Quantifying Hyperbole: Explicit Estimates of Exaggerated Utterances

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ABSTRACT

Purpose. People are exposed to exaggeration in some form every day. They must comprehend and interpret the hyperbole, or conversational overstatement, to which they are exposed. Research suggests that people cognitively correct hyperbolic utterances using information retrieved from memory to generate estimates of what

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really occurred in the situation or event and the sampling of memory traces during the interpretation of utterances is influenced by the form and contextual elements of the utterance.

Methods. In three experiments, participants were presented with texts containing information described in a literal or hyperbolic manner (e.g., “I caught a fish” vs. “I caught a fish the size of a whale”) and asked for explicit estimates of value (e.g., number, size, duration). The form (Experiment 1), context (Experiment 2), and speaker (Experiment 3) of an utterance were all predicted to influence the estimates that people generated.

Results. It was found that the presence of hyperbole, as well as information about the context and speaker, had a reliable impact on participants’ quantitative estimates.

Conclusions. The form, context, and speaker of an utterance all appear to influence the estimates that people generated. Such results are consistent with the notion that people cognitively correct hyperbolic utterances using information retrieved from memory to generate estimates about what really happens in the situation or event. Future research should be aimed at designing experiments that can investigate these memory traces more directly.

Key words: hyperbole, exaggeration, context, speaker characteristics.

Introduction

People are bombarded by exaggeration every day of their lives. For example, they encounter sensationalized news stories on TV, radio, in print, and on the internet. The use of such hyperbole, often in combination with other forms of figurative speech like proverb and metaphor, can contribute to a dramatic increase in the emotionalization of public debates, such as that of the Brexit argument (Musolff, 2021) and COVID-19 (Štulajterova, 2021). Short-term consequences of the successful use of such hyperbole include impacts on referendums and election campaigns, while the long-term consequences can include an increase in “polarization and radicalization of public discourse” (Musolff, 2021). Indeed, hyperbole is frequently employed as both a persuasive political strategy (Abbas, 2019) and in response to accusations of wrongdoing, including in the political area (see Colston & Carreno, 2020, for examples).

When directly interacting with others, people are both the producers and recipients of exaggerated speech. For example, it is not uncommon to hear speakers refer to “millions of people” in line at a busy grocery
store or to suggest that they have been “waiting forever” for the release of a popular new movie. Indeed, when people were asked to keep track of what, when, and how they retold events from their lives to others, 46% of the stories recorded over a four-week period were labeled as distorted, with 82% of those distortions containing embellishments (Marsh & Tversky, 2004). People typically reported exaggerating to entertain others, and retellings for the purpose of entertaining were less tied to the original events than were retellings for the purpose of simply informing others (Marsh & Tversky, 2004).

Even in situations in which accuracy of information is of the utmost importance, people still exaggerate. For example, because the circumstances surrounding a crime are often unique, emotional, and consequential, these types of events naturally lend themselves to being shared with others and to being described in an exaggerated way (e.g., “The perpetrator was literally covered in tattoos” or “the victim was stabbed a thousand times!”). Furthermore, exaggeration in a legal context is not only limited to witnesses providing exaggerated crime descriptions in front of one another; eyewitnesses may make exaggerated claims in the courtroom (e.g., “[The weather] became very nasty. It rained extremely hard <...> obviously, it was dark, it was night, visibility was pretty much zero”) and lawyers may use exaggeration to make their point about the details of a case (e.g., “So it’s fair that you’re pretty familiar with almost every inch of that property, isn’t it?” or “Pretty much every square inch of the property was searched”) (State of Wisconsin v. Steven A. Avery, 2005).

Because exaggeration plays such a significant role in people’s lives, it is important to understand the consequences when people are exposed to it. Such an understanding could provide insight into how audiences process major world events that have been sensationalized by authority figures or the media. In the context of eyewitness testimony, it is important to understand the effects of witness exposure to exaggerated statements to determine how such information may influence the witness’s memory for the original crime details. Finally, in a legal context, being able to appreciate the consequences of exposure to exaggerated statements made by a witness or lawyer can lead to a better understanding of how such information can influence juror decision-making.
Hyperbole: A Distinct Case of Figurative Language

Historically, theories on rhetoric have viewed the figurative devices of metaphor, irony, and hyperbole as a single class of rhetorical strategies called “tropes,” because they share a variety of qualities, most importantly being that they all have literal meanings that are different from their intended meanings (Burgers, Renardel de Lavalette & Steen, 2018). According to Steen (2011), however, this changed in the 1970s with the “cognitive turn” in linguistics. Specifically, one consequence of this change was that research on figurative language began to focus on each trope in isolation and much of contemporary literature on hyperbole has followed suit (Burgers et al., 2018).

