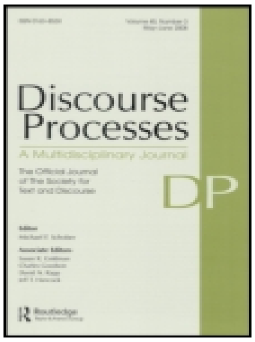

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Less-Detailed Representation of Non-Native Language: Why Non-Native Speakers' Stories Seem More Vague

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The language of non-native speakers is less reliable than the language of native speakers in conveying the speaker's intentions. We propose that listeners expect such reduced reliability and that this leads them to adjust the manner in which they process and represent non-native language by representing non-native language in less detail. Experiment 1 shows that when people listen to a story, they are less able to detect a word change with a non-native than with a native speaker. This suggests they represent the language of a non-native speaker with fewer details. Experiment 2 shows that, above a certain threshold, the higher participants' working memory is, the *less* they are able to detect the change with a non-native speaker. This suggests that adjustment to non-native speakers depends on working memory. This research has implications for the role of interpersonal expectations in the way people process language.

Interactions between native and non-native speakers of a language are becoming commonplace. Although research has examined the potential difficulties and

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communication failures stemming from low linguistic competence and prejudice (Kinzler, Dupoux, & Spelke, 2007; Munro & Derwing, 1995), almost no research examines potential differences in the way listeners represent what native versus non-native speakers say. Indeed, a common assumption is that, aside from the effect of lower intelligibility, listeners represent native and non-native language similarly. In contrast, we propose that native and non-native language are processed differently and for reasons other than intelligibility. We hypothesize that because listeners expect non-native speakers to have lower linguistic competence, they don't fully process their language and therefore represent it with fewer details. This has potentially important pragmatic implications, because the amount of detail in the representation can influence one's understanding of the message, leading in turn to differences in impression of the speaker, the message, and the situation as a whole.

Role of Speaker-Induced Expectations

Listeners' expectations of the speaker influence the way they process and interpret language, and when these prior expectations do not fit the situation, they may even distort the very perception of the speech. For example, listeners' beliefs about the origin of a speaker can lead them to perceive a foreign or a regional accent even when there is none (Niedzielski, 1999; Rubin, 1992), and listeners' perceptions of phonemic boundaries are influenced by their beliefs about a speaker's sex (Johnson, Strand, & D'Imperio, 1999).

Evidence from Event-Related Potentials, which involves the recording of brain response to stimuli, suggests that expectations of the speakers are integrated into the interpretation already at the early stages of processing. For instance, grammatical errors usually evoke the P600 component, but because a foreign accent induces expectations of grammatical errors, they are not surprising and therefore do not evoke such responses in the brain (Hanulikova, van Goch, & van Alphen, 2010). This suggests that the expectations are integrated into the process from the outset.

Because of such early integration, expectations can influence not only the interpretation of speech but the way it is processed. For example, expectations can override habitually inferred implicatures such as listeners' tendency to interpret disfluencies to mean that a to-be-labeled object is hard to name or to infer from the use of an adjective the existence of a contrast set. Listeners no longer make such inferences if the speaker uses the cues unreliably (Arnold, Hudson Kam, & Tanenhaus, 2007; Grodner & Sedivy, 2011). Similarly, listeners remap phonemic categories according to the acoustic information they receive to deal with the variability in speech when they believe the variability in speech is due to a change of speaker but not when they believe that the variability is within a talker (Magnuson & Nusbaum, 2007).

The evidence presented so far shows that listeners' expectations of speakers may influence language processing. Non-native speakers represent one group of speakers regarding which listeners have specific expectations. In general, people expect non-native speakers to be less competent in their non-native tongue (Hanulikova et al., 2010; Long, 1983), rendering their language less accurate in conveying their intentions. For example, non-native speakers may occasionally refer to objects with words that are related to, but are not the same as, the words a native speaker would use, as in calling a paper cup a "glass." We hypothesize that to handle such reduced reliability, listeners process non-native language in less detail. By specifying only some of the words' features, listeners are more efficient, while at the same time less likely to be misled by nonessential details that might be inaccurate. For example, representing "glass" as a small container for liquids would allow the listener to understand the reference to the paper cup referent more easily. Although processing native language in detail usually adds useful information, processing non-native language in detail could add information whose reliability is unknown. Therefore, it would often be optimal for listeners to avoid engaging in detailed processing when listening to non-native speakers.

