So I was, 'like', totally buggin’ – Evidence for the role of attention on entrainment from discourse particles

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SO I WAS, LIKE, TOTALLY BUGGIN’ – EVIDENCE FOR THE ROLE OF ATTENTION ON ENTRAINMENT FROM DISCOURSE PARTICLES

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Dedication

For my family. My mother, Lisa, my brother, Stephen, my late-stepfather, Jon, and my uncle, Greg. For my friends. Thank you all for your endless patience, love and support on my academic journey. I couldn’t have done it without you. And to my kitty, Caligula Caliahee Ernest Williams, the best supporter of late-night work and always being by my side during revisions and stressful times.
SO I WAS, *LIKE*, TOTALLY BUGGIN’ – EVIDENCE FOR THE ROLE OF ATTENTION ON ENTRAINMENT FROM DISCOURSE PARTICLES

by

RACHEL LYNN WILLIAMS, B.A., B.S.

THESIS

Presented to the Faculty of the Graduate School of The University of Texas at El Paso in Partial Fulfillment of the Requirements for the Degree of

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Abstract

In this study, we investigated the role of attention for entrainment during production and comprehension using the discourse particle *like*. We tested two main hypotheses – that entrainment to discourse particles, even if relatively implicit, requires some attentional resources, versus that it requires little (if any) attention. In two experiments, participants read a short story and retold it (baseline retelling phase), then read another short story and listened to a recording of it (priming phase), and then read and retold a third story (target retelling phase). In Experiment 1, half of the participants simultaneously navigated a busy pedestrian zone in virtual reality (VR) during their baseline retelling phase and target retelling phase (high attentional load); the other half sat still and did not move in the same VR location (light attentional load). In Experiment 2, participants were placed in VR only while listening to the recording during the priming phase. We analyzed the production rate of the discourse particle *like* in the target retelling phase relative to the baseline retelling phase, as a function of presence of *likes* in the priming phase and amount of attention load. The present study demonstrated that entrainment to the discourse particle *like* can be elicited in laboratory conditions. However, we did not find any support for attentional involvement in the entrainment to *like*. 
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Chapter 1: Introduction

In some ways, how we speak is not original. Sometimes, we reuse aspects of language we have experienced before – a phenomenon known as entrainment, the term we use here, or alignment. Entrainment has been observed at various levels of linguistic representation, including expressions or word choice (lexical entrainment; Garrod & Anderson, 1987), syntactic structures (syntactic entrainment – referred to in the literature as syntactic priming or syntactic alignment; Branigan et al., 2000), and acoustic-phonetic and prosodic entrainment (Giles & Powesland, 1975; Pardo, 2006). Garrod and Anderson (1987) provide a classic example of lexical and conceptual entrainment. In a cooperative maze game, one participant in a pair had to indicate their position in a maze while the other participant viewed the same maze in another room. Speakers converged on their descriptions of their locations within a maze and the maze structure (e.g., Participant A: “Right - two along from the bottom one up”; Participant B: “Two along from the bottom, which side?”). Entrainment is considered a characteristic of conversation, and likely has a social function, but has also been observed in non-communicative language use (e.g., Bock, 1986; Borrie & Liss, 2014; Pickering & Branigan, 1998; Potter & Lombardi, 1998; Weatherholtz et al., 2014; Heyselaar & Segaert, 2018; Wynn et al., 2018). In either case, both comprehension and production processes are necessary for entrainment to occur: language needs to be comprehended in order to activate existing language representations and influence subsequent production.

In conversation, entrainment can be beneficial in multiple ways. Entrainment may aid in improving mutual understanding (Ferreria et al., 2012) and may make communicative problem-

---

1 Costa et al. (2008) made the useful distinction between entrainment, the tendency of speakers to reuse aspects of language, and alignment, the matching activation of conversation partners’ mental representations. However, the two terms are currently used interchangeably in the literature.
solving more efficient (Nenkova et al., 2008, for lexical entrainment; Borrie et al., 2015, for acoustic-prosodic entrainment). Further, mimicking a conversation partner’s behavior – including language – may increase empathy, liking, and rapport (for review, see Beňuš, 2014; Chartrand and van Baaren, 2009; Garrod et al., 2018). However, many aspects of entrainment and their underlying cognitive mechanisms are still not well understood. In this study, we tested mechanistic accounts of entrainment, presented below, at both the comprehension and production stages of the entrainment process.

Current theories of entrainment suggest two broad classes of mechanisms: automatic and non-automatic mechanisms. The most well-specified account of automatic entrainment, the Interactive Alignment model (Pickering & Garrod), proposes that most of entrainment in conversations among first-language speakers occurs as a result of a cognitively non-effortful process, priming (Pickering & Garrod, 2004). Non-automatic theories (e.g., audience design; Clark & Schaefer, 1987), although not explicitly defined as such, propose or imply the involvement of mechanism(s) that are non-automatic according to cognitive theories. The two classes of mechanisms make diverging predictions about the involvement of cognitive resources for entrainment to occur. Here, we propose to test the automaticity of entrainment by differing the level of attentional load during comprehension and during production.

**AUTOMATIC ENTRAINMENT**

The Interactive Alignment Model (Pickering & Garrod, 2004) proposes that entrainment occurs through an automatic priming mechanism – experiencing specific linguistic input activates its corresponding mental representation, making it more likely that a speaker will use that representation in subsequent production. This representation matching occurs without any
intermediate step – or “decision box” (p. 177) – where the listener would decide on how to respond to the linguistic input.

Another mechanism for entrainment that is considered automatic (and encapsulated within the linguistic system) is error-driven learning (Chang et al., 2006). Chang et al. propose that the language system has a pre-set expectation for frequencies of input and encountering an unexpected input adjusts the system’s weights proportionally to the amount of difference between the predicted and the actual input. The error-driven learning account is typically discussed in terms of structural entrainment, such that less expected (or, less frequent) structures predict greater entrainment. The observed greater entrainment to less frequent structures suggests that entrainment is a consequence of a rational expectation adaptation to a changing environment (Jaeger & Snider, 2013; for referential expressions, see Pogue et al., 2016). We note that for adaptations to be rational instead of indiscriminate, goal maintenance (considered part of central executive functions and therefore non-automatic) must modulate the adaptation processes.

**NON-AUTOMATIC MECHANISM OF ENTRAINMENT**

Non-automatic theories propose that entrainment results from assessing a communicative situation and adapting one’s speech accordingly, for communicative benefit. This implies executive control system involvement for goal maintenance and prepotent response inhibition. As one example of non-automatic entrainment, Communication Accommodation Theory (CAT; Giles & Powesland, 1975) proposes that interactants adjust verbal and nonverbal behavior to indicate relationships to conversational partners and ensure communicative success. For example, speakers with a higher need for social approval tend to converge to their conversational partner’s pause length and vocal intensity more than speakers with a lower need for social approval (Giles & Coupland, 1991). Speakers may also diverge from conversation partners to
indicate disaffiliation from outgroup members (Bourhis et al., 1979; Doise et al., 1976). A related mechanism may be behavioral mimicry, as studies in this area have shown that speakers unconsciously synchronize both verbal and nonverbal behaviors during interactions to ensure smoothness of an interaction and regulate social distances (for review, see Chartrand and van Baaren, 2009).

Another type of account of non-automatic entrainment proposes that speakers design their utterances to be best understood by their listeners in specific situations (Clark & Schaefer, 1987). The use or approximation of a particular referential expression by the conversation partner is evidence that they will understand it if repeated back to them; comprehension slows when a listener hears different terms than they (Ferreira et al., 2012) or their conversation partners (Metzing & Brennan, 2003) have previously produced in dialogue. Audience design involves a top-down decision-making process to make judgements about what would be more or less effective for an interlocutor’s comprehension (Clark, 1996), or what would be maximally informative (Grice, 1975). For example, experts tend to use non-expert vocabulary to refer to items their novice partners would not understand (Isaacs & Clark, 1987), speakers lexically entrain more to computers or avatars than to humans (Branigan et al., 2011; Bergmann et al., 2015), and native speakers lexically entrain more to non-native speakers than to other native speakers (Ivanova et al., 2021).

It must be noted that automatic and non-automatic mechanisms of entrainment are not mutually exclusive but may act for different types of representation and/or different situations.

**ROLE OF ATTENTION FOR ENTRAINMENT**

There is relatively little work on the role of attention for entrainment, and the reported studies have produced mixed results. On one hand, there is some evidence that higher overall
attention in a situation leads to more structural entrainment. In a study investigating how structural entrainment differs with participant role in dialogue, Branigan et al. (2007) found that participants produced the same structure as an interlocuter, or entrained, more frequently when directly addressed in a conversation, than when they overheard a conversation. The authors interpreted their findings in terms of global attention. As addressees are expected to actively participate in a conversation to come to a conversational understanding, they may pay more attention during the extent of a conversation than side participants would. This increased overall attention in a situation also increased attention to the utterance. As structure is an integral component to the utterance, the overall increased attention due to situational demands was assumed to enhance structural entrainment.

Further, in a study investigating how structural entrainment differs between a dialogue and a monologue situation (Ivanova et al., 2020), post-hoc analyses revealed that individuals who were classified as “high attenders” syntactically entrained to a greater extent than individuals classified as “lower attenders” (attention was operationalized as the reaction time variability in the button-press responses to verification pictures). Taken together with Branigan et al. (2007), these results suggest that higher overall attention in a situation may enhance structural entrainment. However, they do not differentiate between attention during the comprehension stage and attention during the production stage.

More support for such a conclusion was provided by Heyselaar and Segaert (2018). In a non-interactive entrainment study, these authors showed that divided attention in a dual task enhanced structural entrainment only at moderate levels of attentional load during comprehension. Overall, participants structurally entrained to the same extent when they traced up to three dots on a computer screen with their eyes while simultaneously listening to or
producing sentences than when they did not. But only moderate levels of load (tracing one dot instead of three) during comprehension led to enhanced structural entrainment. There was, however, no effect of moderate attentional load on structural entrainment for production. The authors interpreted their findings in terms of an “attentional boost,” such that when attention is increased to manageable levels, other processes become more efficient as well, including attention to speech and resulting entrainment. Taken together, these respective studies suggest that a moderate increase of attention to the overall situation increases entrainment.

However, other evidence suggests that increased attention – when directed at a particular linguistic aspect different from structure – reduces structural entrainment. In a non-interactive entrainment study, Bock et al. (1992) found that participants instructed to attend to the form of previously presented prime sentences showed structural entrainment while participants instructed to attend to the meaning of previously presented prime sentences (thereby presumably not attending to the structure of a sentence) did not. The authors interpreted these results to suggest that attending to the meaning of a sentence, an aspect irrelevant to syntactic structure, detracts from syntactic entrainment.

Existing accounts of entrainment do not explicitly account for the role of attention for the entrainment phenomenon. However, the mechanisms they propose can be assessed in terms of automaticity, and hypotheses derived, following the basic logic that more automatic phenomena require few attentional resources, while less automatic phenomena require more attentional resources (e.g., Schneider & Shiffrin, 1977; see Moors, 2016, and Hartsuiker & Moors, 2017, for a view of automaticity as a graded phenomenon). It seems straightforward to assume that entrainment resulting from a conscious decision (such as proposed by mediated theories involving audience design, e.g., Clark, 1996) involves non-automatic processes. However, it is
less clear whether more implicit forms of entrainment are fully automatic, or require at least some attentional resources. The evidence reviewed in this section from entrainment to structure (an implicit phenomenon) suggests some role for attention, but its extent and direction are not fully clear.

**DISCOURSE PARTICLES**

To shed further light on the role of attention for entrainment, we turn to another relatively implicit aspect of language use in which entrainment occurs – entrainment to discourse particles. This topic has not been studied despite discourse particles’ unique linguistic functions as well as their prevalence in spontaneous speech and anecdotally attested “contagiousness” (also see Müller, 2005). One such property of discourse particles, discussed below, makes them a particularly suitable candidate to investigate the role of attention for entrainment.

