

New and Changing Social Evaluations of All-lowercase and Exclamation Points

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1 Introduction

Language is full of variation, which not only patterns along social dimensions but is also socially evaluated by language users (e.g. Lambert et al. 1960, Campbell-Kibler 2007, Labov et al. 2011). These social judgements are not exclusive to face-to-face communication; people also make social evaluations when communicating in the digital space (e.g. Houghton, Upadhyay, and Klin 2018; Heath 2021). In this study, we examine social evaluations in Computer-Mediated Communication (CMC), defined as “text-based human-human interaction mediated by networked computers or mobile telephony” (Herring 2007:1). We specifically focus on perceptions of language used in text messages.

Computer-Mediated Communication uniquely combines features of written and spoken language (Murray 1991, 2000, Yates and Orlikowski 1993). As Georgakopoulou (2011) notes:

“...CMC is recognized as combining qualities which are typically associated with face-to-face interactions, e.g. immediacy and informality of style, transience of message, reduced planning and editing, rapid (or immediate) feedback with properties of written language, e.g. lack of visual and paralinguistic cues, physical absence of the addressee, and written mode of delivery. CMC is thus uniquely positioned in the intersection of written and oral discourse, displaying some of the linguistic features that have been associated with certain forms of written language and others that are more prototypical of spoken language” (p. 1).

CMC is therefore rife with variable linguistic features that may be used to index a wide range of social meanings. The present study investigates the social evaluations of two linguistic variables that are unique to CMC: capitalization and punctuation. We compare two types of capitalization patterns (sentences typed entirely in lowercase, and sentences with standard capitalization at the beginning of a sentence/for proper nouns) and three exclamation point patterns (no punctuation, 1, or 2 exclamation points at the end of the sentence).

Previous research shows that aspects of capitalization and punctuation may have particular prosodic interpretations, which can contribute to their social evaluations (Heath 2021). However, such patterns are not so evident for all-lowercase and multiple exclamation points. Heath (2021) finds that, when participants read aloud tweets with different orthographic patterns, all-lowercase does not actually differ from standard capitalization in intensity, pitch, or syllable duration, nor do two exclamation points significantly differ from one on these dimensions (though clear prosodic distinctions were found for other typographic patterns like all caps). This leaves open the question of whether and how all-lowercase is interpreted differently than standard caps, and how two exclamation points may be interpreted differently from one. To further probe the social meanings associated with all lowercase and exclamation points, we conducted a matched guise experiment investigating social perceptions of various combinations of these two variables when used in SMS text messages. We specifically ask how these features interact and whether their evaluation changes depending on the perceived gender of the texter.

1.2 All Lowercase

Texting in all lowercase has been the topic of a number of recent popular articles with titles like

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“Why Gen Z Made Capitalization Irrelevant” (Merrilees 2020), “the surprising reasons we turn off autocaps and embrace the lowercase” (Joho 2019), and “The Rise of the ‘Lowercase Girl’” (Grady 2020). Grady (2020) attributes the popularity of all-lowercase to its recent use in popular song/album titles such as Ariana Grande’s “thank u, next” and Taylor Swift’s *folklore*, and argues that the rising use of all-lowercase may in part be a push-back against some of the negative associations with all caps: “In a world where Trump capitalizes words like a sci-fi villain, lowercase might well be shorthand for authenticity and vulnerability.” Some have suggested that all-lowercase may also be perceived as deadpan, sarcastic, monotone (McCulloch 2019), or deliberately passive aggressive (Heath 2021), which run counter to popular notions of lowercase as “authentic.” Yet Heath (2021) also finds that some participants described all lowercase as “lowkey” or involving lower emotional arousal, which may be more compatible with associations with authenticity and vulnerability.

These interpretations may also differ across generations. The use of all lowercase has changed with the introduction of auto-capitalization for smartphones in the mid 2000s. Prior to this, all lowercase in text messaging may have been perceived as “lazy,” “careless,” or “lacking effort.” With the introduction of autocapitalization, however, all-lowercase suddenly began requiring *more* effort, with many users of all-lowercase reporting purposefully turning off the auto-capitalization function on their smartphones (McCulloch 2019, Heath 2021). This shift from less effortful to purposeful use of lowercase may coincide with shifts in the social meanings indexed by all-lowercase. We therefore predict that lowercase would be more marked among younger participants, which would yield stronger differentiation in social evaluations of lowercase vs. standard caps.

