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Cripping the "Delay": Multilingualism-Related Consequences of Re-Labeling Language Deprivation Systems

Elena Koulidobrova[1]* *and Deborah Chen Pichler*[2]

[1]Department of English, Central Connecticut State University, New Britain, CT, United States, [2]Department of Linguistics, School of Languages, Education and Culture, Gallaudet University, Washington, DC, United States

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INTRODUCTION

The human capacity for communication is both stunningly innovative and resilient. These points are illustrated most effectively by the literature on homesign systems created by deaf and hard of hearing (DHH) children in the absence of usable language input. Goldin-Meadow (2012) specifies that "homesign systems arise when a deaf child is unable to acquire spoken language" due to the inability to hear speech "and is not exposed to sign language" because their hearing family does not know or use any sign language (Goldin-Meadow 2012:602). Homesigns are invariably described as gestural systems built (in part) on the *gestural* component of the language(s) used by DHH children's hearing families. However, among the estimated ~95% of DHH children who grow up in hearing families (Mitchell and Karchmer, 2004), it is likely that some are also able to access elements of the spoken language that are potentially usable for acquisition. The totality of this received spoken language input does not constitute a full, natural language, but it may nevertheless contribute to the child's initial communication system. If so, questions arise as to what exactly this system is, which is neither homesign (at least in the way it has been typically described) nor a natural language (in the way linguists and layfolk typically understand the term), and how such a system influences subsequent acquisition. These questions form the main focus for this article. We consider here the initial communicative systems created by *all* DHH children with adverse childhood communication experiences (ACCE, Kushalnagar et al. 2020), who have also been termed "language-deprived" (Hall 2017), before they acquire an established natural signed, written or spoken language. For the sake of simplified exposition, we refer collectively to these systems as simply the "initial system," a deliberately broad label that encompasses the full range of communicative mechanisms innovated by DHH people in contexts of degraded, restricted and/or delayed language input. Although such initial systems include homesign systems, the two designations are not interchangeable, as the existing literature is unclear on the extent to which all ACCE/language-deprived individuals develop the grammatical mechanisms described by homesign researchers (Goldin-Meadow, 2020).

A clear understanding of the initial system and its impact on subsequent acquisition is critical, given the many disadvantages and highly variable outcomes documented for language-deprived DHH people in the literature dedicated to "late acquisition of first language." Those studies conclude that initial systems do not provide learners with the foundation necessary for "typical" acquisition of the first- or second/subsequent language (L1 or L2/L*n*) (e.g., Mayberry et al., 2018). However, it is worth noting that many of the tasks used to illustrate language and processing disadvantages for ACCE/language-deprived DHH people are highly decontextualized from actual language use. This contrasts with the heavily interactive and contextualized communication styles observed for many

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***Correspondence:**
Elena Koulidobrova
elena.koulidobrova@ccsu.edu

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language-deprived DHH people around the world, through which meaning is co-created between interlocutors, often extemporaneously and with recourse to extra-grammatical mechanisms (Moriarty Harrelson 2017). The recently articulated framework of *Crip Linguistics* (Henner and Robinson 2021) highlights the ableist and discriminatory implications of marginalizing the communicative practices of so many DHH people as "less than language" simply because they do not conform to expectations of languages as used by abled populations. We extend this view to the domain of language acquisition research, arguing that the common designation of language-deprived children's first conventional sign language as their "late L1" and their subsequently learned written language as their L2 prevents us from considering important contributions that their initial system may make to those languages. Recognizing the potential of the initial system as a source of transfer and/or cross-linguistic influence to subsequently learned languages is a crucial step towards understanding the notoriously variable language acquisition outcomes for DHH people (Mayer and Trezek 2020, Henner et al., 2016, a.o.). This approach also offers valuable insights to current theoretical debates, such as the recent discussion over competing models of third language acquisition (L3A), now recognized as quite distinct from L2A (Rothman et al. 2019; Westergaard 2021). Aside from the language architecture-related constructs which make L2 and L3 different, nothing much changes when one steps outside of the L1 domain of theorizing. For instance, it is well-known that L2 education (García et al. 2021 and references therein) and, more generally, the field of L2 acquisition are racialized (see the discussion in Flores and Rosa 2019, a.o.). Much of the same can be said for multilingual (L3+) discourses, see e.g. Cisneros (2019), Alvarez (2018), a.o.). We thank an anonymous reviewer for bringing this point to our attention. Most importantly, systematic examination of the initial system in the ways we describe it recognizes the diverse language practices of *all* DHH people as valid foundations for language acquisition.

Our discussion is structured as follows. In the remainder of this section, we summarize several problems related to the construct known as "late L1 acquisition" and introduce the tools that a Crip Linguistics framework provides for the re-examination of the initial system. In *Theoretical Consequences of Recognizing the Initial System Within the Crip Linguistics Perspective*, we sketch out some theoretical implications of this recognition. Rather than simply being replaced by or subsumed into subsequent languages, we discuss intial systems as existing foundations exerting specific influence on acquisition of L2 (*Consequences for the First Subsequent Language: Child L2*) and L3 (*Consequence for the Subsequent Languages: Child L3*). Finally, we conclude in *Conclusion* with a summary of the issues raised and suggest directions for further research.

Rationale for the "Initial System" as a Construct

A common assumption among linguists and lay people alike is that DHH children raised in hearing, non-signing families do not develop language unless they encounter a conventional sign language and/or have sufficient access to a spoken language (e.g., due to high levels of residual hearing or successful use of technology). In the meantime, these children communicate with their hearing families using systems that they create from the restricted input available to them. These creations have attracted a great deal of research attention but from two very distinct perspectives that appear contradictory. On one hand are descriptions of homesign systems displaying an impressively sophisticated array of language-like features that are innovated by DHH children in the absence of usable linguistic input (Goldin-Meadow 2012; Carrigan and Coppola 2017; Flaherty et al., 2021; Abner et al., 2021). On the other hand are reports of poor language outcomes for DHH adults who experienced delayed exposure to a conventional sign language; these outcomes are attributed to an initial communication system that was too impoverished to fully support subsequent language development in either modality (Mayberry and Eichen, 1991; Deng and Tong 2021). How could such seemingly opposing characterizations of DHH children's communicative practices both be true? Do they represent the extremities of a broad spectrum along which DHH children naturally fall? Or two distinct developmental stages through which DHH children pass as they grow older (Morford and Hänel-Faulhaber 2011)? We take the ambiguity above as our point of departure and argue that a systematic investigation of the full range of communicative mechanisms innovated by *all* DHH people is crucial for an accurate characterization of their subsequent language learning.