Processing language in less detail is not unique to the processing of the language of non-native speakers. Linguistic input is not always processed in full. Ferreira, Ferraro, and Bailey (2002) demonstrated that sometimes readers only process linguistic stimuli to a level that is "good enough" for the purpose at hand. In the same spirit, Sturt, Sanford, Stewart, and Dawydiak (2004) argued that people do not always incorporate the full details of a word's meaning into the representation of an utterance, especially if the details are peripheral, and that integration with the text's global coherence often precedes full processing of local meanings (Daneman, Lennertz, & Hannon, 2007). Therefore, when they presented participants with two versions of a story in succession in which some of the peripheral details slightly changed, participants sometimes missed those changes. Readers also do not always disambiguate anaphors (Klin, Guzman, Weingartner, & Ralano, 2006). Together, these studies suggest that the level of detail of linguistic representations varies.

The adjustment to a non-native speaker might also depend on attentional resources. In general, working memory constrains what type of information one can use when processing language (Federmeier & Kutas, 2005; Just & Carpenter, 1992; Traxler, Williams, Blozis, & Morris, 2005). For example, although readers with high working memory can use a noun's animacy rapidly to avoid a wrong syntactic interpretation, readers with low working memory are unable to integrate such information until later and are therefore more likely to rely solely on the common syntactic interpretation and correct it later on (Just & Carpenter, 1992; Traxler et al., 2005). Similarly, the integration of expectations regarding a speaker's linguistic reliability could require relatively high working memory. Because listeners with low working memory have difficulty simultaneously attending to multiple types of information, they might not be as able to monitor speakers' characteristics, such as their linguistic proficiency. Furthermore, even when such information is encoded, they might be less able to use it to adjust their manner of processing. This is because low working memory often restricts flexibility in processing, as is illustrated by the experiments that show that the use of animacy information is constrained by working memory (Just & Carpenter, 1992; Traxler et al., 2005). For these reasons, listeners with higher working memory capacity are likely to be better able to adjust their manner of processing according to their expectations. The resources that high working memory provides allow listeners to flexibly tune the number of details they specify to the speaker's reliability. Therefore, for speakers with lower linguistic competence they would specify fewer details.

The language of non-native speakers also tends to be less intelligible than that of native speakers, and this alone might prevent listeners from processing it in full. Yet the assumptions and predictions of our proposal differ from those of an alternative account that is based on lower intelligibility. First, we propose that listeners are more likely to suffice with less-detailed representations when processing non-native language even when the speech is intelligible. Both experiment 1 and experiment 2 were designed to show such cases. Additionally, experiment 2 directly compares the predictions of our account with that of an intelligibility account. As mentioned earlier, we propose that the integration of speaker expectations is an effortful process that requires flexibility in controlling attention. Therefore, the higher listeners' working memory is, the better able they should be at adjusting to the speaker. This leads to the counterintuitive notion that, above a certain level, higher working memory would lead to less detailed representations of non-native speech. In contrast, reduced intelligibility should impact those with lower working memory, because they will have more difficulty processing the less intelligible speech. Therefore, according to such an account, listeners with lower working memory should process the speech of non-native speakers with fewer details. Our account and the reduced intelligibility account, then, make opposite predictions, and experiment 2 provides a critical test between them.

We next describe two studies that test our proposal, using a change-detection paradigm. Experiment 1 examines whether listeners represent non-native language in less detail and for reasons other than intelligibility, and experiment 2 examines whether working memory modulates listeners' adjustment.

EXPERIMENT 1: REPRESENTATION OF NON-NATIVE SPEECH

Experiment 1 tests the hypothesis that listeners represent the language of non-native speakers in less detail than that of native speakers, using a change-detection paradigm (Sturt et al., 2004). Participants first listened to a speaker telling a story. Then they reviewed a transcript of the story where some words were replaced with words of a related meaning. For instance, the word *scream* in "... starts to scream whenever she sees a spider" was changed to *panic*. Participants' task was to detect the word changes. We predicted that listeners would notice fewer changes if they heard the story from a non-native speaker compared with a native speaker, because they would only specify some of the words' features and would consequently find it more difficult to distinguish between related words that differ in peripheral features rather than in the main ones.

