Student text language and literacy


University students’ text messaging language, literacy skills and formal writing

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Abstract

There are media concerns that students’ literacy is being negatively affected by their use of text messaging language. This idea was assessed in a sample of 236 Australian and Canadian undergraduate university students, who supplied naturalistic text messages and completed non-word reading and spelling tasks, with some further language tasks for the Australian students. Both positive and negative correlations between textism use and literacy scores were found, but few reached significance. Further, students with lower literacy scores rated the appropriateness of using textisms more highly than students with higher scores. The examination papers of 153 different Australian students were also checked for the presence of textisms, of which a negligible number were found. This suggests that the students are able to avoid textism use in exams despite media reports to the contrary. While students with poorer literacy may be more comfortable with textism use, we conclude that overall university students’ use of textisms does not seem to have negatively affected their literacy skills.

Keywords: Text-messaging, adults, literacy, writing
Text messaging continues to increase in popularity, with close to 200,000 messages being sent per second globally (International Telecommunication Union, 2010). There are media concerns that increased use of text language is negatively influencing texters’ formal literacy skills, not only in English (Humphrys, 2007; Thurlow, 2006; Woronoff, 2007), but in other languages as well (e.g., Anis, 2007; Tseliga, 2007). This is because the written language of text-messages is characterised by ‘textisms’: abbreviations and other re-spellings such as 2 for to, or nite for night. However, many researchers hold a more positive view of texting, highlighting the creativity and expressive opportunities that it affords (e.g., Crystal, 2008; Shortis, 2007; Tagliamonte & Denis, 2008).

Empirical research has backed up this optimistic view, at least for children. Studies have consistently shown positive links between children’s literacy scores and texting behaviours, in both the UK (e.g., Coe & Oakhill, 2011; Neville, 2003; Plester & Wood, 2009) and Australia (Kemp & Bushnell, 2011). However, these relationships appear much less clear in adults, in the handful of studies to have considered them. The aim of the present research was to examine the links between measures of literacy (including reading and spelling), and of texting (length of phone ownership, frequency of texting, textism use) in undergraduate students from two English-speaking countries; Australia and Canada.

There are various reasons why positive relationships between textism use and literacy ability might be evident in children. Children with stronger reading and writing skills may be better at word play and more capable of representing letter-sound correspondences using unconventional spelling (Neville, 2003; Plester & Wood, 2009). The use of textisms may also demonstrate linguistic awareness in a broader sense (Crystal, 2008); for example, by indicating pronunciation (e.g., wanna for want to), intonation (e.g., pleeease for please), pause-fillers (e.g., umm...), and non-verbal additions (e.g., smiley faces, kisses, and extra
punctuation. Adults, however, are likely to have reached a level of literacy where the ability and confidence to create and use textisms are the norm. Indeed, results concerning the relationship between texting and literacy in older participants have been less than consistent. Kemp (2010) asked 61 Australian university students to read and write text messages using text language and conventional English. She found that higher scores on linguistic tasks were neutrally or positively correlated with faster and more accurate reading and writing of both types of messages. De Jonge and Kemp (2010) found a different pattern of results when they tested the literacy skills of 52 high school students and 53 undergraduates in Australia, who also translated conventional English passages into text language. Initial results showed a negative correlation between use of textisms and reading, nonword reading, spelling and morphological awareness, but the correlations became non-significant once text messaging frequency was controlled.

Mixed results were reported in a study with 718 young American adults, who were asked to generate formal and informal writing after supplying information about their use of texting and textisms (Rosen, Chang, Erwin, Carrier, & Cheever, 2010). The authors found negative associations between reported use of textisms and formal writing skill, but only in those with no or incomplete tertiary education. However, there were positive associations between reported use of textisms and informal writing skill for all participants. In a study of 152 US university students, Drouin (2011) found both positive relationships (between text messaging frequency and tests of spelling and reading fluency) and negative relationships (between reading accuracy and reported textism use on both social networking sites and in emails to professors). Finally, Massengill Shaw, Carlson, and Waxman (2007) found no significant relationship between the reported text message frequency and spelling scores of 86 US university students.
In sum, previous studies have shown consistently positive correlations between children’s use of text language and their performance on literacy tasks, but varied results for adults. It is possible that some of the variability is due to differences in the nature of the literacy skills tested. For example, some literacy tasks are more orthographic in nature (based on conventional spelling rules), such as the spelling of real words in spelling tests. Other literacy tasks draw more strongly on phonological skills (based on letter-sound correspondences), such as the reading aloud of nonwords. The ability to spell a word whose spelling cannot be predicted on the basis of sound-to-letter correspondences depends on prior knowledge of that word. In contrast, the ability to spell an unfamiliar or novel word depends on the individual’s ability to decode the sounds of the letter combinations. Similarly, many textisms are constructed primarily on the basis of either sound or spelling. Phonological textisms tend to emphasise a word’s sound rather than its conventional spelling (e.g., ova for over, 2moro for tomorrow). Orthographic textisms omit some letters, especially vowels, but retain some of the conventional letters, especially consonants (e.g., ovr for over, tmrw for tomorrow). In the present study, we grouped textisms into phonological and orthographic categories. Specifically, we examined whether students with better phonological skills used fewer orthographic textisms, and/or more phonological textisms, and conversely, whether students with better orthographic skills used fewer phonological and/or more orthographic textisms.

