



Speech monitoring and repairs in preschool children's social and private speech



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ABSTRACT

When individuals correct their own speech, it is often assumed they are doing so for the benefit of others' comprehension. As such, most of the research exploring speech repairs, especially among young children, has been conducted with social speech (between two or more people) and little with private speech (speech directed toward the self). In the present study, we explore social and private speech errors and self-repairs from 27 3- and 4-year-old preschoolers who completed a selective attention task and a Lego construction task with and without an involved experimenter. Timing (immediate, delayed) and relevance to task (irrelevant, relevant, action relevant) of self-repairs were compared, and developmental trends were explored. Findings indicated preschoolers made errors and repairs in both private and social speech, though more so in social than private speech. In social speech, there were nearly equal numbers of delayed and immediate repairs suggesting both pre- and post-production monitoring when speaking for a listener. In private speech, there were significantly higher numbers of immediate repairs than delayed repairs suggesting more pre-production monitoring when speaking for the self. Though fewer in number, the presence of delayed self-repairs in private speech indicated some post-production monitoring of private speech. Delayed private speech self-repairs from 4-year-olds were almost exclusively in task-action-relevant speech, while delayed private speech self-repairs from 3-year-olds were mostly in task-relevant speech. Developmental changes in private speech use and awareness of speech during preschool are discussed as possible explanations for these trends. Implications for practice are also provided.

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It has been well documented that young children make self-initiated repairs in their conversational speech with others (Caplan, Guthrie, & Komo, 1996; Forrester, 2008; Forrester & Cherington, 2009; Jokinen, 1998; Laakso, 2006; Laakso & Soininen, 2010; LaSalle & Conture, 1995; Levy, 1999; Levy, Tennebaum, & Ornoty, 2003; Prather, Cromwell, & Kenney, 1989; Ridley, Radford, & Mahon, 2002; Rieger, 2003; Salonen & Laakso, 2009; Schegloff, 2000; Tarplee, 1989; Wong, 2000; Wootton, 1994, 2007). These self-initiated repairs, or *self-repairs* (Schegloff, 1979; Schegloff et al., 1977), are often produced spontaneously as a result of perceived non-involvement or need for clarification by a listener (Forrester, 2008) or in response to other-initiated direct requests (whether verbal or non-verbal) for clarity (Laakso & Soininen, 2010). In either

case, the use of self-repairs is often associated with or results in errors and other issues in produced speech (Rieger, 2003).

A speech error, broadly defined, consists of deviations from intended speech meanings, disfluencies or breaks in speech production, presentations of the wrong order of words or ideas, use of a linguistically improper word choice or inappropriate syntax, or phonemic slips (Nooteboom & Quené, 2013; Postma, 2000; Postma & Kolk, 1993; Trewartha & Phillips, 2013). Some of these types of speech errors fall under the rubric of grammatical errors (e.g., incorrect word order), while others fall under the rubric of fluency errors (e.g., breaks in speech production). A speech error repair corrects or amends any type of "troubled" speech, including that which results from corrections of misspoken words through word replacement or repetitions, pauses, and fillers (lexical, quasi-lexical, non-lexical) caused by word search (Fox, Hayashi, & Jasperson, 1996; Rieger, 2003; Schegloff et al., 1977). Because repairs can result from unspoken or pre-articulatory speech, observers often do not hear the error or issue with the speech but only the result and evidence of repair (e.g., repetition of a word while searching for an appro-

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priate next word). Such repairs, therefore, imply self monitoring of speech by the user, and studying these self-repairs provides an opportunity to evaluate how and why children monitor their own speech production (Laakso, 2010).

In the present study, we explore self-initiated repairs to evaluate preschool children's speech production monitoring during social (when speaking to someone else) and private (when speaking to the self) speech. Doing so provides important information related to preschoolers' motivation for correcting their speech errors. Nearly all studies exploring young children's self-repairs use social conversational speech, and many authors have concluded that repairs are made for the benefit of the listener. By exploring self-repairs in private speech, when children are not directing their speech toward a listener, we are able to evaluate whether preschoolers make self-repairs when a listener is not present and if so the characteristics (e.g., relevancy to task, speed of correction) associated with self-repairs made for themselves. Results supporting children's use of self-repairs during private speech will provide evidence that making precise statements in private speech is important for children and may suggest that the effectiveness of private speech as a tool for regulation depends on accuracy. Further, such results will provide some evidence that preschoolers are aware of and monitor their private speech production.

In addition to providing data related to understanding children's private speech development and uncovering other reasons and uses of self-repairs for preschool children, the results from the present study will also be applicable for professionals and caregivers. Professionals who develop or use self-talk-based programs and trainings as a means for improving young children's functioning or adjustment (e.g., *Tools of the Mind*; Bodrova & Leong, 2007) can use information about how and why children are motivated to make repairs in their self-talk as an important part of how they can help children use self-talk more effectively. Similarly, caregivers who use conversation as a means of transferring knowledge to children and stimulating cognitive and language development and who wish to encourage children's use of private speech as a means for self-regulation (Berk & Winsler, 1995) can use information about how and why children make social and private speech self-repairs as a means for encouraging more adaptive use of both social and private speech.