Non-native speech might be less intelligible, and the greater difficulty in understanding it might impose a cognitive load (Munro & Derwing, 1995). Both load and reduced intelligibility may lead to poorer performance, independently of expectations. To control for this possibility we included a baseline condition. Although in the test conditions participants listened to a story with the goal of comprehending it, participants in the baseline conditions listened for memorization. To prevent participants from naturally switching to a comprehension mode, we presented the same sentences in a random order. Any cognitive load or difficulty in interpreting non-native language should be manifest in this memory condition at least as much as in the comprehension condition, yet the accuracy of the language in conveying the speaker's intention would no longer be relevant. If we are correct, the comprehension condition should yield a larger change detection difference between native and non-native speakers, compared to the memory condition.

Method

Participants. One hundred fifty-one native English speakers participated in the experiment for payment or credit. Participants were undergraduate students in a Midwestern university. All participants were raised in homes where only English was spoken. One participant was excluded because she was not a native speaker of English, one was excluded because she participated in a related study, and one was excluded because he misunderstood the task.

Stimuli. We constructed a 15-sentence story (214 words) that the speaker supposedly generated in response to the question, "Tell me about one of your friends" (Table 1). The story was recorded by one male native speaker of American English and one male native speaker of Turkish. The native speaker of Turkish was chosen because he had a noticeable but easy to understand accent, and native speakers of Turkish compose one of the larger groups of non-native speakers on campus. In the Memory condition the sentences were randomly

TABLE 1
Story Used in Experiment 1

My friend was born in Seattle. She is a third year like me. She's just changed her major. She used to be into film [drama] but decided to move to Econ so that her chances [salary] would be better after she graduates. In general, she's a very optimistic [happy] person. She likes to go out, especially to crowded [noisy] bars. She also spends many hours a week playing guitar [bass] in a band. She also helps with writing the lyrics [music] of their songs. The band is sort of successful and they travel and perform all around the state [country] during the breaks. They don't have a car, so it's funny to see them get on the bus [train] with all their equipment. Most of the songs they play are covers of famous songs, because the audience often wants [expects] that. A couple of years ago my friend started dating the singer of the band. They talk about moving in together. She laughs and says that it's a little quick, but that at least someone will cook and kill the spiders for her, because she never has the patience [time] to cook and just starts to scream [panic] whenever she sees a spider in the kitchen. Her lease only ends in a few months, so it'll be a while before they actually move in together.

Words in brackets are those that were changed.

reordered. This encouraged participants to listen to the information as sentences for memorization and not as a story for comprehension.

We prepared a transcript that was identical to the auditory material except for 11 words that were changed to words with a related meaning, such as *scream* to *panic*. The transcript maintained the format and the order of the auditory presentation: the story in the Comprehension condition and the reordered sentences in the Memory condition.

Design and procedure. The design of the experiment was a 2 (Goal: Comprehension vs. Memory) × 2 (Speaker: Native vs. Non-Native), all between participants. Participants were randomly assigned to one of the four conditions. Participants were either told that they would perform a listening comprehension task or that they would perform a memory task. Those in the Comprehension condition were told they would listen to another participant who was interviewed by the experimenter and then answer comprehension questions. Those in the Memory condition were told they would listen to a series of sentences and then receive a transcript of the sentences, where they would look for word changes.

The text was fully grammatical so the native speaker's competence would not be suspected. But this could have suggested to the participants that the non-native speaker is fully competent in English, which would not have allowed us to test our proposal about the role of expectations. To reinforce expectations about the reduced competence of the non-native speaker, listeners first heard a supposed dialogue in which the experimenter asked the speaker to tell the story

TABLE 2
Introductory Dialogue Used in the Comprehension Condition in Experiment 1

NS condition
Experimenter: Tell me about one of your friends.
NS: OK, but it will be easier if I am told when to stop.
Experimenter: OK.

