Txt msg n school literacy: does texting and knowledge of text abbreviations adversely affect children's literacy attainment?

Beverly Plester, Clare Wood and Victoria Bell

Abstract

This paper reports on two studies which investigated the relationship between children's texting behaviour, their knowledge of text abbreviations and their school attainment in written language skills. In Study One, 11–12-year-old children provided information on their texting behaviour. They were also asked to translate a standard English sentence into a text message and vice versa. The children's standardised verbal and non-verbal reasoning scores were also obtained. Children who used their mobiles to send three or more text messages a day had significantly lower scores than children who sent none. However, the children who, when asked to write a text message, showed greater use of text abbreviations ('textisms') tended to have better performance on a measure of verbal reasoning ability, which is highly associated with Key Stage 2 (KS2) and 3 English scores. In Study Two, children's performance on writing measures was examined more specifically. Ten to eleven-year-old children were asked to complete another English to text message translation exercise. Spelling proficiency was also assessed, and KS2 Writing scores were obtained. Positive correlations between spelling ability and performance on the translation exercise were found, and group-based comparisons based on the children's writing scores also showed that good writing attainment was associated with greater use of textisms, although the direction of this association is nor clear. Overall, these findings suggest that children's knowledge of textisms is not associated with poor written language outcomes for children in this age range.

Key words: text messaging, literacy, mobile phones, reading

Introduction

Text messaging is one of the fastest growing modes of communication, with 135 billion text messages sent worldwide during the first 3 months of 2004 (Cellular Online, 2004), and 32% of adults in Britain are estimated to send and receive text messages every day (Office for National Statistics, 2003). Katz and Aakhus (2002) estimated that over 72% of people in Western Europe own mobile phones. The proportion of young people estimated to be active 'texters' is even higher; the Centre of Science Education at Sheffield University estimated that in 2001, 90% of school children owned phones, and that 96% used text messaging. Reid and Reid (2004, 2007) found that roughly half of the young people who used text messaging actually preferred texting their friends to talking to them, particularly the more anxious. These findings include older teenagers and young adults, but among younger children texting is also widespread, with parents often giving their children mobile telephones to keep in touch with them while giving them more freedom (Haddon, 2000). *The Guardian* (2004) estimated that the number of 7–10-year-olds owning a mobile telephone had almost doubled in the previous 3 years from 13% in 2001 to 25% in 2004. Ofcom's (2006) Media Literacy Audit of 1,536 8–15-year-olds across the United Kingdom reported that 49% of 8–11-year-olds had their own phones, while 82% of 12–15-year-olds did. A significant increase was shown between the ages of 10 (40%) and 11 (78%). Eighty-two per cent of 8–11-year-olds used their phones for texting, while 93% of 12–15-year-olds did so. Texting was more popular than talking for both age groups.

When using text language or 'textisms' children revert to a phonetic language, which it has been suggested may have a negative effect on literacy (Ihnatko, 1997), but equally, may not affect spelling (Dixon and Kaminska, 2007). However, there has been little research in the area (Wartella, Caplovitz and Lee, 2004). Werry (1996) discussed children's invented spellings and described these as often based on pronunciation of spoken language. These included misspellings based on local dialect pronunciations. Many of these showed similarity to text abbreviations, many of which seem to be based phonetically. The point was made, however, that intentional 'misspelling' is quite a different phenomenon from young children's accidental inaccuracies, but phonological awareness appears to be at the root of both variants on standard English words.

Types of textism vary, and include acronyms and symbols as well as rebus abbreviations and other phonetically based variants. Texting has features that correspond to spoken language, in its dialogic character, with several conversational 'turns' sometimes being recorded, but these messages also make use of grammatical omissions that are rarely observed in

spoken language (A. F. Gupta, personal communication, November 2005) and so cannot be said to be truly a written form of spoken language. Another characteristic that sets texting apart from spoken language is the phenomenon of hyperpersonal communication (Walther, 1996), wherein texting allows management of impression and message to a greater extent than real-time conversation or Instant Messaging (IM) (Reid and Reid, 2004, 2005), while still allowing dialogic exchange in a relative short time span.

