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Text-messaging practices and links to general spelling skill: A study of Australian children

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ABSTRACT

This study investigated 10- to 12-year-old Australian children's text-messaging practices and their relationship to traditional spelling ability. Of the 227 children tested, 82% reported sending text-messages; a median of 5 per day. Use of predictive and multi-press entry methods was roughly equal. Children produced a wide range of text-message abbreviations (textisms) (M = 53%) when asked to re-write a list of 30 conventionally-spelt words as they would in a text-message to a friend. The proportion of textisms produced was significantly positively correlated with general spelling ability, which fits with previous findings of positive relationships between children's textism use and literacy.

INTRODUCTION

Using a mobile phone is now a daily activity for many individuals, across the lifespan and across the world. Concurrently, the cheap and efficient medium of text-messaging is proving increasingly popular among teenagers and young adults (Drouin & Davis, 2009; Ofcom, 2010; Pew Internet Survey, 2009), and more recently, children. It is estimated that about 70% of American teenagers own a mobile phone, and that half send daily text messages (Pew Internet Survey, 2009). In the UK about one-third of 8- to 11-year-olds regularly use a mobile phone and send an average of 22 text-messages a week (Ofcom, 2010). In ongoing research, Plester and Wood (2009) report much higher figures, with 93% of the British 9- to 11-year-olds they surveyed having access to a mobile phone. In Australia in 2008, mobile phone ownership was estimated at about 20% for 8- to 11-year-olds and 75% for 12- to 14-year-olds (Cupitt, 2008), with 90% of teenagers using text-messaging, sending an average of 11 texts per week (Australian Bureau of Statistics (ABS), 2008). Current numbers are likely to be even higher. Further, the popularity of the text-message spelling style known as *textese* (discussed below) makes it important to examine the extent of children's use of such spelling. Parents, educators and public commentators have all expressed fears about the possible negative effects of this non-standard form of spelling on traditional literacy skills (e.g., Huang, 2008; Sutherland, 2002), and a discourse analysis of over 100 media articles revealed widespread disapproving attitudes toward text-messaging (Thurlow, 2006). However, only a small number of empirical studies have been conducted to examine the validity of these concerns. The aim of the current study is to provide updated data on the prevalence of text-messaging among pre-adolescent Australian children, and on the relationship between textese use and general spelling skill.

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Textese and literacy skills in children

Described as a hybrid of spoken and written English (Plester & Wood, 2009), textese is a largely phonological (sound-based) form of spelling that can reduce the time and cost of text-messaging (Leung, 2007). Common abbreviations, or *textisms*, include letter homophones (such as *c* for *see*), number homophones (*2day* for *today*), and phonological contractions (*txt* for *text*) (Plester, Wood, & Joshi, 2009; Thurlow & Brown, 2003). The extent to which textisms are used seems to vary with age group and the nature of the text-message. Teenagers and undergraduates have been estimated to write 5-20% of words in their text-message as textisms (De Jonge & Kemp, 2010; Ling & Baron, 2007; Thurlow & Brown, 2003). However, younger children seem to use textisms more often, with estimates ranging from 50-58% in messages 'translated' into textese from standard English (Plester, Wood, & Bell, 2008), to 35% in naturalistic messages elicited by scenarios (Plester et al., 2009), to 21-47% (increasing with grade) in naturalistic messages (Wood, Plester, & Bowyer, 2009).

Research with teenagers and young adults has shown largely neutral, or indeed some negative relationships between texting behaviour (frequency of text-messaging and/or use of textisms), and language and literacy skills (De Jonge & Kemp, 2010; Drouin & Davis, 2009; Kemp, 2010; Massengill Shaw, Carlson, & Waxman, 2007; Rosen, Chang, Erwin, Carrier, & Cheever, 2010). In contrast, the existing experimental research on pre-adolescent children suggests that the use of textese is positively associated with traditional literacy skills. Plester et al. (2008) asked British children aged 10 to 12 years to translate messages from standard English to textese, and vice versa, using pen and paper. They found a significant positive correlation between proportion of textisms used and children's verbal reasoning scores and spelling scores. In another study (Plester et al., 2009) children's use of textisms in messages elicited by a set of scenarios correlated positively with word reading ability and phonological awareness.

