Prompting for Repair as a Language Teaching Strategy for Augmentative and Alternative Communication

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Abstract

Conversational repair has been found to play a fundamental role in the acquisition of language. This paper describes existing research on conversational repair and its relationship to language learning, whether a first language or a second language, as well as its relevance to augmentative and alternative communication (AAC). A case is made for incorporating prompts to repair in conversation-based language interventions with children learning to use AAC. We argue that interventions targeting linguistic complexity should encourage self-repair in conversation in order to develop linguistic and operational competency as well as increase automaticity when using AAC. Clinical implications and directions for future research are discussed.

Keywords: Augmentative and alternative communication; Language intervention; Recast; Repair

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Over the last three decades, there has been a growing interest in the language development of children who use aided augmentative and alternative communication (AAC), provoking several in-depth discussions about the unique aspects of their language learning experience (e.g., Gerber & Kraat, 1992; Light, 1997; Smith, 2006, 2015; Sutton et al., 2002; von Tetzchner, 2018). These differences are often discussed in relation to the following aspects: (a) differences in representation (e.g., Soto & Olmstead, 1993; von Tetzchner, 2015); (b) inter-modal asymmetry (e.g., Smith & Grove, 2003); (c) differences in production (e.g., Smith, 2015) and (d) differences in acquisition contexts with restricted access to sensory, motor, and social conditions that are known to be facilitative of language development (e.g., Light, 1997). Theoretical perspectives of aided language development typically reflect both the processes that are unique to the communicative situation of children who use aided AAC and those involved in typical language development (Smith, 2015; von Tetzchner, 2018). In addition, because AAC systems use representational, syntactic, and semantic aspects to express meaning that are different from spoken language (Light & McNaughton, 2014), children learning to use aided communication can be thought of as learning two language codes simultaneously. Consequently, theories from second language (L2) acquisition may also contribute to a theory of aided language development.

Theories of language development recognize the relevance of language input in acquisition processes, but children's language does not develop from exposure alone. According to social constructivism language is learned through social interaction with more competent children and adults (Bruner, 1975, 1983; Vygotsky, 1962; von Tetzchner, 2018), a stance that is echoed by L2 scholars (e.g., Goo, 2019). A conversation between a novice speaker and an expert

speaker emerges as the product of an interactional process, accomplished over time and incrementally, where both communication partners are constantly adjusting and responding to each other in ways that are relevant to the learner's language abilities (see Gass & Mackey, 2006 for discussion in L2 context). According to Brown (1968), the changes produced in sentences as they "move between persons in discourse may be the richest data for the discovery of grammar" (Brown, 1968, p. 288); however, researchers of typical development are divided on the extent to which children's language production (i.e., output) impacts their language development. For instance, Pinker (1994), suggests that the emergence of grammatical structures is not dependent on overt practice but made possible by linguistic exposure and innate language-learning constraints. This position has been widely contested by those who claim that children are not passive language learners but have an active role in their own language development (Clark, 2018, 2020; Tomasello, 2003; Vygotsky, 1962).

Research shows that, in conversations with young children, adults offer feedback with considerable frequency by checking up on unclear utterances when children make errors (Clark, 2020). When children detect a breakdown between their communicative intention and the message perceived by the adult, they often modify their output in an attempt to repair their original utterance. Modified output in the form of repairs is intrinsic to and ubiquitous in conversations between novice and expert speakers of any language and plays a critical role in language learning, whether children or adults learning their first (e.g., Clark, 2020) or second language (e.g., Goo, 2020). Children's use of words and grammar emerges from their generalizations of others' language use as well as their own. They learn appropriate word usage and rules of grammar by listening to (or seeing) language(s) used by others, as well as from using language, for various reasons in different contexts (von Tetzchner, 2018). A core tenet of

usage-based theory of language development (Tomasello, 2003) is that the child's experience

with constructing and using language influences their language learning. Children's own

production serves to develop the procedural skills required for language use, and also offers an

opportunity to analyze and internalize the rules intrinsic to their language system.

