



# Individual differences in perspective taking and field-independence mediate structural persistence in dialog



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## ABSTRACT

Speakers often reuse syntactic constructions recently produced by an interlocutor. As a form of conversational repetition, evidence for such structural persistence may depend on the extent to which different people are sensitive to the linguistic contributions of others. To investigate how individual differences might mediate the likelihood of structural persistence in dialog, two potential measures of such sensitivity – a measure of self-reported perspective taking and a measure of field-dependence/independence – were collected from participants who also worked with a confederate partner on a picture description task adopted from Branigan, Pickering, and Cleland (2000). Following prime descriptions produced by the confederate, participants produced target descriptions of ditransitive events that could be described with either prepositional dative (PD) or double object (DO) constructions. In general, participants who rated themselves higher in perspective taking and who were identified as more field-independent showed more evidence of repeating the partner's syntax; however, these patterns were limited to PD primes. Variability in sensitivity to others' perspectives, and variability in one's ability to attend to local structure, may shape the likelihood that interlocutors will display evidence for structural persistence in dialog.

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## 1. Introduction

Conversation generally involves the coordination of action and meaning across multiple levels of language use (Clark, 1996). An especially fundamental form of coordination is *output/input coordination* (Garrod & Anderson, 1987), in which speakers produce particular words or phrases shortly after hearing the same words spoken by a partner. For example, after hearing Jonas refer to a piece of furniture as “the sofa,” Carly may be subsequently more likely to use the same word herself (instead of, say, “couch”). By repeating back as output the same or similar material recently received as input, speakers presumably ensure that their own and their partners' discourse representations are suitably aligned for the purposes of interaction. In principle, output/input coordination benefits interlocutors by helping them converge on similar linguistic patterns more quickly, thereby enhancing communicative success.

One type of output/input coordination involves *structural persistence*, in which speakers reuse syntactic constructions that have appeared in the recent context (Bock, 1986; Branigan, 2007; Pickering & Ferreira, 2008). Structural persistence has been observed for a wide variety of syntactic constructions in English, including active vs. passive sentences (Bock, 1986; Bock, Loebell, & Morey, 1992), verb particle

movement (Konopka & Bock, 2009), pre- vs. post-nominal NP modification (Cleland & Pickering, 2003), and the dative alternation (Bock, 1986; Branigan, Pickering, McLean, & Stewart, 2006; Kaschak, Loney, & Borreggine, 2006). Similar demonstrations in other languages exist as well (Hartsuiker & Kolk, 1998; Scheepers, 2003). What makes this body of research possible is the fact that languages like English permit speakers to express the same underlying message using one of several possible syntactic forms. Because the choice of which form to use is relatively flexible, there is room to explore various factors that might affect what speakers ultimately say, including the syntactic structures present in the preceding context.

Although much of the work on structural persistence involves monolog paradigms in which participants first read (or listen to, or repeat back) a prime sentence and then carry out a task (e.g., picture description) that requires production of a target sentence, repetition of syntax is a robust phenomenon in dialog contexts as well (Branigan et al., 2000; Cleland & Pickering, 2003; Hartsuiker, Pickering, & Veltkamp, 2004; Haywood, Pickering, & Branigan, 2005; Levelt & Kelter, 1982; Schoonbaert, Hartsuiker, & Pickering, 2007). A particularly strong demonstration of this comes from Branigan et al. (2000), in which participants engaged in a picture description task in conjunction with a confederate partner. The confederate and participant took turns describing pictures that included simple ditransitive events (involving an agent, a patient, and a recipient) that could be accurately described using either a double object (DO) construction (*The policeman is*

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throwing the boxer the hat) or a prepositional dative (PD) construction (*The policeman is throwing the hat to the boxer*). The pattern of data showed clear evidence of structural persistence: Participants' choices of which construction to use strongly matched the construction used by the confederate on the preceding trial. Additionally, this effect was stronger when the verb spoken on the current trial was the same as the verb from the previous trial (the so-called "lexical boost"; Pickering & Branigan, 1998).

One model of spoken dialog that readily accounts for such consistency of syntax across interlocutors is Pickering and Garrod's (2004) Interactive Alignment model. On this model, convergence on particular linguistic forms does not result from speakers' overt decisions to coordinate. Instead, because speaking and listening are seen as drawing upon the same underlying representations, the residual activation of linguistic representations used during comprehension can increase the likelihood that subsequent production processes will rely upon similar representations. Moreover, the mutual priming of linguistic forms across interlocutors at one level of the language processing system can foster similarity at other levels of the system, causing speakers to come into greater overall alignment as the dialog proceeds. This enables more efficient dialog as interlocutors converge upon increasingly similar discourse representations.