Plester et al. (2008, 2009) propose several possible explanations for the positive relationship between texting and literacy skills. One is that texting is simply another means of increasing exposure to the written word, which is a positive predictor of reading success (Cipielewski & Stanovich, 1992). A second possibility is that textese allows children to play with words, leading to increased engagement with traditional spelling and reading. Finally, the creation of textisms, which are often based on phonology, may enhance children's awareness of the grapheme-phoneme (letter-sound) correspondence rules necessary for traditional spelling and reading proficiency (Plester & Wood, 2009).

Very limited research has examined the links between conventional literacy skills and the use of mobile phones and text-messaging behaviour outside the United Kingdom, where children have had more extensive access to mobile phones for longer than in many other countries, including Australia (ABS, 2008). The present study aims to address this gap in the literature.

Multi-press vs. Predictive Text-messaging Methods

As mobile phone technology evolves, so too do the techniques adopted by phone users. The original text-message input method is *multi-press* text-messaging, in which three to four letters are assigned to each number key and typing one letter requires pressing the same button one to four times (e.g, pressing the 1 button (*abc*) twice produces *b).* The newer text entry method, *predictive* text-messaging, involves making a single key-press per letter, and a dictionary-based system suggests the most likely word and several alternatives (Taylor & Vincent, 2005). These input methods may result in varying proportions of textese use: the relatively laborious multi-press method may encourage greater and more varied use of textisms (in an attempt to reduce typing time), while the faster predictive texting method may limit the use of textisms because its dictionary-based system makes it difficult to type words that are not pre-programmed in (including textisms). Predictive entry seems to be superseding multi-press entry; of Plester et al.'s (2008,2009) British child participants, 63% reported using multi-press in 2008, and 45% in 2009. Australian undergraduates reported multi-press use of only 33% (Kemp, 2010) and in data collected one year later, this was down to 14%, and 21% in high-school children (De Jonge & Kemp, 2010). However, previous studies have not distinguished between the performance of multi-press and predictive texters when examining textism use.

Sex Differences

Women tend to send more text-messages than men, and women's messages are more likely to be longer and more complex (e.g., Ling, 2004; Rosen et al., 2010). The limited evidence as to whether girls and boys differ in their text-messaging behaviour is mixed: Plester et al. (2009) found that girls used a significantly higher proportion of textisms (38%) when asked to generate their own text messages than did boys (28%), whereas De Jonge and Kemp (2010) saw no significant sex differences in any of the texting behaviours of their sample of Australian teenagers. It remains to be seen whether Australian pre-adolescent boys and girls differ significantly in their frequency of text-messaging, text entry method, or knowledge of textese.

Aim

Investigations to date have yielded mixed evidence as to the nature of the relationship between text-messaging, textese use and literacy skill, with positive links observed in British children but neutral or negative links in American and Australian teenagers and young adults. At present it is unclear whether these varying results are due to differences in age, texting method used, length of texting experience, or even cultural factors. Given the importance of reading and spelling for school and life success, and in light of the apparent growing popularity of texting among Australian children, it is important to establish the extent of textese use and the nature of text-messaging behaviour in pre-adolescent Australians. The aim of the current study was to provide such information, as well as to investigate the relationship between textese use and spelling skill and whether it differs according to texting entry method used and sex.

METHOD

Participants

Participants were 227 Australian children; 77 boys and 150 girls, in Grades 5 (n = 107) and 6 (n = 120), aged 10-12 years (M = 11.50 years, SD = 0.55). Children were recruited from three schools in mid- to high social-economic-status areas of a south-eastern Australian city, and data were collected during 2009. All participants were fluent English speakers and 97% of texters reported text-messaging only in English.