*Discourse particles* are words or phrases that have an expressive function but do not affect the propositional content of utterances (e.g., such as *well*, *you see*, *I mean*, and *you know*; see Schweinberger, 2015). Discourse particles are widespread in informal speech. They stand at the interface of lexical and prosodic information that, in part, signals relationships between larger units of spoken discourse (Redeker, 2006). While not exhaustive, current classes of discourse particle functions can be encompassed by four broad categories: connectivity, co-construction of meaning, indicators of feedback and attitudes, and indices of social relationships (Aijmer, 2002).

**Connectivity**

A defining feature of discourse particles, connectivity, is widely agreed to be the primary function of discourse particles. Discourse particles function to more explicitly connect new

---

2We use *discourse particle* as defined in Aijmer (2002). However, there is strong disagreement on terminology to adopt when dealing with these interactional signals and discourse markers (cf., Brinton, 1996; Hansen, 1998; Fraser, 1999; Schourup, 1999).
information to old information (Jabeen et al. 2011). These connections structure discourse by coordinating turns and framing the conversation (Andersen et al., 1999; Croucher, 2004). In the following example, the discourse particle so directly connects the two utterances: “A: You take the first turning on the left. B: So I don’t go past the hospital” (Blakemore, 1987, p. 85).

**Co-construction of Meaning**

Under a second class of functions, discourse particles help scaffold the general conversation. In spontaneous speech, frequent shifts (e.g., topic changes, digressions) can make construction of meaning difficult. Discourse particles assist a listener construct a mental representation of the exchange (Fung & Carter, 2007) and can be communicated proactively by the speaker, or reactively on the listener’s next turn. For example, a speaker may use by the way as an alert to a sudden shift in topic (Croucher, 2004). On a subsequent turn, a conversation partner may indicate active processing via hesitations (e.g., well), reformulations (e.g., I mean, in other words), elaborations (e.g., I mean), etc. (Fung & Carter, 2007). This class of functions also encompasses clarification for previous utterances, filled pauses (e.g., uhm), and gaps, all of which may signal speaker problems during production (Andersen et al., 1999).

**Feedback and Attitudes**

Discourse particles can also indicate whether an utterance was understood (Andersen et al., 1999) and indicate the subjective opinion or stance of the speaker (Brinton, 1996). For example, the discourse particles you know, I see, right, sure, or great may indicate a variety of feedback or indices of understanding, including shared knowledge, agreement or disagreement, acknowledgement, consent, support, or confirmation (Fung & Carter, 2007; Jabeen et al., 2011). Other discourse particles (e.g., well, I think, sort of) may indicate attitude or opinions (Croucher, 2004; Fung & Carter, 2007).
Social Relationships

Discourse particles can also function to reflect the level of familiarity between speakers and their relative status to each other (Andersen, 1999). For example, in the utterance “Well, now, tomorrow you can finish this up” (p. 1340), Andersen et al. illustrate how well and now, coupled with the extended pauses after both discourse particles, indicates the speaker holding authority over the listener. Furthermore, discourse particles can also be used to affect the level of intimacy or familiarity in a conversation, both to increase intimacy or to increase distance between speakers (Alami, 2015; Jabeen et al., 2011).

The Discourse Particle Like

Like, the discourse particle targeted in the present study because of its particular anecdotal contagiousness, frequently appears in many forms of colloquial English (D’Arcy, 2017). It’s associated with American English, though has spread to and is now common in other regional varieties, including: British English, Australia and New Zealand English, and others (Andersen, 2001; Schweinberger, 2015; Tagliamonte, 2005). In many varieties of contemporary spoken English, like exemplifies the versatility of discourse particles. Like can mark quoted speech, approximator, introduce examples, or fillers (Andersen, 2001). It can also appear between clause constituents, within phrases and between propositions. While incredibly flexible, recent accounts restrict the use of like as a discourse particle to uses that modify individual elements on a phrasal level, rather than as a more general discourse marker to indicate connectives, specifications, or exemplifications of utterances that have already occurred (D’Arcy, 2007).

Despite the prevalence and versatility of the use of like in spontaneous speech, there is very little psycholinguistic work on it. An exception is the study of Bosker et al. (2021), who
investigated how the discourse particle *like* influences online word recognition. In a visual word paradigm, participants hearing *like* showed anticipatory looks to cohort competitors (e.g., *lightbulb*) and were faster to recognize cohort competitors of *like*. Bosker et al. thus suggest that lexical discourse particles (that share phonology with many lexical items) are distinct from disfluencies (e.g., filled pauses; that typically do not share phonology with many lexical items). To the extent that speakers do not typically entrain to the production of disfluencies, different entrainment patterns for the use of *like* can hence be predicted. To our knowledge, there are no studies investigating entrainment to *like*.

Unlike other parts of language (e.g., *lexical*, *syntactic*), the use of discourse particle *like* may be perceived, at least in part or by some speakers, as a negative aspect of speech. The use of *like* is often stigmatized and denigrated despite its prevalence in spoken discourse (see Schweinberger, 2015). The use of the discourse particle *like* dates to the mid-twentieth century, with clause-final *like* tracing back to 1960s counterculture groups in New York City (Andersen, 2001), and the quotative *like* gaining prevalence from the Californian ‘Valley Girls’ stereotype in the 1980s (Croucher, 2004; D’Arcy, 2007). The use of *like* is most frequent in people under the age of 25 (Müller, 2005), and particularly in young female speakers (Tagliamonte, 2005). While speakers who use *like* are perceived as friendlier (Dailey-O’Cain, 2000), those who use many instances of *like* are rated as sounding less intelligent compared to controls (Fox Tree, 2006), as well as less educated, and less interesting (Dailey-O’Cain, 2000). Further, high use of *like* during job interviews reduces and applicant’s chance of success (Russell et al. 2008). Given anecdotal impressions that discourse particles, and *like* in particular, are absent in formal contexts such as political discourse or scientific presentations, and actively discouraged in oral communication advice (e.g., Asghar, 2013; Tracy, 2013; Quora, 2015; “How to: Stop,” 2017; Riegel, 2018;
McCord, 2020), it follows that the discourse particle *like* is an undesirable aspect of speech that at least some people may try to avoid entraining to.

The undesirability of *like* is a unique feature of discourse particles. Because their use is not favored, producing *like* suggests an implicit language use, but also that, to avoid producing the undesirable *like*, some executive control processes (in the very least, goal maintenance and inhibitory control) may be (consciously or nonconsciously) engaged. Response inhibition supports goal-directed behaviors (Nigg, 2000; Diamond, 2013). Further, response inhibition is cognitively effortful (Pascual-Leone, 1984). It follows that the addition of cognitive load (i.e., taxing attentional resources) may interfere with the process of avoiding using *like*, thereby leading to greater production of *like* under heavy cognitive load. Due to their anecdotally attested “contagiousness” (also see Müller, 2005), it follows that greater production of *like* may also be a matter of the frequency of the discourse particles, such that a hearing a higher frequency of *like* may elicit greater production.

Discourse particles are also relevant to the study of divided attention in comprehension because they have been linked to attracting attention to aspects of the discourse. Participants’ listening to a two-hour television talk with removed discourse particles showed significantly impaired comprehension compared to controls (Redeker, 2006). This supports how discourse particles aid in scaffolding representations during comprehension. It follows that the addition of cognitive load (attentional resources) during comprehension would detract attention from the discourse particles, thereby disrupting the encoding of *like* – leading to a reduction of *like* under heavy attentional load.
**The present study**

In the present study, we aimed to investigate the role of attention for entrainment during production (Experiment 1) and comprehension (Experiment 2) using the discourse particle *like*. We tested two main hypotheses – that entrainment to discourse particles, even if relatively implicit, requires some attentional resources, versus that it requires little (if any) attention.

In both experiments, participants read a short story and retold it (*baseline retelling phase*), then read another short story and listened to a recording of it (*priming phase*), and then read and retold a third story (*target retelling phase*). In Experiment 1, participants were simultaneously placed in a virtual reality (VR) environment during the baseline retelling phase and the target retelling phase. Half of the participants simultaneously navigated in a busy pedestrian zone in VR during their retellings. The other half of the participants sat still and did not move in the same VR location. In Experiment 2, participants were placed in VR only while listening to the recording during the priming phase. We analyzed the production rate of the discourse particle *like* in the target retelling phase relative to the baseline retelling phase, as a function of the presence of *likes* in the priming phase and amount of attentional load. Overall, we expected a general effect of entrainment such that participants should produce the discourse particle *like* more after listening to another speaker using *likes* in their retelling versus listening to a speaker using no *likes* in their retellings.

Experiment 1 studies the role of attention during production for entrainment to the discourse particle *like*. If the entrainment process itself has a non-automatic component, we can expect less entrainment under heavier attentional load than under lighter load. Conversely, if entrainment to *like* is largely automatic, there should be no effect of attention, a null effect. However, studying entrainment specifically to the discourse particle *like* may be one way to
experimentally avoid obtaining such a null effect. This is because the use of *like* may be undesirable to at least some participants, leading to the necessity to inhibit its use. Inhibition is considered part of the central executive functions (Miyake et al., 2000), and therefore should be (attentional) resource-demanding. As a result, if entrainment to *like* is automatic, we may expect less entrainment under heavier load than under lighter load because the *avoidance* of entrainment to *like* is non-automatic.

Experiment 2 targets the role of attention during comprehension for entrainment to discourse particles. If entrainment to discourse particles is largely automatic, we should expect less entrainment under heavier attentional load than under lighter load. Specifically, heavier load would detract attention from comprehension processes and may preclude encoding the discourse particles - and therefore, subsequently entraining to them. Conversely, if only superficial attention is enough to encode the discourse particles to a degree sufficient to cause subsequent entrainment, we should observe no differences between entrainment to *like* under heavier and under lighter attentional load.

In both experiments, the effect of frequency of *like* use on entrainment to *like* are targeted in follow-up analyses of an additional manipulation (*heavy-like* and *light-like* versions of the prime phase recordings). If entrainment to discourse particles is sensitive to frequency, we should expect greater entrainment after hearing heavier uses of *like* in a prime recording than after hearing lighter uses of *like* in a prime recording. On the other hand, it may be that too many *likes* highlight the undesirability of their use, and lead to greater avoidance. We explore the effects of *like* quantity in both experiments presented here.
Chapter 2: Experiment 1 – Divided Attention During Production

Experiment 1 examines whether additional attentional load during production affects entrainment to the discourse particles. We contrasted speakers retelling short stories while under high attentional load (navigating in a complex environment in VR) to that of speakers retelling short stories under light attentional load (stay stationary in a complex environment in VR). We looked at the rate of like use in the target retelling phase relative to the baseline retelling phase, as a function of the quantity of likes in the priming phase and amount of attentional load during the two retelling phases. If entrainment to like is non-automatic, there should be less entrainment to like under heavier load than under lighter load. If entrainment to like is mostly automatic, we should expect no effect of attentional load, or (as a result of failure to avoid an undesirable habit) more entrainment to like under heavier load than under lighter load.

METHODS

Participants

Eighty undergraduate participants from the University of Texas at El Paso participated for course credit or pay ($10 per hour). A power analysis conducted using G*Power 3.1 (Faul et al., 2009) for a 2 (Retelling Phase, a within-subjects condition) x 2 (like presence, a between-subjects condition) x 2 (Activity in VR, a between-subjects condition) ANOVA (explained below) indicated a total sample size of 76 would be needed to achieve a power of 0.8 given a medium-sized effect (f = 0.2). This sample size estimate was calculated prior to discovering an error in our prime materials (described below) that changed the design of our experiment. Data from eight participants were excluded from analyses due to missing data because of technical errors or participants not following instructions. Also, data from 4 participants were excluded from analyses due to experimenter use of like. Finally, a language history and demographics
questionnaire were administered at the end of the study to ensure that participants are highly proficient in English. As the study requires participants to read and retell stories (approximately 739 words per story), high spoken English proficiency was necessary for the study. Data from 6 participants were excluded from analyses for self-reporting English proficiency at 7 or lower on a 10-point scale (1 = Very basic/none; 10 = Native). Of the 6 participants that self-rated their English proficiency at 7 or below, 5 verbally indicated that they were unable to understand the presented stories, and all 6 scored below 60% on the follow-up comprehension questions. This reduced the final sample size to 62 participants (38 female). Participants’ average age was 20.40 years old. Language history and daily use varied across participants (see Table 1).