Let us consider, for instance, the "late L1 signer/learner" designation commonly applied to DHH individuals who experience delays in childhood language input, and the concurrent assessment of their initial system as an inadequate foundation for "typical" acquisition of a first- or second/subsequent language (L1 or L2/L*n*) (Mayberry and Kluender 2017). Decades of research have repeatedly documented the negative effects of degraded and/or delayed language input on DHH children's linguistic development and the persistence of those effects into adulthood (Mayberry and Eichen 1991; Newport, 1990, i.a.). Cases DHH children who receive neither early exposure to any conventional sign language nor sufficient access to the spoken language(s) of their family environment for L1 acquisition remain troublingly commonplace. Some of these children eventually encounter and acquire a conventionalized sign language, a process typically commonly described as *late L1 acquisition* (e.g., Mayberry 2007). Developmental outcomes in the context of late L1 acquisition are notable in two respects: because such individuals all endure some degree of adverse childhood communication experiences (Kushalnagar et al., 2020)/language deprivation (Hall 2017), which has been shown to correlate with poorer performance on experimental tasks involving language and processing, outcomes are 1) variable, and 2) they diverge notably from "typical" L1 outcomes of children with early and abundant access to language input, displaying differences that persist even despite extensive exposure to accessible language later in life.

The late L1 acquisition construct has also been useful for distinguishing the wide-ranging, persistent differences observed for late-exposed signers from the more "mundane" L2 effects observed for sign language learners who have a well-established L1. However, this designation also raises important questions that

have not been sufficiently addressed in the psycholinguistics literature. Chief among these is the role played by whatever resources the child initially brings to the task of language learning, e.g., the varied combination of signs, gestures and/or spoken words that many DHH children from hearing families develop in subsequent acquisition of a signed language (e.g., in the case of belated exposure to a signing community) and/or a spoken language (e.g., after activation of a hearing aid or cochlear implant); see, for example, the discussion in Kusters (2021) and references therein.

Yet, the notion of a late L1 signer reflects the traditional view that this initial system is not itself a language, so its development is not considered language acquisition. Accordingly, Mayberry and Kluender (2017) write, "In the absence or paucity of prior spoken language development, a deaf child's first exposure to a sign language marks the initial onset of language acquisition, albeit at a late age" (p. 6). Even well-developed homesign systems created by DHH children before encountering a conventionalized sign language are described as "[containing] many, although not all, of the properties of natural language" (Goldin-Meadow 2020:196), qualifying them as being *language-like*, but not actually *language*. Across the psycholinguistics literature there is a collective but implicit assumption that whatever the DHH person developed initially is simply subsumed into a sign language once they are exposed to that language, and the original system ceases to exist. Yet this is not at all how we as a field conceive of linguistic development in any other acquisition context. Instead, we carefully document the processes by which systems that existed beforehand influence those which develop subsequently. Why shouldn't we do the same for the initial systems? We submit that no matter which language properties these initial systems may lack or how much they may diverge from "typical" L1 systems, they are nonetheless actively created by DHH children to serve the linguistic function of meaningful communication and as such, potentially contribute to and participate in subsequent acquisition processes in the same way that conventional languages do.

As language acquisition researchers we have an empirical responsibility to thoroughly investigate this proposal. Doing so in no way diminishes the reality of language deprivation and the unacceptable burdens it places on DHH children. Rather, it recognizes the linguistic adaptations that these children create in contexts of sub-optimal language input and explicitly acknowledges their role in subsequent language learning. In fact, we suggest that continuing to dismiss the initial system contributes to an ableist framework common in scientific research. In contrast, according serious empirical attention to the initial system of ACCE/language-deprived children and recognizing its potential influence on subsequent language learning could offer valuable insight on the variability in linguistic outcomes for DHH people that have proven so difficult to explain otherwise.

A Crip Linguistics Perspective on the Initial System

The view of DHH children's initial system articulated above fits well with the framework of *Crip Linguistics*, introduced by Henner and Robinson (2021). This framework highlights the linguistic adaptations innovated by disabled people and the collaborative, multimodal nature of language that is created by and used among disabled individuals. Henner and Robinson urge researchers "to assume that *all* people are competent co-participants in constructing meaning" (p. 13, emphasis ours), no matter how much their language systems may diverge from "typical" norms. The authors challenge the fundamental dichotomy of typical vs disordered/atypical language discussed in fields such as linguistics, psychology, speech pathology and education, arguing that standards for optimized, typical language actually reflect normative expectations of the abled majority. The most relevant of these expectations to the current discussion are listed in (1).

1) (a) language develops spontaneously along the timeline typical for abled people with unfettered access to linguistic input
   (b) meaning is conveyed through linguistic resources (through a traditional lexicon, grammar, etc.)
   (c) communication between people is "quick, efficient, and spoken" (p. 23).

As we discuss below, none of these characteristics are generally associated with DHH children's initial systems, contributing to their exclusion from language-hood in the existing literature.

Henner and Robinson (2021) challenge the notion of anyone's language as "bad" or intrinsically disordered. They concede that language may *become* impaired as a result of environmental conditions such as language deprivation, but rather than focus on those impairments, Crip Linguistics emphasizes the many competencies that language-deprived individuals display in innovating the "flexible accumulation of languaging practices and modalities" (Moriarty-Harrelson 2019) 1) that constitute the initial systems of many DHH people. These "languaging practices" involve extensive *linguistic care work* between interlocutors (2).