Materials

A questionnaire was developed to measure texting-related behaviours and attitudes, including the prevalence of text-messaging, attitudes toward, and use of textisms, and information about the use of text entry method (predictive or multi-press). A word translation task was also developed to assess children's knowledge and use of textisms. In this task children were asked to re-write 30 conventionally spelled English words (listed in the appendix) as they would "if they were going to use the words in a text-message to a friend". Since these children were not allowed to have their mobile phones at school, we were obliged to rely on participants' written responses. However, hand-written responses can provide a reliable representation of texting behaviour. De Jonge and Kemp's (2010) teenage participants showed near-identical textism use and range when hand-writing as when typing in textism translations of standard English spellings. In the present study, target words were chosen on the basis of their representation of textism categories commonly used by children (Plester et al., 2008, 2009), including potential letter-number homophones (e.g., *see = c*, *late = l8*), contractions (e.g., *birthday = bday*), accent stylisations (e.g., *people = peeps*), non-conventional spellings (e.g., *school = skool*), and omitted apostrophes (e.g., *can't = cant)*. General spelling ability was measured using the spelling subtest of the Wide Range Achievement Test-4 (WRAT) (Wilkinson & Robertson, 2006), which requires participants to spell 42 words of increasing difficulty to dictation.

Procedure

The experimenter administered the WRAT spelling subtest, texting questionnaire and word translation task to the children in their usual classroom groups. For the word translation task, children

were asked to imagine that they were going to write a text message to a friend (whether or not they usually sent text-messages). It was explained that people spell words in text messages differently – some use "normal spelling" (e.g., *you*, *to*) and some use "different spelling" (e.g., *u*, *2*). It was stressed to the children that it did not matter which style they used, but that it was important to write each word exactly as they normally would in a real text-message.

RESULTS

Use of mobile phones and text-messaging.

As shown in Table 1, responses to the questionnaire indicated that 84% of participants (n = 191) used either their own phone (n = 159) or a family member's phone (n = 32), and nearly all of these phone users (96%, or 82% of the entire sample) used text-messaging. Chi-square tests confirmed that the rate of mobile phone and texting use did not differ significantly with either grade or sex.

The 185 children who used text-messaging reported using predictive and multi-press entry methods almost equally (47% and 45% respectively), with a small minority (8%) using both methods. Girls used predictive entry significantly more than boys, χ^2 (1) = 29.5, p < .001, who tended to use multi-press more. Children in Grade 6 used predictive text-messaging significantly more than children in Grade 5, χ^2 (1) = 12.5, p < .001, who used multi-press entry more.

Attitudes toward, and reported use of, textese.

Table 1 also shows participants' responses to the three-alternative questions about their use and understanding of textisms. When typing messages, the majority of children (58%) reported that they used 'a few textisms, such as *u* for *you,* and *2* for *to/too*', while 32% reported abbreviating 'most' words, and only 10% reported using only standard spellings. When reading messages from other people that contained 'lots' of textisms, 65% of children reported finding it 'easy' to understand such textisms, 32% reported being able to guess 'some, but not all', and only 3% reported finding them 'hard' to understand.

Table 1: Self-Reported Proportions of Texting Experience and Behaviour.

	Girls (n = 150)		Boys (n = 77)		Overall (n = 227)
	Gr 5 (n = 67)	Gr 6 (n = 83)	Gr 5 (n = 40)	Gr 6 (n = 37)	
Phone use	.79	.92	.78	.84	.84
Own	.64	.83	.48	.76	.70
Other's	.15	.09	.30	.08	.14
Text use (of phone users, n = 193)					
	1.00	.99	.91	.90	.96
Entry method (of texters, n = 185)					
Pred	.42	.61	.14	.50	.47
MP	.53	.32	.69	.43	.45
Both	.06	.07	.17	.07	.08
Textism use (of texters, n = 183)					
Many	.25	.35	.48	.25	.32
A few	.64	.56	.33	.71	.57
None	.11	.09	.19	.04	.10
Textism understanding (of texters, n = 183)					
Easy	.64	.61	.73	.71	.65
Medium	.36	.34	.23	.29	.32
Hard	0	.05	.04	0	.03

Note. Pred = Predictive text entry, MP = Multipress text entry.

