PLAYING IN A GRAPESTOMP: DESIGNING AN IMAGINARY PLAY ENVIRONMENT FOR DEAFBLIND CHILDREN TO MITIGATE SOCIAL ISOLATION AMONGST DEAFBLIND ADULTS

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INTRODUCTION

Supports that are currently available to deafblind adults neglect or inadequately address their social participation needs, making "isolation...[still] the biggest negative result of deafblindness." (C, in conversation, March 12, 2021). One explanation of designers' neglect of social participation could be a *definition to design* breakdown around what social participation entails generally for people with disabilities and specifically for people who are deafblind. This misunderstanding may generate “inconsistencies” and inadequate technologies for social participation [9].

Alternatively, a *timeline problem* might explain designers' neglect. While social participation skills are early childhood milestones that can influence adult outcomes [7-8] few existing technologies think longitudinally to support deafblind *children’s* social participation skills towards improving their adult experiences. These instead offer support in adulthood, when the skills important to achieve full social participation may be less plastic.

A corollary to the designer's timeline problem may also lie in how imaginary companion (IC) creation and paracosm development have gone largely unexplored in deafblindness due to a rigid “play taxonomy” [2] and an established “developmental progression” [19] that both assume pretense impossibility in deafblind individuals. Meanwhile, improved participation in adulthood may be achieved through encouraging pretend play and ICs in childhood for how pretense shares “underlying mental structures with other [socio-cognitive] capacities” and can have a “training effect” [11] such that “improv[ing] or increas[ing] children’s pretend play may have a similar positive effect on… other abilities” [20].

Borrowing designer Elise Roy’s ask to not be “weighed down by expertise or conventional [disciplinary] wisdom” [18], this project discusses and grounds in a “non-standard philosophical” [15] enactivist approach to pretense that conceptualizes imaginary companion creation in a "fundamentally different way" [14] and allows deafblind children theoretical permission to engage in complex imaginary play.

Under enactivist premises, deafblindness may not preclude IC and paracosm creation. Instead, from a design thinking perspective, it may be that playground and toy designs need to be reconsidered to exist in deafblind children’s “perceptual fields” and within their “tactile reach” [5-6] honoring the “primacy of touch” [3] through which deafblind children play, learn, and access the world.

This project aimed to design the initial stages of such a play environment: first conducting two related online surveys and follow up interviews in both English and Spanish with deafblind adults and parents of deafblind children respectively to inform the design. The surveys ask the following questions around pretense, social participation, and play:

Q1. What is the nature of deafblind adults’ early childhood simple and complex pretense? How does having childhood imaginary companions and paracosms relate to feelings of social inclusion in adulthood?
Q2. What is the effect of the role counts that parents of deafblind children carry (teacher, parent, safety monitor, therapist, etc.) on the degree to which they feel as though they are able to participate in their children’s play?

The decision to approach this project via the complementary perspectives of parents *and* deafblind individuals emerged because designers who have considered a deafblind adult or child singularly against an environment have often missed the “reciprocal” perspectives of these “subjective other[s]” who can be important to deafblind adults’ complete conceptions of social participation [10] As such, when designing, alongside including deafblind adults’ reflections on childhood, it can be important to consider the “joint bodily orientations” and perspectives of parent “each other[s]” [5-6] who “do with” [13,16] deafblind individuals to modulate their participation, perceptions and environmental affordances.

Ultimately, insights from these surveys and interviews informed the early-stage design of a grape stomp playground to facilitate imaginative cognition in deafblind children towards reducing adult isolation. Project challenges and limitations suggest that online survey platforms common in research may neither be the

preference nor the familiarity of those who are deafblind.

METHODS

This project followed an iterative structure: A) Gather insights via a REDCap online survey and optional follow up interviews → Design an initial playground prototype → B) Gather complementary insights via an MS Teams online survey and follow up interviews → Reconsider and amend the initial playground prototype.

Description of Participants and Study Recruitment

Participants for Survey 1 included English and Spanish-speaking adults born with combined vision and hearing loss and/or those who acquired vision and hearing loss before age 12. The age 12 bound emerges informed by [17] who find that non-disabled children typically cease pretending at 10-11 years of age. Age 12 allows flexibility in development and accounts that children who acquire deafblindness after this window may have different experiences with pretense than children whose vision and hearing changed during this formative period. Participants for Survey 2 were parents who had at least one adventitiously or congenitally deafblind child.