In the context of early conversations with children, adult partners use a range of

scaffolding techniques such as repetition, expansion, correction, and requesting clarification to

scaffold children's participation in conversation, model conventional uses of language, and

support children in generating their intended message (Chouinard & Clark, 2003; Clark, 2018,

2020). As children begin to combine words and grammaticalize, adults use these techniques to

provide feedback on the grammatical accuracy of their utterances and to expand their language

use. Children's output offers the adult insight into the system the child is constructing, and at the

same time, reveals aspects of the system that require modification to conform to the conventions

of their linguistic community. According to Wagner (1985), speaking children are estimated to

produce as many as 20,000 words in a day, creating numerous opportunities for interaction and

feedback. In contrast, an aided communicator may produce fewer than 20 utterances in the same

time (Smith, 2006).

Although both speaking children and children using aided communication receive

positive evidence (i.e., appropriate verbal language models) and feedback about their production,

clinical experience suggests aided communicators are far more likely to receive feedback related

to the content of their message or the accuracy of their operational skills than on the accuracy of

their grammar (Smith, 2006). This observation is likely to reflect inherent challenges that graphic

symbol use brings to conversational interaction. For instance, graphic symbols can be difficult to

interpret and morphosyntactic elements are often unavailable or difficult to access (Light &

McNaughton, 2014; Sutton et al., 2002; von Tetzchner, 2015). In addition, explicit feedback may

come at the cost of lengthening the time needed to construct a message and increasing demands

on attention and memory (von Tetzchner, 2018; Wilkinson & Hennig, 2009). Despite these

challenges, command of morphology and syntax is necessary for achieving linguistic competence

and can increase the frequency of successful communication, especially with unfamiliar listeners

(Sutton et al., 2002).

Adult feedback has been recognized as facilitative of language development in aided

AAC (e.g., Soto & Clarke, 2017, 2018), however a number of questions remain including what

the most effective types of feedback are, and what role child repair plays in developing aided

language competence (Binger et al., 2020; Smith, 2006, 2015; von Tetzchner, 2018). The purpose

of this paper is twofold: (a) to provide a brief overview of existing research on conversational

repair as a language learning strategy, and (b) to suggest and provide justification for prompting

conversational repair as a clinical strategy in language intervention for children who use aided

AAC as they begin the process of grammaticalization.

Repair as a Language Learning Strategy

Repair is a term used within the conversational analysis literature to describe a range of

features that are used by participants to manage problems in talk. These problems, or "troubles,"

may relate to speaking, hearing, and understanding the talk in conversation (Schegloff, 2000).

Early work by Schegloff and colleagues (1977) identified two core stages in the realization of

repair: initiation (i.e., displaying something in the prior talk as a troubled utterance) and outcome

(i.e., what may be called the repair itself). They further noted that repair can involve either the

self (the speaker of the trouble-source), other (someone other than the trouble-source speaker), or

both. Four basic permutations of repair are thus possible: (a) self-initiated self-repair, (b) other-initiated self-repair, (c) self-initiated other-repair, and (d) other-initiated other-repair.

In the context of child language acquisition, young children monitor their language production as well as adults' responses and may engage in self-initiated self-repair when their communication partners appear to not understand their utterance (Clark, 2020). Example A from Clark illustrates how Brenda, aged 1;8 (years; months), uses repeated and progressively more accurate attempts at self-repair until her mother explicitly shows that she recognizes the word the child is attempting to say.

Brenda, holding up her mother's shoe and looking at it: *Mama. mama. mama. mama.*

sh. shi. sh. shiss. shoe. shoesh.

Mother: *Shoes!*

Research examining the occurrence of self-initiated self-repair in first language acquisition suggests that it aids the child in progressively mastering different aspects of language (Clark, 2020). Clark reported that children's self-initiated repairs at 2;0-2;4 years old prioritize phonological corrections (32%) over syntactic ones (3%). As they acquire more words and master speech sounds, the proportion of self-initiated repairs dedicated to phonology decreases while repairs of syntax increase (6% and 23%, respectively, for children aged 3;5-3;8). Although Example A exemplifies a phonological repair, these findings suggest that the processes of self-monitoring, mental retrieval, and matching production to stored mental representations that occur during self-initiated self-repair may support the automatization of speech productions in terms of phonology and morphosyntax, gradually reducing the need for repairs (Clark, 2020).

