

Articles

Non-standard typography use over time: Signs of a lack of literacy or symbolic capital?

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New technologies have provoked a debate regarding the role of non-standard typography (e.g. !!!, :-). Some contend that new technologies undermine literacy while others state that new technologies provide new spaces for expressive writing and signal a form of symbolic capital. While previous research has primarily focused on age and gender to account for non-standard typography, we analyze socio-economic variables – education and income level and the use of NST over time. This study entertains these two competing hypotheses by analyzing non-standard typography in text message exchanges over three and a half months in an underprivileged population: people living in an urban public housing. Data reveal that, within this sample, use of NST increased over time and participants with higher education levels were more likely to use non-standard typography than less educated counterparts. Experience with texting was found to mediate this effect. Findings support a symbolic capital hypothesis of non-standard typography use, suggesting NST is not associated with stigmatizing lack of knowledge or literacy, but rather may signal the knowledge of discourse norms ascribed to texting in a community.*

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Introduction

Mobile texting, following its accidental birth via the first text message (Neil Papworth's "Merry Christmas"), was the start of what became a widely popular new form of interpersonal communication. This new form of interpersonal communication includes not only standard language expressions, but also non-standard typography (henceforth NST) (Herring & Zelenkauskaitė, 2009; Zelenkauskaitė & Herring, 2006) or 'textisms,' such as the use of texting slang and abbreviations (e.g. u for you; ppl for people) (Wood et al., 2014). Textisms are viewed as micro-structural linguistic features (Bieswanger, 2013) that were first studied in early contexts when mobile phones were expensive and exclusive (e.g. Ling et al., 2014). Now that most of the population in the United States has a cell phone (PewResearch, 2014), there is potential for studying texts and NST in texts in low-income, underprivileged communities. What are the implications of NST in these communities— is it just a form of *bad writing* or does it represent an emergent online discourse? Who uses NST and can it be predicted by individual level traits (e.g. age, education, etc.)? How do previous trends in texting compare to texting in this understudied context?

Given debates about the harms of texting (e.g. Cingel & Sundar, 2012; De Jonge & Kemp, 2012; Plester et al., 2008; Wood et al. 2014), our aim is to explore NST use considering education level and other sociodemographic variables of the texters in a naturalistic text sample from US public housing residents over a three-month period. The goal of this study is to better understand the role of demographic, social, and cultural factors that predict NST, and, as a result, begin to understand the functions and meanings associated with them in technology-mediated interpersonal communication in a previously unexplored sample. While previous studies demonstrate a link between NST and demographic variables such as gender (Ceccucci et al., 2013; Herring & Zelenkauskaitė, 2009; Ling et al., 2014; Lyddy et al., 2013), and age (e.g. Ling, 2005) or both of the variables (Ling et al., 2012), our goal is to assess demographic variables that have not previously been analyzed, including income, education, and experience by particularly focusing on underprivileged population. In doing so, we delve into debates about the role of socio-economic status and media competencies (Hargittai, & Shaw, 2013) as they are represented in NST use in this sample.

We do this by examining NST use over a three and a half month period in a sample of US adults living in public housing communities. We treat the public housing neighborhood as a physical and online community of practice as defined by Eckert (2006): "a community of practice is a collection of people who engage on an ongoing basis in some common endeavor." The physical component of the community stems from the geographic confines of public housing. In the United States public housing represents a low income segment of the population that qualifies them for government subsidized housing, an understudied population in texting research. The online component of the community is reflected by the reliance on group-based texting feature that allowed all the participants to receive all messages as well as send messages sent by any member of a community.

Public housing communities have a sociodemographic composition that is poorer, more often Latino and Black, and more varied in age and education, than the rest of the US population. Given the range of educational backgrounds in particular, we are able to pose a novel test of competing hypotheses about the role of NST as an indicator of a lack of literacy, or, in contrast, as a signal of texting expertise. We refer to the former as the *literacy hypothesis* and the latter as the *symbolic capital hypothesis*. Moreover, we were interested in the development of community norms as indicated by the adoption of NST use over time. That is, if NST use is a form of *symbolic capital*, used to signal in-group status or familiarity within a given community's social norms, then it is useful to assess NST over time as an indicator of changing community norms within text groups (as suggested by Wellman & Gulia, 1999; Zelenkauskaite & Massa, 2012).

