



Joint Media Engagement in Families Playing *Animal Crossing: New Horizons* during the COVID-19 Pandemic

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The video game *Animal Crossing: New Horizons* (AC:NH) launched during the COVID-19 pandemic and families turned to it as a game to play together during isolation. This interview study of 27 families considered how families used AC:NH for Joint Media Engagement (JME), where family members engage with media content together, interacting with each other and bringing additional meaning to the experience. We find that the design of AC:NH well facilitates Takeuchi and Stevens's six conditions for productive JME. Furthermore, we identify and discuss additional conditions that contribute to productive JME: variety and flexibility in play styles that amplify mutual engagement, support for disentrained play that enables new forms of "joint" engagement, and scaffolding for affective interactions. This is followed by an exploration of how the COVID-19 pandemic affected JME. We conclude with design implications for building games to support productive JME for families through design for persistent shared spaces, flexible in-game progress, and social life simulation.

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CCS Concepts: • **Human-centered computing** → **Computer supported cooperative work**.

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1 INTRODUCTION

When *Animal Crossing: New Horizons (AC:NH)* was released in March 2020, millions of players around the world escaped to the friendly shores of its virtual islands. Its success was unprecedented for the Animal Crossing series, and it became the third best-selling video game in the United States in 2020 [48]. During the onset of the COVID-19 pandemic, individuals and families were restricted in their movement and ability to gather with others, and had to adjust to remote work and school. Many used media for entertainment, coping, and social connections [20]. AC:NH situated itself as “the perfect game for the pandemic,” allowing players to play as a carefree villager on a peaceful virtual island [42] and afforded opportunities for family members to interact with each other in novel ways. To better understand how these interactions affected parents’ and children’s experience with each other and with the game, we use the lens of *Joint Media Engagement (JME)*, which describes how family members engage with media content together, bringing additional meaning to the experience [28]. Previous JME scholarship from Takeuchi and Stevens has identified six conditions and processes that can lead to *productive JME* [63]; these conditions serve as a useful reference to help understand how JME is facilitated through AC:NH. In this study, we consider these conditions (Section 2.2) and highlight emergent conditions due to the design of AC:NH and the influence of the pandemic on JME.

Conducting this study during the COVID-19 pandemic provided a novel context revealing subtle aspects of JME which have received less attention. Specifically, the pandemic has been a time of heightened stress [18, 50] and increased demand for emotional support [32]. The pandemic provides an opportunity to better understand JME under duress, which answers calls to better understand JME in different contexts and devices [19].

In this study, we aim to answer the following research questions:

- RQ1: How are Takeuchi and Stevens’s [63] six conditions for productive JME manifested in AC:NH?
- RQ2: In addition to the six conditions, what other conditions are present in the AC:NH game environment that support productive JME?
- RQ3: How has the COVID-19 pandemic environment impacted JME, as observed through families playing AC:NH?
- RQ4: What design implications can we derive for building games that support productive JME based on the case of AC:NH?

2 BACKGROUND

2.1 Families and Media

For decades, researchers have studied various ways that families use media together to communicate, play, learn, design, create, and coordinate with each other [45]. More recently, this has included interactive video games [65]. Work in the learning sciences and communication fields looks at families using interactive media together for psychological, social, and learning outcomes [11, 16, 17, 23, 27, 47, 67].

One of the most common ways to understand parents’ important and active role in managing and regulating their children’s experiences with media is *Parental Mediation Theory (PMT)*, a theory frequently used in communication, education, and information studies that demonstrates the importance of family communication around digital technologies [14, 33, 47]. Parental mediation is understood as the strategies that parents use to maximize benefits and minimize risks associated with media use [33]. While PMT originated from scholarship around television, the theory is now applied towards interactive, digital, and mobile media [14, 33]. PMT originally stated that parental mediation has three categories of strategies: active, restrictive, and co-usage. Active refers

to parent/child discussions around media usage, and helping children develop skills to make positive choices around media use. In contrast, restrictive mediation sets firm rules and regulations about children's media use. Co-use mediation is in turn about how parents and children interact together with media. Jiow et al.'s [33] update of PMT to include interactive media argues that as digital media becomes more interactive, family friendly, and ubiquitous, the lines between active, restrictive, and co-use blur together as parents engage in a range and combination of mediation strategies, often tied to context such as children's personalities and prior digital gaming experiences. Jiow et al. [33] revised PMT with four mediation practices specifically around digital media: gatekeeping (regulation of exposure to media); discursive (discussions around media); investigative (information seeking around media practices); and diversionary (parents' efforts to intentionally direct their children to other activities). Our study does not explicitly use PMT as a theoretical framework, but parental mediation, particularly co-usage, influences our thinking about family co-play.

2.2 Joint Media Engagement

More recently, researchers have focused on diverse patterns of co-engagement between parents and children, rather than looking at specific parental mediation strategies [26]. Joint Media Engagement (JME) is when "any two or more people—parent and child, siblings, or peers—are looking at the same media at the same time, are involved in the content together, and are prompted by what they are seeing to interact with each other and bring more meaning to what they are watching or doing" [28, p. 171]. Researchers have moved towards using JME as an umbrella term "to capture a variety of experiences that children might have while co-using media that might otherwise be called coviewing, scaffolding, or active mediation" [19, p. 1]. JME activities include co-viewing, playing digital games, co-searching, reading, and designing together [21, 63]. Media can include traditional, new, and interactive media [63]. For CSCW researchers, JME has been used to study sibling interaction [4], parent-child interaction [59], digital storytelling [12], play [30, 74], empowerment [6], and family problem solving [52].