NNS condition
Experimenter: Tell me about one of your friends.
NNS: OK, but it will be more easier if I am tell when to stop.
Experimenter: OK.

and the speaker asked for clarifications (Table 2). The script of the non-native speaker included a few errors that native Turkish speakers commonly make in English. Only participants in the Comprehension condition heard this dialogue to enhance expectations only in this condition. This was done because the role of the Memory condition was to control for differences in performance due to intelligibility alone. Participants then listened to the speaker and immediately afterward they received the transcript and were asked to circle all the new words as well as write down what the original words were.

Results and Discussion

Only fully correct detections were analyzed, because we were interested in the ability to notice changes in content rather than in surface features. Therefore, analyses did not include partial detections in which the participant was unable to recall the original word (9%). Similarly, cases in which the participant recalled a word synonymous to the original word were counted as correct detections because they preserved the meaning. In addition, false detections of changes that did not occur (11%) were excluded from the analyses. Many of the false detections were marking of unchanged words as new without stating what the original words were. Most other false alarms were changes to words that carry the same meaning in that context and to words that might seem more predictable or common in that context. The conditions did not differ in the frequency of partial responses or false alarms (partial response, all Z's < 1; false alarms, all p's $> .12$). We excluded from the analyses two outliers, whose number of correct detections was more than 2.5 standard deviation away from the mean (0 or 1 correct detections).

As predicted, participants detected more word changes after listening to a native speaker than after listening to a non-native speaker, but only if they

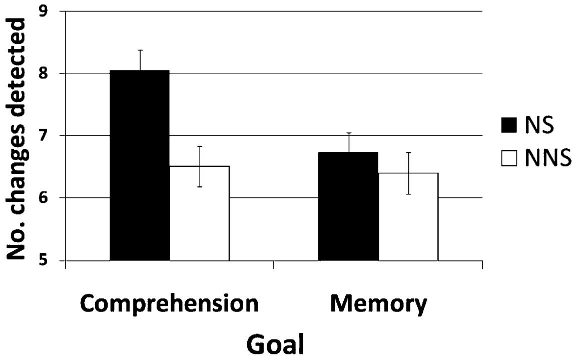

FIGURE 1 Number of detections by Speaker and Goal in experiment 1.

listened for comprehension (Figure 1). We ran a logit analysis with items and subjects as random variables and Speaker (Native, Non-Native), Goal (Comprehension, Memory), and their interaction as fixed effects. We modeled the intercepts for both random variables and included a slope for the Speaker for the items random variable (this was the only slope that improved the model: $\chi^2 = 7.43$, $p < .03$). The analysis revealed a Speaker × Goal interaction ($Z = 2.09$, $p < .04$). To examine the nature of the interaction, we performed separate logit analyses for the two Goal conditions. As predicted, participants who listened for comprehension detected significantly more changes when the speaker was a native speaker than a non-native speaker (means = 8.05 and 6.5, respectively; $Z = 2.89$, $p < .01$). In contrast, participants who listened for memorization detected a similar number of word changes with a native speaker and a non-native speaker (means = 6.7 and 6.4, respectively; $Z < 1$).[1]

These results demonstrate that people represent the language of non-native speakers in less detail and that the impoverished representation of non-native language is not due to the difficulty of processing the speech. Had the difference between word detection for native and non-native language been due to difficulty, this difference should have occurred also when participants listened for memorization, not only when they listened for comprehension.

Although experiment 1 supports our claim, there could be an alternative explanation for the differences between the Memory condition and the Comprehension condition. It is possible that changing the order of the sentences in the Memory condition contributed to the pattern in experiment 1, although

[1]The overall lower rate of detection in the memory condition is most likely due to the difficulty of keeping track of less coherent text.

it is not exactly clear how. To provide converging evidence, we conducted experiment 2, testing the differential predictions the theories make regarding the role of working memory. If less-detailed representations are due to lower intelligibility, working memory should either play no role or lead to worse performance among participants with lower working memory, because they experience greater difficulty. In addition, working memory often correlates with higher IQ and better performance (Conway, Cowan, Bunting, Therriault, & Minkoff, 2002), so one might expect participants with higher working memory to perform better with both speakers. In contrast, our proposal predicts that higher working memory would allow better adjustment to the non-native speaker, thereby *reducing* the ability to notice changes.