We also predict that social meanings of lowercase may extend beyond the associations with sarcasm/passive aggression previously noted. In a pilot survey of 80 respondents’ associations with lowercase, we found that 20% mentioned associations with femininity, regardless of texter gender, and sexuality, particularly indexing gay or bisexual identities. The role of femininity aligns with Grady’s (2020) observation of all-lowercase being used more by female musical artists. However, associations with gender, and particularly sexuality, have not been noted in previous work that we are aware of. A key goal of the present study is therefore to follow up on this novel finding in a controlled experiment.

1.3 Exclamation Points

The use of exclamation points in CMC has seen even more coverage in popular media than all-lowercase, and in many cases these articles explicitly identify exclamation points as a gendered behavior, often decrying women’s “overuse” of this particular type of punctuation¹. Zappavigna (2012) suggests that exclamations are used simply to intensify either positive or negative emotion. Waseleski (2006:1) finds that exclamation points are used more frequently among women but pushes back against prior claims that women use exclamation points as “markers of excitability,” not only because it negatively implies “instability and emotional randomness”, but also because does not align with the evidence. Waseleski instead finds that exclamation points are more frequently used to index friendliness than emotional arousal. McCulloch (2019) and Heath (2021) also suggest that single exclamation points are more indicative of friendliness and warmth rather than excitement.

The distinction between single and multiple exclamation points is not as well understood. McCulloch (2019), for instance, suggests that multiple exclamation points are used to index sincere excitement (a meaning that may have been lost for single-exclamation points, perhaps because of its frequent use), while a single exclamation point can actually have the opposite meaning, indicating sarcasm or insincerity.

In the present study, we compare single exclamation points to double exclamation points to tease apart potential distinctions in their meaning. We compare ! and !! to a no-punctuation condition, rather than a period, since there is some work suggesting that sentence-final periods in text messages are perceived more negatively than neutral (Houghton, Upadhyay, and Klin 2018).

¹Though note that there are nearly as many articles written in recent years reclaiming the exclamation point and pushing back against gendered expectations of exclamation-point usage.

2 Methods

We designed a Matched Guise Task (Lambert et al. 1960) eliciting evaluations of text message “guises” that differed in their use of all-lowercase (vs. standard capitalization) and exclamation points (*none, !, !!*). The task was administered online through Qualtrics and was distributed via the University of Pennsylvania subject pool, as well as on social media. Any participants who indicated that they grew up outside of the U.S. or Canada were excluded, as were participants who completed less than 20% of the experiment. This left us with 208 participants for analysis.

At the start of the online experiment, participants were asked for demographic information (gender, sexual orientation, education level, occupation, race, ethnicity, hometown, age, and their familiarity with the internet/technology). Familiarity with the internet was measured on a numeric scale from 0 (basic) to 100 (advanced), hometown and occupation were open-ended, and the remaining questions were given as multiple choice. Following the demographic survey, participants were presented one by one (each on a separate page) with a series of 12 text messages, modeled after an iPhone text conversation screen, as shown in Figure 1. All participants evaluated the same 12 unique messages, but the guise in which each message was presented was counterbalanced across participants. The order in which the 12 messages were presented was randomized. Participants saw each of the 12 messages with a unique combination of *Caps* (all lowercase or standard capitalization), *Exclamation* (*none, !, !!*), and *Texter Gender* (man or woman), shown in Table 1.



Figure 1: Example of the mock iPhone screen participants were presented as stimuli.

	All Lowercase	Standard Capitalization
0	that restaurant you recommended in philly was so good	That restaurant you recommended in Philly was so good
!	that restaurant you recommended in philly was so good!	That restaurant you recommended in Philly was so good!
!!	that restaurant you recommended in philly was so good!!	That restaurant you recommended in Philly was so good!!