According to the interactive alignment view, persistence of syntax (and other linguistic features) both within and across speakers arises through low-level priming mechanisms: e.g., hearing a particular construction automatically facilitates production of that same construction. However, a variety of work has shown that patterns of linguistic convergence can be strengthened or weakened by other aspects of the communicative situation. For example, Branigan, Pickering, McLean, and Cleland (2007) used a triadic version of the dialog procedure from Branigan et al. (2000), and found that individuals who were the direct addressees for prime descriptions displayed more syntactic repetition compared to individuals who were simply side-participants for the prime trial. More recently, Branigan, Pickering, Pearson, McLean, and Brown (2011) found that participants' tendency to align on particular lexical expressions during an interactive picture-matching task was mediated by speakers' beliefs concerning their partners' communicative abilities; in particular, speakers showed stronger alignment toward computer partners than human partners, especially when the computer was presented as outdated. Finally, Balcetis and Dale (2005) found less evidence for syntactic persistence in dialog when participants worked with "mean" confederates who presented themselves as elitist, judgmental, and shallow, than with "nice" confederates who presented themselves as friendly and relaxed. This finding is consistent with work on Communication Accommodation theory (Giles, Coupland, & Coupland, 1991), a broader account of communication and social interaction that attributes patterns of conversational convergence (and divergence) to speakers' attempts at managing the interpersonal distance between themselves and members of other salient social groups. In a similar vein, Coyle and Kaschak (2012) even showed that the degree of syntactic alignment demonstrated by male participants toward a female confederate was related to where the confederate was in her menstrual cycle. Greater fertility was associated with less alignment, consistent with the idea that men may use non-conformity as a means to display increased fitness. Taken together, these results suggest quite strongly that automatic priming mechanisms cannot be the only factor shaping when and how speakers converge on particular syntactic forms. Indeed, evidence on this same point exists for other types of convergence as well (e.g., phonetic convergence: Kim, Horton, & Bradlow, 2011; Pardo, 2006).

It appears, then, that situational features like participant role or partner identity can influence how strongly speakers show evidence for syntactic persistence in dialog. What about, though, differences in the characteristics of individual speakers? To date, this question has been examined in only a handful of studies. One study, Kaschak, Kutta, and Jones (2011), explicitly considered the role of individual differences as

part of a test of "implicit learning" accounts of structural persistence. In contrast to the transient activation mechanism proposed under models like interactive alignment, implicit learning explanations posit that repeated experiences with syntactic forms can result in long-term changes to the representations that support particular construction types (Chang, Dell, & Bock, 2006). Using a monolog production paradigm, Kaschak et al. tested whether individual differences in implicit learning abilities would mediate the strength of cumulative priming effects for the dative alternation. In a sentence completion task, participants first worked through a block of training trials that consistently elicited DO or PD completions, followed by additional test trials that could be completed with either alternative. A separate perceptual pattern-learning task measured differences in implicit learning. Although biasing participants toward PD constructions resulted in greater cumulative priming effects, Kaschak et al. found that individual differences in implicit learning did not have an influence upon priming, being only marginally correlated with overall rates of DO production. Left open, though, was the possibility that their implicit learning measure might invoke different implicit learning mechanisms than those involved more directly in language production.

The question of individual differences in structural persistence has also been examined from a developmental perspective by Kidd (2012), who asked 4- to 6-year old children to describe target pictures depicting transitive actions (e.g., a girl blowing a feather) after hearing an adult experimenter use a passive construction to describe an unrelated prime picture (e.g., *The guitar was played by the man*). In addition to measuring how often children used passive constructions in their own descriptions, Kidd obtained independent measures of their vocabulary and receptive grammatical knowledge, as well as their nonverbal reasoning abilities. Both vocabulary and grammatical abilities predicted syntactic persistence effects, suggesting that variability in syntactic priming in children may reflect differences in linguistic knowledge. Interestingly, though, levels of structural persistence were also predicted by children's nonverbal abilities, which in this case were measured by Raven's Coloured Progressive Matrices (Raven, Rust, & Squire, 2008). Given the nature of this task, which involves visual pattern identification and abstraction, Kidd speculated that the (nonverbal) ability to recognize structural similarities could be an important constraint upon both language learning in general and syntactic repetition in particular.

Another study, by Gill, Harrison, and Oberlander (2004), used a version of the Branigan et al. (2000) dialog priming procedure to investigate whether differences in "Big 5" personality traits – and in particular differences in one's tendency to withdraw from or approach others – would mediate patterns of structural persistence for individuals in conversation. The results from this study, which examined active versus passive constructions, showed that, while levels of Extraversion did not predict syntactic persistence, both High-Neurotic and Low-Neurotic participants showed less repetition of syntax than moderately neurotic participants. Gill et al. speculated that individuals high in Neuroticism may exhibit less persistence because of a greater tendency to withdraw from others due to concerns about self-presentation, whereas individuals low in Neuroticism may exhibit less persistence due to a diminished concern for how they might appear to others.

Finally, a recent study by Weatherholtz, Campbell-Kibler, and Jaeger (2012) explored how structural persistence may be influenced both by variation in speakers' own interpersonal styles as well as by cues about the social identities of other talkers. Participants first heard a priming passage – a liberal- or conservative-biased political monolog – read by a speaker of White English, Black English, or by a non-native speaker with a Mandarin accent. Embedded in this passage were ten sentences using either all double object or all prepositional dative constructions. Participants then described a series of line drawings depicting ditransitive events, and the measure of interest was whether these descriptions used DO or PD syntax. A final questionnaire measured the participants' own political ideologies and their "conflict management styles," along with evaluations of the speaker of the political passage. In general, the

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