EXPERIMENT 2: THE IMPACT OF WORKING MEMORY ON REPRESENTATION

Method

Participants. One hundred and two native English speakers participated for money or credit. Participants were undergraduate students in a Midwestern university, and none of them participated in experiment 1. All participants were raised in homes where only English was spoken. One participant was excluded because he was not a native speaker of English, and four were excluded because they participated in related experiments about differences in processing native and non-native language.

Stimuli and design. We used the recorded story and the transcript from experiment 1.

Procedure. Participants were informed that they would perform a few tasks. First, participants performed a verbal working memory task (Unsworth, Heitz, Schrock, & Engle, 2005). They received a series of sentences, some of which made sense and some that did not. They determined whether each sentence was sensible and memorized a letter after each sentence. After each set of sentences and letters, participants recalled the letters they had memorized in the order they received them. Sets ranged from three sentences followed by a letter each to seven sentences followed by a letter each. Sets of different lengths were presented in a random order. Participants' working memory scores were determined by the number of full sets they recalled. After the working memory task participants performed the change detection task. The procedure was identical to that of the Comprehension condition in experiment 1.

Results and Discussion

An examination of participants' performance on the working memory measure revealed that four participants (4%) made 10 or more errors on the sentence sensibility judgment task—the secondary task in the working memory measure. For the performance on the main task to reflect participants' relative working memory, participants must not focus on it at the expense of the secondary task. Therefore, those participants were excluded from all analyses. The working memory score of the remaining participants ranged from 18 to 75 of a possible range of 0 to 75, with a median of 55 and a standard deviation of 15.1.

The scoring of the change detection task followed the same guidelines as in experiment 1. Therefore, analyses did not include 50 partial detections in which the participant was unable to recall the original word (4.9%). Similarly, cases in which the participant recalled a word synonymous to the original word were considered correct detections. In addition, 48 false detections of changes that did not occur were excluded from analyses. The conditions did not differ in the frequency of partial responses and false alarms (partial response, $Z < 1$; false alarms, $F < 1$).

Replicating the results of experiment 1, participants detected more changes when they listened to the native than to the non-native speaker (means = 8.04 and 6.2, respectively). We conducted a logit analysis with Subjects and Items as random variables and Speaker, Working Memory, and their interaction as fixed variables. This analysis and the follow-up analyses included intercepts for both random variables but no slopes, because neither improved the models. The analyses revealed a significant effect of Speaker ($Z = 4.36$, $p \sim 0$). In general, neither Working Memory nor its interaction with Speaker reached significance (Z's < 1). This analysis then reveals no simple relation between working memory and the nature of the speaker.

We then considered another possibility regarding the impact of working memory, based on a closer examination of the data. Although it was clear that performance in the Native speaker condition was not affected by the participant's working memory, it seemed to impact performance with the Non-Native speaker when participants had relatively high working memory. Although higher working memory seems to lead to the predicted decrease in performance for most participants, it does not seem to play a role among participants with low working memory. [2] We therefore considered the possibility that listeners' working memories must be over a certain threshold to provide them with sufficient resources to make the adjustment. If we are correct, then above that threshold higher working memory will lead to better adjustment and to representing speech with fewer

[2]For most items, performance peaked at the mid-range of working memory and then mostly declined as working memory increased.

details. Ironically, this would lead to worse performance in the change detection task the higher one's working memory is.

To test this possibility, we tried to identify the "threshold" point, that point of working memory capacity where participants have sufficient resources to both handle the demands of the non-native speech, and to start making the adjustment in manner of processing. We reasoned that at that point participants should be able to perform just as well with the native and the non-native speaker, suggesting they have sufficient capacity to handle the demands of the non-native speech without it impacting performance. To identify that point, we compared the performance of every decile of the participants starting with participants at the lowest level of working memory. Whereas the bottom three deciles exhibited numerically better performance with the native speaker, even if not always significantly so, participants in the fourth decile in fact performed marginally better with the non-native speaker (80% vs. 64%; $Z = -1.78$, $p < .08$). At that level of working memory, then, participants can perform at least as well with non-native and native speakers. If we are correct, then, participants with that level of working memory should have sufficient working memory to make an adjustment to non-native speakers, and from that threshold on, higher working memory should lead to *worse* performance with non-native speakers but not with native speakers.