Table 1: Six possible linguistic variant combinations. Each participant saw all six stimulus types twice, once paired with a male texter and another with a female texter, yielding 12 total guise variations. Each participant saw each of the 12 guise variations one, each with a unique message.

The 12 messages each consisted of a single sentence, the content of which was designed to be

as neutral as possible with regard to the texter’s age and other social characteristics. Each message contained two potential instances of capitalization: the first word of the sentence, and a proper noun within it. There was one possible instance for exclamation: either 0, 1, or 2 exclamation points at the end of the sentence. Finally, Texter Gender was manipulated with a silhouette of a man or woman at the top of the phone screen, as well as the label “Man/Woman #X” (Figure 1). The 12 different texter IDs (Man 1-6/Woman 1-6) reinforced for participants the idea that each message they evaluated was from a different person. Each participant saw each of the 12 unique messages once, each paired with a unique Caps x Exclamation x Texter Gender combination.

For each of the 12 messages, participants were asked to evaluate the hypothetical texter on a series of 100-point numeric scales:

- Feminine – Masculine
- Shy, Gentle, Introverted – Outgoing, Bold, Extroverted
- Laidback, Nonchalant, Casual – Uptight, Dramatic, Intentional
- Not Attractive – Very Attractive
- Does not care about image at all – Cares a lot about image
- Edgy, Cool, Trendy – Old Fashioned, Out of Date, Unpopular
- Never Seen a Computer – Chronically Online
- Really Short – Really Tall
- Very Unlikely to be Queer – Very Likely to be Queer
- Age (select a number 0-100)

The following instructions were provided: “We are interested in learning about what types of things you can tell about a person, just based on their text messages. You will see 12 individual text messages, each from a different person. Please tell us what characteristics you associate with each texter by answering the questions below.”

The scales we chose to include in our study were selected carefully based on previous research and an initial pilot survey we conducted on Instagram. For the pilot survey, the first three authors posted the question “What type of person do you associate with all lowercase/caps off?” on their Instagram stories, eliciting open-ended responses from their followers. From the 80 responses we received, we were able to gauge which traits would likely be relevant for evaluation. In particular 25% of respondents mentioned femininity or gay/lesbian/bi/queer identity, so we included both perceived femininity/masculinity and sexual orientation as characteristics to be rated in the matched guise task. Additionally, several respondents mentioned traits like “nonchalant” and “casual”, as well as “shy,” “quiet”, and “submissive”, while some mentioned “caring about image.” Several also mentioned that lowercase was associated with being younger and “chronically online.” Exclamation points have also been shown to be associated with women, which we may pick up on with the “femininity” measure, as well as friendliness, which may be assessed with our measure of Extroversion. The rating scales measuring perceived attractiveness and height were intended as fillers.

After evaluating the 12 text messages, participants were asked explicitly for open-ended responses on what they believed the experiment was testing, the social characteristics they associate with texters’ use of each variable, as well as how they themselves use punctuation and capitalization when texting. Linear mixed effects regression models were fit to the ratings of each social characteristic, which tested the interactions between *Caps/TexterGender/Exclamation* as well as participant age, and retained them when they improved model fit. By-participant and by-sentence intercepts were also included for all models, and *Caps*, *Exclamation*, and *TexterGender* were also included as random slopes when they significantly improved model fit. Model comparison was performed using the *step()* function in the *LmerTest()* package in R (Kuznetsova et al. 2017), which performs backward elimination of random effects (using likelihood ratio tests) followed by fixed effects (using F-tests, following Satterthwaite’s approximation).

3 Results

3.1 Perceptions of All-Lowercase

As Figure 2 shows, participants' ratings for lowercase guises (compared to standard caps guises) indicated that all-lowercase is associated with texters who are trendier (Est. = 4.58, $p=0.0009$), and more frequently online (Est. = -5.27, $p < 0.0001$). Lowercase guises are consistently rated as younger (mean = 27.4 years) than standard caps guises (mean = 30.8 years) (Est. = 3.31, $p < 0.0001$). We suggest that these traits are linked to one another in their associations with all-lowercase, since younger texters are also likely to be perceived as trendier and more frequently online. We also observe significant effects where lowercase is perceived as more feminine (Est. = 1.74, $p = 0.024$), Queer (Est. = -2.44, $p = 0.003$), and laidback (Est. = 2.42, $p = 0.014$).