Results showing textism use to be unrelated or negatively related to adults’ literacy skills may be at least partially attributable to possible ceiling effects in the literacy skills of university student participants. Social factors might also affect textism use, beyond any differences in reading and writing ability. Although textisms might signal important social groupings for many younger texters (Lewis & Fabos, 2005), many young adults no longer find it socially important to include abbreviated forms (Tagliamonte & Denis, 2008). Pressure
on university students to be seen as academically capable may also limit the use of textisms. For example, Lewandowski and Harrington (2006) showed that students perceived the use of textisms in a student’s formal email as indicating that the writer was less skilled, and had made less effort, than the writer of an email written without textisms. Therefore, in the current study, we asked participants how appropriate they believed textism use to be in a range of formal and informal situations.

In recognition of the pervasive impact of texting on students’ lives, it has been recommended that educators identify to students the situations in which it is appropriate to use formal language (Crystal, 2008; O’Connor, 2005). Media concerns that textism use will intrude into formal writing are based not only on the possibility that students do not know when to avoid textism use, but also that they may not even recognise a word as a textism, having had their conventional lexicon overwritten with non-conventional forms of words (Friess, 2003; Humphrys, 2007; Woronoff, 2007). Previous studies have confirmed that for both adults and children, exposure to incorrectly spelled words can have a negative influence on the spelling of those words (Burt & Long, 2011; Dixon & Kaminska, 1997). However, these impressions are not necessarily borne out by the experimental evidence. Powell and Dixon (2011) showed that adults’ spelling scores were higher after exposure to either textisms or correctly spelled words, even though they were lower after exposure to incorrectly spelled words.

While empirical research is sparse, there is some evidence for the presence of textisms in students’ formal writing. At one American university, 25 lecturers and professors of English reported seeing textism-like intrusions into formal written work (National Council of Teachers of English, 2003). A Pew survey reported that 64% of US teenagers say they have used informal writing styles in their school work, with 38% saying they have used textisms such as LOL (for laugh out loud), and 25% saying they have included emoticons (e.g.,
Furthermore, textism intrusions averaged approximately 2.5 per writing sample (samples averaged about 300 characters) in Rosen et al.’s study (2010), and ranged from 1-4 textisms per formal email in research involving American college students (Drouin & Davis, 2009). In the latter study, 75% of students believed it to be appropriate to use textisms in informal messages to friends, but only 6% believed it to be appropriate in formal written correspondence with an instructor. If textism use were negatively affecting students’ intentions or abilities to use conventional spelling, we would expect to see textism intrusions in their formal writing, especially in the pressured situation of formal exams. Therefore, we also wanted to assess written exams to see whether students used textisms in a situation that requires conventional skills and where textism use has been traditionally considered inappropriate.

**Rationale:** In our first study, we investigated the textism use and literacy skills of students in two English-speaking countries. These students’ attitudes regarding the appropriateness of textism use in a variety of situations, including formal writing, motivated the second study, in which we assessed the formal written exams of a different sample of students for intrusions of textisms. While Study 1 was designed to examine any links between students’ tested literacy skills and real-life messages, Study 2 was intended as a real-world measure of the possible intrusion of informal text messaging on students’ formal writing.

**Hypotheses:** Based on previous studies and generally high literacy skills of university students, we did not expect students to vary significantly in textism use according to their literacy scores. We also expected that links between textism use and measures of exposure to text messaging, specifically phone ownership and daily message sending rates, would be varied or neutral. We predicted that students with poor phonological skills would use fewer phonological textisms than students with good phonological skills, and vice versa for
orthographic skills and textisms. In Study 2, we expected to find only a small number of textism intrusions in students’ formal written exams.

**Study 1**

In this study, we investigated links between students’ textism use and their scores on a set of literacy- and language-based tasks. We also examined students’ views regarding the appropriateness of textism use in different contexts.

**Method**

**Participants**

Participants were first-year Psychology and Education students from two urban universities, one in South Eastern Australia, and one in Western Canada. There were 86 Australian students (63 female), mean age 23.3 years ($SD = 8.2$) and 150 Canadian students (116 female), mean age 22.5 years ($SD = 4.2$). These students were part of a larger study (completed in late 2010) for which they were given course credit for participation and provided informed consent. The study had ethical approval from both universities.

**Materials**

All students completed a text messaging task, two questionnaires, and two literacy tasks to provide measures of phonological and orthographic literacy skills.