Table 1: Experiment 1 Language History and Daily Use Characteristics

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>M (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Self-reported Proficiency</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>English</td>
<td>62</td>
<td>9.44(1.41)</td>
</tr>
<tr>
<td>Spanish</td>
<td>62</td>
<td>5.05(3.21)</td>
</tr>
<tr>
<td>Other</td>
<td>34</td>
<td>3.01(2.42)</td>
</tr>
<tr>
<td><strong>Daily Language Use</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>English</td>
<td>61</td>
<td>79.41%(24.13%)</td>
</tr>
<tr>
<td>Spanish</td>
<td>44</td>
<td>27.33%(24.55%)</td>
</tr>
<tr>
<td>Other</td>
<td>9</td>
<td>2.03%(6.08%)</td>
</tr>
</tbody>
</table>

*Note.* Self-reported proficiency: 1 = very basic/none, 10 = native

**Materials**

**Short stories**

Japanese short fairy tales were used to avoid participant familiarity with the content. The stories were obtained from *Woodblocks in Wonderland: The Japanese fairy tale series*, and were originally published in The Public Domain Review [https://publicdomainreview.org/essay/woodblocks-in-wonderland-the-japanese-fairy-tale-series](https://publicdomainreview.org/essay/woodblocks-in-wonderland-the-japanese-fairy-tale-series) under a Creative Commons Attribution-ShareAlike 3.0. Five stories, selected to be nonviolent and similar in length, were normed for information density, complexity, predictability and ease of understanding (these stories are provided in Appendix A). The three stories with the most
similar ratings (The Hare of Inaba, The Silly Jellyfish, The Old Man and the Devils; \(mean = 4.7, SD = 0.7\)) were selected for the experimental materials. The Silly Jellyfish was selected at random to be used for the recorded story. The end of the story was altered to avoid mentioning violence. The two other stories (The Hare of Inaba, The Old Man and the Devils) were counterbalanced between the baseline retelling phase and the target retelling phase.

**Audio materials**

To manipulate amount of *like* present in the priming phase recordings, four different versions of The Silly Jellyfish were recorded by a sophomore in Theater Arts at the University of Texas at El Paso, instructed to ad-lib the production of the discourse particle *like* (because scripted uses may sound less natural). Recording Version 1 (5:23 mins) contained medium use of *like* (61 instances; 59 discourse particles) and Version 3 (5:15 mins) contained heavy use of *like* (145 instances; 140 discourse particles). Recording Versions 2 and 4 were intended to contain no uses of like to serve as controls. As the medium use of *like* and heavy use of *like* recordings were very different on many different aspects, we included two control conditions to have the same variability for the no-*like* recordings. However, later inspection of materials at the final stages of data collection revealed target uses of *like* in the two control recordings. Therefore, in the statistical analyses, we treated the four conditions as a continuum of the frequency of *like* instead of comparing *like* presence to no *like* presence in a binary fashion. As such, Recording Version 2 (4:23 mins) was a read-aloud transcription of Version 1 and contained low use of *like* (16 instances; 12 discourse particles). Recording Version 4 (5:15 mins) was unscripted and contained the lowest use of *like* (5 instances; 3 discourse particles).
**Procedure**

The experiment was conducted in a sound-proof chamber, on the Finding Five platform (https://www.findingfive.com). Participants first created an account for the Finding Five platform where the experiment was presented. They then received a short familiarization with the VR environment. A pre-determined location that participants were unlikely to have visited is loaded in Google Earth VR (a pedestrian zone at the crossing of Patriarh Evitimiy Street and Vitosa Street in Sofia, Bulgaria). Participants were seated in front of the computer at arm’s length distance and remained seated for the entire duration of the experiment to minimize dizziness. The experimenter assisted the participant with fitting the VR headset and making any necessary calibrations, and explained how to navigate with the hand-held controllers. Once participants were comfortable with navigation, they received practice speaking while simultaneously navigating the VR environment. The experimenters prompted three topics (“What have you done today prior to arriving here at the lab?”; “Tell me about your favorite show.”; “Barring COVID restrictions, if you could go anywhere in the world, where would you want to go?”) until the participant indicated being comfortable with this task. Then, they were asked to remove the VR headset to proceed with the experiment, which has three phases.

**Baseline retelling phase**

Participants read either The Hare of Inaba or The Old Man and the Devils (counterbalanced across participants). The experimenter then placed the VR headset on participants to place them in the VR environment and instructed them to retell the story in their own words, with as much detail as possible. Half of the participants were instructed to move (using handheld controllers) in whichever direction they like for the duration of their retelling. The other half of the participants were placed in the same location but instructed to sit still and
not move. The GoogleEarth view that participants saw in the headset is mirrored on the experimental computer, so experimenters were able to monitor their behaviors and adherence to instructions. If participants did not follow instructions, the experimenter stopped the participant and reminded them of their instructions. Any nonadherence is noted in the participant log. After participants finished retelling the story, the experimenter removed the VR headset, and participants answered five short multiple-choice comprehension questions about the story, to encourage them to pay attention to the content.

**Priming phase**

Participants then read The Silly Jellyfish story. On the subsequent screen, participants listened to one of the four recorded versions of the story (determined through random assignment). They answered five short multiple-choice comprehension questions about the story before continuing.

**Target retelling phase**

The target retelling phase is identical to the baseline retelling phase, except a third story was presented (e.g., if a participant read The Hare of Inaba in the baseline retelling phase, they then read The Old Man and the Devils in the target retelling phase). The VR condition was the same for baseline retelling and target retelling phases.

**Additional measures**

We additionally collected measures of interlocutor perceptions and individual differences, described below, for future exploratory studies. To explore interlocutor perceptions, participants rated the recorded voice on a 7-point Likert-type scale for attractiveness, sense of humor, trustworthiness, educatedness, eloquence, friendliness, ignorance, intelligence, modesty, phoniness, and politeness. The individual differences measures were the Interpersonal Reactivity
Index (Appendix B; Davis, 1980), the 50-item International Personality Item Pool subset of the Big Five personality test (Appendix C; Goldberg, 1992; Goldberg, 1999), and the Resistance to Peer Influence Questionnaire (Appendix D; Steinberg & Monahan, 2007). Participants also completed a language history and demographics questionnaire (Appendix E).

All instructions throughout the experiment were presented immediately preceding each step. The experimental session was digitally recorded using both an ambient microphone positioned near the experimental computer and the microphone embedded within the virtual reality headset.

This experiment was approved by the University of Texas at El Paso Institutional Review Board.

**Design**

The present study used a mixed design, where Quantity of *like* when present (occasional-low, occasional-high, abundant-low, abundant-high), and Activity in VR (moving, stationary) were manipulated between-subjects, and Retelling Phase (baseline, target) was manipulated within-subjects. Additionally, the stories presented in the baseline and target phases were counterbalanced. In total, the combination of these factors produced 16 versions of the experiment.

**Coding and data analysis**

Participant descriptions for the retellings were initially transcribed automatically using Otter.ai, and subsequently reviewed by a human coder for inconsistencies and non-targeted uses of *like* (verb, comparisons). Percent *like* use was calculated by dividing the total number of target-instances of *like* over the total number of words spoken in the respective retelling. The percentages were submitted to a 2 (Retelling phase: baseline, target) x 4 (Quantity of *like*: subtle-
low, subtle-high, abundant-low, abundant-high) x 2 (Activity in VR: moving, stationary) repeated measures ANOVA. To investigate any effects of Activity in VR and/or Quantity of *like* on entrainment, these effects must interact with Retelling Phase.

**RESULTS**

There was a marginal effect of phase, such that the percentage of *like* produced in the target retelling phase was numerically higher (M = 1.95%, SD = 2.23%) compared to the baseline retelling phase (M = 1.59%, SD = 1.95%), $F(1, 54) = 3.851$, $MSE = .884$, $p = .055$. There were no other significant main effects or interactions. Percent *like* use across conditions is plotted in Figure 1.
Figure 1: Experiment 1 – *like* Production Under Attentional Load During Language Production
Discussion

In Experiment 1, we found a marginal entrainment effect, such that percent *like* use was numerically produced more in the target retelling compared to the baseline retelling. Further, there was no interaction between the activity in VR and the entrainment effect. This indicates that adding attentional load does not detract from the entrainment process itself, suggesting that entrainment to the discourse particle *like* is largely automatic. This also suggests that participants may not be inhibiting *like* use during their retellings. Finally, there was no interaction of the quantity of *like* in the prime recording and retelling phase. The number of *likes* present in the prime recording did not differently affect the marginal entrainment effect. Overall, the findings tentatively suggest that entrainment to the discourse particle *like* is not affected by attentional load during production, although we note that the experiment is underpowered after participant exclusions.
Chapter 3: Experiment 2 – Divided Attention During Comprehension

Experiment 2 examined whether additional attentional load during comprehension affects entrainment from discourse particles. In this experiment, participants are placed in the VR environment during comprehension instead of during production. As in Experiment 1, we looked at the percentage of *like* use over total word count in the target retelling phase relative to the baseline retelling phase, as a function of the presence of *likes* and amount of attentional load in the priming phase. If entrainment to discourse particles is susceptible to attentional load during comprehension, we should expect less entrainment under heavier attentional load than under lighter load. Heavier load would detract attention from comprehension processes and may preclude encoding the *likes*. Conversely, if entrainment to discourse particles is relatively unaffected by attentional load during comprehension (as long as some attention is paid to the linguistic exposure), there should be no effect of load on entrainment to *like*.

**Method**

**Participants**

Sixty undergraduate participants from the University of Texas at El Paso participated for course credit or pay ($10 per hour). A power analysis conducted using G*Power 3.1 (Faul et al., 2009) for a 2 (Retelling Phase, a within-subjects condition) x 3 (Quantity of *likes*, a between-subjects condition) x 2 (Activity in VR, a between-subjects condition) ANOVA (explained below) indicated a total sample size of 60 would be needed to achieve a power of 0.8 given a medium-sized effect (f = 0.2). Nine participants were excluded from analyses due to missing data because of technical errors or participants not following instructions. Data from 2 participants were excluded from analyses due to nonadherence to VR instructions. Also, data from 1 participant was excluded due to reported awareness of experiment purpose and intentional
manipulation of own data. Finally, a language history and demographics questionnaire were administered at the end of the study to ensure that participants are highly proficient in English. We maintained the same self-proficiency criterion as in Experiment 1, such that participants self-reporting English proficiency at 7 or lower on a 10-point scale (1 = Very basic/none; 10 = native) were excluded from analyses (n = 4). Of the 4 participants that self-rated either English proficiency at 7 or below, 2 verbally indicated that they were unable to understand the presented stories, and all 4 scored below 60% on the follow-up comprehension questions. This reduced the final sample size to 44 participants (19 female). Participants’ average age was 21.59 years old. Language history and daily use varied across participants (see Table 4).

<table>
<thead>
<tr>
<th>Table 2: Experiment 2 Language History and Daily Use Characteristics</th>
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<td><strong>Self-reported Proficiency</strong></td>
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*Note. Self-reported proficiency: 1 = very basic/none, 10 = native*

**Materials**

The materials were the same as in Experiment 1 with the following exception. We realized before administering Experiment 2 that the materials initially intended as controls contained instances of *like* (5 and 16, respectively). Therefore, to include a control condition with no instances of *like*, a researcher went through recording Version 4 (5:15 mins; 5 instances of *like*) and spliced out the uses of *like*. The other control version was dropped as the instances of *like* could not be spliced out without excessive unnaturalness.
**Procedure**

The procedure was the same as in Experiment 1, except for when participants are placed in VR. In Experiment 2, participants were placed in VR only during the priming phase.

**Coding and data analyses**

The coding procedure was the same as in Experiment 1. Percent *like* use were submitted to a 2 (Retelling phase: baseline, target) x 3 (Quantity of *like*: subtle, abundant, control) x 2 (Activity in VR: moving, stationary) repeated measures ANOVA. To investigate any effects of Activity in VR and/or Quantity of *like* on entrainment, these effects must interact with Retelling Phase.