Experience with text-messaging.

Table 2 shows children's self-reported experience with text-messaging, and their estimated frequency of sending and receiving text-messages, according to sex, grade, and usual text entry method. Overall, children reported having been writing text-messages for a mean of 21.1 months (SD 1.4 months), with a range of 1 month to 5 years. Grade 5 children reported having begun text-messaging at a significantly younger age (8 years, 10 months) than Grade 6 children (9 years, 7 months), F (1, 189) = 13.3, $p < .001$, which adds to the growing body of evidence that text-messaging is being taken up by younger children every year.

Participants reported sending and receiving a median of five messages per day (sent M = 13.31, SD = 24.00; received M = 13.27, SD = 25.80). Median figures are given because the means were inflated by a few extremely high (and possibly unreliable) responses, by children (primarily Grade 6 boys) claiming to send and receive 200 messages per day.

To investigate whether texting behaviour differed with text entry method, we carried out two between-subjects analyses of variance (ANOVAs) with two factors, sex (male, female) and text entry method (predictive, multi-press). In order to maintain reasonable cell sizes, we did not break down groups by grade. We also excluded the 15 children who reported using both text entry methods. In the first analysis, of texting experience, we found a main effect of text entry method, F (1, 163) = 6.50, partial η^2 = .04, p = .012. Predictive texters reported significantly longer texting experience (approximately two years) than multi-press texters (approximately 18 months). In the second analysis, we looked at the number of text messages sent per day (square-root transformed to address skew). (The number of messages reportedly received per day was nearly identical to the number sent, and so we did not also analyse messages received.) Again, there was a main effect of text entry method, F(1, 163) = 19.48, partial η^2 = .08, p < .001, with predictive texters sending significantly more text messages per day (median 7) than multi-press texters (median 3). There were no significant effects of sex for either analysis.

Table 2: Descriptive Statistics for Children's Text-Messaging Behaviour, Across Text Entry Methods.

	Girls n= 129		Boys n = 62		Overall
	Gr 5 (n = 53)	Gr 6 (n = 76)	Gr 5 (n = 31)	Gr 6 (n = 31)	n = 191
Age of first phone use (years: M and SD)					
Pred	8.92 (1.32)	9.81 (1.26)	8.00 (1.73)	9.26 (1.15)	9.42 (1.34)
MP	9.35 (0.81)	9.15 (1.93)	8.58 (1.54)	9.80 (0.98)	9.17 (1.44)
Both	8.31 (1.20)	10.68 (0.95)	8.00 (2.35)	8.50 (0.71)	9.02 (1.89)
Length of time texting (months: M and SD)					
Pred	17.82 (15.43)	25.93 (15.55)	20.00 (6.93)	27.93 (15.75)	23.93 (15.61)
MP	14.81 (12.24)	22.69 (15.53)	17.45 (15.37)	18.58 (10.93)	18.27 (14.00)
Both	23.67 (31.56)	13.00 (10.82)	27.20 (27.44)	24.00 (0.00)	21.33 (20.74)
Messages received per day (median)					
Pred	2.00	9.29	2.00	22.50	7.00
MP	5.00	5.00	0.57	8.50	5.00
Both	1.00	0.57	4.00	42.50	3.00
Messages sent per day (median)					
Pred	2.57	10.00	3.00	25.00	7.00
MP	3.00	4.29	0.43	5.00	3.00
Both	1.00	1.29	4.00	29.64	2.00

Note. Pred = Predictive text entry, MP = Multipress text entry.

Proportion of textisms produced, and spelling scores.

As shown in Table 3, when asked to write 30 standard English words as if writing them in a text message, participants produced a mean of about 53% (SD 27%) textisms, although the proportion of words written as textisms ranged from 0 to all 30 words. On the WRAT spelling subtest, participants gained a mean standardised score of 106.6 (SD 13.54), which is within the range expected for this age group.

Two between-subjects ANOVAs with sex (male, female) and text entry method (predictive, multi-press, and non-texter) were conducted to determine whether the proportion of textisms produced, or general spelling ability, differed with either of these factors.