We performed a logit analysis with Speaker, Working Memory, and their interaction as fixed variables and with Subjects and Items as random variables on participants in the top seven deciles of working memory. The analysis revealed a main effect of Speaker ($Z = -2.225$, $p < .03$), with participants detecting more changes with a native than a non-native speaker (means = 8.2 and 6.4, respectively). This analysis also revealed a main effect of Working Memory ($Z = -2.16$, $p < .04$) and, most importantly, an interaction between Working Memory and Speaker ($Z = 2.665$, $p < .01$). To examine the nature of the interaction and, specifically, whether participants perform worse with a non-native speaker the higher their working memory is, we conducted separate analyses for participants in the upper seven deciles of working memory who listened to a native speaker and those who listened to a non-native speaker. A logit analysis on participants with high working memory who listened to a non-native speaker revealed an effect of Working Memory ($Z = -1.96$, $p < .05$), such that higher Working Memory resulted in worse performance. In contrast, a logit analysis on participants with high Working Memory who listened to a native speaker revealed a reversed marginal effect of Working Memory ($Z = 1.88$, $p < .06$). For these participants, higher Working Memory led to better performance. [3]

[3] A logit analysis with Speaker, Working Memory, and their interaction as fixed variables and Subjects and Items as random variables on participants in the bottom three deciles of working memory scores did not reveal any effects or interactions, although performance was numerically better with native than non-native speakers (7.7 vs. 5.7, respectively; $p > .2$).

These results replicate those of experiment 1, demonstrating that listeners represent non-native speech in less detail, thereby reducing their ability to detect word changes. This suggests that listeners adjust their manner of processing with non-native speakers. The results of experiment 2 are also consistent with the idea that such adjustment requires working memory capacity. At relatively low working memory there was no evidence of adjustment to non-native speakers. But once listeners had sufficient working memory to perform just as well with non-natives as with native speakers, the higher working memory they had, the worse they performed with a non-native speaker. Clearly, participants whose performance with non-natives is equivalent to the performance of participants who listened to native speakers had sufficient working memory to overcome the potential difficulty imposed by reduced intelligibility. With even higher working memory, performance should have been maintained or improved. Instead, performance with the non-native speaker deteriorated as working memory increased, suggesting that higher working memory allowed a more effective adjustment to non-native speakers.

GENERAL DISCUSSION

Two experiments showed that listeners remember fewer details of what non-native speakers say compared with what native speakers say, supporting our hypothesis that listeners' expectations of non-native speakers lead them to represent their language in less detail. Experiment 2 also provided evidence consistent with the idea that the adjustment to non-native speakers is constrained by working memory. Once listeners have sufficient working memory, they are able to adjust more effectively, leading them to represent the language with fewer details.

Importantly, non-native speakers' lower intelligibility alone cannot explain the pattern of the results. First, if reduced performance was due to lower intelligibility, participants should have remembered fewer details with non-native speakers not only when they listened for comprehension but also when they listened for memorization in experiment 1. Second, reduced intelligibility cannot explain the results for listeners who were at or above the working memory threshold in experiment 2. Participants at this threshold level were capable of detecting changes with non-native language as successfully as with native language. This suggests they had sufficient working memory to overcome any impact of reduced intelligibility on their performance. Therefore, participants with even higher working memory capacity should certainly not have been more affected by intelligibility, and their performance should have remained the same or improved with higher working memory. Instead, their performance deteriorated as working memory increased. This is consistent with our proposal that higher working memory provides the necessary resources for adjustment, leading to processing what non-native speakers say in less detail and, consequently, to worse performance in the change detection task. Therefore, even though intelligibility could play a role in processing non-native language, it cannot explain this pattern of results.