Carston and Wearing (2014), for example, examined the similarities and differences between metaphors and hyperboles and concluded that a distinction must be drawn between the two. Wilson (2017) argued that hyperbole and a range of other phenomena should not be viewed in the same scope as irony. Aljadaan (2018) similarly suggested that although hyperbole shares similarities with metaphor and irony, there are important differences between hyperbole and these tropes. Furthermore, it is emphasized that hyperbole shares certain features with generalization, but because there are still differences between the two, it is argued that hyperbole is its own distinct form of figurative language (Aljadaan, 2018). Barnden (2018) even went so far as to identify a special class of hyperbole called “reflexive hyperbole,” and from there differentiated between various forms of reflexive hyperbole.

Hyperbole is clearly its own distinct form of figurative language, should be studied separately from other, related tropes (e.g., metaphor, irony), and, as a result, is deserving of its own definition. Cano Mora (2006) has provided what is likely the most thorough, extensive, and multidimensional definition of hyperbole, which includes no fewer than nine qualifications for an utterance to be labeled hyperbolic. Such qualifications include hyperbole being a subjective act, one that produces contrast with reality, and the specification that the type of contrast created by hyperbole is one of magnitude (see Cano Mora, 2006, for the full list). Ultimately, the multipage definition boils down to a single sentence: “hyperbole is a figure whereby the quantity or quality of an objective fact is, whether purposely or inadvertently, subjectively inflated or deflated in varying degrees but always to excess in an utterance which listeners do not normally interpret literally or...
perceive as a lie” (Cano Mora, 2006: 108). Indeed, consistent with this definition, most definitions of hyperbole have emphasized the qualities of extremity and exaggeration (e.g., Cano Mora, 2009; Carston & Wearing, 2015; Norrick, 2004; Tian, Sridhar & Peng, 2021) and extreme case formulations (Colston, 2007; but see Christodoulidou, 2009, 2011). Claridge (2010) provided a useful preliminary definition of hyperbole by emphasizing the distinction between literal and hyperbolic expressions. Literal expressions “agree[s] with the extralinguistic facts in the given context” whereas hyperbolic expressions are said to “exceed[s] the (credible) limits of fact in the given context” (Claridge, 2010: 5).

Despite the fact that hyperbole should be examined separately from related tropes such as metaphor and irony, interpretations of isolated examples of hyperbolic utterances extracted from their contexts are also problematic. Claridge (2010) states that the role of contextual knowledge is necessary for identifying cases of hyperbole and it is our assertion that knowledge of speaker characteristics is likely also an important factor in the interpretation of such utterances.

The goals of this study were thus twofold: We examined interpretations of hyperbolic utterances first in isolation, to establish that hyperbolic statements do in fact lead to higher quantitative estimates than their literal counterparts. Next, we demonstrated that hyperbolic statements do not exist in a vacuum and it is not possible to accurately study the explicit quantitative interpretations of hyperbolic utterances without also considering both the context and the speaker. The ultimate goal of this paper, then, was to demonstrate that quantitative estimates of hyperbolic utterances are significantly influenced by the contexts in which they appear and by the characteristics of the speaker who uttered them.

Hyperbole Should Influence Explicit Estimates

When someone says, “I’ve heard that song at least ten thousand times today,” listeners will likely not reject this statement as a lie. Still, it is equally unlikely that they will truly believe the speaker heard the song at least ten thousand times in a single day. Upon exposure to a hyperbolic characterization of a real event, then, how do people arrive at an understanding of what really occurred?

The related literature on the interpretation of irony can provide insight into this question. It has been suggested that just as when
someone hears an ironic utterance, a listener who is exposed to hyperbole may “cognitively correct” the statement. For example, with irony, when someone hears the statement, “What a lovely day!” on a rainy day, he or she “corrects” the statement to actually mean, “What a horrible day!” (McCarthy & Carter, 2004). If this correct process also occurs during the interpretation of hyperbole, the difference between the utterance and the final interpretation would not be one of kind (as with irony) but of degree or magnitude. The response to hyperbole may be to upscale or downscale the utterance to reflect reality more closely (Fogelin, 1998: 13). For example, perhaps the listener who hears, “I’ve been waiting an eternity for you to pick me up from work” corrects the utterance to something like, “[the speaker] has been waiting a long time,” or, in this case, perhaps the listener simply down scales “an eternity” and makes a more specific estimate of duration, like “[the speaker] has been waiting for about 45 minutes”.