The first analysis, of the proportion of textisms produced, revealed a significant main effect of text entry method, F (1, 190) = 5.81, partial η^2 = .09, p = .001, subsumed by a significant interaction between sex and texting method, F (1, 190) = 4.14, partial η^2 = .05, p = .017. Tukey post-hoc tests showed that for boys, predictive texters wrote more textisms than either multipress or non-texters (who did not differ significantly), while for girls, both predictive and multipress texters (who did not differ significantly) wrote more textisms than non-texters, all ps < .01.

The second analysis considered WRAT spelling scores, and again revealed a main effect of text entry method, F (1, 202) = 5.19, partial η^2 = .05, p = .006, subsumed by a significant interaction between sex and texting method, F (1, 202) = 7.89, partial η^2 = .07, p = .001. Tukey post-hoc tests revealed that girls' spelling ability did not differ according to texting method. However, male non-texters showed significantly better spelling than male multipress texters, p < .01, although male predictive spellers did not differ significantly from the other two groups. Further, male non-texters were significantly better spellers than female non-texters, p < .01.

Correlations between texting and other variables.

To investigate the potential relationship between texting behaviour and one aspect of conventional literacy skill, we calculated Pearson's product moment correlations between texting variables (texting experience, frequency of sending/receiving texts, and proportion of textisms produced in translation task) and WRAT spelling scores. Length of texting experience was positively correlated with number of text messages sent per day (r = .234, p = .002), and also to greater use of textisms in the translation task, r = .177, p = .02. However, frequency of sending messages did not correlate significantly with textism use. More importantly, the proportion of textisms produced was positively correlated with conventional spelling ability, r = .271, p < .001. Thus, the greater a child's spelling ability, the more textisms he or she produced. Further, this relationship remained significant after controlling for length of texting experience, r = .251, p = .047. No other texting variable was significantly correlated with spelling score.

Table 3: Means and Standard Deviations for Children's Textism Production and WRAT Spelling Scores, According to Texting Entry Method Used.

	Girls (n= 149)		Boys (n = 76)		Overall (n = 225)
	Gr 5 (n = 67)	Gr 6 (n = 82)	Gr 5 (n = 39)	Gr 6 (n = 37)	
Proportion of textisms produced					
Pred	.57 (0.25)	.51 (0.23)	.69 (0.25)	.62 (0.24)	.55 (.56)
MP	.57 (0.24)	.62 (0.25)	.37 (0.34)	.51 (0.32)	.53 (.29)
Both	.66 (0.10)	.31 (0.22)	.64 (0.29)	.60 (0.26)	.53 (.57)
Non-text	.35 (0.18)	.39 (0.27)	.29 (0.25)	.42 (0.22)	.36 (.22)
WRAT spelling scores					
Pred	107.23 (8.34)	108.83 (13.40)	109.75 (9.22)	105.14 (10.55)	107.86 (11.59)
MP	103.86 (12.78)	107.67 (14.10)	95.26 (11.93)	101.00 (14.95)	102.58 (13.85)
Both	110.67 (19.76)	107.00 (9.35)	108.60 (17.01)	106.00 (1.41)	108.13 (12.89)
Non-text	103.00 (14.20)	103.00 (6.06)	112.73 (18.70)	116.44 (16.93)	108.56 (15.84)

Note. Pred = Predictive text entry, MP = Multipress text entry, Non-text = non-texter.

Types of textisms used in word translation task.

Finally, we considered the types of textisms that children produced in the word translation task, as shown in the appendix. All 30 words were written as textisms by at least some participants (from 8 to 85% of the time), but children's translations were not dominated by textisms. Only 10 of the 30 words were written as textisms more often than they were written in standard English. Words which could be written as letter/number homophones were translated as such quite consistently (e.g., *are* was written as *r* 84.6% of the time, and *for* as *4* 73.4% of the time). However, for most other words, children showed a wide range of spellings, ranging from just two representations of *for* (73.4% *4* and 26.6% *for*), to 29 spellings for *tomorrow*, with a mean of 9.55 different spellings per target word.