Recast as a Form of Other-initiated Repair

Communication partners, including parents and language teachers, execute multiple

strategies in order to signal that an error or "glitch" in a speaker's utterance was detected. Other-

initiated self-repairs are commonplace in conversations between adults (Dingemanse et al., 2015)

and between adults and children (Chouinard & Clark, 2003). Other-initiated repairs can take the

form of *open requests*, which do not pinpoint the type of correction needed (e.g., *hm?, huh?*),

and *restricted requests*, which underscore the information needing clarification (e.g. *where?,*

who?) and make relevant a self-repair by the prior speaker. A third repair type, *restricted offers*

(Clark, 2020; Dingemanse et al., 2015) are immediate reformulations of all or part of the

speaker's problematic utterance with the error corrected. In the case of first language acquisition,

restricted offers are commonly referred to as *reformulations* and have two purposes: to check up

or confirm the child's meaning, and to provide a conventional way of saying the intended

message without being obtrusive or disturbing the flow of conversation. This can be seen in

Example B from Clark (2020):

Child (4;1): *It might get loosed down the plug hole.*

Adult: *Lost down the plug hole?*

In second-language learning contexts (e.g., Goo & Mackey, 2013) and in clinical settings

(e.g., Baker & Nelson, 1984), the reformulation of an erroneous or imperfect utterance in order

to provide feedback is typically referred to as a *recast.* A recast occurs when a communication

partner responds to a learner's original (i.e., platform) utterance by reformulating it with one or

more contrasting elements while maintaining its central meaning and incorporating at least some

of the words from platform utterance. This reformulation, which can address any aspect of

speech or language, is offered in the conversation turn immediately following the platform utterance.

Unlike open and restrictive requests, which make relevant a self-repair by the speaker (i.e., other-initiated self-repair), restricted offers, or recasts, simultaneously signal and resolve the problem. Thus, recasts serve as both the initiation of the repair and the repair itself (other-initiated other-repair; Schegloff et al., 1977). It is important to note that, although not required, recasts sometimes lead the speaker to repair their initial problematic turn following the recast, as demonstrated by the child's word change in Example C (Chouinard & Clark, 2003):

D (2;4): *Don't fall me downstairs!*

Father: *Oh, I won't drop you downstairs.*

D: *Don't drop me downstairs.*

Numerous studies have found recasts to be an effective intervention strategy for treating children with a wide range of speech and language impairments (see Cleave, 2015, for a review). Additionally, investigations of second language classrooms have found that recasts are the most frequent feedback move used by teachers (Brown, 2016; Lyster & Ranta, 1997). Recasts are thought to be effective, in part, because they follow immediately on the child's utterance, incorporate elements of the child's turn while maintaining its central meaning, and provide contrastive comparison (see Saxton, 2005). According to the contrast theory of negative input (Saxton, 1997), the immediate juxtaposition of an erroneous statement with a corrected one provides the child with negative evidence and signals the need for a repair. Furthermore, because the recast is based on a joint attentional focus and maintains the child's original content, less cognitive load is needed for comprehending its meaning, and more processing energy can be used to analytically compare the two forms (Baker & Nelson, 1984; Chouinard & Clark, 2003;

Nelson et al., 1996; Saxton, 2005). The same aforementioned affordances of recasts have also

been extensively discussed in the context of second language learning and instruction (see

Ammar & Spada, 2006; Ellis & Sheen, 2006; and Goo, 2020 for reviews).

In an analysis of five children in conversation with their parents, Chouinard and Clark

(2003) found that adults reformulated up to two-thirds of their children's erroneous utterances.

The children in the study frequently demonstrated evidence of attention to the adult's correction

in their next turn through overt uptake (i.e., repair), rejection, acknowledgment, or repetition of

information provided by the reformulation. Although immediate repair by the child followed, on

average, less than 20% of adult reformulations, the findings provide evidence to support the view

that children monitor and make use of the feedback provided by reformulations.

