Journal of Experimental Child Psychology 167 (2018) 314–327

Contents lists available at ScienceDirect

Journal of Experimental Child Psychology

journal homepage: www.elsevier.com/locate/jecp

When it is apt to adapt: Flexible reasoning guides children's use of talker identity and disfluency cues

Justine M. Thacker [a], Craig G. Chambers [b], Susan A. Graham [a,*]

[a] Department of Psychology, University of Calgary, Calgary, Alberta T2N 1N4, Canada
[b] Department of Psychology, University of Toronto, Mississauga, Ontario L5L 1C6, Canada

ARTICLE INFO

Article history:
Received 6 May 2017
Revised 15 November 2017

Keywords:
Speech disfluencies
Talker identity
Eye tracking
Spoken language comprehension
Referential intent
Pragmatic inference

ABSTRACT

An eye-tracking methodology was used to examine whether children flexibly engage two voice-based cues, talker identity and disfluency, during language processing. Across two experiments, 5-year-olds ($N = 58$) were introduced to two characters with distinct color preferences. These characters then used fluent or disfluent instructions to refer to an object in a display containing items bearing either talker-preferred or talker-dispreferred colors. As the utterance began to unfold, the 5-year-olds anticipated that talkers would refer to talker-preferred objects. When children then encountered a disfluency in the unfolding description, they reduced their expectation that a talker was about to refer to a preferred object. The talker preference-related predictions, but not the disfluency-related predictions, were attenuated during the second half of the experiment as evidence accrued that talkers referred to *dispreferred* objects with equal frequency. In Experiment 2, the equivocal nature of talkers' referencing was made more apparent by removing neutral filler trials, where objects' colors were not associated with talker preferences. In this case, children ceased making all talker-related predictions during the latter half of the experiment. Taken together, the results provide insights into children's use of talker-specific cues and demonstrate that flexible and adaptive forms of reasoning account for the ways in which children draw on paralinguistic information during real-time processing.

* Corresponding author.
E-mail address: susan.graham@ucalgary.ca (S.A. Graham).

https://doi.org/10.1016/j.jecp.2017.11.008
0022-0965/

Introduction

Successful communication frequently relies on listeners' ability to attend to a variety of cues beyond the information conveyed by words alone. Consider, for example, a woman's utterance "I'll have my usual!" spoken by a regular customer in a restaurant. The meaning of this statement relies in part on the listener attending to the talker's identity (and memory for what her usual order is, e.g., a salad or pasta). These types of person-specific associations seem likely to interact with other kinds of paralinguistic cues found in spoken utterances. In the above example, imagine that the regular customer instead began her order with the following: "I'll have thee, uhh . . ." Here, the talker's hesitation (marked by the filled pause "uhh") may suggest to the listener that she is, in fact, considering ordering something other than her usual order. Although there is considerable evidence that young children are adept at using different talker-produced cues to guide real-time referential interpretation, including talker identity and filled pauses, it is unclear the extent to which these abilities involve flexible forms of reasoning and whether these cues can be used simultaneously. The current study addressed these issues by investigating two questions. First, can 5-year-olds integrate two paralinguistic cues in the speech stream (talker identity and disfluency) to inform real-time referential predictions? Second, will 5-year-olds rapidly modify these predictions in response to counterevidence in the language they hear?

As background, previous research has demonstrated that children as young as 3 years can use talker identity cues to guide online language processing (e.g., Borovsky & Creel, 2014; Creel, 2012, 2014). For example, once preschoolers have learned that two distinct characters have a different preferred color, they demonstrate anticipatory looking to shapes bearing the talker's preferred color when listening to utterances produced by a given character. This is based entirely on cues to talker identity carried in the speech stream (Creel, 2012). Furthermore, children demonstrate flexible use of this cue. Specifically, whereas children use talker information to anticipate reference to talker-preferred objects when a talker speaks on her or his own behalf (e.g., Billy: "I want to see the square"), they will draw on knowledge of other individuals' preferences when the talker is speaking on their behalf (e.g., Billy: "Anna wants to see the circle"). It remains unclear, however, how referential expectations based on learned talker preferences are affected by evolving patterns as the discourse proceeds. That is, if the objects referred to by a talker in successive statements reflect a mix of talked-preferred and talked-dispreferred things, will child listeners dynamically adjust their earlier-formed expectations? If so, this would provide an additional source of evidence for the claim that children's use of talker identity cues relies on highly flexible forms of situation-specific reasoning.

Another point to consider is that research on children's use of talker identity cues has relied heavily on the link between preferences and desires, such that the talkers in these paradigms use desire statements (e.g., "I want . . ."; Creel, 2012) to indicate that previously presented preference information is relevant to the current communicative context. Given that preference information can be relevant to referential intentions even when desire is not explicitly voiced, it is important to understand whether or how young children draw on a talker's identity to inform their interpretation of utterances that do not contain explicit statements of preference or desire. Hence, an additional goal of the current study was to examine whether children use recently presented preference information even when utterances are purely ostensive in nature such as simply directing listeners to "look" at an object in the display. If young children demonstrate anticipatory use of talker identity information in the absence of explicit desire statements, this would provide evidence for a subtler kind of sensitivity to talker preference information.

In the current study, we also considered talker effects alongside another important paralinguistic cue relevant to referential processing, namely *filled pause* disfluencies such as "um" and "uh". Filled pauses occur at a rate of approximately 2.56 per 100 words in adult speech and are associated with increased planning difficulty (Bortfeld, Leon, Bloom, Schober, & Brennan, 2001). As such, filled pauses tend to occur in predictable locations in the speech stream such as in advance of noun phrases that refer to unfamiliar objects or to entities that have not yet been mentioned (Arnold & Tanenhaus, 2011). Although there is little research on listeners' reactions to spontaneous disfluencies, studies that