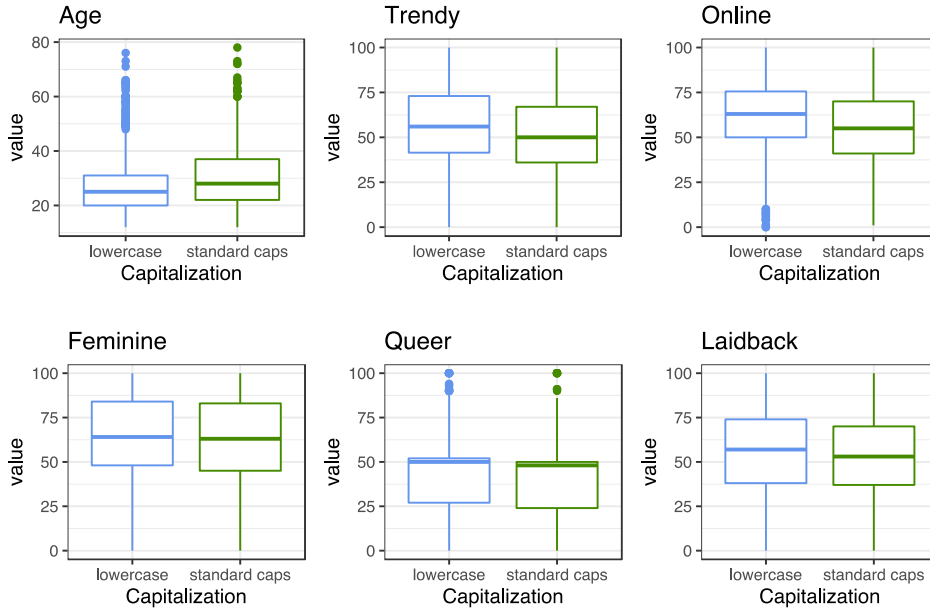


Figure 2: Traits exhibiting significant rating differences for lowercase and standard caps guises.

Many of these quantitative observations align with the open-ended responses gathered at the end of our Matched Guise task. In fact, 22 out of the 154 participants who completed the open-ended questions at the end of the study (14%) mentioned associations of lowercase with femininity, while only one mentioned associations with masculinity (0.6%). Associations with gay or queer identities were mentioned less frequently, only 5 times, despite being mentioned by 10% of our pilot survey respondents. Associations with age were very apparent in the open-ended responses: “young” or “youth” were mentioned 73 times (47%), while association with older texters were only mentioned 5 times. Associations with being frequently online were also mentioned 19 times.

In addition to confirming our rating data, the open-ended responses also shed light on some of the nuances of the social meanings associated with all lowercase. For one, we observe a tension between lowercase users being perceived as both “laid-back” and “trying too hard.” While the Cares about Image rating did not significantly differ across the lowercase and standard caps guises, lowercase was rated as significantly Trendier than standard caps, and many participants mentioned in their open-ended responses that they viewed lowercase texting as “trying hard” to be trendy or “caring” about other’s opinions. Some of this discrepancy reflects different views of all-lowercase across participants. For instance, one participant describes lowercase as “people who care more about appearance” while another writes nearly the exact opposite: “doesn’t care about their image, lazy.” Some participants, especially older participants, viewed lowercase as “lazy” or not caring about grammar, while others view lowercase as a specific stylistic choice, particularly due to the added effort typing in all-lowercase required due to autocapitalization that comes standard on most smartphones. We even observe both insights from a single participant who evaluates all lowercase as lazy while simultaneously acknowledging that it actually requires more work than using standard caps: “Laziness and lack of knowledge of grammar, especially when virtually ALL text methods automatically capitalize the first letter of a sentence.” Another participant similarly addresses this

opposition: “Texters who use lowercase may be perceived as lacking knowledge or having enough knowledge to intentionally subvert it.” Joho (2019) similarly picks up on this seeming contradiction in a *Mashable* article on turning off autocaps: “lowercase is meant to signify low investment, going out of your way to judiciously turn off autocaps on your phone and computer betrays an inconsistent level of devotion from anti-autocappers.”