In the context of first language acquisition, the importance of immediate modified output

has been debated (e.g., Camarata et al., 1994), and it has been suggested that for naturally

speaking children acquiring their first language, immediate self-repair is not necessary for them

to make use of the corrective feedback provided by recasts (Nelson, 2000). In contrast, more than

two decades of empirical research in second language acquisition has yielded abundant evidence

indicating that the production of modified output immediately following the provision of

corrective feedback is an integral part of second language learning (see Lyster & Saito, 2010 for

a meta-analysis). In L2 literature, modified output is described as a means for enhancing fluency

and automatization of language production, as well as increasing metalinguistic awareness by

bringing the learner's attention to the contrast between their utterance and the target language

(Goo, 2019). The Output Hypothesis, proposed by Swain (1993), argues that second language

learners need to be "pushed" (i.e., prompted) ... to reflect on their output and consider ways of

modifying it to enhance comprehensibility, appropriateness, and accuracy" (p. 161). Several

investigations have found that corrective feedback that elicits self-correction (e.g., open and restricted requests) are more effective for teaching linguistic targets to second language learners than recasts alone (Ammar & Spada, 2006; Ellis, 2015; Ellis & Sheen, 2006; Lyster, 2004). For example, Ellis (2015) suggests that second language learners may benefit from a combination of recasts and prompts to repair, with recasts providing models of new linguistic targets and prompts providing opportunities for learners to refine their prior knowledge through self-repair. Lyster (2004) argues that when students learning a second language are pushed to correct themselves without hearing a model of the correct form, they are required to retrieve information from long term memory, which increases mental activation and the likelihood that the linguistic item will be retrieved again in the future. These contributions from second language acquisition may theoretically offer some application to aided language development where accurate and efficient use of an AAC system is important for becoming an independent communicator (Light & McNaughton, 2014).

Interactional Features of Aided Communication Related to Self-Repair

Children learning aided communication are language learners. The interactional mechanisms underlying aided language acquisition, its content, and its form have attracted considerable attention from AAC researchers over the last three decades (see Smith, 2015 for an extensive discussion). The form of aided communication output in spontaneous conversations is often characterized by a predominance of single-symbol utterances, a persistence of simple clause structures that lack grammatical markers and inflectional morphology (even when these are available on the user's device), word-order differences from the local spoken language, and the use of numerous word strategies to compensate for the lack of appropriate vocabulary (Deliberato et al., 2018).

While all conversational interaction is co-constructed, one of the distinct features of aided conversations is the extent and manner to which communication partners work together in co-constructing the contribution of the person for whom the AAC system is provided (Clarke, 2016; Hörmeyer & Renner, 2013; Solomon-Rice & Soto, 2011; von Tetzchner, & Martinsen, 1996). The process of co-construction typically starts with an utterance provided by the aided communicator, often a single word, that is not fully interpretable on its own. This utterance very often kicks off a series of guesses and specific yes/no questions by the speaking partner, which are accepted or rejected. Through guessing and follow-up questions the two individuals work through several turns to glean the intended message (Binger & Light, 2008; Clarke, 2016; Hörmeyer & Renner, 2013).

Within these types of everyday interactions children using graphic symbol-based aided AAC may use vocabulary items in strategic and creative ways to express meaning beyond the symbol gloss (von Tetzchner, 2018); however, the use of aided AAC may also be limited by co-construction practices. For example, analysis of conversations between mothers and their children who use aided communication found that the mothers typically produced talk that did not solicit or require the use of aided AAC to continue the interaction and instead invited the use of unaided responses such as nods and smiles (e.g., Savolainen et al., 2020b). Furthermore, speaking children and children using aided AAC have been seen to bring about sequences that position the aided communication turn to a "pre-defined conversational slot (Clarke et al. 2013, p. 38)," such as a response to a question. This may be helpful for both partners because contingent replies produced via aided communication may be easier to understand and less likely to need repair (Clarke et al., 2013; see also Clarke & Wilkinson, 2007, 2008). In addition, such strategies may support positive, spontaneous interaction as they can minimize often significant

time delays, effort, and operational demands inherent in aided AAC use. Nonetheless, these practices contrast with those seen in conversations involving typically developing children learning language (e.g., Waller & O'Mara, 2003) where adults embed recasts, prompts, and expansions into open-ended questions to help frame children's narratives and to stimulate further dialogue. Throughout this dyadic process, children may self-repair spontaneously or in response to adult prompts to repair.