Children of this age, at least when writing textisms on paper, did not consistently create textisms that were simply abbreviated spellings of their standard forms. They also included textisms that seemed to represent play or creativity with written words, such as *stick-1* for *sick* (apparently the *1* represents a *t*, which when removed from *stick* spells *sick*), *for+* for *forgive* (the plus sign was reported to represent the crossed ribbons of a present, and thus the concept *give*), deliberately fanciful spellings which were sometimes longer than their standard forms, such as *abowte* for *about* or *peepole* for *people*, and emoticons or synonyms for the target words, such as ☹ for *sick*, *happy* for *excited*, and ↓ for *back*.

DISCUSSION

This study provides an updated picture of Australian children's texting experience and behaviour and how this might relate to the important literacy skill of spelling. In this sample, 84% of 10- to 12-year-old children regularly used a mobile phone, and nearly all of these engaged in text-messaging, sending and receiving a median of about five text-messages per day. On average, the children had been texting for one-and-a-half to two years, with younger children beginning at a significantly younger age than older children. These numbers confirm that although Australian children have been texting for less time than their UK counterparts (e.g., Plester et al., 2008, 2009), this behaviour is now similarly extensive, even in primary school. Most children who wrote text-messages reported using textisms, although not exclusively, and nearly all reported that they could generally read others' textisms.

About half the children reported using the multi-press method to enter messages, and the other half, the more recent predictive entry method. This is similar to the 45% multi-press use observed by Plester et al. (2009), but rather more than the multi-press use reported by Australian undergraduates (14%) and high school students (21%) (De Jonge & Kemp, 2010), who had largely moved on to predictive texting. It may be that like their older counterparts (Kemp, 2010; De Jonge & Kemp) children begin by using the multi-press method (perhaps on older phones handed down by parents or siblings) and as they become more accomplished, learn to use the predictive entry method, either on their current phone, or a newer model. The data support this idea: Grade 6 children used predictive entry more than Grade 5 children, and predictive texters reported having been texting for significantly longer and sending significantly more text-messages per than multi-press texters. Girls were more likely to use predictive entry than boys, although further research would be necessary to explore whether this difference was driven by the capabilities of the phones, or their users. Given the constantly-evolving nature of mobile phone technology and the emergence of new entry methods (e.g., QWERTY keypads in which each button represents a single letter), it is likely that children will continue to learn new ways of text-messaging, and research will need to keep up with these changes.

When participants wrote down 30 English words as they would write them in a text-message, they wrote, on average, about half as textisms, and the rest in their standard forms, although there was much variation. The proportions of textisms produced in this list-like translation are not really comparable with those produced by children translating actual messages (e.g., Plester et al., 2008, 2009), because all of our words were potentially translatable into textisms. It seems that examples of textese pervade children's environments: even children who did not use text-messaging produced a substantial number of textisms. However, experience also clearly plays a part, as children who did use text-messaging produced significantly more.

The general spelling ability of the girls in this study did not vary with text entry method. In boys, non-texters showed significantly better spelling than texters, and better spelling than girl non-texters. Although causal relationships cannot be inferred from this cross-sectional study, previous research with children of this age range (Plester et al., 2008. 2009) makes it seem unlikely that not texting had somehow protected these boys' spelling ability. It may be that the parents who did not give their sons access to a mobile phone were also those who provided more exposure to conventional reading- and writing-based activities. However, this relationship did not hold for girls. As reflected in our participants' spelling scores, boys' literacy skills are often more varied than those of girls (e.g., Alexander & Martin, 2000), and this variability may partially explain the significant differences observed here between the different groups of boys, but not girls. However, other explanations should be considered in future research. Girls used predictive texting more often than did boys, but no further sex differences in text-messaging experience or behaviour were observed. In this sample, at least, girls and boys had largely similar experience with mobile phones and text-messaging, although it remains to be seen whether this experience has a differential effect, if any, on the developing literacy skills of girls and boys.

