be derived from contextual clues. For an unknown opaque idiom, context is the primary source for meaning derivation, whereas the meaning of a transparent idiom can (partially) be derived through semantic analysis as well. A comparison of these two types of idioms provides insight into the use of processing strategies and may help us to understand why idiom comprehension is deviant or delayed in some children. The good and poor comprehenders did not differ in their ability to explain the meanings of novel transparent idioms, in or out of context, but differed significantly in their ability to explain the meanings of novel opaque idioms when presented in a supportive story

context. In contrast to Levorato et al.s' (2004) study, there was no evidence of a literal processing preference.

The study of children with language comprehension difficulties to date demonstrates the importance of context for idiom comprehension: poor comprehenders are particularly impaired in their use of context to derive appropriate meanings of idiomatic expressions. However, the source of poor comprehenders' difficulties with idioms remains unclear. Levorato et al.'s work indicates that children with comprehension difficulties may be developmentally delayed: the poor comprehenders showed a literal processing preference, similar to that described for young children (e.g., Levorato & Cacciari, 1999). Cain et al.'s study indicates that poor comprehenders' difficulties were specific to use of context: performance on transparent idioms, which can be partially understood through semantic analysis, was not impaired. In this study, we ask: do poor comprehenders suffer from a general lag in the processing strategies used to learn and understand idioms (semantic analysis and use of context) or are their problems specific to the use of context?

Our research addressed this question in the following ways. We compared children's ability to understand idioms that were amenable to semantic analysis with those that were not: hereafter, transparent and opaque. The idioms were presented in isolation and also in supportive story contexts to investigate how context aids idiom comprehension. We used British English idioms and translations of European idioms that did not appear in English idiom dictionaries and were not known to adult native-speakers: hereafter, real and novel respectively. Our reason for doing so is that the use of real idioms may provide an inaccurate picture of children's idiom processing skills because those with better reading comprehension may be more

familiar with particular idiomatic phrases (see Nippold & Rudzinski, 1993, for a discussion of the language experience hypothesis of idiom acquisition). Additionally, the use of novel idioms enables us to address issues related to the acquisition of idiomatic meanings, which has an extended period of development that is not completed during adolescence (Nippold & Taylor, 1995).

The participants were 9- and 10-year-old children with age-appropriate word reading skills: one group had age appropriate reading comprehension (good comprehenders), the other had a lag in reading comprehension of up to 24 months in relation to both their chronological age and their word reading skill (poor comprehenders). In contrast to the poor comprehenders studied by Nesi and colleagues (Nesi, Levorato, Roch, & Cacciari, 2006), this population's reading comprehension difficulties do not spontaneously recover, but persist for several years (Cain & Oakhill, 2006). Our work extends our earlier research on this population's difficulties with idiom comprehension in two important ways.

First, we included an independent measure of semantic analysis skills. In this task, children are required to produce (at least) two different meanings for sentences with ambiguous words and grammatical structures. This task involves many of the same skills that can aid the interpretation of an unfamiliar transparent idiomatic expression. To date, there are no published studies comparing idiom comprehension to performance on an independent measure of semantic analysis.

Second, we used a multiple-choice task to assess understanding of idioms. Cain et al. (2005) used an explanation task to assess idiom comprehension, which may disadvantage children with language difficulties because they are required to produce a verbal response (Spooner, Gathercole, & Baddeley, 2006). Our previous work may have underestimated poor comprehenders' abilities and a multiple-choice

task may provide a more sensitive measure of idiom understanding in children with comprehension difficulties.

If the idiom comprehension difficulties of poor comprehenders are truly comprehension difficulties, rather than response production difficulties, the good comprehenders should perform better than the poor comprehenders in general. If poor comprehenders' difficulties are specific to inference from context, they should do particularly poorly on (novel) opaque idioms, but both groups should obtain comparable scores on (novel) transparent idioms and the semantic analysis task. If the poor comprehenders' difficulties with idioms arise from more widespread language processing delays or deficits, e.g., poor semantic analysis skills in addition to poor use of context, they should also be poor on the novel transparent idioms and obtain lower scores on the independent measure of semantic analysis.