The characteristics of co-construction seen in typical and AAC-mediated interactions, including strategies for resolving troubles with understanding, may be understood in relation to principles of conservation, specificity, and division of labor (Dingemanse et al., 2015). According to Dingemanse et al., when a person receives a message that they do not understand, they typically utilize a specific repair-initiator (i.e., restricted requests and reformulations) in order to efficiently signal the type of repair needed while suggesting that the rest of the message was understood, such as the repair-initiator *who?* presented in Example E (Dingemanse et al., 2015). The division-of-labor principle explains that listeners prefer to be altruistic, opting to make repairs easier by using restricted requests and reformulations instead of less specific open requests such as *huh?* whenever possible. Among natural speakers, other-initiated self-repair is typically an efficient way to resolve misunderstanding.

Speaker A: *Oh Sibbie's sistuh had a baby boy*

Speaker B: *Who?*

Speaker A: *Sibbie's sister.*

Speaker B: *Oh really?*

These principles may be useful for understanding why naturally speaking communication partners appear to take on more of the co-construction work when conversing with aided

communicators. Because aided communication can be laborious, slow, and extremely fatiguing

speaking partners may be more inclined to put more effort into resolving breakdowns, possibly

finding guessing and asking specific yes/no questions more efficient than relying on other types

of repair initiators (*Sorry? What?)* when limited information, such as a single symbol, is

provided.

In everyday interactions, co-construction is a positive and effective interactional resource

that conserves time and effort for both partners and potentially maximizes successful exchanges

(Clarke & Wilkerson, 2008; Savolainen et al., 2020b). Even so, a number of researchers have

begun to question whether co-construction, as observed in practice and in naturalistic

conversation, provides aided communicators with contrastive feedback and practice

opportunities through self-repair that will support the internalization of language conventions

and automatization of the operation of their communication aid (e.g., Binger et al., 2020; von

Tetzchner, 2018). Undoubtedly, the interactional experiences, acquisition systems, and

expressive mechanisms related to typically developing children seem well suited to the task of

language development without the need for explicit feedback or immediate self-correction. When

adults provide corrective information via reformulations and other co-constructive strategies to

typically developing children, immediate self-repair is optional, as was seen in Example C

presented earlier. Speaking children, however, have the opportunity to retrieve and practice

production of the target form in subsequent turns, especially if they are guiding the conversation.

When aided communicators are engaged in a process of co-construction, they do not have the

same opportunity to practice the production of new linguistic forms because they are typically

responding to the questions and conjectures of their speaking partner. In addition, immediate

repair after a recast may not be crucial for typical language development because the linguistic

forms stored auditorily can be produced later using the same medium of speech. However, children learning language through aided AAC must learn to integrate spoken language with symbolic representations of language as well as the organization structure of their AAC system (Clarke et al., 2017; Smith & Grove, 2003). Verbal or aided AAC modeling alone may not provide sufficient scaffolding to support the integration of spoken and aided AAC language codes (Clarke et al., 2017). Similarly, linguistic input alone is often insufficient for mastering elements of a second language (Goo, 2019).

Given the complexities of many AAC systems, even if a child registered the corrective function of the recast, attended to the contrast, and processed the linguistic data, it is very difficult to ensure that they know how to access the enhanced version on their communication device. Aided communicators often have to navigate through multiple pages or screens to locate and select the desired vocabulary items, and many AAC programs are not conducive to grammaticalization (Binger & Light, 2008; Sutton et al., 2002). Without regular practice, the individual may struggle to execute the motor plan with the level of automaticity needed to make communicating with the device efficient (Clarke et al., 2017; Ibrahim et al., 2018; Savolainen et al., 2020a; Soto & Clarke, 2017; Soto et al., 2019; Valencia et al., 2020). In the long term, persistent lack of self-repair may delay aided communicators' expressive language development and impact their learning of grammar, especially when compounded with operational challenges of aided AAC use; thus, immediate self-repair as part of language intervention and instruction may be especially important for children using aided AAC. Within educational or clinical intervention contexts, prompting a child to self-repair can conjecturally increase the noticeability of feedback, support the development of new language forms such as grammaticalization,

provide opportunities for learning how to construct messages, and facilitate the procedural

practice necessary for efficient word retrieval in the future (Clarke et al. 2017; Soto et al. 2019).