Early approaches to understanding non-standard typography

Research investigating NST use has typically focused on individual traits to understand patterns and trends, such as age and gender. Age particularly has been articulated in texting analysis, because of initial commercial targeting of texting towards youth (for example by offering reduced cost for texting compared to voice-talk in European cellphone providers especially) as an affordable and efficient way to keep in touch (Grinter & Eldridge, 2001). This new and growing ability to quickly type on a tiny phone keyboard eventually gave birth to the notion of the "thumb-generation" (Grinter & Eldridge, 2001). As a result, numerous studies have focused on younger adults' texting practices (e.g. Igarashi et al., 2005; Ling & Baron, 2007; Thompson & Cupples, 2008), finding that overall younger people text more often than older adults and that texting is central to youth culture (Goggin & Crawford, 2011; Ling, 2010).

Gender has been another variable used to account for differences in text messaging, including NST (e.g. Acision, 2012; Bernicot et al., 2012; Herring & Zelenkauskaite, 2009; Holtgraves, 2011; Ling, 2005). Studies have found that females write longer messages than males (Acision, 2012; Herring & Zelenkauskaite, 2009), and that females and teenagers are the most prolific texters, where females use more NST in the form of abbreviations and non-standard punctuation (Ling, 2005). Despite this foundation of research on NST production, little work has explored socio-economic factors associated with NST production, such as income and education. At the same time, criticisms have been levied against texting as a tool for encouraging poor literacy (see Grace et al., 2015; Thurlow, 2006 for discussion). Given that, it may be beneficial to examine texting within a group that has more variable education experiences and income (as income is often associated with education). Our aim is to broaden this body of work by examining these socio-economic factors as they relate to NST use.

A lack of literacy or symbolic capital?

We consider a two-sided debate regarding NST as it applies to socio-economic variables. The first approach, which we refer to as the *literacy perspective*, is based on reactions to NST as indicative of impoverished literacy (e.g. Crystal, 2008; De Jonge & Kamp, 2012; Wood et al. 2014). From this perspective, NST is highlighted for its

violation of written grammatical rules (Cingel & Sundar, 2012), and is seen as contributing to the reduced ability to use proper grammar (Powell & Dixon, 2011). The second approach is the *symbolic capital* perspective, which considers NST to be a function of emerging social norms or symbolic currency within a community of users (Herring & Zelenkauskaite, 2009). We examine each in turn.

Literacy hypothesis. The *literacy* approach to NST use represents the drive to guard the rules of writing currently threatened by emerging new technology and mediated text-based writing norms. Discourse on the escalation of these threats, exemplified by the prevalence of NST in formal academic settings (Barker, 2007), has proliferated in popular media and thus affected public discourse surrounding it, including the ‘moral panic’ associated with new media use (Grace et al., 2015; Thurlow, 2006). In support of these claims, researchers have found that frequent text-messaging, as well as greater use of textisms and more varied textisms, are associated with poorer performance on spelling, reading, and nonword reading assessments (De Jonge & Kemp, 2012). Similarly, naturalistic textism use has been found to correlate negatively with reading and spelling (Drouin & Driver, 2014), and negatively with spelling (but not reading) in Canadian students and negatively with timed non-word reading (but not spelling) in Australian students (Grace et al., 2015). Although some studies have also found null or even positive relationships between texting and literacy (e.g. Ouellette & Michaud, 2016), evidence that texting is sometimes associated with poor literacy reflects lingering concerns that NST undermines the ability to use proper grammar. This may be particularly important to assess within a low-income community where educational resources are often compromised.