Method

Participants

Two groups of 9-10-year-olds participated in this study: 15 good comprehenders (7 girls, 8 boys) and 15 poor comprehenders (6 girls, 9 boys). Participants were recruited from small urban schools with socially mixed catchment areas in the north west of England. Participants in the experiment were children who spoke British English as their first language, had no known behavioural problems or learning difficulties, and for whom teacher and parental consent was obtained. The procedures were approved by the Departmental ethics committee.

Two tests were used to select participants from an original sample of 169 Year 5 children (9-10-year-olds): The Gates-MacGinitie Primary Two Vocabulary Test (Level 4, Form K) (MacGinitie & MacGinitie, 1989), which provides an index of a child's ability to read and understand written words out of context, and the Neale Analysis of

Reading Ability - Revised British Edition (Form 1) (NARA II: Neale, 1989), which provides scores for word reading accuracy in context and text comprehension. The Gates-MacGinitie is a group-administered test and the NARA II is individually administered.

TABLE 1 AROUND HERE

The group characteristics are reported in Table 1. The good and poor comprehender groups were matched for chronological age $t(28) < 1.0$, and also for performance on the Gates-MacGinitie vocabulary subtest, $t(28) < 1.0$. On the NARA-II, all of the selected children obtained reading accuracy in context ages that were good for their chronological age, indicated by the mean standardised scores (*M*s = 106.9 and 107.7, for the good and poor comprehenders, respectively). The good comprehenders' reading comprehension ability was slightly above their chronological age and in line with their reading accuracy level (standardised $M = 106.1$) and the poor comprehenders' scores were below average for their chronological age ($M = 84.4$). The good and poor comprehender groups differed significantly with regard to their reading comprehension age, as measured by the NARA-II: $t_{\text{age-equivalent}}(28) = 7.39$, $p < .001$; $t_{\text{standardised}}(28) = 9.75$, $p < .001$. The good and poor comprehender groups were matched on the NARA-II measure of word reading accuracy, $t(28) < 1.0$. In this way, we were able to exclude any child whose weak comprehension skills had arisen from difficulties in reading words in continuous prose (NARA-II) or understanding written words (Gates). The two groups were also matched on the number of stories that they had read on the NARA-II, $t(28) < 1$. The latter measure was necessary to ensure that the difference in comprehension scores did not arise because the poor comprehenders had read fewer stories and, therefore, obtained lower comprehension scores simply because they had attempted fewer comprehension questions.

Materials: construction and evaluation

Twenty four idioms were used in this study: twelve were common British English idioms and twelve were translations of European idioms for which no British equivalent was known and were, therefore, considered novel. The interpretations for the British English idioms were taken from *The Collins Cobuild Dictionary of Idioms* (Sinclair, 2002). The European idioms were selected from publications and websites listing idioms in other languages. All appeared in more than once source and were checked with native speakers of these languages (Italian, Spanish and Danish). There were six transparent and six opaque idioms for each set, which had been piloted and used in previous research (see Cain et al., 2005, for full details).

The contrast between the transparent and opaque idioms was checked with a component rating task, in which adult participants rated the extent to which individual words or groups of words contributed to the meanings of the idiomatic expression (higher scores indicate a greater contribution). The mean ratings for the items used in the current research were: real transparent =3.49, real opaque = 2.55, novel transparent = 3.33, novel opaque = 1.85. The scores obtained for the transparent and opaque idioms for each type (real and novel) differed significantly, *p*s < .001. Full details of the selection of these idioms can be found in Cain et al. (2005). The full set of idioms is provided in Appendix One.

In our original selection work (reported in detail in Cain et al., 2005) we obtained 'recognition' scores from our participants. These indicated that the children had not heard the novel transparent or novel opaque idioms before (*M*s = .43 and .14, out of 6, respectively). The recognition scores were higher for real transparent than for real opaque (*M*s =2.5 and 1.6) but the effect of transparency was not significant. For the current study, we obtained familiarity ratings from 16 native

British-English speakers adults for the 24 idioms. We adapted the instructions of Titone and Conine (1994) to do so and used a rating scale of 1 to 7, where 7 indicates 'never seen or heard' and 1 indicates 'frequently seen or heard'. Participants were instructed that variants of idioms existed. They were asked to write down a variant, if that was the form of the expression that was familiar to them, to rate the known variant. No variants for novel idioms were reported. The two sets of real idioms (transparent and opaque) did not differ in their familiarity ratings, neither did the two sets of novel idioms: *p*s > .10, but all other contrasts were significant. Mean scores were real transparent = 2.4, real opaque = 2.8, novel transparent = 6.7, novel opaque = 6.8.