We argue here that an emerging social meaning of all lowercase combines these perceptions that seem to be at odds with one another. Specifically, we suggest that lowercase seems to reflect “trying hard to look like you’re not trying too hard,” or as one participant in our pilot survey noted: it indexes “very carefully calibrated laidbackness, coolness, subtly.” Open-ended responses seem to confirm this observation. Others described lowercase as:

- “Trying to act like they don’t care, but they actually care a lot.”
- “trying to sound casual”
- “It is intentional they are trying to seem calm”
- “Purposely turned off autocorrect to be more casual”

3.2 Perceptions of Exclamation Points

The more exclamation points used, the more Extroverted, Image-Oriented, and Uptight (compared to laidback) a texter was perceived. For these three traits, exclamation point usage exhibited an incremental pattern, such that 1 exclamation point was rated as more Extroverted (Est. = -11.46, $p < 0.00001$), Image-Oriented (Est. = -5.95, $p = 0.0002$), and Uptight (Est. = -6.94, $p = 0.001$) than no exclamation points, and 2 exclamation points were rated as even more Extroverted (Est. = 3.906, $p = 0.0001$), Image-Oriented (Est. = 3.51, $p = 0.024$), and Laidback (Est. = 2.81, $p = 0.015$) than one exclamation point. This pattern is shown in Figure 4.

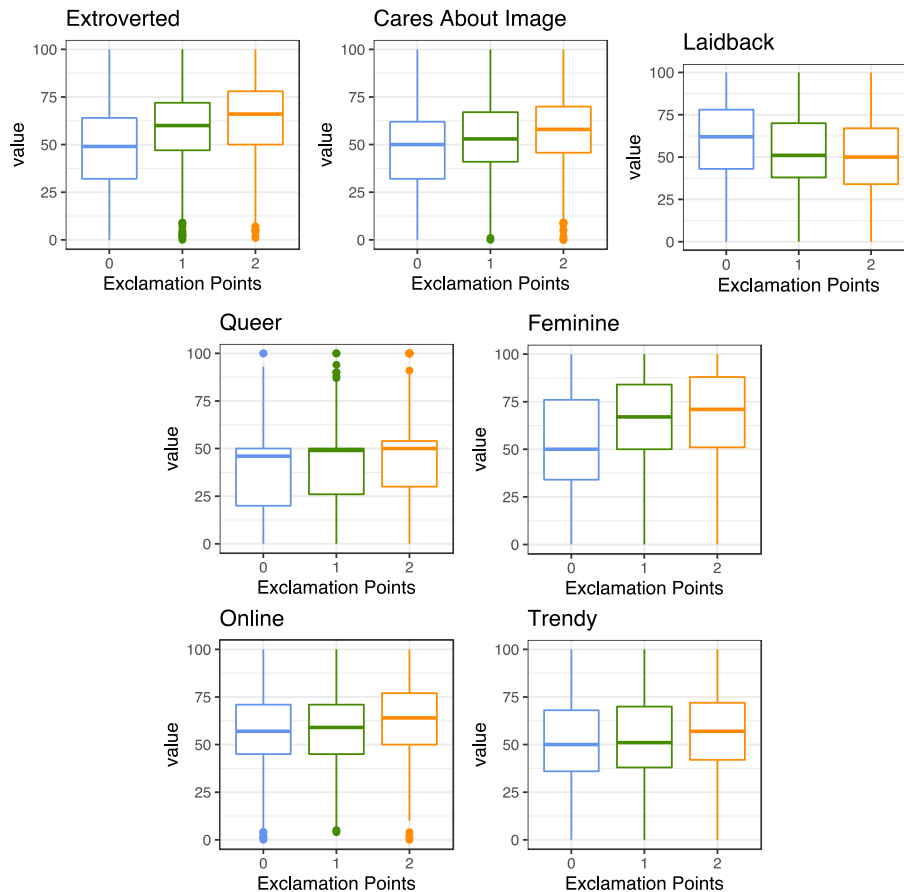


Figure 4: Traits exhibiting significant rating differences across capitalization guises.