2) Linguistic care work is the time taken in being patient, in supporting and providing semiotic resources, in seeking, expanding, and claiming our own semiotic resources, in calibrating to each other in seeking mutual understanding. This is not only language work but care work through languaging in being invested in collective access and belonging to create and provide optimal environments and material conditions for language (and mutual understanding) to take place. (Henner and Robinson, 2021: 25)

The communicative resources recruited during linguistic care work can extend well beyond the grammatical mechanisms traditionally recognized as "language." For instance, Moriarty Harrelson (2017) documents the communicative practices of deaf Cambodian adults considered (sometimes even by themselves) as having "no language" prior to learning one of the national sign languages in Cambodia. To communicate with those around them, these deaf Cambodians use gestures, text and signs, but also creatively incorporate graphic resources (e.g., drawings, emoticons, and maps) and technology (e.g., calculators for haggling over prices at the market), practices that contravene expectations (1b) and (1c) by being "non-linguistic," time-consuming and requiring patient engagement and multiple

exchanges between interlocutors. Yet, if these multimodal, collaborative interactions are ultimately effective in achieving mutual understanding, there must be some linguistic mechanisms underlying these practices. Translanguaging researchers have variously discussed such mechanisms in terms of 'sense making' and semiotic repertoire assemblage, which are characteristically 1) distributed, 2) individually evaluated, 3) contingent on access as well as self-conceptions, and 4) unstable and, importantly, have also been argued to be part-and-parcel of communication strategies of spoken language communities unaffected by language deprivation (see Kusters 2021 and references therein). For language acquisition researchers, the mechanisms underlying language care ought to be particularly interesting. They represent the initial system developed by language-deprived DHH people, and it is reasonable to ask how they are maintained and how they shape development of Cambodian Sign Language or any other language that these signers subsequently encounter. Crucially, however, while these systems *shape* the subsequently acquired languages, there is no good reason to assume that they actually *become* these languages, somehow morphing into their L1, albeit slowly (and typically not fully successfully). In the next section we articulate some specific theoretical consequences of recognizing the initial system as one which persists into and is active during subsequent language development.

THEORETICAL CONSEQUENCES OF RECOGNIZING THE INITIAL SYSTEM WITHIN THE CRIP LINGUISTICS PERSPECTIVE

As noted in *Rationale for the "Initial System" as a Construct*, the psycholinguistics and language acquisition literatures are notoriously vague and even contradictory in their characterization of what we have labeled the initial system. On the one hand, there is a robust literature detailing the linguistic complexity displayed by homesigns: the existence of lexical items, morphemes, and hierarchically organized structured strings/sentences with distinct word-order patterns, if not specific grammatical constructions (Goldin-Meadow, 2020). These linguistic patterns are not attested in the gestures of hearing family members, indicating that they were innovated by homesigners rather than acquired from input (Carrigan and Coppola 2017; Flaherty et al., 2021, i.a.). Such findings are powerful testimony to the resilient human ability to create certain grammatical subsystems even in the absence of those systems in the linguistic input. At the same time, several studies demonstrate that, despite all of the internal complexity, homesigners often fail the main goal of the task: successful communication hearing family members. In contrast, DHH signers of *other* sign languages can comprehend homesigner's discourse (Carrigan and Coppola 2017), perhaps DHH interlocutors more readily engage in the "care work" essential in crip linguistics and familiar to DHH people worldwide. Thus, despite input deprivation, a linguistic system emerges spontaneously after all [as in (1)]; "care work" [as in (2)] is required, but a question arises whether and in what form such "care work" must take place, and to what extent it is affected by factors outside of the narrow definition of "language".

On the other hand, even when homesigners are subsequently exposed to an established sign language, their development of that language has been argued not to resemble that of typical L1 or L2 learners (e.g., Slabakova 2020), despite similarities of their homesign system to established languages (Morford and Hänel-Faulhaber 2011). Morford et al. 1997) demonstrate this point through a direct comparison of classifier verbs elicited from the well-known homesigner David both before and after he began acquiring ASL in his late teens. The grammatical sophistication of David's homesign system is particularly well-documented (Morford and Goldin-Meadow, 1997; Hunsicker and Goldin-Meadow 2012; Cartmill et al., 2017), including his systematic use of certain handshape classifiers to represent objects with specific sizes and shapes (Goldin-Meadow et al., 1995). Yet, despite the impressive homesign system he had created as a child, which included mechanisms for encoding different types of objects through handshape, David's subsequent acquisition of this aspect of ASL was not more successful than that of other deaf late-learners (Newport, 1990; Mayberry, 1993). Indeed, Mayberry and Kluender (2017) explicitly conclude that the performance of late-exposed signers on grammatical tests in their first conventional sign language indicate that "homesign does not function as an L1 for the deaf child" (p. 10). We consider this to be a pre-mature conclusion.

The prolific "late L1 signer" literature documents significant disadvantages for ACCE/language-deprived deaf signers on various linguistic tasks, compared to deaf and hearing people who had the benefit of an early-established L1 (Mayberry et al., 2002, Ramírez et al., 2013 Mayberry 2007, a.o.). Yet the observation that homesigner's subsequent development of a signed or spoken language does not resemble "typical L2 development" in those languages begs the question of *how* that development is being shaped by the initial homesign system. Today's language acquisition literature is rich with analyses for examining cross-linguistic influence and transfer, yet application of these models to DHH people's initial systems is virtually nonexistent, blocked by the assumption that only formal/classically acquired linguistic systems (a.k.a. "languages") exert grammatical influence on subsequent language learning. In Morford et al.'s (1997) comparison of David's homesign and subsequent ASL production, his overall scores on the verbs of motion test were low, but accuracy in selecting the appropriate handshape for a given classifier depended on whether David's homesign repertoire had an established handshape for representing that particular object type. If it did, the handshape production in the elicited production task was more accurate, even if his homesign handshape differed from the conventional ASL handshape for that object. Morford et al. conclude that although David's homesign system did not allow him to acquire ASL more successfully than other deaf late-signers, David's homesign acted as a source for transfer of some handshapes from his homesign to

his ASL, in much the same way a conventional previous language would.