Prompting to Repair as a Clinical Strategy

Prior research in AAC has found a relationship between child output and learning of

linguistic targets. For example, Romski and colleagues (2010) taught 62 young children with

developmental delays single-word vocabulary that was individually chosen for each child and

suitable for age-appropriate activities such as playing or shared book reading. Children were

randomly assigned to three intervention conditions: (a) speech communication condition,

whereby children were prompted to produce targets using speech only; (b) augmented

communication input condition, in which target vocabulary was modeled using the children's

speech-generating device (SGD) as well as with natural speech but the children were not

expected to produce vocabulary items; and (c) augmented communication output condition,

where adults modeled targets using speech and the children's SGD and children were prompted

to produce the target words using their SGD. Results revealed that children who were expected

to produce the target words on their SGD learned to use more augmented words than those who

were taught the words but were not expected to produce them on their device. Although the

focus of Romski et al. was on single-word vocabulary, the observed relationship between

production and vocabulary growth can theoretically be extrapolated to other parts of language

such as grammatical elements.

In later work, Soto and colleagues (2019) analyzed video data from a clinical

conversation-based intervention study involving eight children between 8- and 13-years-of-age

with motor speech disabilities who used SGDs. Data were extracted from earlier and later

intervention sessions to investigate the relationship between different types of adult recast and

child repair, and the relationship between child repair and later spontaneous use of linguistic

targets. Spontaneous use of target items during later intervention sessions was significantly and

positively related to earlier conversational sequences in which adult recasts included targets that

the participants used in a repair of their prior turn, pointing to a relationship between child repair

and distal spontaneous use of linguistic targets. Furthermore, the rate of repair varied according

to recast type, with participants repairing more often when they were directly prompted to do so

and when they were presented with an interrogative choice recast, which necessitated a reply

using their SGD.

Similarly to L2 literature (see Ellis, 2015 for L2 context), recasts and prompts to repair

are believed to serve different functions in aided language intervention. Recasts are considered

beneficial because they provide the learner with opportunities to directly contrast their utterance

with one that is grammatically improved (Binger & Light, 2008; Clarke et al, 2017). A prompt to

repair delivered after multiple turns of co-construction can shift the focus of a clinical interaction

from negotiating meaning to language instruction (Savaldi-Harussi et al., 2019; see Lyster, 2004

and Lyster & Ranta, 1997 for L2 classroom context). Prompts to repair encourage the learner to

attend to the new linguistic information and reformulate their message accordingly. Prompts also

offer opportunities for language construction and familiarization with the language infrastructure

of the device during meaningful learning experiences.

Recent studies offer preliminary support for combining recasts and prompts to repair in

clinical conversation-based interventions (Luckins & Clarke, 2019; Soto & Clarke, 2017, 2018).

In Soto and Clarke's clinical studies with children and youth who used SGDs, clinicians used

participant-relevant photos and other artifacts as a context for conversation. When the

participants generated an utterance, the clinician asked a series of questions to elicit different

sentence constituents and glean the complete message. Once the message was understood, the

correct form was then recast and the clinician prompted the participants to modify their original

utterance using grammatical elements that were previously absent, as in the example below. The

clinician used verbal and gestural prompts to assist the participants in locating the necessary

targets. Younger children demonstrated improvement in all of the grammatical targets (pronouns,

verbs, and bound morphemes) as well as their spontaneous production of clauses. Among the

adolescents, all four participants improved in their use of at least one linguistic target, and three

increased their use of spontaneous clauses. These changes were generalized to conversations

with familiar adults and peers who were blind to the intervention strategies.

Adult: *Do you remember how old were you?* (looking at a photograph of the child)

Child: "*Nine years old.*"

Adult: *You were nine years old. Let's make that a full sentence. I was*

Child: "*I was nine years old.*"

Adult: *What else do you remember about that day? Tell me about it.*

Child: "*Dad mom*"

Adult: *So remember, we're using our complete whole sentences, right? So you would*

say: This is mom and dad.