Exclamation points are also rated more Feminine and Queerer in a similar incremental pattern, such that 1 exclamation point is rated as more Feminine (Est. = 10.7, $p < 0.00001$) and Queer (Est. = -2.77, $p = 0.002$) than no exclamation points, and 2 exclamation points were rated as even more Feminine (Est. = -3.02, $p = 0.049$) and Queer (Est. = 2.97, $p = 0.0008$) than one. Some of these findings align with previous work suggesting the exclamation points are associated with women, friendliness, and emotional arousal. We further show that it is not just exclamation point usage at all but the *amount of exclamation points used* that contributes to evaluations of traits like femininity and extraversion. Associations of exclamation point use with queer identity is a novel finding. Additionally, seemingly more calculated and purposeful characteristics like “Image Oriented” and “Uptight” seem to run counter to previous suggestions that exclamation points indicate emotional arousal, which may involve less control. This falls in line with Waseleski (2006)’s argument that exclamation point usage should *not* be taken to indicate “instability and emotional randomness.” Instead, we suggest exclamation point usage conveys careful and deliberative cultivation of image.

Finally, we observe that 2 exclamation points have additional associations that are not associated with single-exclamation point usage. For instance, texters who used 1 exclamation point were rated as equally Online as those who used none (Est. = -0.81, $p = 0.36$), but using 2 exclamation points was perceived as more Online than using 1 (Est. = 4.46, $p < 0.00001$). The same is true for Trendy ratings. One exclamation point was not perceived as significantly trendier than no exclamation points (Est. = 1.26, $p = 0.22$), but two exclamation points were perceived as trendier than one (Est. = -3.34, $p = 0.0009$). These traits go hand-in-hand, as texters who are more frequently online and more embedded in internet culture are likely earlier adopters of trends spread via online mediums. Interestingly, it is using two exclamation points specifically that carries with it social meanings of trendiness and being frequently online.

3.3 Interactions between Linguistic Variables and Texter Gender

Next, we investigated whether capitalization and exclamation point usage contributed to social evaluations independently, or whether these two linguistic variables interacted with one another. We further examined whether perceived texter gender, as indicated with a silhouette and “Man #X” / “Woman #X” label at the top of the screen, influenced the perception of these two variables.

The statistical modeling reveals a single significant interaction between Capitalization and Exclamation Points: for Trendy ratings, as shown in Figure 5. The effect of capitalization on perceived trendiness disappears when 2 exclamation points are also present in the message (Est. = -0.47, $p = 0.57$). With 0 and 1 exclamation points, standard caps is perceived as less trendy than all lowercase. However, a message with standard caps gets a boost in perceived trendiness when it occurs with 2 exclamation points. The interaction between caps and exclamation points is significant for 0 compared to 2 exclamation points (Est. = 6.61, $p = 0.0006$) and 1 compared to 2 exclamation points (Est. = 4.3, $p = 0.026$), but not for 0 exclamation points compared to 1 (-1.16, $p = 0.23$).

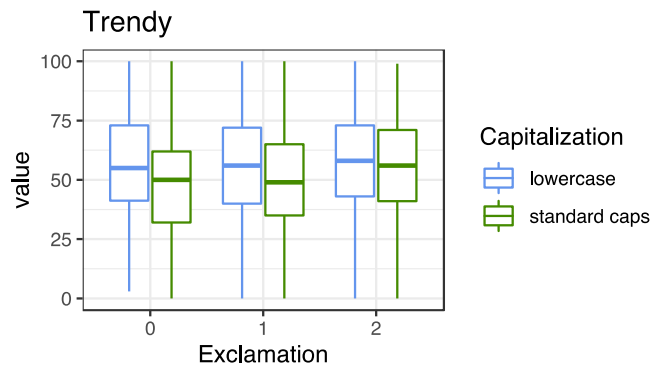


Figure 5: Interaction between exclamation points and capitalization for trendiness ratings.