**Results**

After removing invalid data from the sample, the group exposed to the abundant *like* prime while instructed to remain still in VR yielded a sample of one. Due to the lack of variance, we eliminated the group from the final analyses. As such, we separately analyzed the data from the two VR conditions. We first submitted the percent *like* use to a 2 (Retelling phase: baseline, target) x 2 (Quantity of *like*: subtle, control) for only the stationary VR condition. There was no significant effect of phase $F(1, 17) = .000, MSE = 1.318, p = .988$, such that there was no entrainment effect in the stationary VR condition. There were no significant effects or interactions. We also submitted percent *like* use to a 2 (Retelling phase: baseline, target) x 3 (Quantity of *like*: subtle, abundant, control) for only the moving VR condition. There was no significant effect of phase $F(1, 21) = 1.951, MSE = 1.028, p = .177$, such that there was no entrainment effect in the moving VR condition. There were no significant effects or interactions.

Although there was no overall entrainment effect in the moving VR condition, we investigated planned comparisons in the presence of a non-significant Retelling Phase x Quantity
of *like* interaction, as the experiment was underpowered. To compare the subtle *like* condition to the control (no *like*) condition, we also submitted percent *like* use to a 2 (Retelling phase: baseline, target) x 2 (Quantity of *like*: control, subtle) for only the moving VR condition. We did not find an interaction between Retelling phase and the Quantity of *likes* for the subtle use of *likes* in the recording, $F(1, 17) = 1.257, MSE = 1.209, p = .278$. There were no other significant effects.

To compare the abundant *like* condition to the control (no *like*) condition, we submitted percent *like* use to a 2 (Retelling phase: baseline, target) x 2 (Quantity of *like*: control, subtle) for only the moving VR condition. We found a marginal interaction between Retelling Phase and the Quantity of *likes* for the abundant use of *likes* in the recording, $F(1, 14) = 3.717, MSE = .963, p = .074$. There were no other significant effects or interactions.

Percent *like* use across conditions is plotted in Figure 2.
Experiment 2: *like* Production Under Attentional Load During Language Comprehension (N = 44)

Figure 2: Experiment 2 – *like* Production Under Attentional Load During Language Comprehension
DISCUSSION

Experiment 2 sought to test whether added attentional load during comprehension affects entrainment from discourse particles. We predicted that if entrainment to discourse particles was susceptible to attentional load during comprehension, there wouldn’t be an effect of attention load on entrainment. However, we also predicted that if entrainment to discourse particles is relatively automatic during comprehension, that we would find reduced entrainment under heavier attentional load than under lighter attentional load. We only found a marginal interaction of phase and quantity of like for the abundant prime, compared to control, in the moving VR condition. This tentatively suggests that entrainment to like may be sensitive to frequency of likes, such that hearing a greater number of like triggers greater production of like.
Chapter 4: General Discussion

The present study sought to investigate the role of attention for entrainment during production and comprehension, focusing on entrainment to the discourse particle *like*. We tested two main hypotheses: that entrainment to discourse particles, even if relatively implicit, requires some attentional resources, versus that it requires little attention (if any).

Overall, we expected a general effect of entrainment, such that participants should produce the discourse particle *like* more after listening to another speaker using *likes* in their retelling versus listening to a speaker using no *likes* in their retellings. In Experiment 1, we found a marginal effect of entrainment, suggesting that this can be elicited in laboratory conditions. However, we did not find an effect of entrainment in Experiment 2. Both experiments were underpowered after removing invalid or incomplete data from the analyses.

In Experiment 1, we investigated three hypotheses for the production side of the entrainment process. First, if entrainment to *like* itself has a non-automatic component, we expected less entrainment under heavier attentional load than under lighter load. Second, if entrainment to *like* is largely automatic, there should be no effect of attentional load. Third, if entrainment to *like* is largely automatic but the avoidance of entrainment to *like* is non-automatic, we expected less entrainment under heavier load than under lighter load. In Experiment 1, we found no interactions of attentional load on the entrainment effect. This tentatively supports our second hypothesis, that entrainment to *like* is largely automatic.

While the use of *like* is discouraged in oral communication advice and notably absent from formal contexts such as political discourse or scientific presentations), the discourse particle *like* may not be an undesirable aspect of speech for the tested demographic. The use of *like* is most prevalent in speakers under the age of 25 (Müller, 2005) and the mean age of our
participants in Experiment 1 are under that threshold. Alternatively, the average counts of *like* produced appear low overall (see Table 3 and Table 8 for mean counts of *likes* per condition in Experiments 1 and 2, respectively). Given a laboratory setting is a professional context, participants may have been conscious of the negative social perceptions associated with using *like* and exercised that caution even under load.

In a second experiment, we sought to investigate the role of attention during comprehension for entrainment to the discourse particle *like*. However, it did not yield the predicted general entrainment effect or interactions with attentional load. The only (marginal) entrainment effect we found was in the abundant *like* condition relative to no-*like* condition under heavier attentional load (moving in VR). This tentatively may indicate that when you move, you don’t notice the *likes* as much and, as such, need a high frequency of *likes* to be primed. This very tentatively supports our hypothesis that entrainment to the discourse particle *like* is sensitive to frequency.

Notably, this work was the first of its kind to explore entrainment to discourse particles, in particular the discourse particle *like*. It further expanded upon the limited body of research on the role of attention for the entrainment phenomenon. Participants managed to perform both tasks successfully and in Experiment 1 their entrainment was not affected. This tentatively implies (though we caution that these results are preliminary) that even when participants are under higher attentional load, such as when driving and talking, their entrainment to discourse particles is unaffected. This suggests that entrainment is a conversational mechanism that optimizes the success of linguistic interactions, given that entrainment has social functions and is beneficial for rapport between interlocutors and prosociality (see, e.g., Chartrand & Van Baaren, 2009).
In sum, the present study demonstrated that entrainment to the discourse particle *like* can be elicited in laboratory conditions (though this was not supported in Experiment 2). We did not find any support for attentional involvement in the entrainment to *like*. In future work, we aim to replace the excluded participants, as well as conduct an experiment without any attentional manipulations, and conduct experiments with a more controlled attentional load manipulation.
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Appendix A

Selected Japanese Stories for Norming

Sample linguistic materials to be provided to participants (retrieved from https://publicdomainreview.org/essay/woodblocks-in-wonderland-the-japanese-fairy-tale-series, include minor edits by PI)

Story 1: The Goblin Spider

Word count: 487

In very ancient books it is said that there used to be many goblin-spiders. Some folks declare there are still some goblin-spiders. During the daytime they look just like common spiders; but very late at night, when everybody is asleep, and there is no sound, they become very, very big, and do awful things. Goblin-spiders are supposed to also have the magical power of taking human shape, so as to deceive people. And there is a famous Japanese story about such a spider. There was once, in some lonely part of the country, a haunted temple. No one could live in the building because of the goblins that had taken possession of it. Many brave samurai went to that place at various times for the purpose of killing the goblins. But they were never heard of again after they had entered the temple. At last, one who was famous for his courage and his prudence went to the temple to watch during the night. And he said to those who accompanied him there: "If in the morning I am still alive, I shall drum upon the drum of the temple." Then he was left alone, to watch by the light of a lamp. As the night advanced, he crouched down under the altar, which supported a dusty image of Buddha. He saw nothing strange and heard no sound till after midnight. Then there came a goblin, having but half a body and one eye, and said, “There is the smell of a man!” But the samurai did not move. The goblin went away. Then there came a priest and played music so wonderfully that the samurai felt sure it was not the playing of
a man. So he leaped up with his sword drawn. The priest, seeing him, burst out laughing, and said: "So you thought I was a goblin? Oh no! I am only the priest of this temple; but I have to play to keep off the goblins. Does my instrument not sound well? Please play a little." And he offered the instrument to the samurai who grasped it very cautiously with his left hand. But the instrument instantly changed into a monstrous spider web, and the priest into a goblin. The warrior found himself caught fast in the web by the left hand. He struggled bravely, and struck at the spider with his sword, and wounded it; but he soon became more and more entangled in the net, and could not move. However, the wounded spider crawled away, and the sun rose. In a little while the people came and found the samurai in the horrible web, and freed him. They saw tracks of blood upon the floor, and followed the tracks out of the temple to a hole in the deserted garden. Out of the hole issued a frightful sound of groaning. They found the wounded goblin in the hole, and killed it.

Story 2: The Old Man and the Devils

A long time ago there was an old man who had a big lump on the right side of his face. One day he went into the mountain to cut wood, when the rain began to pour and the wind to blow so very hard, that finding it impossible to return home, and filled with fear, he took refuge in the hollow of an old tree. While sitting there doubled up and unable to sleep, he heard the confused sound of many voices in the distance gradually approaching to where he was. He said to himself “how strange! I thought I was all alone in the mountain, but I hear the voices of many people”; so, taking courage, he peeped out, and saw a great crowd of strange-looking beings. Some were red and dressed in green clothes, others were black and dressed in red clothes, some
had only one eye, others had no mouth. Indeed, it is quite impossible to describe their varied and strange looks. They kindled a fire, so that it became as light as day. They sat down in two cross rows, and began to drink wine and make merry just like human beings. They passed the wine cup around so often that many of them became very drunk. One of the young Devils got up and began to sing a merry song and to dance; so also many others; some danced well, others badly. One said, “we have had a lot of fun tonight, but I would like to see something new”. The old man losing all fear, thought he would like to dance, and saying “Let come what will, if I die for it I will have to dance too”, crept out of the hollow tree and, with his cap slipped over his nose and his axe sticking in his belt, began to dance. The Devils in great surprise jumped up saying, “Who is this!”; but the old man advanced and receded, swayed to and fro, and postured this way and that way. The whole crowd laughed and enjoyed the fun saying, “how well the old man dances, you must always come and join us in our sport; but for fear you might not come you must give us a pledge that you will”. The Devils consulted each other and agreed that the lump on his face, which was a token of wealth, was what he valued most highly; thus they demanded that it should be taken. The old man replied, “I have had this lump many years and would not without good reason part with it; but you may have it, or an eye or my nose either if you wish”. So the Devils laid hold of it, twisting and pulling, and took it off without giving him any pain, and put it away as a pledge that he would come back. Just then the dawn began to break and the birds to sing, so the Devils hurried away. The old man felt his face and found it quite smooth: there was no trace of the lump left. He forgot all about cutting wood, and hastened home. His wife, seeing him, exclaimed in great surprise, ”What has happened to you!”. So he told her all that had befallen him. Now among the neighbors there was another old man who had a big lump on the left side of his face. Hearing all about how the old man had got rid of his lump, he determined that he would
also try the same plan to get rid of his lump. So he went and crept into the hollow tree and waited for the Devils to come. Sure enough, they came just as he was told. They sat down, drank wine and made merry just as they did before. The old man, afraid and trembling, crept out of the hollow tree. The Devils welcomed him saying, “the old man has come, now let us see him dance” This old man was awkward and did not dance as well as the other. So the Devils cried out, “You dance badly, and are getting worse and worse, we will give you back your lump which we took from you as a pledge”. Upon this, one of the Devils brought the lump and stuck it on the other side of his face; so the old man returned home with a lump on each side of his face.