*Text messaging naturalistic task.* Participants were asked to copy down the last five messages they had sent from their phones, including more messages as necessary to add up to at least 50 words overall. Participants were asked to write messages “exactly as they appear on your phone, including punctuation and emoticons”.

*Questionnaire data.* Participants completed a questionnaire regarding demographic and texting data; in this paper we report length of phone ownership and daily sent messages as measures of texting experience. Participants also rated how appropriate they thought it was to use textisms in a variety of message types (text-messages, email, instant messaging, and
university work) to different audiences (ranging from a friend to a stranger). Responses were recorded on a 5-point Likert Scale (1 = not at all appropriate and 5 = entirely appropriate).

**Nonword Reading, Form A.** The Nonword Reading Test (Martin & Pratt, 2001) is a standardised test in which students read aloud a list of 54 nonwords of increasing difficulty. Although many university students may be able to read most of these words accurately given unlimited time, the addition of time pressure is assumed to identify any individual performance differences. This is because while accuracy measures are often at a ceiling for university students, tasks that measure the automaticity of students’ skills may capture any remaining word-level problems (Deacon, Parrila, & Kirby, 2006). Therefore we presented this task in two stages. First, students were asked to read aloud as many nonwords as they could in 30 seconds without compromising accuracy. The number of nonwords read correctly was the ‘timed nonword reading score’. Words were printed on a single sheet of paper (rather than in the standard booklet form) to control for individual differences in page-turning time encountered in a pilot study. Students were then instructed to continue reading to the end of the nonwords in their own time, and were asked to re-read any items read inaccurately in the first 30 seconds. The overall total of correctly read nonwords was the ‘total nonword reading score’. Standard scores were calculated from the raw scores on this task for both the timed and total stages, but it should be noted that these scores should be interpreted with caution, as the task is not timed in the standard administration.

**WRAT Spelling.** Participants were administered the spelling subtest of the Wide Range Achievement Test, Fourth Edition (WRAT-IV, Wilkinson & Robertson, 2006), a standardised test in which students spell 42 dictated words of increasing difficulty.

The Australian students also completed several tasks that the Canadians did not:

**Adult Reading History Questionnaire - Revised.** The first section of the Adult Reading History Questionnaire - Revised (ARHQ-R, Parrila, Corkett, Kirby, & Hein, 2003)
was completed by the Australian students. Respondents rated any difficulties they had encountered with literacy learning in primary school, on 15 items with rating options from 0 to 4 on a series of 5-point Likert scales. These items elicit ratings of students’ difficulties with reading, spelling and other classwork, with an emphasis on aspects of reading. Usually, scores are obtained by adding students’ ratings for the 15 items and dividing by the maximum possible score of 60 to produce a proportion. To match the other literacy tasks, we inverted this score so that lower scores indicated poorer literacy.

**Word Attack.** The Word Attack subtest of the Woodcock Reading Mastery Test (Woodcock, 1999) is a standardised test in which students read aloud 45 written words which are a mix of nonsense words and very uncommon words.

**Word ID.** The Word Identification subtest of the Woodcock Reading Mastery Test (Woodcock, 1999) is a standardised test in which students read aloud 106 written words of increasing difficulty.

**Spoonerisms.** In the Spoonerisms subtest of the York Adult Assessment (Hatcher & Snowling, n.d.), the researcher reads the first and last name of 12 well-known people (e.g., Michael Caine), and the student is instructed to reply with the initial sound of each name exchanged (e.g., Kykle Maine). The test is timed but the Accuracy score is based on the number of correct answers alone (maximum possible score = 24).

**Block Design.** The Block Design subtest of the Wechsler Adult Intelligence Scale, Fourth Edition (WAIS-IV, Wechsler, 2008) is a nonverbal reasoning standardised test in which students recreate increasingly difficult patterns by manipulating a set of blocks.

**Procedure**

Students completed questionnaires and tasks individually or in pairs, in either a single session or two shorter sessions, in a quiet university room. The Australian students took approximately 75 minutes to complete all tasks, and the Canadian students took 30–40
minutes to complete their smaller set of tasks. Both participant groups also completed two other text messaging tasks (not reported in this paper).

**Categorisation of textisms.** The textisms observed in each text message were categorised according to the type of transformation that was made from the conventional word, using categories employed in several previous studies (e.g., De Jonge & Kemp, 2010; Plester et al., 2009; Thurlow & Brown, 2003). Examples include ‘shortenings’ such as *lib* for *library*, ‘missing apostrophes’ such as *didnt* for *didn’t*, and ‘g-clippings’ such as *thinkin* for *thinking*. Each transformation was counted, even when more than one appeared in a word, to capture the full detail of textism types used (following De Jonge & Kemp, 2010; Varnhagen et al., 2009). For example, *im* for *I’m* was counted in both the categories ‘omitted capitals’ and ‘omitted apostrophes’. Textism density, in terms of proportion of transformations, was calculated by dividing the number of transformations in students’ total messages by the number of words in their total messages for each student.