Crystal (2006a, pp. 45, 47) lays out in tabular form how the language typically used in various forms of computer-mediated communication is both like and unlike spoken and written language. Beacause Crystal does not include text messaging as an independent genre in his tables, we will use his analysis of IM as these forms are often similar in their use of language. Ling and Baron (2007), however, have identified both quantitative and qualitative differences between the two uses of language among American teenagers. Where texting departs from IM features in Ling and Baron's analysis, this will be noted. In Crystal's view, text language fulfils the criteria of spoken language as follows: it is spontaneous, loosely structured, socially interactive and, in contrast to IM and speech, not time-bound, as the message may remain as long as desired; it is immediately revisable, a feature Reid and Reid (2004) found made it the medium of preference for those with higher levels of social anxiety. Text language differs from spoken language in that it is not face to face except with image-enabled phones, and it is not prosodically rich.

Text language also fulfils the criteria of written language as follows: it is space-bound, repeatedly revisable, again a departure from IM, visually decontextualised, except with image-enabled phones, and it can be factually communicative. Crystal (2006a, p. 49) further claims that it is not contrived, beholden to shared conventions of construction such as punctuation and capitalisation or the use of grammatically correct sentences. However, some features are becoming codified as the medium matures, such as the use of smileys and symbols, e.g. @. It is not an elaborately structured language, nor is it graphically rich.

As texting has features in common with both writing and speaking, we might expect experience with it to relate to both children's reading and writing development. Another reason for expecting there to be some form of relationship between literacy attainment and text messaging is because the use of text abbreviations in particular is dependent upon a certain level of phonological awareness. As noted earlier, the most commonly used text abbreviations or 'textisms' are phonologically based, as in 'wot', 'nite' and 'C U L8R'. Given the established relationship between phonological, and especially phonemic awareness and reading development (e.g. Adams, 1990; Snowling, 2000), it seems reasonable to expect a positive association to exist between children's performance on these different forms of written communication.

However, there has been concern about the supplanting of standard written English by what is often seen as the more conversationally based and orthographically reduced medium of texting language. This concern, often cited in the media, is based on anecdotes and reported incidents of text language used in schoolwork. Thurlow (2006) analysed over 100 media reports, finding that the predominant themes were negative in tone about the effect of texting on standard English. Typical descriptions, for example, from Sutherland (2002), are ''bleak, bald, sad shorthand'' and ''Linguistically, it's all pig's ear''. Thurlow's (2003) own work, however, has shown that the naturalistic text messages of older adolescents were generally comprehensible, contained few opaque abbreviations and showed a good sense of what Crystal (2006a) has referred to as ludic use of language, language rich from a playful use of words. Others have also been optimistic about texting (Lee, 2002; Bell, 2003; O'Connor, 2005, Helderman, 2003) in that it ''gets children writing'' where previously they may have been less likely to do so.

Research to date has focused on adolescents and young adults who have already learned to read and write standard English to acceptable levels of achievement. As mobile phones are increasingly available to young children who are still developing their written language skills it is increasingly important to recognise the links between texting and academic competence in general and standard written English in particular. Toward this end we report two initial studies into the question of whether school-age children show negative associations between use of mobile telephones to send text messages and their developing written language skills.

Study One

In the first study, we were interested in exploring whether high and low text users differ in their academic outcomes on standardised tests of academic potential used by schools to predict Key Stage test performance. We were also interested in the extent of the children's knowledge of textisms and how this may relate to their performance on the academic tests.

Method

Participants

Sixty-five 11- and 12-year-old children were recruited to the study from a school in the Midlands of England. The mean age was 11 years and 8 months, ranging from 11 years, 4 months to 12 years, 8 months. Fifty-one children (78.5%) had regular, sole use of a mobile phone; 14 (27.4%) used a mobile rarely or never. Thirty-

Table 1: Summary statistics by level of estimated text message use (SD in parentheses)

	High text use N = 27	*Low text use N = 22*	*No text use N = 15*
Non-verbal SAS score	99.0 (11.2)	107.5 (9.1)	110.5 (17.4)
Verbal SAS score	99.2 (12.8)	106.2 (13.9)	115.5 (16.7)
Errors translating text to English	1.2 (2.4)	2.3 (3.9)	1.0 (2.0)
Txtsms: words ratio	.57 (.2)	.59 (.2)	.58 (.2)

two (62.7%) used it primarily for text messaging; 14 (27.4%) for calls; four for emergencies and only one for entertainment. Thirteen used predictive text most of the time, 18 rarely and 18 not at all.