Previous research with British children has shown a consistently positive relationship between text-messaging behaviours and literacy skills (Plester et al., 2008, 2009). In support of these results, we found that the proportion of textisms that children produced was significantly and positively related to their general spelling ability, even after controlling for the number of months that children had been text-messaging, and even though the words to be translated formed a list rather than a naturalistic message. These results also provide additional evidence that reasonable measures of text-messaging behaviour can be gained by asking participants to hand-write their responses, when mobile phone access is not allowed (De Jonge & Kemp, 2010). Finally, we found that the more months of experience that children had had with texting, the more text messages they sent and received, and the more textisms they produced. It seems that it is length of time, rather than frequency of text-messaging, that encourages the use of textisms, as the numbers of messages sent and received did not correlate significantly with textism use. This evidence for a positive link between textism use and literacy skill speaks against media claims that text-messaging has a detrimental effect on spelling, and may help to reassure teachers and parents that allowing 10- to 12-year-old children to engage in mobile phone texting is likely to be associated with greater, rather than lesser, spelling abilities.

As discussed earlier, there are several possible explanations for this positive relationship between the use of textisms and spelling ability. The fun of text-messaging one's friends, and the relative freedom of spelling allowed in text-messages, may increase children's overall enjoyment of reading and writing, leading to greater engagement and achievement in traditional literacy activities. Even if this enjoyment does not translate directly into conventional literacy tasks, engagement with texting is likely to increase exposure to the written word, which has been shown to be a positive predictor of reading ability (Cipielewski & Stanovich, 1992). Many textisms have a highly phonological basis (Thurlow & Brown, 2003), and the freedom to play with word sounds and spellings may help children to master the grapheme-phoneme correspondence rules necessary for conventional spelling proficiency (Plester & Wood, 2009). This idea forms the basis of Crystal's (2008) theory of literacy enhancement, which proposes that using textisms can assist children to improve their traditional spelling ability. Alternatively, being good at spelling (and possessing the phonological skills that come with this) may help children to distinguish the sound components of words, enabling them to create a large variety of textisms.

There is no clear convention for how words should be abbreviated, and like teenagers and young adults (Kemp, 2010, De Jonge & Kemp, 2010, Varnhagen et al., 2009), the current participants produced a variety of textisms. The most consistency was shown for words that could be written as letter/number homophones (e.g., *r* for *are*), but other words were re-written in a range of ways, some dropping letters (e.g., *thks* for *thanks*), some changing spellings to represent sounds (e.g., *thanx*) and others doing both (e.g., *tnx*). Words which appear frequently in text-messages did not appear to have undergone some conventionalised process of abbreviation: the word *because* was re-written in 17 ways, and the word *tomorrow* in 29 ways. Future research could explore the categories of textisms produced, and their relationship, if any, to conventional literacy skills.

This study provides further evidence that children's use of textisms is associated not with declining standards of literacy, but with better spelling skills. Parents and teachers who become aware of this positive relationship will be better placed to enhance children's literacy development, by supporting their interest in all aspects of traditional and new forms of writing, while also providing guidance on the differences between formal and informal spelling styles. It looks as though digital communication is here to stay, and so rather than deploring children's use of textisms, parents and teachers can play a role in helping this new form of written communication to encourage children's interest and skills in language and literacy.

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APPENDIX

Percentage of each type of Spelling Produced for Target Words, from Most to Least Consistent. (Spellings of < 2% each are combined.)