Story 3: The Silly Jellyfish

Word count: 739

Once upon a time, the King of the Dragons, who had till then lived as a bachelor, took it into his head to get married. His bride was a charming and lovely Dragonette. Great were the rejoicings on the occasion, and for some days all was feasting and merriment. But alas, before a month had passed, the young Dragon Queen fell ill. The doctors dosed her with every medicine that was known to them, but all to no purpose. At last they shook their heads, declaring that there was nothing more to be done. But the sick Queen said to her husband: “I know of something that will cure me. Fetch me a Monkey’s liver to eat, and I shall get well at once.” “A Monkey’s liver!” exclaimed the King. “Darling, you must be mad! You forget that we Dragons live in the sea, while Monkeys live far away from here, among the forest-trees on land.” Hereupon the young Dragon Queen burst into tears: “I only ask you for one small thing,” whimpered she, “and you won’t get it for me. Oh! I wish I had stayed at home with my own m-m-m-mama and my own papa-a-a-a!” Here her voice choked with sobs. So a Jellyfish was sent on the strange errand.
In those days the Jellyfish was just like any other fish, with eyes, and fins, and a tail. He even had little feet, which made him able to walk on the land as well as to swim in the water. It did not take him many hours to swim across to the country where the Monkeys lived; and fortunately, there just happened to be a fine Monkey skipping about among the branches of the trees near the place where the Jellyfish landed. So the Jellyfish said: “Mr. Monkey! I have come to tell you of a country far more beautiful than this. It lies beyond the waves, and is called Dragon-Land. If you will come with me, I will take you there. Just get on my back.” The Monkey thought it would be fun to see a new country. So he leapt onto the Jellyfish’s back, and off they started across the water. But when they had gone about half-way, he began to fear that perhaps there might be some hidden danger. It seemed so odd to be fetched suddenly in that way by a stranger. So he said to the Jellyfish: “What made you think of coming for me?” The Jellyfish answered: “My Master, the King of the Dragons, wants you in order to cut out your liver, and give it as medicine to his wife, the Queen, who is sick.” “Oh! That’s your little game, is it?” thought the Monkey. But he kept his thoughts to himself and only said: “Nothing could please me better than to be of service to Their Majesties. But it so happens that I left my liver hanging to a branch of that big chestnut-tree, which you found me skipping about on. A liver is a thing that weighs a good deal. So I usually take it out, and play about without it during the day-time. We must go back for it.” The Jelly-Fish agreed that there was nothing else to be done under the circumstances. When they reached the shore of Monkey-Land again, the monkey bounced off of the Jelly-Fish’s back, and up to the topmost branch of the chestnut-tree in less than no time. Then he said: “I do not see my liver here. Perhaps somebody has taken it away. But I will look for it. You, meanwhile, should go back and tell your Master what has happened. He might be anxious about you if you did not get home before dark.” So the Jellyfish started off a second time; and when he got home, he told
the Dragon King everything just as it had happened. But the King flew into a rage with him for his stupidity, and shouted, “You are so stupid your brain is nothing but jelly! From now on, your body will be jelly too, to remind you of how stupid you are.” This is the reason why, to this very day, Jellyfishes are nothing more than a mass of jelly. As for the Dragon Queen, when she found she could not have the Monkey’s liver – well, she made up her mind that the only thing to do was to get well without it.

Story 4: The Hairless Hare

Word count: 739

There were once eighty-one brothers, who were Princes of the land. They were all jealous of one another, each one wishing to be King, to rule over the others, and over the whole Kingdom. Besides this, each one wanted to marry the same Princess. At last they made up their minds that they would go together to her castle, and each one would try to persuade the Princess to marry him. Although eighty of these brothers were jealous of one another, they all agreed in hating the eighty-first, who was good and gentle, and did not like their rough, quarrelsome ways. When they set out upon their journey, they made the poor eighty-first brother walk behind them, and carry the bag, although he was as much a Prince as any of them. Along the way, the eighty Princes found a poor Hare, with all his fur plucked out, lying down very sick and miserable. The eighty Princes said to the Hare, "We will tell you what you should do. Go and bathe in the sea water, and then lie down on the slope of a high mountain, and let the wind blow upon you. That will soon make your fur grow, we promise you." So the poor Hare believed them, and did as they said. But, as the salt water dried, the skin of his body all cracked and split with the sun and the wind, so that he was in terrible pain, and lay there crying, in a much worse state than he was
before. Now the eighty-first brother was a long way behind the others, because he had the luggage to carry, but at last he came up, staggering under the weight of the heavy bag. When he saw the Hare he asked, " Why are you lying there crying?" Oh dear!" said the Hare, "Just stop a moment and I will tell you all my story. I wanted to cross over from my island to this land. I didn't know how to get over, but at last I hit upon a plan. I said to the sea crocodiles, "Let us count how many crocodiles there are in the sea, and how many hares there are in the land. Let’s begin with the crocodiles. Come, every one of you, and lie down in a row, then I will step upon each one, and count you as I run across. When I have finished counting you, we can count the hares, and then we shall know whether there are more hares, or more crocodiles." The crocodiles came and lay down in a row. Then I stepped on them and counted them as I ran across, and was just going to jump on shore, when I laughed and said, "You silly crocodiles, I don't care how many of you there are. I only wanted a bridge to get across." Oh! why did I boast until I was safe on dry land? For the last crocodile, the one which lay at the very end of the row, seized me, and plucked off all my fur." "And serves you right too, for being so tricky," said the eighty-first brother; “however, go on with your story.” "As I was lying here crying," continued the Hare, "the eighty Princes who went by before you, told me to bathe in salt water, and lie down in the wind. I did as they told me, but I am ten times worse than before, and my whole body is smarting and sore." Then the eighty-first brother said to the Hare, "Go quickly now to the river, it is quite near. Wash yourself well with the fresh water, then take the pollen of the trees growing on the river bank, spread it about on the ground, and roll on it; if you do this, your skin will heal and your fur will grow again. So the Hare did as he was told; and this time his fur grew thicker than ever. Then the Hare said to the eighty-first brother, "As for those eighty Princes, your brothers, they shall not get the Princess. Although you carry the bag yet, your Highness shall at last get both the
princess and the country." And indeed, the Princess would have nothing to do with the eighty bad brothers, but chose the eighty-first who was kind and good. Then he was made King of the country, and lived happily all his life.

Story 5: Little Peachling

A long, long time ago there lived an old man and an old woman. One day the old man went to the mountains to cut grass; and the old woman went to the river to wash clothes. While she was washing, a great big thing came tumbling and splashing down the stream. When the old woman saw it, she was very glad, and pulled it to her with a piece of bamboo that laid nearby. When she took it up and looked at it, she saw that it was a very large peach. She then quickly finished her washing and returned home intending to give the peach to her old man to eat. When she cut the peach in two, out came a child from the large kernel. Seeing this the old couple rejoiced, and named the child Little Peachling because he came out of a peach. As both the old people took good care of him, he grew and became strong and enterprising. So the old couple had their expectations raised, and bestowed still more care on his education. Little Peachling, finding that he surpassed everybody in strength, determined to cross over to the island of the Devils, take their riches, and come back. He at once consulted with the old man and the old woman about the matter, and got them to make him some dumplings. These he put in his pouch. Besides this, he made every kind of preparation for his journey to the island of the Devils and set out. Then first a dog came to the side of the way and said; "Little Peachling! What do you have there hanging on your belt?" He replied: "I have some of the very best dumplings." "Give me one and I will go with you," said the dog. So Little Peachling took a dumpling out of his pouch and
gave it to the dog. Then a monkey came and got one the same way. A pheasant also came flying and said: "Give me a dumpling too, and I will go along with you." So all three went along with him. In no time they arrived at the island of the Devils, and at once broke through the front gate; Little Peachling first; then his three followers. Here they met a great multitude of Devils who tried to stop them, but they still pressed inwards, and at last encountered the Devils’ Chief. Then came the tug of war. The Devils’ Chief made at Little Peachling with an iron club, but Little Peachling was ready for him, and dodged him adroitly. At last they grappled each other, and without difficulty Little Peachling crushed down the Devils’ Chief and tied him with a rope so tight that he could not even move. All this was done in a fair fight. After this, the Devils’ Chief said he would surrender all his riches. "Out with your riches then." said Little Peachling laughing. Having collected and arranged in order a great pile of precious things, Little Peachling took them, and set out for his home, rejoicing, as he marched bravely back, that, with the help of his three companions, to whom he attributed all his success, he had been able so easily to accomplish his goal. Great was the joy of the old man and the old woman when Little Peachling came back. He feasted everybody bountifully, told many stories of his adventure, displayed his riches, and at last became a leading man, a man of influence, very rich and honorable; a man to be very much congratulated indeed.
Appendix B: Interpersonal Reactivity Index

The following statements inquire about your thoughts and feelings in a variety of situations. For each item, indicate how well it describes you by choosing the appropriate letter on the scale at the top of the page: A, B, C, D, or E. When you have decided on your answer, fill in the letter on the answer sheet next to the item number. READ EACH ITEM CAREFULLY BEFORE RESPONDING. Answer as honestly as you can. Thank you.

ANSWER SCALE:

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>DOES NOT DESCRIBE ME WELL</td>
<td></td>
<td></td>
<td></td>
<td>DESCRIBES ME VERY WELL</td>
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</table>

1. I daydream and fantasize, with some regularity, about things that might happen to me. (FS)
2. I often have tender, concerned feelings for people less fortunate than me. (EC)
3. I sometimes find it difficult to see things from the "other guy's" point of view. (PT) (-)
4. Sometimes I don't feel very sorry for other people when they are having problems. (EC) (-)
5. I really get involved with the feelings of the characters in a novel. (FS)
6. In emergency situations, I feel apprehensive and ill-at-ease. (PD)
7. I am usually objective when I watch a movie or play, and I don't often get completely caught up in it. (FS) (-)
8. I try to look at everybody's side of a disagreement before I make a decision. (PT)
9. When I see someone being taken advantage of, I feel kind of protective towards them. (EC)

10. I sometimes feel helpless when I am in the middle of a very emotional situation. (PD)

11. I sometimes try to understand my friends better by imagining how things look from their perspective. (PT)

12. Becoming extremely involved in a good book or movie is somewhat rare for me. (FS) (-)

13. When I see someone get hurt, I tend to remain calm. (PD) (-)

14. Other people's misfortunes do not usually disturb me a great deal. (EC) (-)

15. If I'm sure I'm right about something, I don't waste much time listening to other people's arguments. (PT) (-)

16. After seeing a play or movie, I have felt as though I were one of the characters. (FS)

17. Being in a tense emotional situation scares me. (PD)

18. When I see someone being treated unfairly, I sometimes don't feel very much pity for them. (EC) (-)

19. I am usually pretty effective in dealing with emergencies. (PD) (-)

20. I am often quite touched by things that I see happen. (EC)

21. I believe that there are two sides to every question and try to look at them both. (PT)

22. I would describe myself as a pretty soft-hearted person. (EC)

23. When I watch a good movie, I can very easily put myself in the place of a leading character. (FS)

24. I tend to lose control during emergencies. (PD)

25. When I'm upset at someone, I usually try to "put myself in his shoes" for a while. (PT)

26. When I am reading an interesting story or novel, I imagine how I would feel if the events
in the story were happening to me. (FS)

27. When I see someone who badly needs help in an emergency, I go to pieces. (PD)

28. Before criticizing somebody, I try to imagine how I would feel if I were in their place. (PT)

NOTE: (-) denotes item to be scored in reverse fashion

PT = perspective-taking scale
FS = fantasy scale
EC = empathic concern scale
PD = personal distress scale

A = 0
B = 1
C = 2
D = 3
E = 4

Except for reversed-scored items, which are scored:

A = 4
B = 3
C = 2
D = 1
E = 0
Appendix C: IPIP 50-Item subset of Big Five Personality Test

Introduction

This is a personality test, it will help you understand why you act the way that you do and how
your personality is structured. Please follow the instructions below, scoring and results are on the
next page.

Instructions

In the table below, for each statement 1-50 mark how much you agree with on the scale 1-5,
where 1=disagree, 2=slightly disagree, 3=neutral, 4=slightly agree and 5=agree, in the box to the
left of it.