Morford et al. (1997) demonstrates the great potential for longitudinal examination of interactions between homesign and subsequently learned conventional language(s), but to date there are very few such studies. We propose that for practical purposes (and theoretical ones as well, as we will see), the initial system that an ACC/language-deprived child creates serves as an existing foundation on which any subsequent language is built, whether signed or spoken, or both. Whether that initial system displays sufficient linguistic sophistication or systematicity deemed a "proper language" does not diminish the fact that this system has been created by the DHH child to serve the purpose of language and displays properties of conventionalized languages. As such, a comprehensive investigation of that DHH child's overall language development should include consideration of how that initial system contributes to subsequent language acquisition. Explicit examination of this interaction can tell us if cases typically discussed as late L1 acquisition are actually more akin to L2 acquisition, displaying errors in the L2 grammar that are traceable to features of the child's initial system. Likewise, cases typically categorized as DHH signer's L2 development (most commonly of written language) may actually be instances of L3 acquisition. L3/L*n* acquisition is rarely discussed in the context of sign language users of any category (either deaf or hearing), but recent recognition of the prevalence of multilingualism among signers (Guiberson and Crowe, 2018; Zeshan and Webster 2019) suggests that the L3 literature offers useful tools for new insights on what is currently discussed as homesigner's second language learning of a spoken or written language.

Let us summarize in the interim. Within the framework of Crip Linguistics, we have argued directly why cripping "late acquisition" is necessary (3 and 4 below). (5) and (6) then follow.

3) Any child who has been deprived of a natural language input is expected to create a communicative system that recruits multiple modes of sense-making, i.e., it is multimodal.
4) This system (which we have provisionally labeled the "initial system", although it should be named and elaborated, given how many people begin their communicative lives with it) needs to be taken seriously by researchers in terms of structure. We should turn to the exploration of this system in *all types of cases* because it has ramifications for subsequent language development.
5) Despite immense individual variation, the initial system is the first building block of communicative intent on which all subsequent language learning will rely for language-deprived DHH children; accordingly, the field of language acquisition should be applying constructs associated with L1 development to it directly.
6) All of the *other* and, in particular, *subsequent* languages of the learner should thus be considered L2, L3, . . . L*n*.

In particular, 6) emerges from the epistemological conundrum of inaccurate labeling (vis-a-vis cognitive success, e.g., in Schurz, 2014 and references therein), as well as a growing L3 acquisition literature that raises additional problems with treating a learner's linguistic system as an L2 when it is in fact their L3. We proceed to that point next.

CONSEQUENCES FOR THE FIRST SUBSEQUENT LANGUAGE: CHILD L2

Theorizing about multilingual experiences necessarily involves considerations of language minoritization, since s languages, even national ones, are minoritized (De Meulder et al., 2019). This phenomenon is, unfortunately, well documented in the literature, as are its effects on multilingual language acquisition. Skutnabb-Kangas and colleagues (see Skutnabb-Kangas 2020 for an overview) have argued that linguicide is commonly committed against indigenous and linguistically minoritized communities. According to these authors, removing the indigenous language from the indigenous person also results in language deprivation as the majority language tends to dominate not only language attitudes but also acquisitional trajectories of the children who are surrounded by it. Here, however, the parallels between hearing and DHH children end. Hearing children always have the dominant language of the community to turn to for communicative functions (though often at the expense of linguistic and cultural loss associated with their L1), which they often acquire (near-)natively. Matters are potentially different for DHH children: even with additional training and/or augmenting technology, (full) access to this majority language and, thus, native(-like) acquisition remains out of reach. But if what they *do* acquire is not a L1 as typically defined, then what is it? We explore this question in more detail for the context of DHH children who have experienced language deprivation, but the general process should hold for spoken languages as well.

On any theory of multilingualism (simultaneous or sequential), a language learner is expected to demonstrate language interaction, to which we have already alluded in our discussion of David (Morford and Goldin-Meadow, 1997). The typical approach to such interaction is conceptualized as transfer and/or cross-linguistic influence between languages (Vainikka and Young-Scholten, 1996, Eubank 1993, Platzack and Clahsen 1996, White 1989, Schwartz and Sprouse 1996; Hulk and Müller, 2000, a.o.). The specific systems that should be expected to transfer to/influence subsequent language learning varies from case to case. For a DHH child of deaf parents they will likely acquire a sign language first, which will interact during (pre-) school ages with the written (version of the spoken) language they then acquire as L2. This situation is replicable for a DHH child of hearing parents placed at a very young age into a sign language-based early intervention program (Sass-Lehrer 2014). However, the reality is different for the vast majority of DHH children who do not receive natural language input before they begin school (ages 3.5–8). While researchers studying DHH L1 acquisition might still consider children in this age-range as "early acquirers" (Mayberry 1993; Cormier et al., 2012), the same cases would be categorized by many L2 acquisition researchers as *child L2 acquisition,* which begins at approximately 3–4 years of age (Schwartz, 2004; Unsworth 2005; Meisel 2008; Chondrogianni et al., 2018) and ends before age 7; 0 (Abrahamsson and

Hyltenstam, 2009; Meisel 2013). The child L2 literature also tracks effects of the quality of input (Chondrogianni and Marinis, 2012, Paradis 2011) especially when caregiver fluency in the L2 is low (Hammer et al., 2014), protracted "default" acquisitional patterns are involved (Hulk and Cornips, 2006), and asynchronous development occurs in different domains (e.g., significantly quicker learning of phonology than vocabulary and morphosyntax; McCarty 2013; McCarty 2014). In other words, the child L2 literature offers immediately applicable predictions for the majority of DHH children's language acquisition, once we are explicit about the role of their initial system.