Word	Spelling 1	Spelling 2	Spelling 3 and beyond	No. of spellings
are	r (84.6)	are (14.5)	u, ya (0.9 combined)	4
friend	friend (79.0)	frend (7.9)	frnd (5.6), bf (2.8), bff, f, frind, freind, frd, fwend (4.7 combined)	10
being	being (77.0)	bein (9.9)	bing (7.5), bng, beng, ben, beein, been, b'in (5.6 combined)	9
would	would (75.8)	wood (9.5)	wold (4.3), wuld (2.8), wld (2.8), wod, woud (4.7 combined)	7
sick	sick (74.5)	sik (10.9)	sic (8.0), sck (2.8), :(, ick, ill, si, stick-1 = (3.8 combined)	9
excited	excited (74.1)	xcited (11.8)	xsited (5.3), exited (2.9), xcitd, :) , xsited, cited, ecited, happy (6.5 combined)	10
for	4 (73.4)	for (26.6)	-	2
see	c (68.9)	see (29.0)	se (2.3)	3
back	back (68.9)	bak (20.3)	bac (5.7), bck (2.8), bk, brb, ↓ (2.4 combined)	7
between	between (65.7)	betwen (17.9)	btwen (2.4), btw, tween, b-tween, b/w, (), be2, betwem, betwn, b'tween (8.7 combined)	12
about	about (64.5)	bout (29.9)	abot (2.8), ab, aboute, abowt, abut, b, [circular arrow] (2.8 combined)	9
people	people (61.6)	peeps (16.0)	ppl (7.6), peple (3.8), pple, peaps, peep, peepole, people, pepl, peoples (4.7 combined)	11
when	when (61.1)	wen (37.9)	whn, whee, time (1.9 combined)	5
message	message (60.2)	msg (24.2)	mesage (4.3), mesge, mess, mssge, messge, msge, txt, mesag, mes, mesg, ms, sms, [picture of envelope] (11.4 combined)	15
don't	don't (58.7)	dont (31.0)	dnt (6.6), d'nt (2.4), do not (1.4)	5
school	school (58.3)	skool (25.4)	scool (9.9), schl, scol, skewl, skl, shol, scul, chool, scho, sckool, skwl (6.1 combined)	13

can't	can't (57.8)	cant (32.4)	cnt (5.6), cn't (2.4), can not, cos, can (1.9 combined)	7
text	txt (57.0)	text (38.8)	tex (2.8), tt, tx, [picture of an envelope] (1.4)	6
what	wat (51.9)	what (34.6)	wot (7.1), wht, ? , wha, wa, huh, waz (6.6 combined)	9
late	late (49.5)	l8 (41.6)	lat (4.2), lte, l8t, 8te, 8 (4.7 combined)	7
forgive	forgive (47.6)	4give (42.0)	4giv (6.1), forgiv, forgve, frge, fgive, for+[picture of present], soz (4.3 combined)	9
please	plz (45.3)	please (35.1)	pls (7.9), plese (2.8), plse, ples, pleaz, plez, pease, pez, pleas (8.9 combined)	11
everyone	every1 (44.8)	evry1 (6.1)	everyone, evone, ev1, ever1, eveone, evereyone (5.2 combined)	8
because	because (43.9)	cause (21.0)	bcause (12.2), coz (9.8), cos (3.9), becoz, bcos, cuz, cuse, couse, caus, cas, becus, becous, becau, bcose, b1 (9.3 combined)	17
someone	someone (43.6)	some1 (38.4)	sum1 (8.5), som1 (6.6), someone, sumone, smone, sme1 (2.8 combined)	8
thanks	thanks (39.8)	thx (23.7)	thanx (13.7), thnx (5.2), thnks (4.7), tanks, thks, tnx, thax, thankx, tnks, tnx, ty, thxs, tks, tare, thancs (12.8 combined)	17
tonight	2night (38.5)	tonight (34.7)	2nite (18.8), tnight (2.4), tonite, 2nit (3. 8 combined)	6
tomorrow	2morrow (30.2)	tomorrow (29.7)	2moz (11.3), tomoz (9.4), 2moro (2.8), 2morow (2.3), 2morro, tomrow, tomorrow, tommoz, tmoz, 2mo, 2morорrow, 2moru, 2moz, 2omoro, 2one, 2tomozzo, morrow, tmorrow, tmozz, tmrrw, tom, tomo, tomomo, tomoro, tomoroz, tomos, tomox (12.3 combined)	29
birthday	b'day (28.6),	bday (25.7)	birthday (23.8), b-day (14.8), B.day (2.4), BD, birthday, bifday, birfday, birfdi, birth, birthday (4.8 combined)	12