Survey Construction

Survey 1 was informed by Fein (1975)'s concept of *transformations* and presented the following definition of pretend play, adapting typically audio-visual examples for "tactile reach" [5]:

> Playing pretend can be about transforming your "here and now" inside your head into something different. This could be like touching a carpet and pretending it's volcano lava, playing with magic water or soil that turns you into a flower, having an imaginary companion, or using invisible items in games, like throwing a ball that isn't really there. These are only some examples, and there are many, many more.

Some of the tactile adaptations in questions included phrases like "the heat of a real fire could make me imagine a fire inside a volcano" and if I were swimming, I could "feel it in my arms."

Questions in Survey 1 discussed definitions of pretense, engagement and absorption, material choices in pretend play, timelines for stopping and starting play, fantasy/reality orientation in pretend play, imaginary companions and paracosms, family support of childhood pretense, and adult feelings of participation.

Survey 2 offered exploratory questions that encouraged parents to brainstorm activities done with their child to then generate purpose from those activities and distill parenting roles; this structure hoped to encourage parents towards a full panel of role generation beyond "caregiver burden" roles that many questionnaires and studies have sought from parents of disabled children [1]. Parents also selected closed-choice answers to participation statements such as:

- My child shows me what to do when we play, and I follow their lead.
- There is a lot of space for my child to play. I supervise from a distance.

RESULTS

Survey 1 and Follow Up Interviews with Deafblind Adults

Survey 1 collected 87 total responses across English (81) and Spanish (6) participants. All participants answered questions selectively across the survey suggesting accessibility problems or an unfamiliarity with survey taking. In summarizing, a response was deemed complete if eligibility and consent questions both included a positive response and at least one other question in the survey was answered. There were 25 completed responses.

62 responses were excluded, of which (51) were blank responses where a survey start time was documented but the survey was incomplete, and no answers were selected. It is possible that accessibility challenges emerged beyond those that were accounted for through usability reviews and providing high contrast, large optotype formats with word level crowding bars. One participant who requested a large optotype-high contrast text alternate of the survey reported, "The circles to check the answers are there and not there" which suggested further barriers.

Count summaries from Survey 1 revealed the following: 16 of 25 deafblind adults who completed the survey played pretend anywhere from always to rarely. 3 could not remember. 9 always or sometimes had an imaginary companion, and 1 rarely did. 12 left this question blank. 1 person could not recall memories from childhood. The question around adventitious/congenital deafblindness seemed to confuse survey takers as many answered in doubles or not at all.

Three participants volunteered their time for 40 min – 60 min follow up interviews that found:

Typical “loose parts” toys as were included in [4] feel associated with physical therapy, educational intervention and “what I have to do.” Naturalistic themes and dirt is loved because it suggests rugged adventure, has a meaningful scent and reduces visual fatigue. (Participant: “I would make my own dirt out of wooden handcraft”)

When they emerge, imaginary companions seem to emerge from motion and span both embodied objects and complete abstractions: a pretend friend that emerges from the running of jewelry through fingers or through embodied headphones and dancing to the music. Alternatively, Bill the Eagle who flies along when the car is driving emerging from the car’s motion, perceptible against the window.

Developing an Initial Prototype After the Results of Survey 1:
A model for a single dome cave layout emerged: with smooth, predictable, level, flooring. Sketches for the initial idea contained an outer ring with expected ‘drop pits’ in a star shape around the perimeter. This geometric predictability facilitated safe exploration and knowledge of the spatial layout while allowing a child to drop into a hole for a break. To integrate olfaction and touch in these cave drops, we considered coffee “dirt” mixed with ground creosote to intimate a garden paracosm with bodily play of being a seed. We also considered also adding fabric protrusions from the cave walls: as sound dampeners, orientation mobility supports, and encouragers of pretense. A Survey 1 participant shared that the fabric extensions of his parent’s clothes with wind under them cued a “galloping horse” in pretend play.