**Results**

Participants’ questionnaire data, literacy scores, and naturalistic text messages were collated, and textisms were categorised as described above. The Australian messages contained a higher mean proportion of textisms (*M* = .188, *SD* = .091) than the Canadian messages (*M* = .156, *SD* = .085); a difference which an independent-samples *t*-test showed to be significant, *t*(234) = 2.77, *p* = .001. The Australian students had owned phones for significantly longer (*M* = 7.1 years, *SD* = 2.4) than the Canadian students (*M* = 6.0 years, *SD* = 2.3), *t*(234) = 3.53, *p* = .001. However, the Australian students sent fewer messages per day (*M* = 23.9 messages, *SD* = 31.9) than the Canadian students (*M* = 39.8 messages, *SD* = 44.5). (The data for one Canadian outlier who reporting sending 1000 messages per day was excluded from analyses of this factor.) As the data were positively skewed, we conducted a
square-root transformation before conducting a $t$-test, which showed that this difference was significant, $t(233) = -3.53, p < .001$.

Participants’ mean ratings for how appropriate they thought it was to use textisms in various situations are reported in Table 1.

(Table 1 about here)

Overall, appropriateness ratings were almost identical between countries. For both countries, ratings differed with audience for each message type, with a clear decrease in appropriateness ratings from less formal (writing to a friend, taking lecture notes) to more formal (writing to a stranger, completing university work). Almost all students rated textism use in exams and typed assignments as “not at all appropriate”. However, ten students rated textism use in exams as “not really appropriate” and one as “it’s okay”, and three students rated textism use in typed assignments as “not really appropriate”. Pearson correlations confirmed that the more appropriate that students believed textism use to be (overall, across audience and message type), the more textisms they used in their own text messages in both Australia ($r = .369, p = .001$) and Canada ($r = .194, p = .02$).

**Literacy tasks scores and textism use**

Performance on the standardised literacy tasks and the block design task was within the normal range. Scores on the tasks that were completed by participants in both countries showed some variation, with better nonword reading by the Canadian students and better spelling by the Australian students. Table 2 shows descriptive data for all task scores for both countries, and independent-samples $t$-tests for differences between countries.

(Table 2 about here)

A series of Pearson correlations was calculated to compare students’ scores for each literacy task with length of phone ownership, messages sent per day, overall appropriateness rating for textism use, and the proportion of textisms in their naturalistic messages. Spelling
errors have been counted as textisms by some researchers (e.g., De Jonge & Kemp, 2010; Thurlow & Brown, 2003) and not by others (e.g., Ling & Baron, 2007; Plester, Wood & Bell, 2008). For this analysis, and those following, we excluded textisms categorised as spelling errors. This was done to preclude the potential for even the small proportion of spelling errors observed (less than 2% of all textisms) to confound the results. Specifically, those participants who made more spelling errors in their texting, regardless of their use of other textisms, might have been those who had poorer literacy scores.

As shown in Table 3, there were only weak correlations, both positive and negative, between standardised task performance, and factors of texting experience (phone ownership and sent messages), attitude towards textism use (appropriateness ratings) or actual textism use in naturalistic messages.

(Table 3 about here)

There were only two significant correlations between length of phone ownership and standardised task performance, one positive (Australians, for Word Attack) and one negative (Canadians, for WRAT Spelling). There was only one (negative) significant correlation between messages sent per day and standardised task performance (Australians, for Word Attack). For Australians, Timed Nonword Reading and ARHQ-R scores correlated significantly and negatively with both appropriateness ratings for textism use, and actual textism use. It seems clear that any early reading difficulties (measured on the ARHQ-R) cannot be attributed to textism use, since the earliest age at which any participants reported receiving a mobile phone (ten years) is beyond the age at which children first start to learn to read and write. For Canadians, WRAT Spelling scores correlated significantly and negatively only with actual textism use.

To ensure that correlations were not simply attributable to differences in participants’ levels of general non-verbal intelligence, we also calculated partial correlations between all
literacy task scores and textism use with Block Design as a covariate, for the Australian group only (since we did not have Block Design scores for the Canadian students). However, the level of significance remained the same for each correlation. Thus it seems that in these samples, there was no clear relationship between textism use and students’ literacy skills.

**Phonological and orthographic textism types.** We also wanted to investigate whether individuals with stronger orthographic skills were more likely to create orthographic textisms, and/or less likely to create phonological textisms, and vice versa. We therefore identified the textisms which could be categorised as phonological textisms, or as orthographic textisms (not all textisms were included in one of these categories).

Phonological textisms were defined as those which involved substitutions of one character or symbol for another to represent sounds within words: specifically, single and combined homophones (e.g., gr8 for great), nonstandard spelling (e.g., awesum for awesome), accent stylisation (e.g., da for the), and other symbols (e.g., @ for at). Orthographic textisms were defined as those which involved abbreviating words without substituting the original spelling: specifically, shortenings (e.g., bout for about), contractions (e.g., txt for text), omitted apostrophes (e.g., wont for won’t), and initialisms (e.g., atm for at the moment).