For the time being, let’s suppose that, rather than immediately rejecting a hyperbolic statement as false or accepting it at face value, people adjust the statement so the information more readily accords with reality. If people cognitively correct hyperbolic utterances as they do with ironic utterances, interpretations of hyperbole should be constrained by pre-existing notions of what constitutes a “realistic” or “physically possible” event. For example, people are unlikely to imagine that someone really did “a million loads of laundry” in a single week. Instead, they are presumably able to use their knowledge of the real world (e.g., how long a week lasts and how long it takes to do a load of laundry) to generate an interpretation of what could have realistically taken place.

Norm theory (e.g., Kahneman & Miller, 1986) provides a potential explanation of the processes involved in understanding a hyperbolic utterance so that the final interpretation of what really happened takes physical plausibility into account. For example, the listener who hears “I waited in line forever for a Coke at 7-Eleven” may retrieve a sample of memory traces related to the event (e.g., personal experiences of waiting in line at 7-Eleven) and construct an estimate of how long he or she has waited in line in the past. Furthermore, given that the description of the event is hyperbolic in nature, the listener may adjust upward or downward from the estimate he or she has constructed, reflecting the fact that, while the speaker certainly did not wait in line
“forever,” the wait was likely longer than would typically be expected. Still, the final estimate of the length of time the speaker actually waited in line will likely be grounded in physical possibility, as determined through the sample of memory traces recruited by the retrieval cue (i.e., the utterance). The final interpretation of the hyperbolic utterance is likely a result of either sampling memory traces to construct an estimate of the “typical” amount of some quantity or magnitude and adjusting upward or downward from there to take the hyperbole into account or is simply the result of sampling memory traces in a biased fashion from the beginning (i.e., retrieving only those memories of waiting in line at 7-Eleven for longer than expected).

**Experiment 1**

The purpose of Experiment 1 was to examine the impact of hyperbole on the explicit estimates people make. Participants read scenarios that included literal (e.g., “I waited in line at 7-Eleven”) or hyperbolic (e.g., “I waited in line forever at 7-Eleven”) versions of the same utterances made by story characters. For the purposes of the present paper, we define and discuss hyperbole in a manner consistent with the very thorough description provided by Cano Mora (2006). When designing materials for our experiments, however, we relied primarily on the distinction between literal and hyperbolic expressions provided by Claridge (2010). This distinction naturally lent itself to the creation of literal and corresponding hyperbolic versions of the same utterance. After reading each scenario, participants provided an estimate of the quantity mentioned in the scenarios (e.g., the amount of time, in minutes, the character waited in line at the store). It was predicted that hyperbolic utterances would lead to significantly higher estimates than literal versions of the same utterances.

**Method**

**Participants**

Thirty-seven undergraduate students from a large public university participated in this experiment for course credit. They were all native speakers of English.
Materials
Forty scenario and question pairs were written. Each scenario consisted of one to two opening lines (e.g., “Kayla was complaining to her husband, Dylan, that he never did anything romantic for her”) followed by an utterance made by one of the characters. There was a literal version (e.g., “Kayla said, ‘My boss got roses from her husband’”) and hyperbolic version (e.g., “Kayla said, ‘My boss got a truckload of roses from her husband’”) of each utterance. The question that followed each scenario asked for an estimate of the quantity (i.e., number) or magnitude (e.g., size, duration) referenced in the scenario (e.g., “How many individual flowers do you think Kayla’s boss got?”). Immediately following each question, participants were reminded how they should respond to the question (i.e., “Please express your answer as a whole number”). The order of the scenarios was randomized, and they were distributed four scenarios to a page in an eleven-page packet. The first page of the packet provided instructions, which included a sample scenario and question.

Design
This experiment used a within-subjects design. The independent variable was utterance type (literal vs. hyperbolic) and the dependent variable was mean estimate in response to each scenario. Two questionnaire packets were used. Each packet had twenty hyperbolic utterances and twenty literal utterances. The distribution of the utterances was counterbalanced so that participants read all forty scenarios, but only one version of each utterance. The order of the pages in each packet was randomized.

Procedure
Data was collected in groups ranging from two to eleven participants. After obtaining consent, an experimenter randomly distributed one of the two versions of the packets to each participant. Twenty participants received version 1 and seventeen participants received version 2. The experimenter then read the instructions aloud to the participants and asked if there were any questions before telling the participants that they could proceed to the first page. Upon completion of the experiment, participants were provided with a debriefing form that explained the purpose of the study.
Results and Discussion

Data were separated by utterance type and responses that were three standard deviations above or below the mean estimate for each scenario were removed. For this experiment, eleven responses (representing 1.49% of the data) for the hyperbolic utterances and ten responses (representing 1.35% of the data) for the literal utterances were removed.