In general, Texter Gender did not appear to influence ratings much. Perhaps unsurprisingly, Femininity ratings *did* significantly differ based on texter Gender, such that the male silhouette was rated as less feminine than the female silhouette (Est. = 21.84, $p < 0.00001$). The male silhouette was also rated as less concerned with image (Est. = -1.64, $p = 0.034$), and Taller (even though this item was intended as a filler item) (Est. = 5.85, $p < 0.00001$). Perhaps surprisingly, the only trait for which Texter Gender interacted with one of the linguistic variables was for Queer ratings. Exclamation point usage was rated as more likely to be Queer, but this effect was greater in both instances for the male silhouette, as shown in Figure 6. The modeling revealed a significant interaction between Texter Gender and 0 (compared to 1) exclamation points (Est. = - 4.31, $p = 0.014$) and 2 (compared to 1) exclamation points (Est.= 4.22, $p = 0.017$).

For the most part, lowercase and exclamation point usage appears to contribute to social meaning independently of one another, and, despite participants' responding to Texter Gender in the predicted ways (for example, in Femininity ratings), the Texter Gender manipulation had relatively little influence on the way participants interpreted lowercase or exclamation points in text messages.

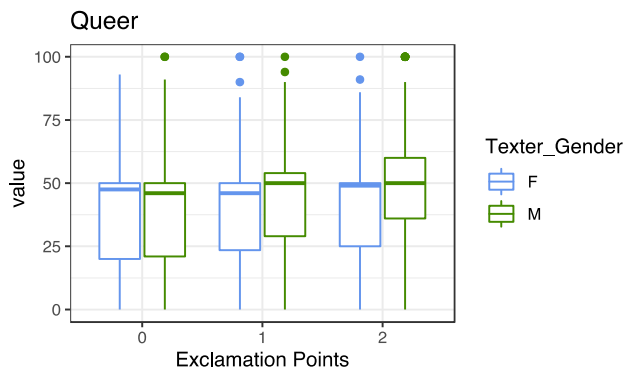


Figure 6: Interaction between exclamation points and perceived texter gender for Queer ratings.

3.4 Interactions with Participant Age

Participants' ages ranged from 14-83, and in general, we observed that younger participants were more influenced by the guise manipulations in their ratings. We illustrate this informally with absolute differences between capitalization guises (left) and 0 vs. 2 exclamation point guises (right).

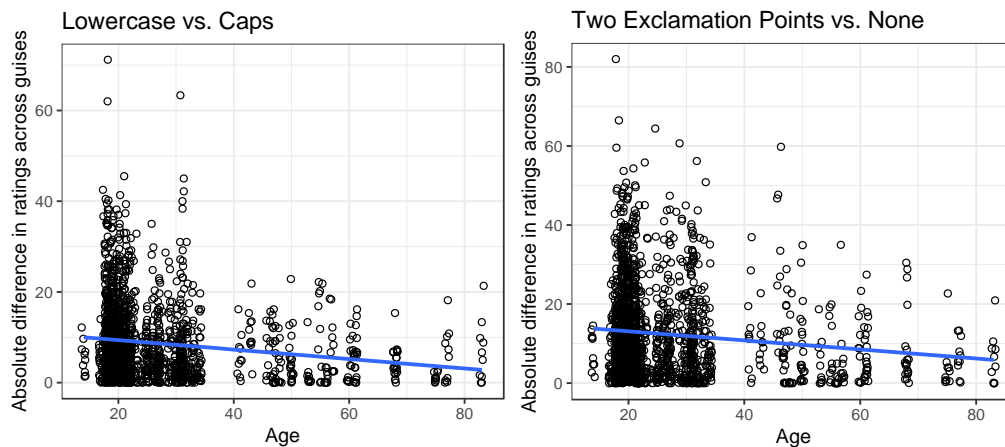


Figure 7: Absolute difference between capitalization guises (left) and exclamation guises (right) is greater for younger participants.