<table>
<thead>
<tr>
<th>Rating</th>
<th>I…</th>
<th>Rating</th>
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<tbody>
<tr>
<td></td>
<td>1. Am the life of the party.</td>
<td></td>
<td>26. Have little to say.</td>
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<tr>
<td></td>
<td>2. Feel little concern for others.</td>
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<td>27. Have a soft heart.</td>
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<td></td>
<td>3. Am always prepared.</td>
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<td>28. Often forget to put things back</td>
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<td></td>
<td>in their proper place.</td>
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<td></td>
<td>5. Have a rich vocabulary.</td>
<td></td>
<td>30. Do not have a good imagination.</td>
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<tr>
<td></td>
<td>6. Don't talk a lot.</td>
<td></td>
<td>31. Talk to a lot of different people</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>at parties.</td>
</tr>
<tr>
<td></td>
<td>7. Am interested in people.</td>
<td></td>
<td>32. Am not really interested in others.</td>
</tr>
<tr>
<td></td>
<td>8. Leave my belongings around.</td>
<td></td>
<td>33. Like order.</td>
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<tr>
<td></td>
<td>9. Am relaxed most of the time.</td>
<td></td>
<td>34. Change my mood a lot.</td>
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<tr>
<td>10.</td>
<td>Have difficulty understanding abstract ideas.</td>
<td>35.</td>
<td>Am quick to understand things.</td>
</tr>
<tr>
<td>11.</td>
<td>Feel comfortable around people.</td>
<td>36.</td>
<td>Don't like to draw attention to myself.</td>
</tr>
<tr>
<td>12.</td>
<td>Insult people.</td>
<td>37.</td>
<td>Take time out for others.</td>
</tr>
<tr>
<td>13.</td>
<td>Pay attention to details.</td>
<td>38.</td>
<td>Shirk my duties.</td>
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<tr>
<td>15.</td>
<td>Have a vivid imagination.</td>
<td>40.</td>
<td>Use difficult words.</td>
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<tr>
<td>16.</td>
<td>Keep in the background.</td>
<td>41.</td>
<td>Don't mind being the center of attention.</td>
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<tr>
<td>17.</td>
<td>Sympathize with others' feelings.</td>
<td>42.</td>
<td>Feel others' emotions.</td>
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<tr>
<td>18.</td>
<td>Make a mess of things.</td>
<td>43.</td>
<td>Follow a schedule.</td>
</tr>
<tr>
<td>19.</td>
<td>Seldom feel blue.</td>
<td>44.</td>
<td>Get irritated easily.</td>
</tr>
<tr>
<td>20.</td>
<td>Am not interested in abstract ideas.</td>
<td>45.</td>
<td>Spend time reflecting on things.</td>
</tr>
<tr>
<td>22.</td>
<td>Am not interested in other people's problems.</td>
<td>47.</td>
<td>Make people feel at ease.</td>
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<tr>
<td>23.</td>
<td>Get chores done right away.</td>
<td>48.</td>
<td>Am exacting in my work.</td>
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<tr>
<td>25.</td>
<td>Have excellent ideas.</td>
<td>50.</td>
<td>Am full of ideas.</td>
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</table>
E = 20 + (1) - (6) + (11) - (16) + (21) - (26) + (31) - (36) + (41) - (46) 
= ______

A = 14 - (2) + (7) - (12) + (17) - (22) + (27) - (32) + (37) + (42) + (47) 
= ______

C = 14 + (3) - (8) + (13) - (18) + (23) - (28) + (33) - (38) + (43) + (48) 
= ______

N = 38 - (4) + (9) - (14) + (19) - (24) - (29) - (34) - (39) - (44) - (49) 
= ______

O = 8 + (5) - (10) + (15) - (20) + (25) - (30) + (35) + (40) + (45) + (50) 
= ______

The scores you calculate should be between zero and forty. Below is a description of each trait.

- **Extraversion (E)** is the personality trait of seeking fulfillment from sources outside the self or in community. High scorers tend to be very social while low scorers prefer to work on their projects alone.

- **Agreeableness (A)** reflects much individuals adjust their behavior to suit others. High scorers are typically polite and like people. Low scorers tend to 'tell it like it is'.

- **Conscientiousness (C)** is the personality trait of being honest and hardworking. High scorers tend to follow rules and prefer clean homes. Low scorers may be messy and cheat others.

- **Neuroticism (N)** is the personality trait of being emotional.

**Openness to Experience (O)** is the personality trait of seeking new experience and intellectual pursuits. High scores may day dream a lot. Low scorers may be very down to earth.
Appendix D: Resistance to Peer Influence (RPI)

Instructions:
For each question, decide which sort of person you are most like. Then decide if that is sort of true or really true for you.

- **s0RPI01a**: (1) Some people go along with their friends just to keep their friends happy OR (2) Other people refuse to go along with what their friends want to do, even though they know it will make their friends unhappy.
  - **s0RPI01b**: (1) Sort of True OR (2) Really True

- **s0RPI02a**: (1) Some people think it's more important to be an individual than to fit in with the crowd OR (2) Other people think it is more important to fit in with the crowd than to stand out as an individual.
  - **s0RPI02b**: (1) Sort of True OR (2) Really True

- **s0RPI03a**: (1) For some people, it's pretty easy for their friends to get them to change their mind OR (2) For other people, it's pretty hard for their friends to get them to change their mind.
  - **s0RPI03b**: (1) Sort of True OR (2) Really True

- **s0RPI04a**: (1) Some people would do something that they knew was wrong just to stay on their friends' good side OR (2) Other people would not do something they knew was wrong just to stay on their friends' good side.
  - **s0RPI04b**: (1) Sort of True OR (2) Really True

- **s0RPI05a**: (1) Some people hide their true opinion from their friends if they think their friends will make fun of them because of it OR (2) Other people will say their true
opinion in front of their friends, even if they know their friends will make fun of them because of it.

- s0RPI05b: (1) Sort of True OR (2) Really True

- s0RPI06a: (1) Some people will not break the law just because their friends say that they would OR (2) Other people would break the law if their friends said that they would do it.
  - s0RPI06b: (1) Sort of True OR (2) Really True

- s0RPI07a: (1) Some people change the way they act so much when they are with their friends that they wonder who they "really are" OR (2) Other people act the same way when they are alone as they do when they are with their friends.
  - s0RPI07b: (1) Sort of True OR (2) Really True

- s0RPI08a: (1) Some people take more risks when they are with their friends than they do when they are alone OR (2) Other people act just as risky when they are alone as when they are with their friends.
  - s0RPI08b: (1) Sort of True OR (2) Really True

- s0RPI09a: (1) Some people say things they don't really believe because they think it will make their friends respect them more OR (2) Other people would not say things they didn't really believe just to get their friends to respect them more.
  - s0RPI09b: (1) Sort of True OR (2) Really True

- s0RPI10a: (1) Some people think it's better to be an individual even if people will be angry at you for going against the crowd OR (2) Other people think it's better to go along with the crowd than to make people angry at you.
  - s0RPI10b: (1) Sort of True OR (2) Really True
Appendix E: Language History and Demographics Questionnaire

All responses required typed free-response descriptions, unless otherwise noted.

1. Please enter your age
2. Please enter your sex
3. How many years of college education have you completed?
4. Where were you born? (city, state, country)
5. Where did you live the longest part of your life? (city, state, country) How many years did you live there?
6. What is the native language of your mother/first caregiver?
7. What is the native language of your father/second caregiver?
8. What is the language you normally use to speak with your mother/first caregiver?
9. What is the language you normally use to speak to your father/second caregiver?
10. What is the language you normally use to speak to your sibling(s)
11. What is the language you normally use to speak to your partner?
12. Where and how were you exposed to English for the first time? (home, friends, kindergarten/school, college, work, language class, etc.)
13. How old were you when you were exposed to English for the first time? If it was from birth, please type 0.
14. At what age did you first start speaking English?
15. Where and how were you exposed to Spanish for the first time? (home, friends, kindergarten/school, college, work, language class, etc.)
16. How old were you when you were exposed to Spanish for the first time? If it was from birth, please type 0.
17. At what age did you first start speaking Spanish? If you don't speak Spanish, please type none.

18. What other language(s) (apart from English and Spanish) do you know, or have studied?
   For example, among these could be a language you know well, a language you studied in a language course for a short period of time, or a language you can't speak but heard spoken at home. If you know or have studied more than 3 additional languages, just choose the 3 that you know the best. Please take note of the order of your 3 answers because we will ask you a few more questions about them. If you don't know any additional languages, please write 'N/A'.

19. In what situation were you exposed to each of these languages (for example, home, friends, school)? Please indicate your answers in the order in which you mentioned them in the previous question. If you don't know any additional languages, please write 'N/A'.

20. At what age were you exposed to each of these languages for the first time? Please indicate your answers in the order in which you mentioned them initially. If you don't know any additional languages, please write 'N/A'.

21. In an average day, what (approximate) amount of your speaking time do you speak each language you know? The percentages for all languages should add up to 100% and should include English (and Spanish if you use it).

22. In an average day, what (approximate) amount of your speaking time did you speak each language AS A KID - until you were 10? The percentages for all languages should add up to 100% and should include English (and Spanish if you used it as a kid).

23. What is your proficiency level in English?
   a. Proficiency rated on a 10-point Likert-type scale, example below:
24. What is your proficiency level in Spanish?

a. Proficiency rated on a 10-point Likert-type scale, example below:

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
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<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very basic/none</td>
<td>Native</td>
<td></td>
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</table>

25. What is your proficiency level from 1 to 10 in the first additional language that was neither English nor Spanish? If there isn't any, please type 'none'.

26. What is your proficiency level from 1 to 10 in the second additional language that was neither English nor Spanish? If there isn't any, please type 'none'.

27. What is your proficiency level from 1 to 10 in the third additional language that was neither English nor Spanish? If there isn't any, please type 'none'.

28. What is the highest level of education attained by your mother/first caregiver? (Please give exact number of years completed, e.g., High School graduate = 12 years; College graduate = 16 years)

29. What is the highest level of education attained by your father/second caregiver? (Please give exact number of years completed, e.g., High School graduate = 12 years; College graduate = 16 years)

If there is anything about your language or cognitive abilities that you feel is important, please comment below.
Appendix F: Audio Prime Materials

Coded transcripts of the five versions of the audio prime materials presented to the participants.

A table summarizing number of each like type present in the transcript follows each version.

Legend:

QT = Quotative
AP = Approximator
EX = Exemplifier
HD = Hedge
FL = Filler
NT = Non-target (verb, comparison)

Prime Version 1: Abundant-low like (61 uses of like)