Table 1 presents sample results for five of the scenarios. It was predicted that hyperbolic utterances would lead to significantly higher estimates than literal versions of the same utterances. To assess the reliability of the overall findings, all of our response data was first converted to z-scores to account for differences in measurement units (e.g., degrees Fahrenheit, number of individual flowers, duration in minutes).

<table>
<thead>
<tr>
<th>Literal Utterance</th>
<th>Hyperbolic Utterance</th>
<th>Mean (SD)</th>
<th>Mean (SD)</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Craig said, “It’s so hot in Arizona.”</td>
<td>Craig said, “It’s so hot in Arizona. I’ve never been so hot in my entire life.”</td>
<td>94.53 (10.30)</td>
<td>101.60 (6.5)</td>
<td>Degrees Fahrenheit</td>
</tr>
<tr>
<td>Kayla said, “My boss got roses from her husband.”</td>
<td>Kayla said, “My boss got a truckload of roses from her husband.”</td>
<td>11.82 (4.79)</td>
<td>27.74 (15.14)</td>
<td>Individual flowers</td>
</tr>
<tr>
<td>Adam said, “I waited in line at 7-Eleven.”</td>
<td>Adam said, “I waited in line forever at 7-Eleven.”</td>
<td>8.29 (4.24)</td>
<td>12.84 (7.29)</td>
<td>Minutes</td>
</tr>
<tr>
<td>Eddie said, “I need to read research articles for my psychology class.”</td>
<td>Eddie said, “I need to read an endless pile of research articles for my psychology class.”</td>
<td>4.47 (2.24)</td>
<td>8.20 (4.18)</td>
<td>Research articles</td>
</tr>
<tr>
<td>Andrew said, “My cheeseburger has pickles on it.”</td>
<td>Andrew said, “My cheeseburger is literally covered in pickles.”</td>
<td>2.60 (0.94)</td>
<td>5.76 (2.46)</td>
<td>Pickles</td>
</tr>
</tbody>
</table>

Paired samples t-tests were conducted with participants ($t_1$) and items ($t_2$) as random variables. As predicted, participants gave significantly higher estimates in response to hyperbolic ($M = 0.43$, $SD = 0.43$) compared to literal utterances ($M = -0.42$, $SD = 0.22$), $t_1(36) = 11.58, p < .01; t_2(39) = -13.95, p < .01$. Experiment 1 provided...
evidence for the most basic claim that people exposed to hyperbole generate estimates of what occurred in the real world and these estimates substantially exceed those generated in response to literal versions of the same utterances.

**Experiment 2**

The sample of memory traces recruited during the interpretation of hyperbolic utterances is likely affected not only by the use of hyperbole but also by other information related to the utterance. Consider, for example, a situation in which someone hears, “I paid a fortune for the meal at the snack bar”. In addition to sampling memory traces based on the form of the utterance (i.e., hyperbole), the listener can use information such as the context referenced in the utterance (i.e., paying for a meal at a snack bar) to constrain their understanding of what really happened in the event. In this particular case, the listener may retrieve a sample of memory traces related to the context (e.g., personal experiences of purchasing food at a snack bar) and construct an estimate of how much he or she has paid in similar situations in the past. In this particular case, a listener is likely to give a smaller estimate of cost when the context is “paying for a meal at [a] snack bar” compared to if the context was “paying for a meal at a seafood restaurant”. Indeed, research on context (e.g., Regel, Gunter, & Friederici, 2011) is consistent with the notion of situation-specific sampling of memory traces during utterance interpretation. Differences in the estimates people make when exposed to low context (e.g., paying for a meal at a snack bar) compared to high context (e.g., paying for a meal at a seafood restaurant) versions of the same hyperbolic utterances was also investigated. It was predicted that high context utterances would lead to significantly higher estimates than low context utterances.

**Method**

**Participants**

Twenty-seven undergraduate students from a large public university participated in this experiment for course credit. They were all native speakers of English.
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Materials
Sixty scenario and question pairs were written. Thirty of the pairs were target stimuli, that used hyperbolic utterances, and thirty of the pairs were filler stimuli, that used literal utterances. Each scenario consisted of one to two opening lines (e.g., “Ashley told Nicole about her dog, Gia, and Nicole asked about Gia’s size”) followed by an utterance made by one of the characters.

For the target stimuli, there was a low quantity context version (e.g., “Ashley said, ‘My Chihuahua weighs a ton’”) and a high quantity context version (e.g., “Ashley said, ‘My Great Dane weighs a ton’”) of each hyperbolic utterance. For the filler stimuli, there was only one context (e.g., “Ben said, ‘At the Berry’s house, I was stung by bees’”) for each literal utterance. The filler stimuli were included to reduce the likelihood that participants would catch on to the use of hyperbole.