Experimental tasks and procedure

Idiom comprehension was assessed using a multiple-choice task. Children were required to choose one out of four interpretations of an idiom: a target idiomatic interpretation of the phrase; a figurative interpretation, which was plausible within the story context; a figurative interpretation, which was not plausible within the story context; an interpretation that provided a literal interpretation of part of the phrase. Examples are provided in Table 2. There were six items each for the following types: real transparent, real opaque, novel transparent, novel opaque. Pilot work with adults (N=34) established that, in context, the idiomatic interpretation was the most common selection, with the following mean correct scores: real transparent = 5.8; real opaque = 5.7; novel transparent = 5.7; novel opaque = 5.3 (maximum possible = 6).

TABLE 2 AROUND HERE

Idioms in isolation. Children were tested individually in a quiet room away from the classroom. The work was completed in a booklet. The instructions for the task were printed on the front cover of the test booklet and read out to the child: "In this booklet there are a number of short expressions or sayings, for example 'it's raining cats and dogs'. After each saying there are four possible meanings. Your job is to choose the right one." An example with four multiple-choice options followed, which was completed by each child in their booklet with help from the experimenter and feedback as necessary. An example is provided in Table 2. Children were then told: "Don't worry if you haven't heard some of these sayings before, a few of them have been made up. If you're not sure which one is the right answer, just choose the one that you think it might be." The experimenter then worked through the booklet with each child: she read out each item and the four multiple-choice options.

Idioms in context. The idioms in context condition was administered a minimum of two weeks after the isolation condition, in a similar way. The same twenty-four idioms were used, each was embedded in a supportive story (see Table 2.) The instructions were adapted to note the story context. The items were presented in the same order for each child, distributed so that the same type of idiom (real-transparent, real-opaque, novel-transparent, novel-opaque) did not appear consecutively. A different order was used for the in isolation and in context conditions. The total number of each response option selected was calculated (maximum = 6, for each condition).

Semantic analysis skills. Children completed an adaptation of the Ambiguous Sentences subtest from The Test of Language Competence, Expanded Edition (TLC-Expanded: (Wiig & Secord, 1989)). This test is developed for American English. Eleven items were selected from Level 1 and eight from Level 2 on the basis that

they were common in British English. The Level 1 items comprised a short sentence that could have multiple interpretations, because of a word that could take two or more different meanings, e.g., 'This key doesn't work'. Each sentence was accompanied by four pictures, two of which depicted possible meanings. The Level 2 items comprised a sentence only with no accompanying pictures. The different meanings of these sentences rested on computing a different grammatical structure for the sentence, e.g., 'I don't know about you, but visiting relatives can be a nuisance'. The selected items contained common British English words and grammatical structures. The items were scored according to the manual.

Results

The mean sum scores obtained for correct idiomatic choices in isolation and in context are shown in Table 3.

Idioms in isolation. A series of one-sample *t* tests for each comprehension group was conducted to determine the likelihood that each group were able to select the correct response by chance with the α level set at .00625 (adjusted for the 8 comparisons). Both groups performed comparably: they responded above chance level on both types of transparent idiom: good comprehenders real, $t(14) = 6.58$, $p < .005$ and novel, $t(14) = 7.91$, $p < .005$; poor comprehenders real, $t(14) = 4.19$, $p < .005$ and novel, $t(14) = 3.52$, $p < .005$. Their performance on both types of opaque idiom did not differ from chance, all ts < 1.71, all ps > .10.

TABLE 3 AROUND HERE

Idioms in context. A series of one-sample *t* tests for each group demonstrated that all scores were significantly greater than chance (*p*s < .001).

Facilitatory effect of context. The total number of idiomatic choices made 'in isolation' and 'in context' for each type of idiom were treated as the dependent variables in a four-way analysis of variance. The ANOVA had the following factors: comprehension level (good, poor) was a between-subjects factor, context (present, absent), familiarity (real, novel) and transparency (transparent, opaque) were within-subjects factors.