Measures

General literacy ability was measured using the Cognitive Abilities Test (CAT) standardised verbal and non-verbal reasoning scores provided by the school. In terms of children's literacy outcomes, performance on the CAT verbal reasoning task in particular is known to be predictive of both KS2 and 3 English scores (e.g. Strand, 2006).

As a simple measure of textism knowledge, we asked the children to translate one sentence into text language from standard English (I can't wait to see you later tonight, is anyone else going to be there?), and one message from text language into standard English (Hav u cn dose ppl ova dere? I fink 1 of dems my m8s gf.). We counted grammatical, spelling and punctuation errors in their standard English writing, and the total number of these errors represents the children's error score on the textism to standard English translation task. The English to textism translation was scored in terms of the ratio of textisms to total words used in their text message writing.

Results

Examples of some of the children's translations include the following: cnt = can't; CU = see you; 2night = tonight; NE1 = anyone. Errors made in translating from text language into English included missing words, missing punctuation (mates), textisms left untranslated (hav), and simple misspellings (girlfrend).

The children estimated that they sent a mean of 4.39 (SD = 6.2) texts per day, ranging from 0 to 36. We used the median (3.0) to determine high and low text users, so three or more messages per day constituted high use for this group ($N = 27$), two or one, the low use group ($N = 22$) and zero the no text group ($N = 15$).

Table 1 shows the children's mean school CAT scores, the number of errors the children made on average when translating the text message back into standard English and mean ratio of textisms to words used in the English to Text Translation Exercise by text message use group. It can be seen that there appears to be a negative relationship between CAT score and the extent of text message use generally. A significant main effect of group was found on both non-verbal reasoning scores, F (2, 58) = 4.695, $P = 0.013$, $\eta^2 = 0.172$, and on verbal reasoning scores, F (2, 58) = 6.028, $P = 0.004$, $\eta^2 = 0.139$. The Bonferroni post hoc tests showed that the High Text Use group scored significantly lower on both measures than the No Text Use group ($P < 0.05$). However, there was no evidence that extent of text message use was associated with use of text abbreviations in the translation exercise, as the ratio of textisms to real words stayed broadly similar across groups, F (2, 61) = 0.038, $P > 0.05$. There was also no evidence of an effect of texting group on the number of errors the children made when they translated the text messaging into standard English, F (2,57) = 1.081, $P > 0.05$.

We were also interested in the extent of any associations between the scores from the textism–English translation exercises and the children's CAT scores. As the number of text messages that the children send each day could also be a factor in the results observed here, we also included this variable in the analysis. The Pearson correlation coefficients are reported in Table 2. In particular, there was a significant positive association between proportion of textisms used and the children's verbal reasoning scores, $r(60) = 0.347$, $P = 0.007$, indicating that those children whose text language was more densely abbreviated were those whose verbal reasoning scores were highest. There was also a significant negative association between the number of messages the children sent each day and

*Table 2: Correlations between texting measures and SAS scores (*P < 0.01)*

Variable	*2*	*3*	*4*	*5*
1. Ratio of textism to words	0.032	0.347*	0.243	0.053
2. No. of translation errors		− 0.012	− 0.058	− 0.104
3. Verbal SAS score			0.636*	− 0.267
4. Non-verbal SAS score				− 0.460*
5. No. of texts sent per day				

their performance on the non-verbal reasoning measure, $r\ (47) = -0.460$, $P = 0.001$, indicating that the children who were sending the most text messages were showing the lowest performance on the non-verbal measure, which is in line with the data in Table 1.

As a consequence of the patterns of association observed in Table 2, hierarchical regression analyses were conducted to see if the ratio of textisms to real words obtained in the translation exercise could explain individual differences in the children's verbal CAT scores, after controlling for the influence that the number of texts sent per day may have on those relationships. The number of texts sent per day was not able to account for a significant amount of variance when entered into the model at the first stage, $R^2 = 0.073$, $F(1,44) = 3.449$, $P = 0.070$. However, the ratio of textism to words used in the translation exercise was able to account for an additional 12.4% of the variance in verbal CAT scores, R^2 *Change* $= 0.124$, *F Change* $(1, 43) = 6.623$, $P = 0.014$.