The question that followed each scenario asked for an estimate of the quantity (i.e., number) or magnitude (e.g., size, duration) referenced in the scenario (e.g., “How much [in pounds] do you think Ashley’s dog weighs?”). Immediately following each question, participants were reminded how they should respond to the question (i.e., “Please express your answer as a whole number”). The order of the scenarios was randomized, and they were distributed four to a page in a seventeen-page packet. The first page of the packet provided instructions, which included a sample scenario and question.

Design
This experiment used a within-subjects design. The independent variable was context type (low quantity vs. high quantity) and the dependent variable was mean estimate in response to each scenario. Two questionnaires were used. Each questionnaire had thirty target stimuli and thirty filler stimuli. Of the thirty target stimuli, fifteen used the high quantity context version and fifteen used the low quantity context version of each hyperbolic utterance. The distribution of target stimuli was counterbalanced so that participants read all thirty target scenarios, but only one version of each utterance. The order of the pages in each packet was randomized.

Procedure
Data were collected in groups ranging from five to ten participants. After obtaining consent, an experimenter randomly distributed one of
the two versions of the packets to each participant. Fourteen participants received version 1 and thirteen participants received version 2. The experimenter then read the instructions aloud to the participants and asked if there were any questions before telling the participants that they could proceed to the first page. Upon completion of the experiment, participants were provided with a debriefing form that explained the purpose of the study.

**Results and Discussion**

Data were separated by context type and responses that were three standard deviations above or below the mean estimate for each scenario were removed. For this experiment, seven responses (representing 1.73% of the data) for the high context versions and six responses (representing 1.48% of the data) for the low context versions were removed.

Sample results are presented in Table 2. It was predicted that the high context versions of the hyperbolic utterances would lead to significantly higher estimates than the low context versions of the same hyperbolic utterances. To assess the reliability of the overall findings, all of our response data were first converted to z-scores to account for differences in measurement units (e.g., weight in pounds, amount in dollars, number of questions).

**Table 2**

*Sample Results of Experiment 2: Mean Estimates in Response to Low and High Context Versions of the Same Utterances*

<table>
<thead>
<tr>
<th>Low Context Utterance</th>
<th>Mean (SD)</th>
<th>High Context Utterance</th>
<th>Mean (SD)</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ashley said, “My Chihuahua weighs a ton”.</td>
<td>16.43 (10.91)</td>
<td>Ashley said, “My Great Dane weighs a ton”.</td>
<td>119.00 (61.72)</td>
<td>Pounds</td>
</tr>
<tr>
<td>Allison said, “When I read how much money Mark stole from his job at the grocery store, you could have knocked me over with a feather”.</td>
<td>3,586.62 (4,919.60)</td>
<td>Allison said, “When I read how much money Mark stole from his job at the law firm, you could have knocked me over with a feather”.</td>
<td>72,192.31 (118,172.82)</td>
<td>Dollars</td>
</tr>
<tr>
<td>Matt said, “That was the longest essay question test in the world”.</td>
<td>4.33 (2.77)</td>
<td>Matt said, “That was the longest multiple-choice test in the world”.</td>
<td>96.07 (38.29)</td>
<td>Questions</td>
</tr>
</tbody>
</table>
Paired samples t-tests with participants ($t_1$) and items ($t_2$) as random variables were conducted. As predicted, participants gave significantly higher estimates in response to high context ($M = 0.41$, $SD = 0.47$) compared to low context utterances ($M = -0.41$, $SD = 0.30$), $t_1(26) = 13.80, p < .01$; $t_2(29) = -6.56, p < .01$. Experiment 2 supported the claim that people use the contexts referenced in hyperbolic utterances to generate estimates of what really might have occurred.

Experiment 3

A listener can also use the identity of the speaker to constrain his or her understanding of an utterance. Consider our earlier example in which someone hears “I paid a fortune for that meal”. In addition to sampling memory traces based on the form (e.g., literal vs. hyperbolic) and context (e.g., a meal purchased at a snack bar vs. a meal purchased at a seafood restaurant) of the utterance, knowledge about the speaker (e.g., whether he or she is notoriously cheap or frivolous) could also be used to constrain the estimate of how much the meal cost. In this case, if the speaker is known to be frivolous with money, then the listener can assume the bill must have been particularly high for the speaker to say he or she “paid a fortune”. If the speaker is instead known to be cheap, the listener can assume that the bill could be relatively low and still cause the speaker say he or she “paid a fortune”. Indeed, research on readers’ use of speaker traits (e.g., Albrecht & O’Brien, 1993; Rapp, Gerrig, & Prentice, 2001) is consistent with the notion that such information influences the sampling of memory traces during utterance interpretation.