There were significant main effects of comprehension level, $F(1,28) = 6.35$, $p < .05$, $\eta_p^2 = .19$, context, $F(1,28) = 93.72$ $p < .001$, $\eta_p^2 = .77$, familiarity, $F(1,28) = 5.33$ $p < .05$, $\eta_p^2 = .16$, and transparency, $F(1,28) = 60.29$, $p < .001$, $\eta_p^2 = .68$. There was a significant two-way interaction between context and transparency, $F(1,28) = 33.58$, $p < .001$, $\eta_p^2 = .55$. There were two three-way interactions. One involved the factors context, transparency, and familiarity: $F(1,28) = 5.06$, $p < .05$, $\eta_p^2 = .15$; the other involved comprehension level, context, and transparency, $F(1,28) = 4.83$, $p < .05$, $\eta_p^2 = .15$. Each three-way interaction was explored further.

The interaction between context, transparency and familiarity was explored by analysing the performance of the real and novel idioms, separately, because of our interest in factors that may influence acquisition. In each analysis, there were significant main effects of context and transparency and a significant interaction between the two, all *F*s > 6.40 all ps < .01.

The other three-way interaction involving comprehension level, context, and transparency is depicted in Figure 1. The issue of interest here is whether the groups differ in their use of context to derive meaning for idioms, so the interaction was explored by analysing performance for the two types of idioms separately. For

transparent idioms, there was a main effect of context, $F(1,28) = 19.13$, $p < .001$, $\eta_p^2 = .15$, but the effect of comprehension level and the interaction did not reach significance, both Fs < 1.70, ps > .10. For opaque idioms, there were main effects of context, $F(1, 28) = 121.86$, $p < .001$, $\eta_p^2 = .81$, group, $F(1, 28) = 7.95$, $p < .01$, $\eta_p^2 = .22$, and an interaction, $F(1, 28) = 5.15$, $p < .05$, $\eta_p^2 = .15$. This interaction was explored with t-tests using an α level of .0125 to correct for 4 comparisons. The interaction arose because the groups did not differ in their performance when the opaque idioms were presented in isolation, $t(28) < 1.0$, but the good comprehenders obtained higher scores when opaque idioms were presented in context, $t(28) = 3.69$, $p < .005$.

FIGURE 1 AROUND HERE

Mechanisms of acquisition: analysis of novel idioms. To determine the relative importance of the processing mechanisms proposed to aid the acquisition of idiomatic meaning, an analysis of performance on the novel items only was conducted. The effect of comprehension level did not reach significance, $F(1,28) = 3.19$, $p = .09$. There were, however, significant and sizeable effects of context, $F(1,28) = 58.14$, $p < .001$, $\eta_p^2 = .68$, and transparency, $F(1,28) = 30.13$, $p < .001$, $\eta_p^2 = .52$. There was a significant two-way interaction between context and transparency, $F(1,28) = 10.35$, $p < .005$, $\eta_p^2 = .27$, explored with corrected comparisons ($\alpha = .0125$). It arose because performance on the transparent and opaque idioms differed when presented in isolation, $t(29) = 6.08$, $p < .001$ ($Ms = 3.43, 1.90$, in order), but the difference in context did not reach our stringent level of significance, $t(29) = 4.27$, $p = .043$ ($Ms = 4.47, 3.93$). The interaction between context, transparency, and group did not reach conventional levels of significance, $F(1,28) = 3.72$, $p = .064$, $\eta_p^2 = .12$.

Analysis of errors

Three types of error were possible: selection of the plausible figurative interpretation, the implausible figurative interpretation, or the literal interpretation of the phrase (see Table 2 for examples). The mean total numbers obtained for each choice, for the good and poor comprehenders are shown in Table 4. There were six children who did not make any errors in one condition (out of a possible 8). For that reason, the errors were analysed in relation to the total number of errors made in isolation (four conditions) and in context (four conditions).