Students’ naturalistic messages contained higher proportions of phonological textisms (Australian: $M = .228, SD = .062$, Canadian: $M = .215, SD = .052$) than orthographic textisms (Australian: $M = .131, SD = .037$, Canadian: $M = .119, SD = .026$). As these data were not normally distributed, arcsine transformations were performed prior to further analysis. A repeated measures ANOVA was conducted with one within-subjects factor, Textism Type (phonological, orthographic) and one between-subjects factor, Country (Australia, Canada). The effect of Textism Type was significant, $F(1, 234) = 66.69, p < .001, \eta^2_p = .222$, in that there were more phonological than orthographic textisms. There was also a significant effect of Country, with Australian messages containing more textisms than Canadian messages,
$F(1, 234) = 7.35, p = .007, \eta^2_p = .030$. The interaction was not significant, $F(1, 234) = 0.80, p = .37, \eta^2_p = .003$.

Pearson correlations were calculated between these two broader categories of textisms and scores on all tasks completed by the students in both countries. However, as with total textisms, few were significant. For phonological textisms, correlations were negative for Spoonerisms ($r = -.219, p = .050$) for Australians and negative for WRAT Spelling ($r = -.219, p = .007$) for Canadians. For orthographic textisms, correlations were negative for ARHQ-R scores ($r = -.231, p = .037$) and Total Nonword Reading ($r = -.228, p = .039$) for Australians, and positive for Timed Nonword Reading ($r = .196, p = .016$) for Canadians.

It is possible that the relative lack of significant correlations could be at least partially attributed to the relatively infrequent use of textisms, and the relatively low variability in the proportions of textisms that were used. Therefore, we conducted a series of one-way analyses of variance (ANOVAs) on two more extreme groups; those whose proportion of textism use (overall, phonological and orthographic) was in the upper and lower thirds of the distribution in participants’ naturalistic messages. For textisms overall, the only significant difference was for untimed (Total) Nonword Reading scores, in that these scores were lower for students with higher densities of textisms in their messages ($M = 108.8, SD = 11.4$) than for those with lower textism densities ($M = 114.1, SD = 10.7$), $F(1, 153) = 0.89, p = .003$. For phonological textisms overall, the only significant difference was for WRAT Spelling, in that scores were lower for students who produced more phonological textisms in their messages ($M = 106.2, SD = 9.8$) than for students who used fewer phonological textisms ($M = 110.9, SD = 11.5$), $F(1, 153) = 7.46, p = .007$. For orthographic textisms overall, the only significant difference was for ARHQ-R results, in that students who produced more orthographic textisms in their messages ($M = .708, SD = .147$) had lower scores (i.e., reported more difficulties in primary
school learning) than students who produced fewer orthographic textisms ($M = .788$, $SD = .133$), $F(1, 57) = 4.26$, $p = .043$.

**Discussion**

In previous research with adults, links between literacy skills and textism use have been inconsistent. The present study also revealed varied results, with Australian students using higher proportions of textisms than Canadian students in their sent messages, and correlations with literacy tasks also differing between countries. International differences might explain some of the variability in results regarding literacy in this and previous studies, in that Australia’s earlier uptake of text messaging and phone technology may have influenced textism use (CIA, 2004, 2010). Overall, however, the correlations between tasks and textism use were quite weak, with few reaching significance, even when scores were compared in terms of phonological (e.g., *wot* for *what*) and orthographic (e.g., *wht* for *what*) textism types. Thus, the current findings of varied or negative links between literacy skills and textism use are similar to the negative or mixed results found in previous studies with adults (e.g., Drouin, 2011; Massengill Shaw et al., 2007; Rosen et al., 2010). A general lack of relationship between literacy scores and either their rate of message sending or length of phone ownership suggests that text messaging has not damaged students’ literacy abilities.

Compared to children, adults seem to place higher priority is placed on maintaining spelling correctness in texting (see Ling, 2010; Plester & Wood, 2009). Our questionnaire data showed that students from both Australia and Canada clearly differentiated between audiences when rating the appropriateness of textism use. Students who rated textism use as more appropriate used significantly higher proportions of textisms in their messages. Further, appropriateness ratings correlated significantly and negatively with literacy task scores (students with lower literacy scores rated textism use as more appropriate). This suggests that relationships between textism use and literacy scores may be mediated more by social factors
regarding the popularity of textism use (or, inversely, of ‘correct’ spelling) more than the abilities of the students involved.

Study 2

In this study we assessed students’ formal written exams for intrusions of textisms. We had initially intended only to look at students’ exams, but the process of securing informed consent was completed by email, and these emails turned out to include a relatively high proportion of textisms. Therefore, we contacted students a second time, to ask if their first consent emails could be included in the same study, so that we would have a measure, however crude, of the same students’ use of textisms in emails.