For example, Rapp, Gerrig, and Prentice (2001) found that participants use information about characters’ dispositions to construct...
trait-based models that affect the ease of assimilating characters’ behaviors. Participants were presented with information about characters that allowed them to construct inferences about each character’s disposition. For example, participants read statements such as “Albert’s shoes were buried under old candy wrappers, crumpled magazines, and some dirty laundry”, presumably leading to trait-based inferences such as “Albert is sloppy”. In the first experiment, participants were more likely to agree with possible story outcomes that were consistent versus inconsistent with their trait-based models. The results of a second experiment revealed that participants’ expectations about characters were narrowly (e.g., “Albert is sloppy”) as opposed to generally (e.g., “Albert is not a good person”) defined. Finally, two self-paced reading experiments showed that participants were slower to read story outcomes that were inconsistent compared to consistent with the trait-based models (Rapp, Gerrig & Prentice, 2001). The results of this study demonstrate that people not only take trait-based characteristics into account when interpreting information, but they also generate trait-based models that influence expectations.

Differences in the estimates people make when exposed to the same hyperbolic utterances made by a low response (e.g., a speaker who is notoriously cheap) compared to high response (e.g., a speaker who is notoriously frivolous) speaker (Experiment 3)) were examined. It was expected that utterances made by high response speakers would lead to significantly higher estimates than utterances made by low response speakers.

**Method**

**Participants**
Thirty-five workers from Amazon’s Mechanical Turk site participated in Experiment 3. Each worker was compensated $3.00 for participation. All workers were native speakers of English.

**Materials**
Sixty scenario and question pairs were written. Thirty of the pairs were target stimuli, that used hyperbolic utterances (e.g., “Amanda said, ‘I brought your backpack. How many bricks do you have in there?’ ”)
and thirty of the pairs were filler stimuli, that used literal utterances (e.g., “Christine said, ‘It’s my turn to pay for the coffee this morning’”). Each scenario consisted of one to two opening lines (e.g., “Amanda picked up her roommate, Paige, after class on Friday”) followed by an utterance made by one of the characters.

For the target stimuli, the scenario was either prefaced with a speaker description designed to lead to a high response (e.g., suggesting that the speaker was strong) or a speaker description designed to lead to a low response (e.g., suggesting that the speaker was weak). For the filler stimuli, there was only one neutral speaker type (e.g., suggesting that the speaker was someone who follows a morning routine) for each literal utterance. All speaker descriptions were fifty to sixty words in length and “target” descriptions did not differ by more than three words between the high response and low response speaker types. The “filler” stimuli were included to reduce the likelihood that participants would catch on to the use of hyperbolic utterances.

The question that followed each scenario asked for an estimate of the quantity (i.e., number) or magnitude (e.g., size, duration) referenced in the scenario (e.g., How much [in pounds] do you think Paige’s backpack weighs?). Immediately following each question, workers were reminded how they should respond to the question (i.e., Please express your answer as a whole number). The order of the scenarios was randomized, and they appeared one at a time on the computer screen. The screen immediately prior to the presentation of the first scenario and question pair provided instructions, which included a sample scenario and question.

**Design**

This experiment used a within-subjects design. The independent variable was speaker type (high response speaker vs. low response speaker) and the dependent variable was mean estimate in response to each scenario. Two versions of the materials were used. Each version had thirty target stimuli and thirty filler stimuli. Of the thirty target stimuli, fifteen used the high response speaker version and fifteen used the low response speaker version of each hyperbolic utterance. The distribution of target stimuli was counterbalanced so that workers read all thirty target scenarios, but only one version of each hyperbolic utterance. The order of stimuli presentation was randomized.
**Procedure**

Data were collected from workers individually. Native English-speaking workers registered on Amazon’s Mechanical Turk site had the opportunity to view a HIT (i.e., a “Human Intelligence Task”) consisting of a brief title and description. They also saw the approximate length (in minutes) of the HIT and how much monetary compensation they would receive for completing the HIT. If a worker chose to complete the HIT, he or she clicked the HIT link and was immediately routed to the HIT information screen. The HIT information screen informed workers that after completing the HIT, they would receive a unique, computer-generated confirmation code, which they would be required to paste into a box on the HIT information screen to receive compensation. The HIT information screen then instructed participants to open a link to begin the HIT in a new window.

The new window routed workers to the experiment, housed on a site called “Qualtrics”. The first screen workers viewed consisted of a consent form. Each worker was asked to read the consent form, then type his or her name into a box to give consent. After giving consent, workers viewed a new screen that provided instructions for the experiment. Workers were required to click an arrow at the bottom of the screen to progress to the first scenario and question pair. Qualtrics randomly assigned each worker to one of the two experimental versions. Nineteen workers were assigned to version 1 and sixteen workers were assigned to version 2.