Symbolic capital hypothesis. The initial accounts of NST believed that NST was part of a new universal linguistic tool that functioned across multiple platforms and languages (Crystal, 2001). Such a view proposed that online environments had triggered the birth of a new “Netspeak” (Crystal, 2008). This perspective was bolstered by the fact that NST is not unique to texting, and has been observed in previously trendy text-based online communities such as Internet Relay Chat (Cherny, 1999; Paolillo, 2001; Paolillo & Zelenkauskaite, 2013; Werry, 1996; Zelenkauskaite & Herring, 2006); instant messaging (Ling & Baron, 2007); and blogs (Vaisman, 2011; 2014). However, the use of NST has not been found to be homogeneous across demographic groups (e.g. differences found by gender noted above; Herring & Zelenkauskaite, 2009; Zelenkauskaite & Herring, 2006), suggesting that Netspeak, is not universal but rather is composed of a complicated array of communicative practices that vary by community.

But what is the purpose of these various communicative practices? If NST is not indicative of poor literacy, perhaps it serves socio-emotional functions within groups. Functional accounts of NST argue that it was centered around people (e.g. using abbreviations such as ‘u’ indicating ‘you’, ‘bf’ boyfriend, ‘gf’ girlfriend, and combinations of them). This finding was interpreted as representing relational activity between users. Other abbreviation categories included *amusement*, such as expressing emotions through ‘lol’, ‘hahah’ or similar (Beasley, 2009). In other words, Beasley (2009) concludes that text messaging content often represents new modes of emotional expression. Moreover, users of this community are often not concerned with

grammatical correctness and these preferences are often (micro)culture-specific (Beasley, 2009). Insertions, such as letter repetitions, may enrich computer-mediated communication when auditory cues are absent (Herring, 2012) and can also convey unique socio-emotional context (Darics, 2013; Eija-Liisa, 2003). That is, texts may reflect the nuances, trends, and priorities shared between people that content alone cannot convey.

From this perspective, researchers have posited that NST is part of a creative writing process (Eija-Liisa, 2003; Frehner, 2008; North, 2007). As Carrington (2005) contends, “[NST] takes its place as one of a range of texts, literacies and social practices (p.171).” With this claim, Carrington (2005) identifies the use of NST as intentional and purposeful rather than a reflection of the inability to write. Moreover, NST is also efficient (Bieswanger, 2007). Given that technologically-mediated spaces require typing of each of the character via a cumbersome keyboard, “correct spelling and grammar are viewed as inefficient and impractical” (Beasley, 2009, p. 89). In sum, instead of denoting poor literacy, NST may serve as an intentional and efficient social function by linking people within a shared cultural linguistic time and space.

Social norms and NST use

Another way to articulate this perspective is to recognize that NST may serve as a form of symbolic capital practiced by a specific group. The symbolic capital view of NST supposes that users utilize certain non-standard typography strategically or unintentionally to convey symbolic information. As conceptualized by Bourdieu (1991), symbolic capital assumes that communicative practices, being based on intricate social interactions, are not value free. Interlocutors' intentionality is not only to achieve mutual understanding, but also through language to engage in a pursuit of symbolic profit, be it cultural capital, or a transmission of specific values that could be interpreted by the interlocutor (Bourdieu, 1991). Another way of conceptualizing this is that discursive strategies reinforcing power are sometimes used to reinforce differences in status – e.g. the discourse of elitism (Thurlow & Jaworski, 2006). For example, by analyzing frequent flier programs, Thurlow and Jaworski (2006) deconstructed specific discourse structures that airline companies use to reinforce the distinction between different types of customers (e.g. First class vs. coach customers). Such status gets constructed through the processes of “symbolic differentiation” (Rampton, 2003). It is thus possible that non-standard typography serves the same function, as a signal of social status or symbolic capital within a group that is delimited by the limits of texting. According to the symbolic capital hypothesis of NST use, then, NST serves as a symbolic currency which signals status within a community, be it through playful writing or expression of intimacy (Herring & Zelenkauskaitė, 2009).