We should thus be open to considering the pre-school learning of a natural sign language by DHH children who are not exposed to that language from birth as potential cases of child L2 acquisition. For instance, Cormier et al. (2012), indicate that age of acquisition effects in prelingually DHH signers from hearing families exhibit several of the aforementioned effects between the ages of 2–8, just as predicted by the child L2 literature. The authors report that prelingually DHH signers from hearing families (whom they categorize as *early learners,* distinct from *native signers*) exhibit age of acquisition effects in their grammaticality judgments on their first sign language (British Sign Language/BSL). In particular, among the 2–8 year-olds, 1) age of acquisition correlates with more target-like performance on the grammaticality judgment task, 2) younger children perform more target-like on some grammatical structures but not on others, demonstrating the aforementioned "asynchronous development". According to the authors, 2–8 year-olds exhibit a growth effect, in contrast to other groups. We expect the early learners in Cormier et al. to *eventually* settle on the native-like BSL patterns in several domains (rather than performing immediately in line with child L1, adult L1, or adult L2 norms, Chondrogianni et al., 2018; Unsworth et al., 2019, a.o.), a prediction that arises from the child L2 literature. This research also shows "richness of L2 input" *vs*. proficiency to be crucial in predicting target structures. Note that, in the case of signers, research has leaned towards the same conclusion (Holcomb et al., 2021; Lieberman et al., 2021, and references therein). Following this line of argumentation, we can also expect some direct outcomes of different languaging distributions in child L2 configuration, such as have been reported by Puskás 2017 for young children learning Swedish as child L2/L*n*. This study shows that what Henner and Robinson label "care work" may be reformulated as "high level of trust between children and their teachers" (Puskás 2017:313).

In turn, as we have argued, we can test the null hypothesis that the previously unnamed initial system of the majority of DHH learners will participate in subsequent language learning in the manner observed for child and adult L2 (see Unsworth 2005 for extended discussion). In our examination of linguistic patterns of any multilingual learner we should expect to encounter structures that come from a system *other than* the signed (e.g., ASL) or spoken/written languages (e.g., English); namely from what we have thus far been calling the initial system. In this way we remain open to attributing language interaction effects to that initial system, in addition to acquired signed or written/spoken languages.

CONSEQUENCE FOR THE SUBSEQUENT LANGUAGES: CHILD L3

We have articulated our position that the *first subsequent* language beyond the initial system of a ACCE/language-deprived DHH person will not *become* a ("delayed") L1, but rather should be considered as a child L2, a theoretical construct with its own predictions for development and mastery across modules. We now move to the next language of the learner which they are likely to be learning in school *as an L3*. This language may be either signed (especially if the L2 was a spoken one, developed through intensive auditory training and/or utilization of various technologies) or written, reflecting the dominant language(s) of the country: e.g., Spanish in Spain, Japanese in Japan; and so forth. Because the tenets of L3 acquisition are new to many language researchers (including ourselves), we first offer first a brief overview of the basic concepts we consider the most relevant to the current discussion.

L3/L*n* research is a fairly young field just over 15 years old or so, rooted in the L2 theoretical frameworks but with a strong contribution of its own, engaging several types of audiences. As we understand it, the main foci of this field are 1) the sources of interaction between the languages of the multilingual, and 2) the details of this mechanism. While these questions belong to the domain of L3 theorizing proper, we argue that sign language acquisition research offers potential answers where spoken language research falls short. Principally, theoretical models of L3 acquisition are modality independent; it should not matter whether the third language is signed or spoken, and whether learners access it via the aural/oral, visuo-gestural, or even print channels.

Despite the relative youth of the field, several L3 theories have been articulated that distinguish between contributions of the learner's previous linguistic systems to cross-linguistic interaction. A few of the most prominent theories are listed below.

7) A selection of L3 theories describing contributions of a previously-acquired language:
   (a) L1 (Jin 2009, Na; Ranong and Leung 2009; Hermas 2014).
   (b) L2 (Bardel & Falk 2007).
   (c) L1+L2 (Cumulative Enhancement Model, Flynn et al., 2004; Scalpel Model, Slabakova 2017; Linguistic Proximity Model, Westergaard et al., 2017)
   (d) L1 *or* L2 (Typological Primacy Model, Rothman 2011).

These theories all rely on the previous linguistic experiences and, thus, make strong predictions about the contribution of the initial system with which most DHH children begin their linguistic journey. For the models in 7), whichever new language is being acquired is simply expected to be affected by the initial system, though *how* and *to what degree* remain a matter of debate.

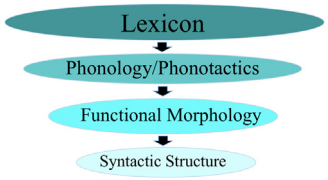

FIGURE 1 | | Implicational hierarchy of input cues Adapted from (Rothman et al., 2013; Rothman et al., 2015).

A contested issue in L3 acquisition literature is whether to characterize the mechanism of language interaction as transfer/cross-linguistic influence, or more accurately, whether the two are independently attestable (RSherwood-Smith (2017)). For instance, Rothman et al. (2019) refer to *transfer* as literally a "reduplication of a representation from previously acquired linguistic representations," a "copy" of the grammar of a previously acquired language. In contrast, cross-linguistic influence is a temporary "bleeding" of one language into another (p. 15). On this approach, transfer occurs only at the initial stage of acquisition, when the learner, or rather, the learner's linguistic mind, first "decides" which language to (fully) copy (Schwarz and Sprouse 1996). That is, *transfer* happens only once and affects the entirety of the grammar ("wholesale"). The use of the term by Rothman et al. (2019) is literal. In turn, for Slabakova (2017) and Westergaard (2020, 2021) "(full) transfer" is a metaphor; "transfer" itself does not exist *per se*. Instead, cross-language interaction occurs due to co-activation of all of the languages of the multilingual and is expected at several junctures. Under this view, L3 learning is incremental, proceeding "property-by-property," regardless of the order of acquisition of the previous languages or (psycho-) typological similarities between languages. The only requisite context is input that co-activates shared structures in the previously acquired languages (Westergaard 2021). We do not currently know of any work exploring the application of any of these models to DHH children with delayed input to natural language, but let us consider what such research might look like. Here we focus on two recent models for reasons of exposition, but similar argumentation can also be applied using other models.