Method

Participants

Participants were 153 undergraduate students (121 female). They came from the same urban South-Eastern Australian University as in Study 1, but did not participate in that study. Of these, 126 students (103 female) also consented to their consent emails being included in the study. Data regarding whether students had English as a first language were not available.

Materials and Procedure

Three hundred and three papers for final exams which had been completed in the previous two semesters were examined. Exams came from four disciplines (Psychology, Management, Aboriginal Studies, and Zoology), and contained a total of approximately 533,500 words. Students were asked to reply by email to consent for their exams to be checked, by writing “I accept”, although some students wrote more. The 126 consent emails examined contained a total of 855 words.

The exam papers and consent emails were checked for textisms, which were coded in the same way as Study 1, with several exceptions. Students’ use of + and & for and, which were used extensively, were not counted, and neither were spelling errors, since we could not
justify coding these as textisms in the context of a written exam. Errors with possessive apostrophes, which were also widespread, were similarly excluded. We did follow Study 1 in counting the much rarer omitted contractive apostrophes such as don’t for don’t, but we acknowledge that these do not necessarily represent the intrusion of textisms into formal writing. Because of these differences, the following results are not directly comparable with those from Study 1.

**Results and Discussion**

Descriptive statistics for textism types found in the formal exams and consent emails are reported in Table 4.

(Table 4 about here)

In the formal exams, only a very small percentage of words could be counted as textisms, and 43 of these occurred in a single student’s paper. Of the few expressive symbols observed, all were emoticons, and most of these were included in sidenotes to the marker (e.g., continued 3 pages on ... Sorry :)). The consent emails contained a high number of the textism i for I (which accounts for 14 of the total textisms categorised as omitted capitals), which reflects the instruction to reply with “I accept”. While six of the expressive symbols were emoticons (e.g., I Accept :)), there was also one ‘kiss’ (x). Overall, the proportion of textisms of all words in the written exams was a tiny 0.02%, compared to the 4.8% textisms in the consent emails.

It seems that despite media concerns, students’ formal literacy skills have not been measurably affected by exposure to text messaging culture. The negligible proportion of textism intrusions found in students’ formal exams was even smaller than seen in previous research where students wrote essays and emails under experimental conditions (e.g., Drouin & Davis, 2009; Rosen et al., 2010), and suggests that students remain capable of discerning conventional spellings from textisms. The higher proportion of textisms in emails shows that
the same students do use textisms in other settings, even though it could be considered inappropriate to use textisms in emails to an unfamiliar student researcher. The difference between proportions in exams and emails may also reflect the fact that words commonly written as textisms in informal or conversational text messages (e.g., *i* for *I*) are less likely to be used in formal exams. Either way, it appears that textism intrusions into students’ formal written exams are too few to justify concerns that students’ use of text messaging is damaging their literacy skills, at least in this sample.

**General Discussion**

Media concerns continue regarding text messaging and the influence of textism use on literacy skills (e.g., Broadhurst, 2008; Llewthor, 2010), but our studies confirm that such fears may be exaggerated. In Study 1, we examined links between students’ literacy task scores and measures of texting experience, opinions about textism use, and actual textism use. There was some evidence that students with poorer literacy scores on some tasks were more likely to use textisms, consistent with findings by Drouin (2011) and Rosen et al. (2010). However, not all the language tasks we looked at correlated negatively with textism use, which is consistent with findings by Kemp (2010) and Rosen et al. (2010). Other measures of texting also produced mixed results, with both positive and negative correlations between task scores and both length of phone ownership and frequency of texting, although very few of these reached significance. This is consistent with the varied or neutral results expected in our hypothesis, based on findings by Drouin (2011), who found positive correlations between texting frequency and two language tasks, and Massengill Shaw et al., (2007) who found no significant correlations.

Social reasons may have had some influence on the current results. There were significant negative correlations between ratings of the perceived appropriateness of textism use and students’ literacy scores. Students who think that it is more appropriate to use
textisms in a greater range of contexts might also be those who find it more difficult to achieve consistently correct spelling in general. It may be that educating students as to the appropriate time and place for textism use (as recommended by Crystal, 2008; O’Connor, 2005) may alleviate concerns, although most students demonstrated a clear understanding of audience in their questionnaire results.

Further investigation of the links between textism use and literacy scores was undertaken by dividing both textisms and literacy tasks into phonological and orthographic types, to address the possibility that previous results have been muddied by differential effects within task and textism types. However, there were no clear links between tasks that emphasised phonological versus orthographic skill and the use of phonological versus orthographic textisms. Stronger relationships may have been observed with a group more varied in their range of literacy ability. Even within this university sample, the students with poorer literacy skills may use more textisms for reasons such as to cover spelling difficulties or to fit in with a social group with relaxed literacy standards. Conversely, students with better literacy skills may have greater confidence to use textisms while maintaining or enhancing the communicative value of their messages. Overall, links between the extent of textism use and literacy task scores of students seem minimal, although results may be confounded by competing motivations for textism use.