Hypotheses

Prior work on NST use has explored its relationship to demographic markers such as gender and age, but has not explored its relationship to socio-economic demographic markers, such as education and income. We move this body of literature forward in two

ways. First, by providing descriptives of NST within an understudied sample: individuals of low socio-economic status. Second, we test two alternative theoretical frameworks – the *literacy* and *symbolic capital frameworks*—to account for the use of non-standard typography as it is associated with variability in socio-economic status within this sample. As a proxy for literacy, we assess the relationship between education and NST.

First, in support of the literacy hypothesis that suggests that NST use is a signal of poor grammar skills or literacy training, we would expect to find that:

H1a: Participants with a **lower** education background are expected to use more non-typographic elements.

In contrast, if NST is a tool for enhancing symbolic capital within a group rather than acting as an indicator of impoverished literacy, we would then expect to find that NST use is positively associated with education. We thus propose the following counter hypothesis:

H1b: Participants with a **higher** education background are expected to use more non-typographic elements.

Finally, we pose two hypotheses contingent on evidence of H1b to explore the mechanisms of that relationship. If NST use is associated with increased education, and is therefore indicative of social capital, we would expect that NST use would be more directly tied to experience with texting and should actually increase over time as community norms are established. We therefore posit:

H2: User experience with texting will mediate the positive relationship between education and NST use.

H3: NST will increase over time.

Method

Sample and participants

There were n=35 active participants in the study who sent 1,531 messages within subgroups over three and a half months of message exchanges. When each participant would send messages, they would be available to every member of the sub-group by using a group-text function provided by the software. Such interactions allowed for a multi-participant chat experience for each participant even if a participant's cellphone did not aggregate group texts as a default function. That is, each message would be displayed on everyone's cellphone number as any other text message with the name of the texter preceding the message (e.g. Marco: [content]).

The study consisted of four large texting groups of 8, 8, 9, and 10 active participants. One of these groups contained 3 sub-groups of 2, 4, and 4 active participants. All

members of each group lived in the same housing development – i.e. in New York City public housing developments.

Table 1: Sample: demographic data

Demographic data	
Age	Average: 44; range: 22-62
Median income	<\$5,000 a year
Gender	40% male; 60% Female
Racial composition	14 Latinos; 11 Black/African Americans; 4 interracial individuals; 6 participants did not report race

All participants spoke English and 70% also spoke a second language (primarily Spanish). All participants were paid \$30 for their first contact and \$30 at study completion for participation in the three and a half month group texting study.

Procedure

Participants were recruited from two public housing developments in New York City— one in northern Manhattan and one in the Bronx. Over an initial two-month period, the second author and a research assistant spent 2-3 hours on five separate occasions posting flyers throughout each development (10-15 hours total). Flyers advertising a study about “neighborhood social interactions” were posted within building entryways, in stairwells, and throughout each housing development property. This method has been chosen because of the goal of the study to focus on the underprivileged populations. Public housing in the United States usually is based on government subsidies to the population that is in need. This method of recruitment was the best suited, given the focus of the study population, compared to other sampling methodologies used in social science research, e.g. methods online recruitment or focus on undergraduate students’ population did not suit the focus of this study.

After participants were recruited, an initial information session was conducted at libraries across the street from each housing development. At that session participants were told that they were participating in a study on “how people might use group-texting to communicate with neighbors.” The second author orally described the consent form in full and all participants were told briefly about the benefits of having strong social connections for neighborhood and individual well-being. Participants were then told that they would be given a shared texting number that they could use to text all other members of the group as desired.