The Typological Primacy Model (TPM, Rothman 2011, et seq.) argues that at the initial encounter with L3, the parser (a "grammatical analyzer" or sorts) "makes a decision" based on a psycho-typological assessment of similarity between the L3 and the learner's L1 and L2. The parser "ranks" contributions of similarities according to a set hierarchy: lexical items > phonology > morpho-syntax. This sequence is shown in **Figure 1**, adapted from Rothman et al. (2015).

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Let us illustrate with a hypothetical example of a DHH native signer of Catalan SL (LSC) whose (child) L2 is Spanish Sign Language (LSE), and who has just embarked on L3 acquisition of ASL. The first assessment their parser makes is to check whether they recognize (or rather, *think* they recognize) the same signs in ASL as in LSC (L1) *or* LSE (L2). If the answer is "yes" for either LSC or LSE, then exactly (and only) that language will become the source of transfer; that is, a copy of the grammar of that language will serve as the starting point for L3 development of ASL. If neither the LSC nor the LSE resembles ASL on a lexical level, the parser will turn next to phonology. If the phonological patterns of one of the learner's previous languages are perceived to be more similar to those in ASL, then that previous language will become the source of transfer. However, if no such perception is obtained, the parser turns to evaluating morpho-syntactic similarity.

Now let us apply this analysis to a more common DHH learner, who experienced delayed exposure to a sign language (say, LSE), typically (though not always) before approaching a spoken language. This is the first place where the TPM requires further elaboration. What immediately complicates matters is whether this learner has had any amount of input in spoken Spanish, through residual hearing or training, that is usable for construction of a Spanish grammar, albeit clearly a different one from "standard Spanish." If the answer is "yes", we expect this new system produced by the learner to also include co-speech gesture. If the gestural system underlying homesign and L3 Spanish correspond, then we should expect the parser to consider this lexicon, and the evaluation procedure should proceed very similarly to what we articulated above for the LSC/LSE learner of L3 ASL, where all of the languages were in the same visuo-gestural modality. By the same token, the parser "sees" and considers the phonology of the co-speech gesture associated with Spanish. If that phonology is not deemed similar enough to that of a previous language, the parser then considers the morpho-syntax of Spanish against the initial system and the L2 LSE. If the syntax of this initial system *appears* closer to what is observable in Spanish, we should expect to see evidence of transfer from that system rather than from LSE in the Spanish of language-delayed DHH learners. The crucial question thus is whether access to spoken input/speech (in any amount) was a part of the child's initial system. An affirmative vs. negative answer to this question leads to direct predictions for whether the grammars in each of the modalities will be considered by the parser as the source of transfer.

Another concrete example: for a DHH child growing up in a hearing environment with *no* access to sound, the initial system typically consists of 1) pointing, 2) lexical items that are iconic, invented by the child to be understood (but not necessarily used) by the caregiver(s), and 3) gestures borrowed from the co-speech gestures used by the caregiver(s) (Goldin-Meadow, 2007; Torigoe and Takei 2002, a.o.). Let us imagine such a child growing up in a Spanish-speaking household, having established what we have been calling the initial system for communicating with the family that is directly label-able as "homesign," learning a sign language in an intervention program (e.g., LSE), and now attempting Spanish (potentially spoken and also written). What will the parser do in this case? We assume that the parser does not decide based on modality, but does it do so based on iconicity? For instance, sets (a)-(b) above offer predictions related to this particular characteristic of sign languages, which has not yet been discussed in the spoken language theories of L3 acquisition, but one can imagine how such argumentation would proceed

(Sanchez 2019). Otherwise, the sequence of evaluation proceeds as before, with the parser evaluating for similarity based on psycho-typology, starting at the lexical level, followed if necessary by the phonological then morpho-syntactic levels. The "winner" of that comparison becomes the source of transfer for Spanish.

However, another complication arises, associated with a common educational practice of placing the "spoken words on the hands" (Gustasonn et al., 1982) through sign supported speech (SSS) or invented signed systems. This practice arguably creates an acquisition problem for the learner because it is neither 1) a sign language, since it violates basic structural principles of natural sign languages, 2) a spoken language, since it is not spoken and because it omits a variety of morphological components that are part of the spoken language, nor 3) homesign, since homesign is a communicative system devised by the learner based on gestures of the community while SSS are invented by educational authorities. Yet, SS is precisely the strategy often used for instruction of the written language for the DHH children. In this situation, identifying the source of transfer should proceed as described above, but given the artificial nature of invented sign systems, it is less obvious to us where the parser will find sufficient overlap between the previous languages and the written L3.

An interim conclusion arising from Rothman-style (2011) theorizing is that DHH signers who received a natural sign language early and therefore bypassed "the initial system stage" will move reasonably seamlessly into learning of another sign language, in that we expect to see run of the mill L1/L2 transfer at the initial approach to L3. In contrast, children who experienced language deprivation in childhood and thus had to create an initial system for communication will entertain either this system (as designated L1) or an actual sign language (as L2) when they approach an L3, be it spoken/written or signed. If the L3 is spoken/written, perceived similarities between the initial system and L3 may outweigh the similarities between the L2 and L3 in the creation of the new grammar; restructuring of the newly copied grammar will follow.