Discussion

The results of this study present a mixed picture of the relationship between texting experience and academic ability. First, the higher text users scored significantly lower on the verbal and non-verbal reasoning measures than did no text users, and marginally lower than low text users. This could provide evidence for the critics of text messaging, were it not for some qualifications. One qualifying factor here could be that the median estimated frequency of texts per day was quite low, only 3.0. Another is that we cannot imply causation from the design used by this study – we cannot claim that frequent texting causes low verbal and non-verbal reasoning scores from the data here, and it seems likely that there are intervening (possibly cultural) variables at work here that could explain this pattern of results.

More importantly, when we look at children's textism use in the translation exercise, regardless of how often they actually sent text messages, there was clear evidence of a positive association between use of textisms and performance on the CAT verbal reasoning measure, which is the sub-scale known to be highly related to KS2 and 3 English performance (Strand, 2006). In some ways this result is not unexpected given the creative nature of children's textism development and their phonological roots. This result lends support to the positive views voiced by Crystal (2006a), O'Connor (2005), Bell (2003), Helderman (2003), and Lee (2002), and indicates a need for further exploration of the texting phenomenon.

Study Two

Because of the mixed results from the first study, we conducted a further study, with the aim of looking more specifically at the association between textism use and children's performance on spelling and writing tasks. In this study we used a standard measure of spelling ability (*British Ability Scales II*) along with the children's KS2 English writing scores. We also recruited children slightly younger than those who participated in the first study, as the 10–11-year-old group has been identified as the fastest growing market with respect to mobile telephone use (Hale and Scanlon, 1999).

Method

Participants

Thirty-five children were recruited from Year 6 classes in two schools. There were 26 girls and 9 boys, 6 10-year-olds and 29 11-year-olds. No differences were found between boys and girls on any measure, and only one difference was found between 10- and 11-year-olds, which will be discussed, so for all analyses the ages and sexes are combined into one group.

Measures

In addition to some short questions enquiring about the use of the mobile phone as in Study One, all the children were asked to complete the Spelling sub-test of the *British Ability Scales II* (Elliot et al., 1996). The school was asked to provide information on the children's KS2 assessment of writing ability. This measure differed from the standardised CAT scores obtained in the previous study, as they were ordinal scores indicating overall level of competence (children were classified as Level 3, 4 or 5). Level 4 is the level expected of most 11-year-old children, whereas Level 5 means that the child was exceeding the level expected of an 11-year-old.

In addition we asked the children to translate a text language exchange into standard English:

> *"LO! How R u? I havnt cn U 4 ages*
> *hi m8 u k?-sry i 4gt 2 call u lst nyt-y dnt we go c film 2moz. hav U dn yor h/w?*
> *Im goin out w my bro & my best frNd tomorrow 4 a<). Do U wnt 2 cum along?"*

The children's translations were coded for errors of interpretation (i.e. they got the meaning of a textism wrong) and standard English spelling errors.

We also asked them to translate an exchange from standard English into text language (coded for kinds of textisms used).

> *"Hello! What are you up to? Would you like to go out tonight?*
> *I have to stay in and look after my little brother. Maybe another night?*

That's a shame. We were going to go and see a film. It is the cheap night at the cinema tonight."

From this translation, we computed the ratio of real words to textisms used as a measure of textism density, as in Study One.

Box 1:

The children were asked to translate a standard English passage into text language: *Hello! What are you up to? Would you like to go out tonight?*
I have to stay in and look after my little brother. Maybe another night?
That's a shame. We were going to go and see a film. It is the cheap night at the cinema tonight.
Some of them translated like this:
What r u up 2? Would u like 2 go out 2night. I av 2 stay in 2 look after me bro mayb another night? dats ashame we were going 2 c a film it's a cheap night at the cine 2night.
LO! What r u ↑ 2 Woud u like 2 go out tonight I av 2 sta in & look after mi brov mbe another night ⊛ We wre goin 2 see a film It's the ceep night in da cinma tonit.
LO! WUU2? U wanna go out 2nite? I av 2 stay in & look after lil bro. Mayb nother nite ⊛ We were gunna c a film cheap nite @ movies

Box 2:

The children were asked to translate text language into standard English:
LO! How R u? I havnt cn U 4 ages
hi m8 u k?-sry i 4gt 2 call u lst nyt-y dnt we go c film 2moz. hav U dn yor h/w?
Im goin out w my bro & my best frNd tomorrow 4 a<). Do U wnt 2 cum along?
Some of them translated it like this:
laugh out how are you I havnt seen you for ages hi mate are you OK sorry I forgot to call you lats night why dont we go and see a film tomorrow. have you done your homework I am going out with my brother and my best friend tomorrow for a walk. Do you want to come with us. Hello How are you I havent seen you in ages hello mate are you ok sorry I forgot to call you last night why dont we go and see a film tomorrow have you done your homework I'm going out with my brother and my best friend tommrow for a bit Do you want to come along? Hello! How are you? I havn't seen you for ages! Hi mate, are you OK? Sorry I forgot to call you last night–why don't we go to see a film tommorrow? Have you done your homework? I'm going out with my brother and my best frent tomorrow for a bit Do you want to come along?\cell

Results

One child, one of the least able, responded to the messages rather than translate, so her data could not be used. Of the 35 remaining children in the study, 3 were found to be at Level 3 on the Writing KS2 test, 19 were at Level 4 and 13 were at Level 5, which demonstrates that the children were academically able as a group. Summary statistics for the other dependent variables were calculated and these are shown in Table 3.

It can be seen that the mean ability score for the children's spelling attainment was 129.0 (SD = 14.9), which equates to a spelling age equivalent of 12 years, 9 months. The mean age of receiving their first mobile phone was 9.5 years (SD = 1.4 years), the 10-year-olds received their first phones on average at 8.7 years (SD = 1.2) and the 11-year-olds received their first phones at a mean age of 9.7 years (SD = 1.4), t (29) = -2.27, $P = 0.031$.

We coded the textisms used into five categories:

- Rebus, or letter/number homophones (C U L8R);
- other phonological reductions (nite, wot, wuz);
- symbols (& @+);
- acronyms (WUU2–what you up to);
- and the casual register we called 'Youth Code' (wanna, gonna, hafta, me bro, dat).

There were 747 textisms used, out of a total of 1,486 words, a proportion of 53%. Table 4 shows the proportion of each of these types of abbreviations across all the translations into text language.

The children's spelling scores from the *British Ability Scales II* were correlated with several measures, as Table 5 shows. In particular, it can be seen that there was a significant positive correlation between spelling ability and the ratio of textism to real words, $r(34) = 0.520$, $P = 0.001$. There was also a significant association between spelling ability and the number of interpretation errors made in the textism to English translation, indicating that as the children's spelling score increased, so the number of interpretation errors made decreased, r (34) = -0.416, $P = 0.014$.

Correlations were also observed calculated to explore the extent of any association between spelling attain-

Table 3: Summary statistics for performance on dependent measures

Variable	*Mean*	*SD*
BAS II spelling ability scores	129.0	14.9
Age when received phone	9.5	1.4
Spelling errors in text translation exercise	1.1	1.1
Interpretation errors in text translation exercise	2.2	3.2
Total errors in text translation exercise	3.3	3.9
Ratio of textism to words in text translation exercise	0.50	0.1

Table 4: Proportion of text abbreviations in English-to-text translation by type

	Rebus	*Phonological*	*Youth code*	*Acronyms*	*Symbols*
Percentage of total (%)	35.6	44.6	14.6	3.7	1
Total number used	268	335	110	28	11

Table 5: Correlations between British Ability Scales II spelling scores and task scores

Variable	*2*	*3*	*4*	*5*
1. BAS II spelling ability scores	0.134	− 0.259	− 0.416*	0.520**
2. Age when received phone		− 0.237	− 0.050	0.098
3. Spelling errors in text translation			0.564**	− 0.187
4. Interpretation errors in text translation				− 0.259
5. Ratio of textism to words				

*$P < 0.05$; **$P < 0.01$.

ment and the children's use of particular types of text abbreviation. Of the five kinds of textism identified by this study, two were found to be significantly related to spelling ability: use of phonological abbreviations, r (34) = 0.439, $P = 0.009$, and use of 'youth code' textisms, r (34) = 0.393, $P = 0.021$. As a result, these two variables were used in a multiple regression analysis to identify the amount of variance in spelling ability that these two factors could account for. Together, use of these two forms of textism could account for 32.9% of the variance in spelling attainment, *Adjusted* $R^2 = 0.329$, $F = 9.083$, $P = 0.001$.