Each participant sent and received messages to and from each other group member. Messages were sent and received through a given participant's personal mobile phone. The dispatch of the messages took place through a GroupMe.com, a free web-based software system. Each group member received a shared group phone number from GroupMe.com. Yet, text messages were displayed through an individual phone and did not differ from any other text message. The advantage of GroupMe.com service was that it allowed for group message exchanges—the service that is otherwise unavailable for flip phones that some of our participants had. The study aimed at maintaining a naturalistic message exchange setting, therefore, participants could use their own phones which would not alter their texting experience because of a different device. All texts sent to that number were then re-sent to all group members via the GroupMe.com platform. This allowed people to participate in group-text exchanges even if they had a flip phone that did not have a built-in group-texting function. Participants signed up for the texting group using personal cell phone numbers and a pseudonym of their choice. Members of the group were not able to see individual private phone numbers and were not asked to use identifying information, though many participants eventually revealed first names by choice. These data were taken from a larger field experiment examining neighborhood cohesion and health in public housing that examined the effects of group text on neighborhood cohesion and individual health (Gonzales, 2016); this is a subset of participants from that sample.

Measures

Demographic measures

Independent variables in the multi-level regression models included: age, gender, race, employment, education, language, and income. All variables were self-reported by participants. Age was a continuous variable. Gender was a dichotomous variable. Race was a categorical variable with Black/African Americans (1), Latinos (2), interracial participants (3), and participants of unknown race (4). Annual income was treated as a continuous measure of income range from 0-9 where 0 = < \$5,000 a year and 9=\$50,000-\$59,000 a year. Education was also treated as a continuous measure where 0 = Less than high school and 5 = Four-year degree.

Non-standard typography

Non-standard typography in texts was measured along four different dimensions including: non-standard uses of words, use of emoticons, deleted spaces, and non-standard punctuation marks. A composite measure of non-standard typography calculated for each person across all texts was measured by summing all four non-standard typography dimensions (see Table 2). Due to the right skew of these variables, they were then transformed using a square root function. These transformations help to normalize the distribution of each variable, making them more suitable for use in multi-level regression modeling.

Coding categories were adopted from previous coding schemes (e.g. Hård af Segerstad, 2005). These included content dimensions, such as changes in words, and structural categories such as changes in punctuation and spaces. Finally, we used emoticons as a category to account for technologically-embedded constraints related to emotion expression. Non-standard words include examples such as gm for good morning, gd for good day, ppls for please; ooops for oops; 2morrow for tomorrow; lil for little; thikin for thinking; nite for night, 4 meaning for, as in example 1:

Example 1: Opps is Manuela again..I meant to say same time 2morrow...:-) good night.

More conventionally standardized abbreviations such as *Fri* for Friday, *ok*, & for and, *thru* for through, *km/h* such as kilometers per hour; *min* for minute were not included. Emoticons were included as graphical emoticons, such as in Example 1, :-). Emoticons were included if they had 'eyes'. Omitted spaces as a category is used in texting because of the space limits of a given message as in Example 1 where spaces are omitted after .. and .. Extra punctuation marks included repeated punctuation marks as such as multiple dots or extra characters such as *.

Users largely engaged in interpersonal interactions dealing with mundane every-day content that include the following:

Example 2 (read in reverse order):

9:26pm Fabian: Yes????

7:04pm James: It was Fabian

3:19pm Fabian: @ James ...Hope it was worthy....lol....

3:09pm James: LOL shady

3:02pm Flora: Lmaoooo it gives you wings they say

3:01pm James: Both. I need a Redbull! LOL

2:57pm Flora: Lol tired or taking a nap

2:57pm James: I went out last night & I'm still "recovering".

A subsample (152 messages or 10%) was coded by two coders to calculate interrater reliability where each text was a unit of analysis. After the first set of training, each coding category achieved a satisfactory, more than 80% of interrater reliability agreement based on Krippendorff Alpha. Specifically, *non-standard words* resulted in an acceptable (Lombard et al., 2002) 81% of agreement; *emoticons* – 100% of agreement; *no space* – 91%; *extra punctuation* – 94%. Once coding was completed, post-coding interrater reliability was calculated again. Post-coding interrater reliability was calculated for an additional 10% of the data (152 messages). Again, post-hoc coding resulted in a satisfactory above 80% interrater reliability level based on Krippendorff's Alpha for the overall categories: *non-standard words* resulted in 82% of agreement; *emoticons* – 100% of agreement; *no space* – 96%; *extra punctuation* – 95%.