In contrast, models that feature grammatical representations growing in real time, such as Westergaard et al., 2017 Linguistic Proximity Model, abandon wholesale transfer, relying instead on the parallel activation of previously acquired languages. In the words of Westergaard (2021) "any property can be shared but what is actually shared will depend on the outcome of competition between candidates." On Westergaard's model: 1) the learner first scans her previous grammars; 2) if she finds corresponding structures, they are activated; if she does not, she resorts to universal grammar (UG). In this system then, nothing "transfers"; rather, cross-linguistic effects arise due to co-activation of shared structures. This particular feature of the model makes certain prediction for DHH learners of other languages: on the one hand, it highlights the "instability/variability typical of early L3 grammars" prior to "setting"/stabilization (Westergaard 2021); on the other, it suggests that depending on the modality of the languages involved, the pre-stabilization stage may be protracted due to reduced inhibition/coactivation.

As before, we illustrate the workings of this model by starting with a simpler, albeit less typical, case of a unimodal L3 learner with LSC as their L1, LSE as their L2 and ASL as their L3. At various points during the acquisition stage, upon encountering new data-points in ASL, the learner is expected to scan her LSC and LSE grammars, building ASL representations in real time out of the candidate representations that win among the competitors. The same prediction holds for cases when the L1 is an initial system rather than a conventional sign language. That is, if at any point the representations in the initial system and the L3 are shared, the linguistic mind of the child will adopt that representation for the L3. Further, we expect that the DHH learner with access to a written or spoken language will engage in the inhibitory processes to a different extent (Dias et al., 2017, a.o.). Effects on the learner's comprehension/production of the written (and spoken) language should follow. Thus, similar to the research on bimodal *vs.* unimodal bilinguals (Lu et al., 2019; Schaeffner and Philipp, 2020; Kaufmann et al., 2018, i.a.), research on unimodal vs. bimodal L3A learners should produce different patterns of acquisition, at least under the Westergaard (2021) model. Finally, to date, L3 literature has not yet arrived at a final measurable conclusion as to whether any contributing language is ever fully abandoned/discarded after transfer into L3. This type of "abandonment" is well-known as language attrition (Schmid 2011). The process remains under empirical scrutiny (see various resources at https://languageattrition.org/), with the current conclusion being that it is unlikely to completely "erase" the L1 from the mind of the learner (cf. Bayram et al., 2019; Westergaard 2020). We thus predict something similar for the initial systems: despite the many developments of the communicative strategies and practices, what we have called "the initial system" is expected to persist in the linguistic mind of the learner, yet may subsequently be subject to attrition at various junctures.

We hope the introduction to the L3 models of acquisition outlined above demonstrates the concrete predictions they offer for examining the contribution of the initial system to DHH children's subsequent language development. In return, including DHH learners in L3 research has potential to not only test the models themselves but also increase their empirical coverage. Thus, irrespective of one's theoretical allegiances, we believe that the fields of L3 acquisition, Deaf Studies and sign linguistics stand to mutually benefit from this new line of inquiry. As originally advanced in Morford et al. (1995) (and discussed in *Theoretical Consequences of Recognizing the Initial System Within the Crip Linguistics Perspective*), we should expect a variety of properties from a child's homesign to surface in their subsequent languages but with the following amendment: only to the degree that the parser finds appropriate. Rothman (2011, et seq.) predicts that the initial stage of L3 acquisition will involve wholesale transfer of one of the previous linguistic systems (i.e., the homesign system or a subsequently acquired language), which will subsequently undergo restructuring to match L3 input. The decision of which system will be copied lies solely with the parser and is based on psycho-typological (learner perceived) proximity of a previously acquired language to the target L3. In contrast, according to Westergaard, the linguistic mind of the learner may "transfer"

some but not all parts of previous languages to the target L3, offering a promising (albeit currently hypothetical) behavioral account for why DHH learners exhibit such variable outcomes in their subsequent language acquisition, particularly with regard to spoken language(s) and literacy (Crowe and Cupples, 2020; Scott et al., 2021, and references therein).

Another set of predictions directly arising from the L3 literature is neurolinguistic in nature: to the degree that the initial system is usable by the parser as the "L1", it will be co-activated during L2 and L3 tasks (Westerdgaard 2019; et seq). Until now, we have set aside any questions that can be broadly construed as "language and brain," although of course such questions are critical in theorizing about language of the population under discussion, as has been argued before (Mayberry and Kluender 2017; Twomey et al., 2020; Cardin et al., 2020, a.o.). We have focused on the language itself, and the practices associated with it, both on the part of the signers, their caregivers, and crucially, the researchers examining them. However, our approach to the initial system within Crip Linguistics suggest that we should see the presence of this system in empirical works probing multilingual neural networks in various domains (Emmorey et al., 2020; Hofweber et al., 2020, a.o.). This brings potential advantages (for the disambiguation among the L3A theories) of multimodal *vs.* unimodal ways of languaging. Theories which rely on co-activation of structures in both languages (Westergaard) *vs.* incremental restructuring of the grammar (Rothman) offer explicit predictions for DHH learners whose initial system may contain certain *representations* for spoken/sign languages. In addition, research on sign languages in general and languages of the DHH, with and without initial system experiences, can enrich the predictive power of models of L3 acquisition: currently, these models all assume "native language knowledge," although both Rothman and Westergaard and colleagues have published extensively on bilingual acquisition by Heritage Language learners and have made strong claims about "nativeness" of such systems, as well as their (in)compatibility with other varieties of the same languages (see, Lohndal et al., 2019, a.o.). Yet, in their discussions of L3 acquisition, both authors (and colleagues) assume the inherent complexity of the system. The question, however, is whether this complexity is necessitated by either of the theories. In principle, it is not, which harkens to the discussion of the core properties of language in Lohndal et al. Thus, the homesign/initial system data challenge the L3 theorists to the same question: are there minimal requirements for the initial system before it can be expected to participate in L3 processes? Today, this is an empirical question that deserves careful examination.