TABLE 4 AROUND HERE

Idioms in isolation. To determine whether the poor comprehenders had a literal processing tendency (as found for younger children, Levorato & Cacciari, 1999), the proportion of remaining responses that were literal response options was compared between groups. The groups did not differ, $t(28) = 1.12$, $p > .20$ (*M*s = .23 and .29 for the good and poor comprehension groups, respectively).

Idioms in context. To determine whether the poor comprehenders were less likely to make appropriate use of context, the proportion of remaining responses that were plausible in the context of the story was compared between groups. This response error option was the most common for both groups. It was more likely to be made by the good comprehenders, $t(28) = 2.52$, $p < .02$, $d = .83$ (*M*s = .73 and .56 for the good and poor groups, respectively). The poor comprehenders made more implausible choices than the good comprehenders (*M*s = .15 and .36 for the good and poor groups, respectively).

Contribution of semantic analysis skills. The two groups did not obtain significantly different scores on the ambiguous sentences task: good comprehenders = 45.26 (SD=7.90), poor comprehenders = 41.33 (SD=6.77), $t(28) = 1.46$, $p > .15$, indicating the poor comprehenders did not have a significant impairment in their ability to provide two alternate meanings for the items. A series of two-tailed correlations was performed to look at the relation between semantic analysis skills and performance on the four types of idiom in and out of context. Performance on the semantic analysis task was correlated with scores for the real and novel transparent idioms in context and in isolation, rs = .36 - .61, ps < .05, but not significantly with performance on the opaque idioms, rs < .30.

Discussion

When presented with idioms in isolation, the good and poor comprehenders both demonstrated skill in analysing the internal semantics of the phrase to work out the meanings of transparent idioms: both groups obtained scores that were significantly above chance. Further, the good and poor comprehenders did not differ in their ability to derive alternative meanings of phrases containing ambiguous words. Together, these findings indicate that the poor comprehenders were able to use semantic analysis skills to work out appropriate meanings for transparent idioms. Both groups benefited from the presence of a supportive story context, but the poor comprehenders were less able to use this information to work out the meaning of novel opaque idioms. Analysis of error responses indicated that the poor comprehenders were less likely, in general, to use context appropriately: they made proportionately fewer errors that were plausible within the context of the story. These findings are discussed in relation to our understanding about idiom

comprehension, the development of idiom comprehension, and the nature of reading comprehension difficulties.

This study supports Cain et al.'s (2005) findings that individual differences in idiom comprehension are not solely attributable to knowledge differences. The task developed for the current research did not rely on an individual's knowledge of idioms: we assessed understanding of phrases rather than idiom stem completion (in contrast to Nesi et al., 2006), we compared performance for transparent and opaque items (in contrast to Levorato et al., 2004) and, uniquely, we used novel idioms to assess children's ability to derive the meanings of idioms. We did not find strong effects of the familiarity variable: there was a significant but small advantage for real over novel idioms, but the pattern of performance on real and novel idioms in relation to both transparency and context was comparable. This suggests that our real idioms were not well known by this age group.

Poor comprehenders' difficulties on measures of idiom comprehension were related to their ability to use context to derive an appropriate interpretation, rather than their ability to analyse the phrase. Both groups were aided by the presence of the supportive context and the effect size associated with this factor was large. In addition, there was a sizeable effect of group in the analysis of errors made in context, indicating that the poor comprehenders' were less able to detect and/or select and use the cues in context to derive appropriate meanings. However, the groups performed comparably on transparent idioms and did not differ on the measure of semantic analysis. These findings support other research on idioms that emphasises the importance of comprehending language in context (e.g., Gibbs, 1987; Levorato & Cacciari, 1995; Nippold & Martin, 1989). Further, our findings indicate that children with specific reading comprehension difficulties have a difficulty with

the use of context to derive appropriate meanings of idioms, that is not fully accounted for by weak semantic processing abilities.

As stated, the poor comprehenders' scores improved when idioms were presented in context, but their performance was not as good as that of the good comprehenders and the error analysis indicated that they were less likely to select the contextually appropriate distracter than were the good comprehenders. Together, these findings suggest that the poor comprehenders are impaired in their ability to select appropriate cues from context and use these to derive the meanings of unfamiliar idioms. Other work has highlighted this population's difficulties with the use of context to generate appropriate inferences to ensure adequate comprehension: poor comprehenders are capable of generating inferences, but fail to generate as many target inferences as good comprehenders (Cain, Oakhill, & Lemmon, 2004; Cain & Oakhill, 1999; Cain et al., 2001). Further, they continue to have difficulties, even when the text is available to search through (e.g., Cain & Oakhill, 1999; Oakhill, 1984). Together with the current findings, this work suggests that remediation should focus on how to select and use context when processing prose.