Texting Experience

Texting experience was assessed with a single item asking participants, “How often do you use your cellphone to send text messages?” (1 = Never; 5 = Very Often; $M = 3.97$, $SD = 1.36$).

Texting over time

Texting over time analysis was conducted by comparing the first month of texting April (816 messages) with the rest of two months (715 messages). This sorting has provided insight on the initial practices and norms and their evolution during a more extended period of time – the rest of two months. Moreover, this sorting has generated similar number of messages useful for comparison.

Analytic approach

To test H1 and H2, multi-level modeling using STATA 11 was used to account for interdependence within the four texting groups (Rabe-Hesketh & Skrondal, 2008). It is possible that linguistic style matching would lead to group-level effects on non-standard typography, in that the use of linguistic categories by one person within a mobile phone-mediated group may influence the use of that same category by others within the group. There are no theoretically meaningful distinctions between groups, thus we are not conceptually interested in these differences, but rather need to account for them when testing for individual level fixed-effects. To do this, we assess the intra-class correlation associated with the four primary texting group-level effects on NST production. Analysis of the intra-class correlation ($ICC = .24$) suggests some groups used more NST than others and supports the use of mixed models to account for group-level effects on NST use. The intra-class correlation was also assessed for the three subgroups, though there was no effect of these subgroups on NST use ($ICC = 0$). For this reason, only the higher order texting groups were accounted for in the subsequent analyses.

NST use over time

To assess texting over time we have conducted a multilevel regression model on NST use.

Results

Descriptive statistics

Of the 35 participants in the study, over 79% of participants used at least one type of NST (Table 2). Seven users did not use non-standard typography at all, whereas 41% used only one type of them, and one user used all dimensions (NST in words, punctuation, spaces, and as emoticons) of non-standard typography.

Table 2: Number of types of non-standard typography used within a given message

Number of NST types	Messages	Percent	Participants	Percent
None	855	55.7	7	20.6
One type	452	29.5	14	41.2
Two types	172	11.2	5	14.7
Three types	54	3.5	7	20.6
Four types	1	0.1	1	2.9
Total	1,534	100	34	100.0

Previous research has primarily examined NST use as a function of gender and age (see Ling, 2010; Ling et al., 2014). In keeping with this research we performed similar descriptive analyses: males overall wrote more messages (781 messages, $M = 61.77$) compared to females (490 messages, $M = 27.62$) and the difference is statistically significant $F(1, 394.845) = 10109.538, p = .034$, but females wrote longer messages than males $F(1, 394.845) = 1022.4, p = .000$. Males' message length was equal to $M = 7.3$ words, while females' message length was equal to $M = 9.14$ words. However, we found no effect of age or gender on frequency of overall NST or NST by individual category.

In a descriptive analysis, we split the sample by median age and compared differences between those groups. In our sample, the group below 44 years old wrote fewer messages ($n = 681, M = 42.5$), but used more words ($n = 5,982, M = 373.8$), compared to the above 44 years old counterparts ($n = 767, M = 42.6$) who used fewer words total ($n = 5,357, M = 297.6$), however, the results are not statistically significantly different either for number of messages $F(1, 34) = .020, p = .998$ or for length of the messages $F(1, 34) = 49266.472, p = .640$.

Number of Types of NST per message

Table 2 shows that majority of the messages did not include non-standard typography use (55.7%) and the most frequently used was one type of non-standard typography, with only one message using all four types of non-standard typography.

NST and message length

Given that the length of the message is fixed (maximum of 160 characters including spaces), we tested for a correlation between message length and number of non-standard typography. Results show positive correlation between the number of words in a given message and non-standard typography for NST words category ($r(1280) = .067, p = .016$); NST deleted spaces ($r(1280) = .079, p = .005$); NST extra punctuation ($r(1280) = .073, p = .$

009). No such correlation was found to be statistically significant in the use of emoticons.