The literature reviewed below expands upon reasons why people monitor and repair their speech and describes the role of timing in repairs for understanding the motivation behind repairs. Included in this review are potential hypotheses for how and why children might monitor their private speech differently from their social speech. Nearly all of the self-repair research conducted, and presented below, focuses on social conversational speech. As such, relevant private speech research is also presented as support for potential differences between self-repairs in social and private speech.

1. Reasons for speech monitoring and repair

Many researchers believe speech monitoring is the result of either clarification requests from listeners (i.e., other-initiated monitoring; Bowey & deBhal, 1994; Brinton, Fujiki, Loeb, & Winkler, 1986; Levy, 1999; Levy et al., 2003; Prather et al., 1989) or from personal inspection by the speaker (i.e., self-initiated monitoring; Hartsuiker & Kolk, 2001; Levelt, 1983, 1989; Postma, 2000; Postma & Kolk, 1993). Similarly, repairing speech errors is believed to either occur as a result of the speaker's desire to increase comprehension by the listener (i.e., other-initiated repair; Bowey & deBhal, 1994; Brinton et al., 1986; Levy, 1999; Levy et al., 2003; Prather et al., 1989) or as a result of the speaker's desire (either conscious or unconscious) to use comprehensible, error-free, "good" speech

(i.e., self-initiated repair; Nakatani & Hirschberg, 1994; Nooteboom, 1980; Postma, 2000; Van Hest, 1996).

If repairs are made exclusively for comprehension by others (whether self- or other-initiated), then repairs might not be found in self-directed private speech in which the speech is not intended for a listener. If, however, repairs are made for other reasons, such as support for verbal self-regulation (Winsler, 2009), then they should be apparent in private speech and particularly private speech related to regulatory actions. An example might be a speaker talking herself through a task in a self-regulatory way and incorrectly stating something critical to the task. In a case such as this, it might be expected that the misspoken utterance is repaired (e.g., "I need to put the red—blue one here.").

Vygotsky (1987) argued private speech is used by young children as a tool for cognition and is particularly apparent during the preschool years. Private speech has been associated with children's task performance dynamically over time during preschool (Berk, 1986; Fernyhough & Fradley, 2005; see Winsler, 2009 for a review). For example, Winsler, Carlton, and Barry (2000) noted that 3-year-old children use private speech in many different situations and settings, while 4-year-olds use private speech more systematically as a means to achieve task goals. It is possible global changes in children's awareness of their own use of private speech during the preschool years increases the likelihood private speech is used systematically as a tool for self-regulation (Manfra, 2009). Manfra and Winsler (2006) found evidence that children between roughly 4.5 and 6 years were largely aware of their own use of private speech during a problem-solving selective attention task (similar to the one used in the present study), while children between 3 and 4.5 years were largely unaware of their own use of private speech. These researchers suggest development of private speech awareness may contribute to their increased use of private speech as a verbal self-regulatory tool.

It is possible that changes in awareness of private speech will be apparent in private speech repair data. For example, as children become more aware of their private speech, they may also begin to monitor their private speech and subsequently repair their private speech errors when those errors are contrary to achieving their task goals (e.g., saying "blue" when they intend "red"). Such findings might suggest that private speech self-repairs are made for a regulatory benefit. One of the goals of the current study is to explore how younger and older preschool children use self-repairs in their private speech and whether these differences might be associated with differences in the use of private speech during problem-solving tasks and whether these differences might provide some evidence related to the degree to which preschoolers are aware of their own private speech use.

2. Timing of errors and repairs in speech

Both monitoring and repairing have been shown to occur before speech is actually articulated (i.e., the speaker is unable to overtly listen because s/he has not stated anything overtly; Blackmer & Mitton, 1991; Dell & Repka, 1992; Garnsey & Dell, 1984; Kolk & Postma, 1996; Postma & Kolk, 1992a, 1992b; Postma & Noordanus, 1996) and after speech is articulated (i.e., the speaker hears and listens to his/her own overt speech; Berg, 1992; Levelt, 1983, 1989; Nakatani & Hirschberg, 1994; Postma, 2000). Most of the support for repairs occurring prior to speech articulation (i.e., pre-articulatory) has been generated by speech error and repair research with adult samples. Some studies show pre-articulatory repairs by demonstrating that (a) corrections are frequently ready before the articulation of an error (Blackmer & Mitton, 1991), (b) individuals often create errors *without* articulation, such as repeating a tongue-twister with inner speech (Dell & Repka, 1992), (c)

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