Survey 2 and Follow Up Interviews with Parents of Deafblind Children
Survey 2 collected 27 total responses across English (27) and Spanish (0) participants. There was no meaningful correlation (r=0.03) between parent role count and participation. Parents confirmed teacher, therapist, safety monitor, and other roles expressed and implied in the literature; new roles that emerged in this survey further specified these (e.g. massage therapist). Teacher/mobility-related roles repeated often.

Follow up interviews found that being close to nature emerged important. Sand felt calming in shared play spaces and beaches were discussed since some parents felt pressured to co-regulate [their] child’s emotions and found that “water helps with that. It’s peaceful.” It was also important for parents to be as “normal as possible” and “adapt to our environment, to everyone else.” One phrase emerged frequently: “You think a deafblind child will be the opposite of impulsive!” Parents described children jumping from too-high heights or making loud noises in quiet places or laughing in “wrong” moments, countering parents’ environmental awareness. 2 of 3 parents interviewed were concerned with balance. The 3rd parent reported that this was not her concern *yet* due to age.

Changing the Design in Response to Survey 2 Input
To integrate “physical body memories” that deafblind adults reported in Survey 1 with parents’ focus on walking skills and the occupational therapist/mobility-aide role, the structure of this initial cave environment became a grape stomp. Typically, a grape stomp is a large platform on which everyone jumps, and under the platform, there are grapes. The grapes are juiced by the togetherness of the community. Approaching a playground with this interaction and environment combines parent affordances with deafblind adult perspectives, allowing multiple people to work together to support each other’s mobility while preserving the “bead” quality of necklaces that the deafblind adult interviewed identified as an inspiration for embodied pretense. Bead irregularity is that of windswept sand, too and may facilitate emotion regulation. A playground build for jumping motions might encourage pretend play via vestibular senses akin to the survey statement, “I can feel it in my arms when I swim” and meet parent desire to practice with vestibular senses and meet teaching goals. Further, the squishy underfoot environment in a grape stomp over the initial smooth tile might also encourage more risk-taking and impulsiveness in a safe context for both children and adults.

Recycled parachute material was considered at this stage as an alternative to the initial mixed papercrete base to more simulate motion in water for how this material traps air under it. Parachute material is promising as a few Survey 1 mentioned how fantastical orientations about outer space helped generate their pretense, and parachute material can balloon to simulate planetarium domes. However, user input would determine tolerance for the low-grade odor in the material.

CONCLUSION AND DISCUSSION

Despite the sample size limitations and survey delivery barriers prompting large exclusions in this project, it is clear that some deafblind individuals can and do have imaginary companions and may engage in paracosms.

Deafblind adults, particularly in non-Western countries, expect medical questionnaires about disability status, and we can do more to broaden our inquiries; all survey participants who elected to complete a phone-based survey and all interview participants commented outside the project questions before ending the call on how exciting it was that someone was asking about “fun…and their friends.”

Pretense research has not exclusively considered the experiences of deafblind children and adults, when deafblindness is its own unique disability, perspective, and experience. Designing for deafblindness could design inclusively for children with other disabilities for how the carefulness around tactile stimuli and “a smell aesthetic” (G, deafblind adult, in conversation, April 10, 2021) supports the development of these skills in typically-developing children, too addressing these absences in developmental psychologists’ consideration of perceptual development” [3]. Further, the enactivist premise that considers environmental affordances as generating pretense needs to be further explored while including children with disabilities.

The parent survey did mention caregiving roles in interviews. Although the combined count and cognitive load of these roles did not correlate with participation in play here. future work might consider the weight of caregiving differently and may too consider the perspectives of other interdependent others who engage with deaflind children: siblings, interveners and paraprofessional aides, etc.

Next stages in the design process could consider incorporating salt to support breathing difficulties in certain etiologies of deafblindness and collecting sensor data to obtain objective measures of gait and supportive pathway development in a play space, simultaneously considering existing naturalistic spaces like cave historic sites for how these can engage deafblind visitors in play.

Finally, an online anonymous survey with format accommodations may fit COVID-19 pandemic research bounds and be inappropriate for data collection with deafblind adults, Future projects might explore avenues towards more inclusive research participation.

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