Luckins and Clarke (2019) replicated these procedures in another study including four

children with partially intelligible speech and receptive and expressive language delays. These

children, for whom speech was their primary mode of communication, used SGDs to repair

unintelligible natural speech. During intervention, the clinicians asked the participants about a

personally relevant photo, recast the child's utterance into a full verbal clause, modeled the target

clause on the child's SGD, and prompted the child to repair. Their intervention was effective in

increasing the rate of self-initiated clauses by all children. Three out of four children also showed

increases in the total number of words used within clauses, with more moderate gains in the use

of fully grammatical sentences. Linguistic gains also generalized to conversations with adults

unaware of the intervention strategies.

In both the Soto and Clarke (2017, 2018) and Luckins and Clarke (2019) studies, recasts

were combined with prompts to repair to teach grammatical targets such as pronouns,

prepositions, articles, verbs, and inflectional morphology, among others. While the level of

participant operational competence in AAC prior to intervention may have influenced outcomes,

the results of these studies provide positive preliminary evidence for combining recasts with

prompts as a clinical intervention strategy within conversation-based intervention for individuals

who use aided AAC and are learning to use grammar.

Implications for the Use of Prompts to Repair in Aided Language Intervention

Preliminary research evidence suggests that encouraging aided communicators to repair

their utterances after a recast has promise as an effective clinical intervention strategy to promote

language learning; however, effective communication with an aided communicator will continue

to benefit from co-construction for efficient and functional communication. Individuals who use

aided AAC are a unique population requiring intervention approaches that are tailored to their

exceptional needs. Many children who use aided AAC present with characteristics that are

consistent with language-learning disabilities. Their messages tend to show an overall

immaturity in grammatical structure, including difficulties with pronouns, syntax, verb

morphology, elaboration of interrogative, negation, and complex sentences (Binger & Light,

2008; Sutton et al., 2002). They typically have a late onset and a slower rate for learning specific

grammatical features (Smith, 2015). Due to the interaction between the complex nature of their

disabilities and the complexities of using aided AAC to learn language, it is often challenging to parse out the nature of their difficulties in acquiring grammar.

Language intervention for children who use aided AAC is a long term, complex, and multi-modal process that requires systematicity and time. Due to their heterogeneity in etiologies, communication aids, receptive/expressive language profiles, level of AAC competence, etc., intervention strategies need to be selected and modified according to the target skill and the language needs and the capacities of each individual client (e.g., Beukelman & Light, 2020). Children's language acquisition typically develops at the crossroads of the appropriation of the linguistic system and its use in dialogue (Morgenstern et al., 2013). Children acquiring language via aided communication find themselves at an intersection of learning their first language and learning to use a communication system with different representational features and unique encoding demands, which can arguably be likened to aspects of learning a second language. Because of this, discerning effective treatment approaches for facilitating language growth by people using AAC may draw on contributions from the fields of communication disorders, typical language acquisition, and second language learning.

There are many users in the early stages of communication development for whom a focus on form rather than content may not be warranted or desirable as it can potentially disturb the flow of the conversation, increase operational and cognitive demands, decrease motivation, and limit interactional opportunities for authentic use (von Tetzchner, 2018). It is therefore critical to understand how, when, and with whom to use different types of feedback. Combining recasts and prompts for repair may serve to maximize the benefits of grammatical intervention for children who use aided AAC and are beginning to combine symbols into longer utterances, by maintaining a client-centered approach that provides sufficient feedback and opportunities for

practice. When constructing grammatical interventions for children with language challenges, Fey et al. (2003) prescribe maximizing the "frequency, saliency, meaningfulness, and opportunity to make use of target grammatical constructions" (p. 5). Combining recasts with prompts for repair during intervention elevates the saliency of the linguistic contrast and increases the likelihood that the feedback is accurately registered. Prompting for repair increases the opportunity for practice, which can contribute to automaticity and allow the client to make use of the target in the future.