Our account also differs from an intelligibility account regarding the longevity and trajectory of the adjustment and its influence on performance. Non-native speakers categorize the sound system using cues and categories that are relevant for their native tongue but not necessarily for their non-native tongue (Iverson et al., 2003). This leads to a foreign accent and reduces its intelligibility because speakers produce phonemes that are different from prototypical native phonemes. Listeners, in turn, adjust to foreign accent by learning to remap the foreign phonemes onto native ones. This is achieved relatively rapidly and eventually leads to processing and representing accented speech with less and less difficulty (Clarke & Garrett, 2004). In contrast, the adjustment we propose is of a different nature. It does not involve learning to transform the non-native input, and its goal is not to reach native-like representation. In fact, the adjustment is prompted by the expectation that processing non-native language in the same manner as native language could lead to a misleading representation. Extended exposure to non-native language, then, should not lead to native-like processing and might even strengthen expectations regarding non-native speakers' linguistic competence, thereby increasing the adjustment.

Our studies are the first to show that non-native language is represented in less detail than native language. The studies were neither designed to investigate at which level of language representation the difference occurs nor which words would be represented in less detail and what the less-detailed representation would contain. Yet consistent with the more general literature on less-detailed representations, our studies do suggest that less-detailed representations might differ in meaning from more detailed representations even at the situation model. For example, in our story *bus* was changed to *train*. For participants who did not detect the change, the representation probably did not distinguish between a bus and a train. This would most likely impact the situation model that was based on that representation. We expect that the level of detail would depend on listener's evaluation of the importance of each segment of the input, as previous research on less-detailed representations demonstrates (Sturt et al., 2004). It is likely that important segments would be more fully represented, whereas less important segments would be represented with fewer details. This notion of less detailed processing is similar to the notion of gist processing in the sense that both assume that the final representation focuses on important concepts. But our account could be different from gist processing as it assumes that peripheral details could also be specified if strong expectations direct attention to them.

The role that working memory plays in modulating one's ability to adjust to non-native speakers extends previous studies that demonstrate that working memory can influence language processing by constraining one's ability to make timely use of different types of information (Federmeier & Kutas, 2005; Just & Carpenter, 1992; Traxler et al., 2005). Working memory resources might also change with circumstances and age, suggesting that the same person might adjust to different degrees under circumstances that differ in their cognitive demands, such as situations that require attention to more things, that require more operations on things kept in mind, or that require multitasking. Therefore, if adjustment to a non-native speaker impacts the interaction, more or less demanding situations might lead to different interactional patterns, raising the possibility that listeners might have the resources to adjust to non-native speakers in some situations but not in others.

Our findings contribute to the literature on less-detailed processing and representations by showing that interpersonal factors, such as expectations regarding the speaker, can influence the level of detail in the representation of that speaker's language. The research on less-detailed representations so far has focused on the role of linguistic complexity and linguistic highlighting of importance in influencing level of processing (e.g., Brédart & Modolo, 1988; Ferreira et al., 2002). Here we provide the first demonstration that social factors, such as interpersonal expectations, can influence the level of processing as well. This raises the possibility that the manner of language processing could adjust when other social circumstances suggest reduced reliability of speakers, as with young children, the elderly, or speakers with language impairment. If this is true, then the implications could be quite important. For example, caregivers might not always fully process the language of young children, making them less likely to notice errors that children make and thus perhaps even affecting the feedback they provide. Such potential implications would be worth investigating in future research.

The less-detailed processing of non-native language is also interesting because of its potential social implications. For example, interlocutors accumulate common ground as they converse, and one of the major sources of such shared reality is what participants in the conversation say (e.g., Clark, 1992). Normally, whether people call something a cup or a glass makes a difference and is encoded in the shared record of the conversation. But if listeners represent what a non-native interlocutor says with fewer details, the particular term that the speaker used would be less likely to be remembered and would therefore be less likely to become part of the shared record of the conversation. This might lead the native and the non-native interlocutors to hold a different belief about what is in common ground, which could introduce an obstacle to the interaction.

These findings, then, show that the expectations we have of non-native speakers can influence the way we represent and remember non-native language. They contribute to our understanding of the role of working memory in language processing as well as to our understanding of the role that social factors can play in language processing. Because the differences in the level of representation could potentially lead to differences in the way we interact with speakers, these findings can also potentially lead to new understanding of the way people interact with speakers of other groups.

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