So, like (FL), the king of Dragons used to be a single guy, and then he decided that he, like (FL), he wanted to get married. So, like (FL), he found a bride. Her, she was, uh, a dragonette. And then, like (FL), so yeah, they got married. And then they were, everything was good. They were living, like (FL), the best life that they could and then she gets ill, like (HD), she gets really ill and well, they get all the doctors, and, like (FL), they give her all this medicine and like (FL) they're saying like (QT), “Oh, we're gonna try and fix you and nothing's, nothing’s working.” So, she says, “I need a monkey’s liver.” Like (FL) that was like (HD) what she thought was gonna fix her. So, she said, “Yeah, give me a monkey liver.” And the king was like (QT), “A monkey liver? Like (FL), where are we gonna get that, like (FL), we live in the ocean.” Apparently, the Dragons, yeah, they lived there in the water, I think. And so like (FL), she's gonna throw fit, of course. And she's like (QT), “Oh, my goodness, I should've stayed with my mom and my dad,” and she's crying. And so of course, the kings like (QT), “Well, I can’t leave
my, my bride like crying.” So, he sends a fish, a jellyfish. But at this time, like (FL), apparently, jellyfish were not, like (HD), what we're used to, they were, like (EX) actual fish. They're not, they're not the squishy ones. They're, like (HD), regular fish, like (EX) with fins and tails and everything. So, he says, “Okay, jellyfish. Go to where the monkeys live. It's very far, but, like (FL), you can do it. Just, just go to the monkey, where the monkeys are. Get a monkey. Bring him back so that well, like (FL), I can save my wife.” And so, the, sorry, the jellyfish. He’s like (QT), “Okay, yeah, here. I’m going to do this.” Like (FL), he's doing something for the king. So, he feels great. And he goes and he's swimming away, and he finds this place. The land of the monkeys, I guess. And well, like (AP) as soon as he gets there, he sees the monkey, like (FL), good for him. He finds a monkey right away. And he says, “Mr. Monkey,” I think he said Mr. Monkey, “Mr. Monkey, please come down from the tree. I come from a faraway land and, and, like (FL), my king. He wants me to, uh, bring you back. They need your help. The king and the queen need your help and the monkey.” Well, like (FL), he's a monkey and he just lives here. So, like (FL), he said, “Okay, fine. Let me, uhm yeah, let me go with you. That sounds that sounds like a good time.” So, he gets on the jellyfish's back. This is a monkey on a jellyfish's back. And, like (FL), they go swimming. They're there. They're, like (FL), on their way and the monkey realizes like (QT), ‘Hey, like (FL), what's happening here?’ So, he says, “What made you come for me?” He's talking to the jellyfish. “What made you come for me?” And the jellyfish said, “Well,” this dumb jellyfish tells him what's happening. He said, “My king wanted me to, like (FL), come and get a monkey because his wife is dying she's dying and, like (FL), the only thing that she thinks that can save her is your liver. So, he wants to, like (HD), cut out your liver and give it to his wife so that she won’t die.” And the monkey keeps to himself. He’s like (QT), “You know what I need to get,” he's thinking in his head, he's like (QT), “I need to get out of this.” He,
and he so he tells the fish, the jellyfish. He says, “You know what, jellyfish? I left my liver
hanging on that tree that you found me in. Like (FL), I, like (FL), I need to go back and I need to
get the liver because it's there. Like (FL), you can't go to the king and then be empty handed. I
don't have my liver.” So the jellyfish well, he said, “Okay, like (FL), we need to, we need to go
back. Obviously, we need to go back and we need to go get your liver that's like hanging on the
tree.” So the monkey, they finally make it to the land and the monkey goes up, climbs up to the
top of the tree and he said, “Jellyfish, uhm, my livers not here. Somebody must have like (HD)
taken it or something.” The jellyfish is like (QT), “Oh no.” And then he goes, yeah, the monkey
said, like (FL), “Yeah, you have to go back you have to go back to the king and the queen and
you have to tell them that, that uhm, that I couldn’t find my liver so they have to find someone
else they’re going to be expecting you, they’re gonna be expecting you so you have to hurry
jellyfish you have to get to them before dark or else they’re going to be worried.” So the jellyfish
leaves and then yeah, and he’s like (QT), “Oh my goodness, I need to go tell the king,” and he
gets to the king. And he tells the king, “I found a monkey. But like (HD), he forgot his liver. So
then we went back and then he went up the tree and, and he couldn’t find it. He couldn’t find his
liver.” And the king was like (QT), “Are you kidding me? Like (FL), How stupid are you? You
jellyfish? Like (FL), how dumb can you be to believe that this monkey, like (FL), left his liver
outside of him? Do you not know, like (FL), what a liver is? Like (FL), anybody who knows
what a liver is knows that you can't take it out and just hang it on a tree.” And as punishment for
the jellyfish being, like (HD), the worst person in this quest, the king says, “You are going to be
made of jelly. From now on, like (FL), you’re not going to have fins you’re not going to have
like (EX) anything. You’re not going to be looking like (NT) a fish you’re going to look like
jelly you’re just going to be pure jelly your brain, everything.” So that’s why jellyfish look like
they do now. And the poor queen was left without the monkey liver and she, like (FL), had to just get better on her own without the liver. And that's the end. That's why jellyfishes are like (NT) they are now. Jellyfishes? Jellyfish? Yeah. The end.

Table F1

Version 1 (Abundant-low) Audio Prime Summary of ‘like’ Use by Type

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Prime Version 2: Occasional-high like (16 uses of like)

So, the king of Dragons used to be a single guy. And then he decided he wanted to get married. So, he found a bride, she was a dragonette and, and so yeah, they got married and they were, everything was good. They lived the best life that they could and then she gets ill she gets really ill and well, they get all the doctors, and they give her all this medicine and they're saying, “well, we'll try and fix you.” Nothing's working. So, she says, “I need a monkey's liver.” That was what she thought was going to fix her. So, she said, “Yeah, give me a monkey's liver,” and the king was like (QT), “A monkey’s liver? Where are we going to get that? We live in the ocean.” Apparently, the dragons Yeah, they lived there in the water, I think and so she’s gonna throw a fit, of course. And she’s like (QT), “Oh, my goodness, I should have stayed with my mom and my dad and she's crying.” And so of course, the kings like (QT), “I can't leave my bride crying.” So, he sends a fish, a jellyfish. But at this time, apparently, jellyfish were not what we're used to. They were, like (EX) actual fish. They're not squishy ones. They're, like (EX)
regular fish with fins and tails and everything. So, he says, "Okay, jellyfish. Go to where the monkeys live. It’s very far, but you can do it. Just go to where the monkeys are. Get a monkey bring him back. Well, so I can save my wife.” And so, the jellyfish he's like (QT), "Okay, yeah, here. I'm going to do this.” He's doing something for the king. So, he feels great. And he goes and he's swimming away. And he finds this place a land of monkeys, I guess. And as soon as he gets there, he sees the monkey. Good for him. He just finds a monkey right away. And he says, “Mr. Monkey,” I think he said Mr. Monkey, “Mr. Monkey, please come down from the tree. I come from a faraway land and my king, he wants me to bring you back. They need your help. The king and the queen need your help.” And the monkey. Well, he's a monkey and he just lives there. So, he said, “Okay, fine. Let me, uhm, let me go with you. That sounds like a good time.” So, he gets on the jellyfish’s back. This is a monkey on a jellyfish’s back and they go swimming. They're on their way. And then the monkey realizes like (QT), ‘Hey, what’s happening here?’ So he says, “What made you come for me?” He's talking to the jellyfish. “What made you come for me?” And the jellyfish said, well, the same jellyfish tells him what's happening. He said, “My king wants me to come and get a monkey because his wife is dying. She's dying and the only thing she thinks that can save her is your liver. So, he wants to cut out your liver and give it to his wife so she won't die.” And the monkey keeps to himself and he's like (QT), “You know what? I need to get,” he's thinking in his head. He's like (QT), “I need to get out of this. And so he tells the fish, the jellyfish he says, “You know what, Jellyfish? I left my liver hanging on that tree that you found me and I need to go back and I need to get the liver because it's there. You can't go to the king and be empty handed. I don't have my liver.” So the jellyfish, well he said “Okay, we need to go back obviously, we need to go back and we need to go get your liver that’s hanging on a tree.” So the monkey they finally make it to the land and monkey goes up, climbs
up to the top of the tree. And he says, “Jellyfish um, my liver’s not here. Somebody must have
taken it or something. And the jellyfish is like (QT), “Oh, no.” And then he goes, “Yeah,” the
monkey said, “Yeah, you, Yeah, I can't find my liver. So they have to find some, someone else
they’re gonna be expecting you. They’re gonna be expecting you. So you have to hurry jellyfish.
You have to get to them before dark, or else they’re gonna be worried.” So the jellyfish leaves
and then, yeah, he's like (QT), “Oh my goodness, I need to go tell the king,” and he gets to the
king and he tells the king, “I found a monkey. But he forgot his liver. So then we went back and
then he went up the tree and he couldn't find it. He couldn't find his liver,” and the king was like
(QT), “Are you kidding me? How stupid are you jellyfish? How dumb can you be to believe that
this monkey left his liver outside of him do not know what a liver is? Anybody who knows what
a liver is knows you can’t just take it out and hang it on a tree.” And as punishment for the
jellyfish being the worst person in this quest, the king says, “You are going to be made of jelly
from now on. You're not going to have fins you're not going to have anything you're not going to
be looking like (NT) a fish. You're going to look like (NT) jelly. You're just going to be pure
jelly, your brain and everything.” So that's why jelly fish look like (NT) they do now. And the
poor queen was left without the monkey liver and she had to just get better on her own without
the liver. And that's the end. That's why jelly-jellyfishes are like (NT) they are now. Jellyfishes?
Jellyfish. Yeah. The end.

Table F2

Version 2 (Occasional-high) Audio Prime Summary of ‘like’ Use by Type

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Prime Version 3: Abundant-high *like* (145 uses of *like*)

So, like (FL), there was this Dragon king, and he was, like (HD), living by himself, he was being single. And then he decided, like (FL), “Okay, I, like (FL), I want a bride. So, like (FL), I'm gonna go find a dragonette.” And he did. He found a dragonette, and she, well they, like (FL), they got married. And so like (FL), the whole country is celebrating, they’re like (QT), "Oh yay, we have a king and queen, like (FL), wow.” And then we, after days of like (FL), like (HD) lots of celebrating, like (FL), the Queen gets sick. Like (FL), she gets like (HD) really sick. And they don't know what to do. And like (FL), all the doctors are like freaking out. And they’re like (QT), “Oh, my goodness, let me give you some medicine.” And they're trying, like (HD) everything that they can, like (FL), all these medicines and the Queen is, like (FL), not getting like (HD) any better at all. So, like (FL), they're like (QT), “What do we do?” And the king is like (QT), “Like (FL), oh my goodness, my bride. Like (FL), she can't die.” And Queen decides, like (FL), “Oh, you know what I have, like (FL) a solution. Like (FL), we should get like a monkey liver. And I think if I eat the monkey liver, like (FL), I think I’ll be good.” And the king’s like (QT), “Where'd you get that idea? And like (FL), how are we gonna get a monkey? Like (FL), we live in the middle of, like (FL), nowhere, like (FL), like (FL), we're in the ocean, like (FL) monkeys live on land.” And so she's like (QT), “Oh, my God, like (FL), how dare you? Like (FL), I should just go back and like (FL), live with my parents and like (FL), they would treat me right. And they would like (FL), get me this like monkey liver. And you're not getting it. Like (FL) how dare you like (FL), like (FL), just help me I'm sick.” And so like (FL), of course the kings like (QT), “Okay, fine. Let me get somebody to like (FL), go find this monkey go, go
to like (HD), land, and get a monkey and bring him back and we can have his like (FL) his liver
for, for like (FL) medicine for you.” So, he calls a jellyfish, and the jellyfish is like (QT), “Yes,
Your Highness.” And he's like (QT), “Jellyfish, I need you to, like (HD) go swim, like (FL), go
find land where there's, like (FL), monkeys. And you need to bring back a monkey who has a
liver and, like (FL), we're going to give the liver to the Queen. She's gonna get better.” And the
jellyfish is like (QT), “Oh, yes, of course. I can do this for you, like (FL), yeah,” and he goes
swimming, and he sets off and he finds this, like (HD) land? He finds land and there's, like (FL),
a monkey right there on a tree. The first monkey he sees, he's like (QT), “Uhm, Mr. Monkey, I
need your help. Like (FL), I come from this faraway land and our queen, She's like (HD), very
sick. And like (FL), the king and Queen they just, they need your help. They need your help,
because you're a monkey and, and like (FL) they would just love if I came back with you.” And
so, the monkey was like (QT), “Oh, yeah, sure. Like (FL), let me go help you. I’d love to. I’d
love to meet the, like (FL), the king and queen.” So, the monkey gets down from the tree and,
like (FL), he gets on a jellyfish's back. And they're like (HD), swimming through the ocean. And
then it dawns on the monkey like (QT), "Like (FL), why would this jellyfish come and get me?"
So, he asks the jellyfish like (QT), “Like (FL), what made you decide to come all this way to find
me?” And, like (FL), the jellyfish decides to like (FL), tell him, like (EX) the whole story. Like,
he's like (QT), "Okay, yeah. So, the king, this is what’s happening, like (FL), the queen - the wife
of the king - is dying and, like (FL), she needs your liver. So, like (FL), the king wanted me to
get you. So, we can go back, take you, and they’re like (HD) gonna cut out your liver and they're
gonna, like (FL), give it to the Queen and like (HD), she's gonna be all better.” And so, like (FL),
the monkey's like (QT), “Oh my god, like (FL), what did I get myself into? Like, (FL) Oh, no.”
But he, he acts calm. He acts, like (FL), like (NT) nothing's wrong, you know. So, he's, he tells
the jellyfish, he’s like (QT), “You know what, Mr. Jellyfish? I left my liver on that tree that you found me on, you know, like (EX) that tree that I was swinging from? Like (FL), it's there. Like (FL), the liver, I, I take it out when I like (NT) to play because it weighs too much. So, like (FL), I just hang in there and like (FL), it's on a branch. Like (FL), we can't go to the king and queen empty-handed like (FL), we have to turn back. Like (FL), you have to turn back. You have to take me to that tree so I can get my liver. And like (FL), then we can go to the king." And so, like (FL), the jellyfish is like (QT), “Yeah, okay, like, let me take you back and like (FL), let's go swimming.” And then they finally get back to land where the monkey was, and like (FL) the monkey, like (HD) goes up to the highest point of like (FL) the tree and like (FL) he says, “Oh, you know what my liver is, it's not like (FL), it's not here, like (HD) somebody must have taken it because it's not here. Like (FL) you have to go back because the king and queen are going to be expecting you. So, you have to you have to, like (FL), go back now. Because then they're going to get, like (HD) worried, and tell them what happened. And then, like (FL), see what happens then.” And then, the jellyfish is like (QT), “You know what, you're right. I do have to go back because, like (FL), they're gonna be worried for me." So, like (FL), he goes swimming and he finds the King and he finds the Queen and he tells like (HD) the whole story to the king. And the king's like (QT), “Oh my goodness, are you serious? Like (FL), how stupid are you to like (FL), believe that this monkey like (FL), forgot his liver. Like (FL) really? Like (FL), anybody who knows what a liver is knows that, like (FL), you can't take the liver out of you. Because I mean, he'd be dead like (FL), you know. How is the monkey just gonna pull out his liver?” And the king is super, like (HD) super mad. And he says, “As, like (FL), punishment,” he's like (QT), “You know what, you're not going to be like (NT) a regular looking fish anymore – because back then, jellyfish used to be like (NT) regular fish, like (EX) they used to look like
(NT) regular fish with, like (EX) regular fins and all that. And, and he said, “For this you're going to be, like (FL), turned into just jelly. Like (FL), literally you're going to be a jellyfish. Like (FL), your brain is going to be like jelly, and you're, you're not going to have, like (FL), any fins like (EX) you're just gonna be jelly, all of you is jelly." So that's the story of how, like (FL), how jellyfish turned out to be jellyfish. Like (FL) that's, that's why. It's because of this silly jellyfish who ruined this whole thing and the poor king's, like (FL), wife had to, had to just, like (FL), get better on her own without no jelly. I mean without no, uhm, like (FL), liver you know to, like (EX) as medicine so, like (FL), that's the story of how jellyfish became jellyfish. The end.