Hypothesis testing

To test the competing hypotheses that NST production signaled either poor literacy skills (H1a) or symbolic capital (H1b) within the group, a multi-level model was conducted that examined differences in the overall use of non-standard typography by education level. In support of the *symbolic capital hypothesis* (H1b), findings reveal that education was positively associated with overall non-standard typography use, after accounting for other demographic covariates in the model (Table 3, Model 1). That is, participants with greater education were more likely to use non-standard typography than participants with less education. There were no other demographic effects on overall non-standard typography use.

Given this result, we also explored a measure of experience with texting as a possible mediator of demographic differences (H2). Indeed, participants that were more experienced at sending text messages were also more likely to use non-standard typography (Table 3, Model 2). Moreover, including this variable in the model mediates the effect of education on non-standard typography use. This finding further supports the notion that NST is a tool to convey symbolic capital by signaling familiarity and competence associated with texting.

Table 3: Predictors of overall non-standard typography use in texts after accounting for group-level random effects

	Model 1 Demographics	Model 2 Mediator
Gender (F)	0.27 (1.63)	-2.57 (1.91)
Age	-.11 (.09)	-.10 (.10)
Education	1.57 (.65)*	1.20 (.77)
Second Language Speaker	.70 (2.01)	-.73 (2.40)
Employed	.70 (2.54)	-.59 (2.56)
Income	.31 (.34)	.21 (.44)
Race		
Latino	-1.74 (2.28)	-2.59 (2.27)
Interracial	-3.51 (2.53)	-1.40 (2.61)
Non-reported	5.59 (3.20)	2.71 (3.11)
Experience Texting		1.71(.78)*

Note: Regression coefficients followed by standard error in parentheses. *p ≤ .05.

Finally, to determine whether there is a statistically significant increase in NST over time as an indicator of evolving group norms and added support for NST as symbolic capital, we have conducted a multilevel regression model on NST use per message over time using a split-sample dichotomous variable for time and accounting for group effects. Descriptive results show that the overall number of messages over time has decreased. Yet, the amount of NST increased over time (see Table 4).

Table 4: Use of NST over time

	N messages	NST	NST per message
April	816	806	0.987745
May/June/July	715	1,015	1.41958

The test reveals a statistically significant result between April, and the rest of the months (May, June, and July) indicating an increase over time ($b = .42, p < .001$).

Discussion

Previous research has largely examined non-standard typography (NST) use as it varies by gender or age (Ling et al., 2014). In this study, we focused on understanding differences as predicted by socio-economic variables in an American public housing community that provides us with access to the participants with lower socioeconomic status. This allowed us to extend previous research to new domains of descriptive analysis and, in doing so, explore two alternative theoretical premises explaining why people use non-standard typography in modern texting communication: the *literacy hypothesis* and the *symbolic capital hypothesis*.

The findings underscore the idea that, first, NST production is not a function of impoverished education and, second, that NST reflects socially constructed trends associated with texting; that is, it is likely seen as trendy and even an expected norm that develops once a person acquires a more nuanced understanding of text-based communication (see Frehner, 2008). Just as face-to-face conversation often incorporates slang to indicate cultural capital within a region, community, or even small group, NST is adopted by those that use text message to signal competence with and exposure to a given texting community, in this case small text groups within New York City public housing. In this case, we suggest that NST is an in-group communicative norm rather than deviation from standard writing form.

NST as symbolic capital further gets reinforced by the longitudinal analysis. The longer users interact, the more NST they use. The increased use of NST over time suggests that this community members' do not regard NST as stigmatizing. Instead, users may use NST features to capitalize on Bourdieu's (2011) notion of symbolic capital or what Darics (2013) calls *nonverbal signaling*. Previous research suggests that users shift their writing styles depending on types of interlocutors (e.g. Baron & Ling, 2011). Future

studies could explore the use of NST by lower socio-economic status populations when interacting with various interlocutors – for example, their peers vs. out group members -- to identify whether users adjust their writing style to the context (or addressee) to overcome potential stigmatization and stereotypes.