Language therapy that encourages output using prompts for repair is distinct from pure imitation or decontextualized language performance. Utilizing a conversation-based intervention approach focusing on events that are meaningful and motivating to the child, with implicit and explicit feedback plus opportunities for practice, can provide rich language intervention. Recasts, and conversation-based therapy in general, appear to support linguistic growth in part because they are child-initiated and provide greater interactional opportunities than drill-based tasks. Combining prompts with recasts increases the saliency and frequency of new grammatical forms while maintaining the meaningfulness of discourse-based intervention for individuals learning to use AAC (Luckins & Clarke, 2019; Soto & Clarke, 2017, 2018).

In addition to improving direct intervention practices, incorporating such an approach may have significant implications for generalization of newly acquired linguistic skills to novel situations. Clinicians working to develop the linguistic skills of individuals using AAC may consider coaching other members of the educational team to incorporate target-specific recasts (Camarata & Nelson, 2006) and prompts for repair during appropriate learning opportunities in an intervention or education context. As previously discussed, recasting is a natural part of communication when one attempts to converse with a less competent communicator, whether it

be children, non-native speakers, or those with communication impairments; thus, instructing

potential communication partners to execute this intervention strategy can boost the

opportunities for practice across various situations, activities, places, and contexts.

It is important to underscore that not every interaction with an aided communicator

should incorporate prompts for repair or that children should always be expected to replicate

adult models in full. A person who uses AAC may be less likely to communicate if always met

with corrective feedback and prompts to repair. Co-constructive strategies as described above

will continue to be critical for expedient, functional, and positive interactions between aided

communicators and their communication partners. Supporting a person to express their intent

and feel heard should always precede a prompt to repair. It is proposed, however, that prompting

to repair as a teaching strategy be carried out in clearly defined intervention or education

sessions. Prompts should be used to elicit a limited set of intervention targets, presented in

recasts, that are within the child's zone of proximal development (Vygotsky, 1962). Selecting

appropriate intervention targets is a critical aspect of recast-based interventions but beyond the

scope of this paper (see Binger, et al. 2020; Eisenberg, 2013, 2014; Kamhi, 2014). In addition to

the individual's linguistic level, communication partners should be mindful of the individual's

affect, such as motivation and anxiety, to maximize the potential for language learning (see Goo

& Takeuchi, 2021 for a discussion of feedback and affect in L2).

Limitations and Future Directions

Much research is needed to investigate how prompts to repair may influence the efficacy

of recasts among aided communicators, and to describe how input and output work together to

facilitate language learning in aided AAC. Current evidence suggests that intervention

incorporating recasts in addition to explicit requests to repair has demonstrated promising

preliminary results in children's language use (Luckins & Clarke, 2019; Soto & Clarke, 2017, 2018; Soto et al., 2019). To date, however, such research has incorporated recasts and prompts to repair within broader intervention packages. Isolating specific procedures (e.g., questions, recasts, prompts to repair) to analyze their separate effect as well as order effects is, therefore, warranted. Researchers interested in investigating the differential effects of recast input versus output may consider replicating second language acquisition studies that compare recasts to other types of prompts provided during instructional interaction (e.g., Lyster, 2004). In addition, employing randomized control studies that compare this approach to recast-only and prompt-only treatment is necessary to draw further conclusions.

A second limitation of this recast-plus-prompt approach is that, like most interventions, it may not be suitable for every child, situation, or language goal. For example, it may not be beneficial for some therapeutic objectives such as increasing overall frequency of self-expression or AAC use. More information is also needed about the type of linguistic target and the level of operational and linguistic competence most susceptible to this type of strategy. Here too, recast research conducted in the context of second language learning may offer a framework for such investigations. For example, Ammar and Spada (2006) found differential effects of recasts and prompts between high-proficiency and low-proficiency second-language students.

Because those who use AAC are heterogeneous in terms of AAC system, language ability, and diagnosis, language intervention studies that support participants' use of their own communication systems in authentic discourse-based tasks may be well suited to support generalization of learned skills to everyday conversation. The field of AAC is in serious need of continued research that aims to discover effective and meaningful language intervention strategies. Expanding the recast research agenda to aided communication requires a nuanced

approach that brings together findings from first language acquisition, second language

acquisition, communication disorders, and AAC research.

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