There are many potential consequences of our proposed re-examination of labels, as well as an important caveat: the simple fact that the initial system is utilized/utilizable for language acquisition does not imply that it *ought* to be utilized. Existing research has so clearly demonstrated the importance of early access to natural language input for healthy development in so many domains (not only language, cognition, and education, but also physical, emotional and mental health; Hall 2017) that depriving children of natural language input has been rightfully labeled a violation of human rights (Skutnabb-Kangas and Phillipson 2010, i.a.). Given the very well-documented harms of language deprivation on DHH children's development, Henner and Robinson (2021) concede that it may still be accurate to label the initial systems developed in the face of such deprivation as *impaired*. Such a system will not be the optimal foundation for subsequent language acquisition, yet for reasons that we have outlined above, it may still end up transferring to L2 or L3. In cases where a DHH encounters an invented sign system, perhaps at school in conjunction with a written language, the very fact that such a target is artificially constructed makes it less acquirable than natural languages (Supalla and McKee, 2002). Therefore, the learner could find themself facing the following dilemma: their "designated L1" is a system that is itself not a full-fledged natural language and does not serve all the same linguistic functions of natural languages, and their potential L3 is an artificially constructed system that is also not a natural language, but rather a representation of a natural language. Further, as soon as the L3 moves to orthography (i.e., off the hands), a new problem arises: new learning must be accomplished, an additional learning task for the language user who began with an "incomplete" system and whose L3, as it has been represented until now, is not a natural language. It is no wonder that a variety of complications arise. In our view, however, these complications are all the more reason to pursue this line of work, both from theoretical (e.g., Crip Linguistics, L3/L*n*) and applied perspectives (e.g., Deaf Education, L2 teaching, etc.).

CONCLUSION

In this paper we re-examined the well-established notion of "late L1 signer" and the attendant assumption that language-deprived DHH people's initial system is not a language, and thus does not participate in processes of language acquisition (L1 or beyond). We hope to have illustrated instead that initial systems (including homesigns) used for building subsequent languages are part and parcel of the linguistic experience of the majority of DHH people. Thus, we advocated for the explicit examination of the initial system of *any* DHH child who does not receive timely linguistic input. Offering arguments from various angles, we alluded to the fact that there may not be any principled reason to contrast *homesign* systems as traditionally used in descriptions of communicative practices of Nicaraguan, Turkish, Taiwanese, and American ACCE/language-deprived children (Goldin-Meadow 2020; Flaherty et al., 2021) and the initial systems—communicative strategies of other DHH children who are born to hearing families and grow up without exposure to a sign language.

Throughout the paper, we have covertly suggested that like established sign languages, initial systems may be argued to be categorical insofar as homesigns may be argued to be categorical. This, of course, remains an empirical question. We have argued that systematic examination of the mechanisms by which DHH people's initial system (including homesigns) shapes subsequent language learning through transfer and cross-linguistic influence

is not only theoretically important, but also consistent with the call by Henner and Robinson (2021) to "crip linguistics" in order to "reintegrate languaging with all bodies" (p. 4), not just those fortunate enough to have received early access to a natural language. We hope to have illustrated the connection between the topic of our examination here and the main theses of Henner and Robinson, summarized below:

8) 1 A Crip Linguistics is necessary for analyzing human languaging, lest we reproduce inequities.
2 A Crip linguistics recognizes that languaging is multimodal.
3 A Crip linguistics embraces disabled ways of being in producing language: sensory orientations, interdependence, mutual-aid and world-building, carework, and the ways that time interacts with the bodymind and language. (Henner and Robinson 2021).

We view sign language linguists, especially those focusing on grammatical development (including ourselves), as especially well-placed to re-examine how cultural interaction, disability, and language deprivation lead to multilingual competencies and grammatical development, since these issues are so prevalent in the communities in which we work.

A crip linguistics view may recognize *impaired* language, but impaired language should not be dismissed as *"bad language," intrinsically disordered language,* or, especially, *non-language*. As Henner and Robinson point out, such perspectives are fundamentally ableist and do not further equitably representative science. Setting aside the issue of human rights, we hope to have shown that dismantling the privilege of "native L1 normalcy" observable in signed as well as spoken languages (Quer and Steinbach 2019; Haug et al., 2021) not only makes for ethically responsible academic work, it also brings together strands of research that have not traditionally benefited from each other's expertise, simultaneously extending the empirical reach of all involved. It is well-known that language is used to oppress, to create and maintain inequalities well beyond disabled individuals and has arguably also been observed in racialized and poverty-affected communities (see, e.g., Rickford and King 2016, a.o.). Henner and Robinson (2021) remind us that such inequalities must be addressed from all directions, i.e., every linguist should consider adopting crip linguistics framework.

We thus close by passing along a call to action from our colleagues to the rest of our field: "The cripped linguist highlights the linguistic adaptations used by disabled people, including their relations and world-making, and illuminates structures of ableism that govern how we perceive language" (Henner and Robinson 2021:3). While we are not the first to take on this enterprise in terms of either L1 or subsequent languages, our approach explicitly places the process of language acquisition by DHH homesigners in the pantheon of theories of *multilingual* language development, recognizing the initial system as a linguistic system (if not an L1) that contributes to an emerging L3/Ln grammar based on a particular set of parser "decisions" (Rothman et al., 2019; Westergaard et al., 2017; Slabakova 2017, a.o.). Thus, given that at least on standard assumptions the learner is drawing on their previous language experiences (L1 and L2) before creating new grammars, the heart of the problem then becomes, "What exactly constitutes "L1" (and L2>>L3) for the learners of SLs?" Rather than limiting the scope of inquiry to acquisition of just L1 (Mayberry and Eichen 1991) or L2 (Morford et al., 1995; Hoffmeister and Caldwell-Harris, 2014) for predictions about how DHH with history of language deprivation acquire signed and spoken languages, the field should expand consideration to recent well-articulated theories of L3, thereby acknowledging the entirety of DHH learner's linguistic experiences.

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All authors listed have made a substantial, direct, and intellectual contribution to the work and approved it for publication.

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