We then investigated the effect of KS2 Writing Levels on measures of textism use. For these analyses, we excluded the three children whose scores put them in Level 3. One-way ANOVA showed that there were some significant differences between the groups of children. With respect to the number of interpretation errors in the text–English translation exercise, the Level 4 attainment group made significantly more than the Level 5 children, $F(1,30) = 9.276$, $P = 0.005$. The Level 5 children also outperformed the Level 4 children in terms of:

- Ratio of textisms to real words used in the English–text translation exercise, $F(1,30) = 6.983$, $P = 0.013$;
- number of phonological textisms used, $F(1,30) = 6.874$, $P = 0.014$; and
- number of acronyms used in the translation exercise, $F(1,30) = 5.825$, $P = 0.022$.

Discussion

The level of ability shown in spelling and writing by the children in the second study was strongly related positively to their use of textisms when they composed in text language, and also negatively to the number of interpretation errors they made in their translation from text language into standard English. The strongest relationships between school language skills and text language concern the textisms that use phonological awareness as the key conversion factor. Rebus and phonological types are obvious candidates, but the youth code language is also largely phonologically based, representing a casual kind of speech that emphasises regional dialects or accents, using rules of English phoneme–grapheme conversion. Indeed, Thurlow (2003) refers to this type of text code as Accent Stylisation.

The important conclusions from this second study are that there is no evidence that knowledge of textisms by pre-teen children has any negative association with their written language competence, which contrasts with the bulk of the media coverage reviewed by Thurlow (2006). All associations between text language measures and school-related literacy measures have been either positive or non-significant, but the relationships even in those pairings that did not reach significance were in the direction of a positive relationship between texting and school writing outcomes.

General discussion

There are a number of overriding conclusions that can be drawn from these two initial investigations into the relationships between knowledge and use of text abbreviations and the standard English competence expected of pre-teen children in their school work. The first is that in both studies, the enthusiasm for textisms, for the playful use of language that enables creating a

variety of graphic forms of the same word, is highly related to the kinds of skills that enable scoring well on standard English language attainment measures. Where this appears at least in part a function of phonological awareness that may not be the only cognitive factor at work. The constraints of these two studies have not permitted extensive individual testing of cognitive and other factors, and a wide profile of abilities related both to reading and writing would make a stronger case for the positive relationship between textism use and standard literacy, work that is currently in progress.

A second factor, experience with texting and mobile phone use, had mixed associations with school literacy measures. In the first study, the children who estimated sending more than three text messages per day scored lower in the school literacy measure than the children who said they sent none. In the second study, there was no association between the age that the children first acquired their mobile phone and spelling attainment. But in the first study, the children who used the highest ratio of textisms to words in their text composition also scored the highest in the literacy measure, and in the second study, that relationship was also strongly found with spelling and writing measures. These seemingly conflicting results underscore the need to recognise the distinction between use of mobile phones, frequency of texting behaviour and knowledge of textisms. The effects of experience with texting need further study.

One feature of the children's use of textisms in the translation exercise that was fairly widespread is that there was little evidence of codified abbreviations. These children were neophytes at texting, and were making up abbreviations using their phonological awareness and their understanding of the expectation of texting (that brevity was to be sought), rather than depending on standard or codified abbreviations such as those found in text glossaries (e.g., Crystal, 2004; Ihnatko, 1997). Some words received a large variety of reductions, e.g. night was abbreviated nigt, nght, nyt, nyte, nit, nt, ny, nite, sometimes two different ways in the same message. It would be interesting to determine whether older texters, or those with greater experience, become more conventional in their uses over time.

Study Two also showed clearly that pre-teen children can use metalinguistic awareness to slip between one register of language and another, as they deem it appropriate. Those with the higher spelling scores were more likely to adopt the casual youth code language for texting, which entails using non-conventional spellings that are related to pronunciation. Had the children not been aware of the boundary conditions for the two codes of language and used similar language in their formal English assessments, they were unlikely to have scored as highly in the KS2 English scores as most of these participants did. It may be that experience with texting raises awareness of the variety of language registers available to them.

While further investigation is in order with respect to all aspects of text message literacy and standard school literacy, these early studies have shown no compelling evidence that texting damages standard English in pre-teens, and considerable evidence that facility with text language is associated with higher achievement in school literacy measures.

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CONTACT THE AUTHOR:
Dr Beverly Plester, Psychology Department, Coventry University, Priory Street, Coventry, CV1 5FB, UK.
e-mail: b.plester@coventry.ac.uk