Descriptive findings

We also included descriptive analyses, given a history of research on gender, age, and NST use. In support of previous findings, females did use longer messages, compared to males. This finding of females is consistent with a previous study of multi-participant texting in Italian TV (Herring & Zelenkauskaitė, 2009) or NST use by Israeli girl bloggers (Vaisman, 2011, 2014). This finding, similar to texting in Italian TV was interpreted as females being better at packing more content within a limited text message space (Zelenkauskaitė & Herring, 2008b). This type of non-standard use of ‘non-content’ by females indicates that the strategies indeed are less functional but more so based on visual marking in text-based interaction (Vaisman, 2011, 2014), arguably a type of symbolic capital within this community.

Limitations and future research

As in all cases, this study is subject to limitations. Our corpus has been geared towards an underprivileged population with varying educational and texting experiences that is best suited to test our hypotheses. Therefore, recruitment of these participants through the neighborhood project has yielded a rather small participant size. Also, most previous research has not studied group-text, which has in the past been unconventional, but is increasingly common in digital communication. Studying texting in a group-texting context highlights the community-building potential of texting and can be appropriately analyzed using multi-level modeling to account for the idiosyncratic effect of small group norms on texting. Indeed, the inter-group correlation further underscores the fact that groups were acting like small communities.

Finally, the results show that majority of the messages did not contain non-standard features (around 50%). This finding is consistent with the previous research, suggesting that NST features in texting are not found in all texts not only in mobile texting (Hård af Segerstad, 2005; Thurlow & Brown, 2003) but also previously in Instant Messaging (Baron, 2004; Tagliamonte & Denis, 2008).

Further studies should investigate the relationship of the intentionality and perceptions of NST in the messages from the perspective of users. Some of the users did not use NST at all. Are these the people who did not want to be part of this community? Are they averse to adhere to this community’s norms? These questions remain unanswered by this study. Future studies should address individual differences in NST, especially considering non-users of NST.

Conclusion

This study investigates the role of NST as a signal of greater or lesser education and texting experience and its use over time. We employ two competing theoretical perspectives. The first position—the *literacy hypothesis*—considers that the use of NST in new technologies undermines literacy and is based on a mixed body of previous literature (Grace et al., 2015; Herring & Zelenkauskaitė, 2009). The second perspective treats new technologies, and texting in particular, as context in which texting has symbolic meaning and serves as a signal of symbolic capital within a group or community. These two competing hypotheses were tested by analyzing mobile texting messages of people living in urban public housing in the United States. Findings support a *symbolic capital hypothesis* of NST use, suggesting that participants use NST to signal status and expertise within their digital community rather than reflect a lack of knowledge or literacy, as suggested by some previous research (Darics, 2013; Frehner, 2008; Shortis, 2007; Bernicot et al., 2012). Moreover, members of this community increased using NST over time, despite an overall drop in texts, further supporting a symbolic capital explanation of NST use.

As the first study to examine texting between members of a public housing development, we are able to examine socio-economic factors, like income and education that vary more widely than they would in a typical student sample. These findings suggest that users shape technology based on community norms. While new technologies often provoke public uncertainties about changing communication practice (Thurlow, 2006; Shortis, 2007, Grace et al., 2015), systematic analysis demonstrates that new technologies are not necessarily threatening previously-established modes of communication. Instead, NST provide niches for user expression, especially in contexts where other social cues are absent, which is crucial to successful conversation. As Crystal (2008) suggests, "a strong personal, creative spirit imbues Netspeak, as an emerging variety. Internet users are continually searching for vocabulary to describe their experiences, to capture the character of the electronic world, and to overcome the communicative limitations of its technology and contributes to various fabrics of linguistic expression pertinent to specific groups and their needs. (p. 67)"

Broader implications of this study relate not only to a continuing interest in mobile texting research (e.g. Dürscheid, & Stark, 2011; Rivière & Licoppe, 2005; Tagg, 2009) but also to the design of online communities and the ways in which user-centric needs could be fulfilled not only based on the design of such online platforms (Zelenkauskaitė & Massa, 2012), but also through a range of language codes for individual expression.

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