In Study 2, we assessed students’ formal written exams for textism intrusions. As predicted, we found only a negligible number of unconventional spellings that might be considered as textisms, despite the higher proportions of textisms these students used in their consent emails. This is not surprising, considering the ratings of students in the first study who, on the whole, deemed textism use in exams inappropriate.

Overall, we found very little evidence for concern regarding any negative effect of textism use on students’ performance on conventional literacy tasks. It is worth noting that
our Study 1 participants had owned mobile phones for an average of six to seven years. We assume therefore, that for most of our participants, early literacy skills were well established before they began to use mobile phones. It may be that in the future, children who began texting at a much earlier age could experience the influence of text messaging language in different ways (e.g., textisms could become the dominant lexical reference in place of current conventions for spelling). Conversely, the introduction of new technology (including smartphones with full keypads and improved predictive software) may decrease texters’ motivation to use abbreviated words. Future research could investigate whether such a trend is observable in students’ messages gathered over time.
References


Table 1

*Mean Ratings (and Standard Deviations) of the Appropriateness of Using Textisms*

<table>
<thead>
<tr>
<th></th>
<th>Australia</th>
<th>Canada</th>
<th>Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(n = 86)</td>
<td>(n = 150)</td>
<td>(n = 236)</td>
</tr>
<tr>
<td><strong>Text messages to</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A friend</td>
<td>4.5 (0.9)</td>
<td>4.6 (0.8)</td>
<td>4.5 (0.8)</td>
</tr>
<tr>
<td>A family member their own age</td>
<td>4.4 (1.0)</td>
<td>4.4 (0.9)</td>
<td>4.4 (0.9)</td>
</tr>
<tr>
<td>An older family member</td>
<td>3.0 (1.1)</td>
<td>2.8 (1.1)</td>
<td>2.9 (1.1)</td>
</tr>
<tr>
<td>Someone they don’t know</td>
<td>1.5 (0.7)</td>
<td>1.5 (0.7)</td>
<td>1.5 (0.7)</td>
</tr>
<tr>
<td><strong>Emails</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A friend</td>
<td>3.5 (1.3)</td>
<td>3.8 (1.3)</td>
<td>3.7 (1.3)</td>
</tr>
<tr>
<td>A family member their own age</td>
<td>3.5 (1.2)</td>
<td>3.7 (1.3)</td>
<td>3.7 (1.3)</td>
</tr>
<tr>
<td>An older family member</td>
<td>2.6 (1.2)</td>
<td>2.4 (1.1)</td>
<td>2.4 (1.1)</td>
</tr>
<tr>
<td>Someone they don’t know (as above)</td>
<td>1.3 (0.5)</td>
<td>1.2 (0.6)</td>
<td>1.2 (0.5)</td>
</tr>
<tr>
<td>A lecturer</td>
<td>1.2 (0.4)</td>
<td>1.1 (0.4)</td>
<td>1.1 (0.4)</td>
</tr>
<tr>
<td><strong>Instant Message (On-line Chat)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A friend</td>
<td>4.3 (1.0)</td>
<td>4.4 (0.9)</td>
<td>4.4 (1.0)</td>
</tr>
<tr>
<td>A family member their own age</td>
<td>4.2 (1.0)</td>
<td>4.3 (0.9)</td>
<td>4.3 (1.0)</td>
</tr>
<tr>
<td>A company’s website</td>
<td>1.5 (0.8)</td>
<td>1.3 (0.7)</td>
<td>1.4 (0.7)</td>
</tr>
<tr>
<td><strong>University work</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>While taking lecture notes</td>
<td>3.3 (1.4)</td>
<td>3.1 (1.4)</td>
<td>3.2 (1.4)</td>
</tr>
<tr>
<td>In a handwritten exam</td>
<td>1.1 (0.3)</td>
<td>1.1 (0.2)</td>
<td>1.1 (0.2)</td>
</tr>
<tr>
<td>In a typed assignment</td>
<td>1.0 (0.1)</td>
<td>1.0 (0.1)</td>
<td>1.0 (0.1)</td>
</tr>
<tr>
<td><strong>Overall (for all message types/audiences)</strong></td>
<td>2.7 (0.5)</td>
<td>2.7 (0.5)</td>
<td>2.7 (0.5)</td>
</tr>
</tbody>
</table>

*Note:* Likert Scale ratings from 1 = Not at all appropriate, to 5 = Entirely appropriate
Table 2

*Task Score Means (and Standard Deviations) for Australian and Canadian Students, and t-tests to Show Differences Between Countries.*