We used a multiple-choice task, which does not necessarily tap meaning generation processes: children may have performed the task by checking the response options against the meaning of the text, rather than by first deriving the meaning of the phrase. The advantage of the multiple-choice task is that children are not required to produce a verbal explanation, which might prejudice children with weaker language skills (Spooner, Gathercole, & Baddeley, 2006). Our use of this task, together with the explanation task used by Cain et al. (2005) provides evidence of

task validity and converging evidence of poor comprehenders' specific difficulties with using context to guide text comprehension.

We did not find any evidence of a preference for a literal processing strategy; rather the poor comprehenders had a tendency to select the contextually implausible response option. However, we know from studies of idiom processing in skilled adult language users that selection of literal meanings indicates that the literal meaning of the phrase is activated (Cacciari & Tabossi, 1988; Titone & Connine, 1999). It has been suggested that poor comprehenders and children with Autism Spectrum Disorder may experience difficulties with idiom comprehension because they fail to suppress or inhibit the literal – and, therefore, contextually irrelevant - interpretation of the phrase (Levorato, Nesi, & Cacciari, 2004; Norbury, 2004). Other lines of research indicate that children with reading comprehension difficulties may have weak suppression mechanisms (Barnes, Faulkner, Wilkinson, & Dennis, 2004; Cain, 2006; de Beni & Palladino, 2000). Our study did not use an on-line task to investigate the activation of meaning of known idioms. Future work using such a paradigm is needed to investigate whether poor comprehenders' difficulties extend beyond the processing of novel idioms to the retrieval of the figurative meaning for familiar expressions and/or the suppression of the literal meaning.

Our study adds to the recent literature on the development of idiom comprehension in two important ways. First, we have demonstrated that poor comprehenders' difficulties with idiom comprehension are not due to a general delay in the language processing skills that aid idiom comprehension. Their difficulties are related to their problems with processing language in context. Idiom learning is not all or none. As Nippold has argued in her language experience hypothesis of idiom comprehension, meanings will be consolidated and refined with

repeated exposure of these phrases in different contexts (e.g., Nippold & Martin, 1989). The effects of idiom familiarity remain strong in adolescence (e.g., Nippold & Rudzinski, 1993). Children with language difficulties may fail to benefit fully from exposure to figurative language, which may impede the expansion of their knowledge of figurative language. Second, our study provides good evidence that both semantic analysis and inference from context are important skills that can aid growth in idiomatic knowledge. These findings broadly support Levorato and Cacciari's (1995) model of figurative competence.

The identification of where the problem with idiom processing arises has important implications for remediation. Future work should include measures of on-line processing to understand more fully how children with typical and atypical language development process idioms in real time. As discussed above, we do not know whether poor comprehenders are impaired in their suppression of competing literal interpretations of figurative expressions. The ability to comprehend the intended figurative meaning of an idiom also depends on the ability to monitor one's comprehension of a text during reading in order to appreciate that a truly literal interpretation of a phrase is contextually inappropriate. The ability to monitor comprehension is related to both reading comprehension level and age (Baker, 1984; Oakhill, Hartt, & Samols, 2005). We are currently investigating whether younger and older children, and good and poor comprehenders, differ in their detection of figurative forms.

In summary, this study has demonstrated that poor comprehenders' difficulties with the processing of novel and unfamiliar idioms are related to their established impairments with inference from context: their semantic processing skills appear intact. These findings suggest that poor comprehenders are able to

focus on local, sentence-level meaning, and that they are able to make use of context to a limited extent. However, they fail to take the overall meaning of the text into account when deriving meanings for unfamiliar idioms. Future work should determine how best to support poor comprehenders' to identify, select and use appropriate contextual cues. These data demonstrate the importance of contextual processing for idiom comprehension.

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