Each scenario and question pair were presented one at a time on the screen. Workers answered each question by typing their response into a box. Only numbers were accepted in the response box. After entering each response, workers had to click on a “submit” button at the bottom of the screen to progress to the next scenario and question pair.

Upon completion of the final pair, workers saw a debriefing form that explained the purpose of the study. They were also instructed to click an arrow at the bottom of the screen to receive the unique, computer-generated confirmation code they needed to receive compensation. Once the confirmation code was generated, workers were instructed to copy the code and paste it into the confirmation code box on the HIT information screen window. Workers received compensation within twenty-four hours of completing the experiment.
Results and Discussion

Data were separated by speaker type and responses that were three standard deviations above or below the mean estimate for each scenario were removed. For this experiment, eleven responses (representing 2.10% of the data) for the high response speaker versions and six responses (representing 1.14% of the data) for the low response speaker versions were removed.

Sample results are presented in Table 3. It was predicted that high response speaker versions would lead to significantly higher estimates than low response speaker versions of the same hyperbolic utterances. To assess the reliability of the overall findings, all of our response data were first converted to z-scores to account for differences in measurement units (e.g., price in dollars, age in years, duration in years).

Table 3
Sample Results of Experiment 3: Mean Estimates in Response to Low Response Speaker Type and High Response Speaker Type Versions of Same Utterances

<table>
<thead>
<tr>
<th>Utterance</th>
<th>Low Response Speaker Type Description</th>
<th>Mean (SD)</th>
<th>High Response Speaker Type Description</th>
<th>Mean (SD)</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dennis said, “I paid a fortune for the meal at the snack bar”.</td>
<td>Cheap</td>
<td>12.16 (5.34)</td>
<td>Frivolous</td>
<td>23.28 (11.86)</td>
<td>Dollars</td>
</tr>
<tr>
<td>Sarah said, “My Aunt Martha is my mother’s older sister. She’s old as dirt”.</td>
<td>Pre-teen</td>
<td>61.26 (16.20)</td>
<td>Adult</td>
<td>76.56 (13.80)</td>
<td>Age</td>
</tr>
<tr>
<td>Lea said, “I’ve dealt with that problem since the beginning of time”.</td>
<td>New faculty member</td>
<td>13.13 (7.46)</td>
<td>Department chair</td>
<td>18.47 (6.04)</td>
<td>Duration</td>
</tr>
<tr>
<td>Julie said, “I will never eat that many slices of pizza again”.</td>
<td>Someone known for eating very little</td>
<td>4.40 (1.77)</td>
<td>Someone known for eating a lot</td>
<td>6.11 (1.75)</td>
<td>Quantity</td>
</tr>
<tr>
<td>Aaron said, “My new bicycle cost a bazillion dollars”.</td>
<td>Poor</td>
<td>222.67 (173.18)</td>
<td>Rich</td>
<td>642.11 (712.64)</td>
<td>Dollars</td>
</tr>
</tbody>
</table>

Paired samples t-tests with participants \((t_1)\) and items \((t_2)\) as random variables were conducted. As predicted, participants gave
significantly higher estimates for high response speaker ($M = 0.14$, $SD = 0.40$) compared to low response speaker ($M = -0.14$, $SD = 0.41$) versions of the same hyperbolic utterances, $t_{1}(34) = 3.34, p < .01$; $t_{2}(29) = 3.89, p < .01$. Experiment 3 provided evidence for the claim that people use knowledge about the speakers who made hyperbolic utterances to generate estimates of what occurred in the real world.

**General Discussion**

The three experiments provided consistent evidence that hyperbole affects people’s explicit estimates. In Experiment 1, it was found that participants gave significantly higher estimates in response to hyperbolic (e.g., “I waited in line forever at 7-Eleven”) compared to literal (e.g., “I waited in line at 7-Eleven”) versions of the same utterances. In Experiment 2, it was found that participants gave significantly higher estimates in response to high context (e.g., “I spent a fortune on the meal at the seafood restaurant”) compared to low context (e.g., “I spent a fortune on the meal at the snack bar”) versions of the same hyperbolic utterances. Finally, Experiment 3 found that participants gave significantly higher estimates for high response (e.g., “someone rich”) compared to low response (e.g., “someone poor”) speaker versions of the same hyperbolic utterances. To our knowledge, this study constitutes the first empirical examination of explicit quantitative estimates made in response to hyperbolic utterances studied in isolation and in combination with context and speaker characteristics.