<table>
<thead>
<tr>
<th>Country</th>
<th>Australia (n = 86)</th>
<th>Canada (n = 150)</th>
<th>t-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nonword Reading (std score, Timed)</td>
<td>85.4 (6.9)</td>
<td>90.5 (10.9)</td>
<td>-4.35***</td>
</tr>
<tr>
<td>Nonword Reading (std score, Total)</td>
<td>104.1 (7.8)</td>
<td>115.4 (11.4)</td>
<td>-8.96***</td>
</tr>
<tr>
<td>WRAT Spelling (std score)</td>
<td>111.9 (11.5)</td>
<td>106.6 (9.4)</td>
<td>3.64***</td>
</tr>
<tr>
<td>Adult Reading History (inverted proportion score)</td>
<td>0.728 (0.146)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Word Attack (std score)</td>
<td>98.7 (7.5)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Word Identification (std score)</td>
<td>99.8 (7.6)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Spoonerisms (raw score, Accuracy)</td>
<td>22.2 (2.3)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Block Design (scaled score)</td>
<td>10.7 (2.8)</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

*Note: Canadian students only completed three tasks. *** p < .001*
Table 3
Correlations between Phone Ownership and Texting Attitudes and Behaviours for Australian and Canadian Students

<table>
<thead>
<tr>
<th></th>
<th>Phone Ownership</th>
<th>Sent Messages</th>
<th>Appropriateness Ratings (Overall)</th>
<th>Textism Use</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Canada:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nonword Reading (Timed)</td>
<td>-.153</td>
<td>.070</td>
<td>.046</td>
<td>.036</td>
</tr>
<tr>
<td>Nonword Reading (Total)</td>
<td>.013</td>
<td>-.031</td>
<td>.021</td>
<td>-.146</td>
</tr>
<tr>
<td>WRAT Spelling</td>
<td>-.161*</td>
<td>-.017</td>
<td>-.085</td>
<td>-.182*</td>
</tr>
<tr>
<td><strong>Australia:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nonword Reading (Timed)</td>
<td>.051</td>
<td>-.117</td>
<td>-.233*</td>
<td>-.228*</td>
</tr>
<tr>
<td>Nonword Reading (Total)</td>
<td>.031</td>
<td>-.085</td>
<td>-.142</td>
<td>-.123</td>
</tr>
<tr>
<td>WRAT Spelling</td>
<td>-.070</td>
<td>-.004</td>
<td>-.077</td>
<td>-.095</td>
</tr>
<tr>
<td>Word Attack</td>
<td>.227*</td>
<td>-.221*</td>
<td>.082</td>
<td>.061</td>
</tr>
<tr>
<td>Word Identification</td>
<td>.107</td>
<td>-.113</td>
<td>-.075</td>
<td>-.039</td>
</tr>
<tr>
<td>Spoonerisms (Accuracy)</td>
<td>-.201</td>
<td>.163</td>
<td>-.061</td>
<td>-.218</td>
</tr>
<tr>
<td>Adult Reading History</td>
<td>-.035</td>
<td>.108</td>
<td>-.313**</td>
<td>-.230*</td>
</tr>
<tr>
<td>Block Design</td>
<td>.075</td>
<td>.063</td>
<td>.096</td>
<td>.130</td>
</tr>
</tbody>
</table>

* p < .05, ** p < .01
Table 4

*Frequency of Textism Types Found in Students’ Formal Written Exams and Consent Emails*

<table>
<thead>
<tr>
<th></th>
<th>Exams</th>
<th>Emails</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(533,500 words)</td>
<td>(855 words)</td>
<td></td>
</tr>
<tr>
<td>Contraction</td>
<td>39</td>
<td>0</td>
<td><em>pls</em> for <em>please</em></td>
</tr>
<tr>
<td>Shortenings</td>
<td>13</td>
<td>2</td>
<td><em>recog</em> for <em>recognised</em></td>
</tr>
<tr>
<td>Omitted Apostrophes</td>
<td>26</td>
<td>0</td>
<td><em>Ive</em> for <em>I’ve</em></td>
</tr>
<tr>
<td>Single Homophones</td>
<td>9</td>
<td>0</td>
<td><em>2</em> for <em>to</em></td>
</tr>
<tr>
<td>Other Symbols</td>
<td>13</td>
<td>0</td>
<td><em>@</em> for <em>at</em></td>
</tr>
<tr>
<td>Expressive Symbols</td>
<td>11</td>
<td>7</td>
<td>☺, x</td>
</tr>
<tr>
<td>Extra Punc./Letters/Caps</td>
<td>2</td>
<td>9</td>
<td><em>...ahhh..., I Accept</em></td>
</tr>
<tr>
<td>Omitted Capitals</td>
<td>3</td>
<td>20</td>
<td><em>i</em> for <em>I</em></td>
</tr>
<tr>
<td>Other</td>
<td>0</td>
<td>3</td>
<td><em>goodluck</em> for <em>good luck</em></td>
</tr>
<tr>
<td>Overall</td>
<td>116</td>
<td>41</td>
<td></td>
</tr>
</tbody>
</table>