**Table F3**

*Version 3 (Occasional-low) Audio Prime Summary of ‘like’ Use by Type*

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**Prime Version 4: Occasional-low like (4 uses of like)**

There once was a Dragon king. He lived in Dragon land. He was a bachelor for a very long time he was single. He suddenly decides he wants a bride. So he finds a dragonette, and they get married and everybody's happy. They have a king dragon, they have a queen dragon, and they're celebrating for days. And suddenly the Queen gets sick. And everyone's worried. They're- they're thinking like (QT), “Oh, what do we give her? How do we help her? What medicine do we give her those doctors? They're trying to help her nothing's working.” And she comes up with this idea that she needs a monkey liver, a monkey liver’s what's gonna save her?
And she tells the king this and he, he can't believe it. He's very surprised. He goes, “Where are you going? Where do you expect us to get a monkey liver? We live here in the middle of the ocean. And do you know how far it is to find land where there's monkeys living?” And of course, she gets upset and- and she's surprised that he won't do this for her. And she's saying that she should have just stayed to live with her parents. She's going to go back and she's going to live with her father and her mother, because they would treat her better and you know. So, the king, of course, doesn't want this to happen. So he says, “Okay, fine, fine. I'll send somebody we're gonna go find a monkey. We're gonna get your liver.” He asks the jellyfish. He calls over the jellyfish and says, "Jellyfish. I need you to do something very important for me. I need you to go to the land. Find a land where there's monkeys. Bring me back a monkey. We need his liver to give to my wife – the queen – so that she can feel better.” But jellyfish, of course is very honored. He's like (QT), “Oh, of course. I will do this for you. Of course I will go and get a monkey and bring them back.” He sets off on his journey. He's swimming and swimming. And finally he finds this land. There is a monkey as soon as he gets to the shore there's a monkey. But he can see– I forgot to mention that jellyfish do not look like jellyfish that we know now. They used to look like (NT) regular fish. They used to just have fins they used to have the scales they used to have the tail. They were regular looking fish. But they also did have feet so that's why he was this jellyfish was able to walk on land. Okay, back to him finding the monkey. The monkey. He calls down the monkey from the tree who's up in the tree. He says, “Mr. Monkey I need your help. My Majesty. The king and the queen from my land far far away. You've never been there. They need your help, and I would like (NT) to take you to them.” The monkey is very surprised. He says, “Of course I will go with you. I would love to help the king and Queen sounds like an adventure.” So the jellyfish says, “Get on my back. We're gonna go and they do. The monkey
gets on the jellyfish back there swimming through the ocean. Then the monkey starts to think to himself, ‘Why is this jellyfish… where did this come from? I'm riding on a stranger’s back.’ So he asked the jellyfish, “What made you come to me? What made you decide to go look for me and to bring me back to your kingdom?” And the jellyfish without thinking just tells the monkey exactly what's happening. He says, “Well, my king has a new bride, a- the queen. She's the queen now and she fell ill. She fell very ill and the only way that they think that they can save her is if I bring back a monkey – you – and they're going to cut out your liver and they're going to give it to the Queen and she's going to get better, hopefully.” The monkey takes this in. He acts normal. He doesn't want to show the jellyfish what he's thinking but in his head he's- he's thinking about how he can get out of this. So he tells the jellyfish, “You know what? That- that tree that you found me on, the one that I was swinging on, I left my liver there. We have to go back because we can't go to the king and queen empty handed. We have to go back. I have to get my liver. And then we can go because then I'll have the liver and give it to the Queen.” The jellyfish listens. He says, “Yes. Okay, let's go back. We have to go get that.” They go. They reach the land. The monkey goes into the tree climbs as high as he can. And says, “Jellyfish. You won't believe it, but I can't find my liver. It's not here. Somebody must have taken it while we were gone. You're gonna have to go back. You're gonna have to go back to your kingdom. The king and queen are going to be worried because you're not there and it's getting dark. So- so hurry, hurry back and tell them what has happened.” And the jellyfish says, “Oh, yes, of course I have to go. I better go.” The jellyfish swims and swims. He gets to the kingdom. He tells the king what happened. The king- the king was wondering why- why he's empty handed. He says, “Where's the monkey? Why don't you have a monkey with you?” The jellyfish tells him what happened. The king is so upset. He's- he's saying, “Are you serious? Why- Why would you fall
for such a story? Don't you know that livers belong inside something? The- the monkey fooled you. Oh my goodness.” And he's upset and as punishment for this jellyfish falling for the story he's tells the jellyfish, “You know what? I'm going to turn you into jelly. You’re just always gonna be jelly. Your brain is gonna be jelly, your everything's gonna be jelly. This is what you get for ruining this quest.” And that is a story of why jellyfish are the way they are today. That's why they are just very jelly, like (FL), literally jellyfish. All because of this one jellyfish, and the poor queen had to had to try and get better without her liver and, yeah, all because of this jellyfish. The end.

Table F4

*Version 4 (Occasional-low) Audio Prime Summary of 'like' Use by Type*

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**Prime Version 5: Control (0 uses of like)**

There once was a Dragon king. He lived in Dragon land. He was a bachelor for a very long time he was single. He suddenly decides he wants a bride. So he finds a dragonette, and they get married and everybody's happy. They have a king dragon, they have a queen dragon, and they're celebrating for days. And suddenly the Queen gets sick. And everyone's worried. They're- they're thinking, “Oh, what do we give her? How do we help her? What medicine do we give her those doctors? They're trying to help her nothing's working.” And she comes up with this idea that she needs a monkey liver, a monkey liver’s what's gonna save her? And she tells
the king this and he, he can't believe it. He's very surprised. He goes, “Where are you going? Where do you expect us to get a monkey liver? We live here in the middle of the ocean. And do you know how far it is to find land where there's monkeys living?” And of course, she gets upset and- and she's surprised that he won't do this for her. And she's saying that she should have just stayed to live with her parents. She's going to go back and she's going to live with her father and her mother, because they would treat her better and you know. So, the king, of course, doesn't want this to happen. So he says, “Okay, fine, fine. I'll send somebody we're gonna go find a monkey. We're gonna get your liver.” He asks the jellyfish. He calls over the jellyfish and says, "Jellyfish. I need you to do something very important for me. I need you to go to the land. Find a land where there's monkeys. Bring me back a monkey. We need his liver to give to my wife – the queen – so that she can feel better.” But jellyfish, of course is very honored. He says, “Oh, of course. I will do this for you. Of course I will go and get a monkey and bring them back.” He sets off on his journey. He's swimming and swimming. And finally he finds this land. There is a monkey as soon as he gets to the shore there's a monkey. But he can see– I forgot to mention that jellyfish do not look like jellyfish that we know now. They used to be regular fish. They used to just have fins they used to have the scales they used to have the tail. They were regular looking fish. But they also did have feet so that's why he was this jellyfish was able to walk on land. Okay, back to him finding the monkey. The monkey. He calls down the monkey from the tree who's up in the tree. He says, “Mr. Monkey I need your help. My Majesty. The king and the queen from my land far far away. You've never been there. They need your help and I want to take you to them.” The monkey is very surprised. He says, “Of course I will go with you. I would love to help the king and Queen sounds like an adventure.” So the jellyfish says, “Get on my back. We're gonna go and they do. The monkey gets on the jellyfish back there swimming
through the ocean. Then the monkey starts to think to himself, ‘Why is this jellyfish… where did this come from? I'm riding on a stranger’s back.’ So he asked the jellyfish, ‘What made you come to me? What made you decide to go look for me and to bring me back to your kingdom?’ And the jellyfish without thinking just tells the monkey exactly what's happening. He says, “Well, my king has a new bride, the queen. She's the queen now and she fell ill. She fell very ill and the only way that they think that they can save her is if I bring back a monkey – you – and they're going to cut out your liver and they're going to give it to the Queen and she's going to get better, hopefully.” The monkey takes this in. He acts normal. He doesn't want to show the jellyfish what he's thinking but in his head he's thinking about how he can get out of this. So he tells the jellyfish, “You know what? That tree that you found me on, the one that I was swinging on, I left my liver there. We have to go back because we can't go to the king and queen empty handed. We have to go back. I have to get my liver. And then we can go because then I'll have the liver and give it to the Queen.” The jellyfish listens. He says, “Yes. Okay, let's go back. We have to go get that.” They go. They reach the land. The monkey goes into the tree climbs as high as he can. And says, “Jellyfish. You won't believe it, but I can't find my liver. It's not here. Somebody must have taken it while we were gone. You're gonna have to go back. You're gonna have to go back to your kingdom. The king and queen are going to be worried because you're not there and it's getting dark. So hurry, hurry back and tell them what has happened.” And the jellyfish says, “Oh, yes, of course I have to go. I better go.” The jellyfish swims and swims. He gets to the kingdom. He tells the king what happened. The king was wondering why he's empty handed. He says, “Where's the monkey? Why don't you have a monkey with you?” The jellyfish tells him what happened. The king is so upset. He's saying, “Are you serious? Why- Why would you fall for such a story? Don't you know that livers belong inside
something? The- the monkey fooled you. Oh my goodness.” And he's upset and as punishment for this jellyfish falling for the story he's tells the jellyfish, “You know what? I'm going to turn you into jelly. You’re just always gonna be jelly. Your brain is gonna be jelly, your everything's gonna be jelly. This is what you get for ruining this quest.” And that is a story of why jellyfish are the way they are today. That's why they are just very jelly, literally jellyfish. All because of this one jellyfish, and the poor queen had to had to try and get better without her liver and, yeah, all because of this jellyfish. The end.

**Table F5**

*Version 5 (Control) Audio Prime Summary of ‘like’ Use by Type*

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<td>Filler (FL)</td>
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<td>Non-target (NT)</td>
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Vita

Rachel “Rach” Lynn Williams earned her Bachelor of Arts in Psychology and Bachelor of Science in Physical Science (with magna cum laude honors) from Black Hills State University (Spearfish, SD) in 2018. Their undergraduate research experiences working alongside Eric Clapham, Ph.D. involved nonconscious visual processing and decision making.

At the University of Texas at El Paso, under the guidance of Iva M. Ivanova, Ph.D., her research interests primarily involve the cognitive mechanisms underlying entrainment and alignment phenomena in language. They are expected to complete their Doctor of Philosophy in Psychology in May 2024.

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