The statistical modeling indicates which rating responses significantly differ across age groups. To more clearly illustrate this distinction, we split the data into two categories, those who are a part

of generation Z and those who are older. We grouped participants who were 25 and under at the time of data collection in Fall 2022 as “Gen Z” and the remaining participants as “Millennials & Up.” As Figure 8 shows, older participants do not appear to differ in their trendiness ratings across the lowercase and standard caps guises. Rather, the effect wherein lowercase is perceived as Trendier is driven by younger (i.e., Gen Z) participants. (Est. = -2.06, $p = 0.036$). We also observe a qualitative difference in the way different generations perceive lowercase vs. standard caps. Specifically, Gen Z participants tend to perceive all lowercase as *more feminine*, while participants who are millennials and older tend to perceive all lowercase as *less feminine* (Est. = -2.44, $p = 0.001$), perhaps indicating changes in the social meaning of all lowercase. It is worth pointing out that older participants’ perceptions align with a general sociolinguistic trend of men being associated with using more non-standard variants. On the other hand, younger participants’ perceptions suggest new and emerging social meaning where lowercase is used as a stylistic move to convey a particular social identity.

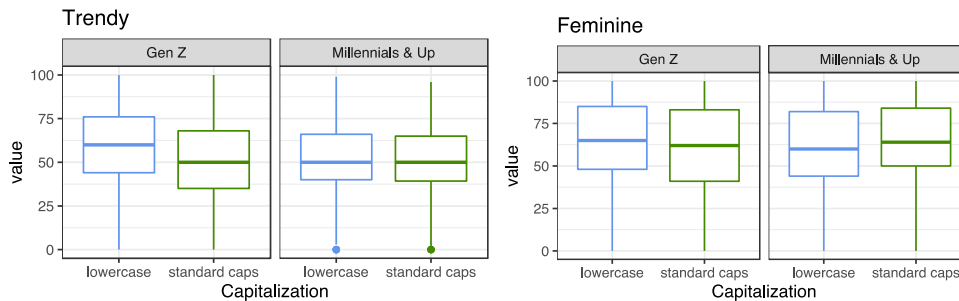


Figure 8: The influence of lowercase vs. standard caps guise on Trendy (left) and Feminine (right) ratings differed across generations.

4 Conclusion

This study has added to a growing body of knowledge showing that people socially evaluated linguistic variables in text messaging. Several of our observations align clearly with previous work on the social meanings associated with all lowercase and exclamation points. All lowercase is perceived as younger, trendier, and more frequently online than using standard caps, and texts with exclamation points are interpreted as more feminine and extroverted, aligning with previous work suggesting that exclamation point usage is associated with women and friendliness (Waseleski 2006).

In addition to affirming these established meanings, our research has also shed light on new social meanings that have not previously been cited in work on lowercase and exclamation points. For one, we observe that both exclamation points and lowercase usage are associated with queer identity. This was one of the prevalent and surprising descriptions of all lowercase observed in our pilot survey, and the rating scale data for all-lowercase appears to support this observation. We did not predict that exclamation points would have associations with queerness, but it was observed that the more exclamation points used, the higher the texter was rated on the Queer scale, primarily for the male texter. On the other hand, all-lowercase appears to indicate a queer identity regardless of texter gender, which aligns with participants’ open-ended responses frequently interpreting all lowercase as “queer.” We also propose an emerging social meaning associated with all-lowercase, in which lowercase indexes “trying hard to appear to be *not* trying hard” or “carefully-calculated casualness.”

We also suggest that the social meanings associated with these features appear to be changing, at least for all-lowercase. In general, all-lowercase appears to be more marked among younger participants, perhaps due to recent auto-capitalization features on smartphones, making all-lowercase a stylistic choice rather than a feature used due to typing ease or lack of experience with texting. Indeed, this is supported by open-ended responses, in which older participants are more likely to perceive all-lowercase as “lazy” or “careless.” Meanwhile, it is younger participants who drive the higher Trendy ratings for all-lowercase guises.

We suggest that future research may investigate how these changing social meanings associated with variable linguistic features used in Computer-Mediated Communication may impact cross-generational communication, as well as whether texters proactively change the way they text when communicating with different people. We focused on participant age due to the scope of the paper, but there are also interesting questions to be asked about how participant gender, sexual orientation, and familiarity with technology may influence their interpretations of these variables. Finally, while we have examined communication via texting specifically, we also suggest that a fruitful area for future research lies in comparing how social meanings of the same linguistic resources may vary across different platforms and mediums.

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