Taken together, the results of Experiments 1, 2, and 3 suggest that hyperbole does have a predictable impact on explicit estimates. The form (Experiment 1), context (Experiment 2), and speaker (Experiment 3) of an utterance all appear to influence the expectations that people generate. Importantly, the results of Experiments 2 and 3 demonstrate that hyperbolic utterances should not be removed from their contexts and studied in isolation, but rather the interpretation of such statements rests heavily on the recipient’s knowledge of the context and characteristics of the speaker. This finding is consistent with the argument made by Claridge (2010) that contextual knowledge is necessary for identifying and interpreting cases of hyperbole.

Such results are consistent with the notion that people cognitively correct hyperbolic utterances using information retrieved from
memory in order to generate expectations for what really occurred in the situation or event (e.g., Kahneman & Miller, 1986). The results further support the underlying model suggesting that the sampling of memory traces during the interpretation of utterances is influenced by form and contextual elements of the utterance. Future research should be aimed at designing experiments that can investigate these memory traces more directly.

The results of the three experiments presented in this paper have a multitude of real-world implications. For instance, the results of Experiments 1, 2, and 3 suggest that exposure to exaggerated news stories or other exaggerated statements on TV, radio, in print, and on the Internet, can exert a consistent effect on peoples’ knowledge and understanding of the world. Indeed, a significant number of research studies have been conducted on the use of exaggeration, otherwise known as ‘sensationalism,’ by the media when covering the recent COVID-19 pandemic (e.g., Bratu, 2020; Gupta, Sharma, Najm & Sharma 2020; Mejia et al., 2020). Based on our experiments, exposure to information presented in such a form may cause listeners to generate estimates and expectations that are not reflective of reality. Furthermore, when presented with information (accurate or not) inconsistent with those expectations, people may experience difficulty integrating this new information with established mental models.

This same scenario can be applied to a variety of other contexts, such as exposure to an exaggerating co-witness, or an attorney who employs hyperbole to make their point about the extent and severity of a crime. Furthermore, research on the explicit quantitative interpretations to hyperbolic utterances can inform the public on the dangers of the use of hyperbole by politicians (e.g., Blain, 1988; Connor, 2018; Kalkhoven, 2016; Stuckey, 2017), which, in addition to fanning the flames of anger and discontent, can provide potentially dangerous non-veridical information to the populace.

Unfortunately, the particular results of these experiments do not allow us to speak to the potential consequences on memory for information either consistent or inconsistent with such expectations. Future experiments measuring memory test performance may be conducted to further investigate the impact of hyperbole on memory. The possible implications of the results from the present experiments and similar studies conducted in line of research are literally endless.
ADHERENCE TO ETHICAL STANDARDS

Ethics Declarations. The ethical examination of the conducted empirical research was carried out and it was approved by the Committees on Research Involving Human Subjects at Stony Brook University (established in 1971).

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All authors commented on previous versions of the manuscript. All authors have read and approved the final version of the manuscript.

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References


Мета. Люди стикаються з перебільшенням у тій чи іншій формі щодня. Вони повинні розуміти та інтерпретувати гіперболу, або розмовне перебільшення, яке вони вербально сприймають. Дослідження показують, що люди когнітивно виправляють гіперболічні висловлювання, використовуючи інформацію з пам’яті, щоб генерувати оцінки того, що насправді відбувалося в ситуації або події, а вибірка слідів пам’яті під час інтерпретації висловлювань залежить від форми й контекстуальних елементів висловлювання.

Методика. У трьох експериментах учасникам пропонували тексти, що містили інформацію, описану буквально або гіперболізовано (наприклад, “Я зловив рибу”)
проти “Я зловив рибу розміром з кита”), і просили дати експліцітну оцінку величини (наприклад, кількості, розміру, тривалості). Передбачалося, що форма висловлювання (експеримент 1), контекст (експеримент 2) і мовець (експеримент 3) впливатимуть на оцінки, які генерують люди.

**Результати.** Виявлено, що наявність гіперболи, а також інформація про контекст і мовеця достовірно впливають на кількісні оцінки учасників.

**Висновки.** Форма, контекст і мовець впливають на оцінки, які генерують люди. Такі результати узгоджуються з уявленням про те, що люди когнітивно коригують гіперболічні висловлювання, використовуючи інформацію, добуту з пам’яті, щоб генерувати оцінки про те, що насправді відбувається в ситуації чи події. Подальші дослідження мають бути спрямовані на розробку експериментів, які можуть дослідити ці сліди пам’яті більш безпосередньо.

**Ключові слова:** гіпербола, перебільшення, контекст, характеристики мовця.