We selected JME as our framing for a number of reasons. First, PMT's expansion towards "participatory learning" [14] is well explained with JME. Participatory learning refers to active mediation and co-use strategies for children that "might also engage with parents in activities that foster strengthened interpersonal relationships, individual and collaborative creativity, and even cognitive development" [14, p. 355]. These types of effects align well with our research questions. By focusing on JME, we can explore nuances that occur in co-play and co-usage of digital gaming technologies (RQ1-3). Second, JME does not require "even expertise" among the co-participants. Parents and children differ in gaming experience, level of play, and other factors. Third, JME focuses on both in-person and remote interactions (e.g., online synchronous and asynchronous gaming), which is important for this study during the COVID-19 pandemic. Finally, we utilize JME because the co-play interactions are presumed not to be static, but ever evolving based on changing new technologies (AC:NH) and the situational context of the COVID-19 pandemic.

2.2.1 Productive JME Conditions.

Drawing on educational research, Takeuchi and Stevens identify six design conditions and processes that can lead to productive JME [63]: mutual engagement, dialogic inquiry, co-creation, boundary crossing, intention to develop, and focus on content, not control. By productive, Takeuchi and Stevens [63] mean supporting learning and development of children, especially "deeper understanding, inspiration, greater fluency, and physical, emotional, or mental wellbeing". These scholars draw from educational research that conceptualizes "productive learning" as learning that facilitates exploration, curiosity, experimentation, and learning with others [39]. Takeuchi and Stevens describe the productive conditions as ideals and therefore they "do not all need to be

present for productive interactions to occur” but the presence of it will help lead to productive JME. In this work, we consider how these conditions are manifested in AC:NH. Each is defined below.

Mutual engagement, when participants are engaged in co-action with others [10], is used by Takeuchi and Stevens to mean that adult and child participants, despite their differences in age and knowledge, are motivated to participate and find it enjoyable, as opposed to obligatory engagement like a parent begrudgingly playing a toddler game like *Candy Land* [63] with their children. In contrast, *Sesame Street* includes humor meant for children and celebrity cameos meant for parents [22].

Dialogic inquiry, also from education research, means that learning outcomes are greater when students have an opportunity to engage in dialogue about them with peers and instructors. Adults support children’s learning by presenting abstract questions and reflection prompts [69]. For instance, adults can steer children’s usage of technology by asking questions and providing guided interactions [53]. It also includes activities that inspire collaboration to make meaning, often through conversations [63].

Co-creation within media is used to build things including artifacts, like a drawing based on a game, common understanding [63], or collaborative designs [3] that create shared understanding that promote learning [63]. Through design, families can gain a sense of participation and play and situate their designs in broader contexts and relationships with other families and communities [63].

Boundary crossing occurs when the interaction spans spatial and temporal boundaries [63]. Boundary crossing involves individual’s transitions between different sites, through a cognitive process that promotes learning [2]. In *Pokémon GO*, past experiences and nostalgia of Pokémon made the mobile game interaction more meaningful to parents with their children [59].

Intention to develop implies that a participant intends for themselves or for another to grow through the activity [63]. This requires awareness of one’s own or the other participant’s needs. For example, a parent can read bedtime stories to foster a child’s love of books [63]. Parents themselves can grow with productive JME. For example, parents may develop further skills in gameplay while interacting with their children.

Focus on content, not control means the design of the media does not hinder interactions with the content [63]. Overly complex media and interfaces can make JME difficult [59]. Instead, when both parents and children can enjoy the digital content with fluid user experiences, productive learning and JME can occur [59].

2.2.2 Families, JME, & Video Games.

JME has been a useful way to look at family digital gaming interactions in HCI and CSCW. Researchers have found in JME studies that parents and children take on specific roles to productively game together [9, 58, 74]. Similarly, gaming technologies can support JME interactions with siblings, which are different from friends and other parents [27]. Parents and children can have varying expertise in JME with video games [1, 59]. In gaming, JME can foster togetherness over distances [26, 59]. Finally, family gaming has shown to be able to produce conditions that lead to more productive forms of JME [59].

Several studies on JME with video games focus on learning and making sense of educational content. Gee et al. [25] highlights the importance of studying educational games as media, as play, and as part of family routines. Different aspects that facilitate learning were identified and discussed. For instance, Stevens et al. [60] presents how combining “in-game,” “in-room,” and “in-world” play can contribute to enhanced learning outcomes in JME. Ballagas et al.’s [4] game *Electric Agents* shows how siblings engaged in JME, through reflection and communication with older siblings providing scaffolding for the younger ones, successfully learned how to play the game. Similarly,

Brooks et al.'s [9] *Electric Racer* showed the importance of clarifying the roles of parent and children, so parents can understand the educational goals and how to scaffold the learning experience of the child.

However, prior studies also show that some parents have concerns about or feel tensions in JME with video games. Some feel guilty about screen time [31, 59] and are unwilling to jointly use mobile devices with children [16, 57]. Hiniker et al. [30] found that design features of digital games, such as one-sided interfaces or demand of continual attention, lead to less engagement between parent and child. They recommend designing apps for shared positioning and ownership, interruptibility, and parent roles, to support interactions between parent and child. Sobel et al. [59] point out that traditional concerns about screen time persist in many parents despite parent involvement in gameplay in *Pokémon GO*, and discuss how parents found ways to mediate and control the play (e.g., using playtime as rewards, restricting access to devices). Prior work exploring intergenerational family gameplay has found that a low barrier to entry [37, 59, 70], social opportunities [37, 49, 70], and opportunities for collaborative and independent play [56] were important for engaging across generations. These studies offer insights for parents and game designers to better engage in and facilitate JME with video games, maximizing the advantages of digital play experiences.

Other work has identified several games that lend themselves to productive JME and collaborative play and extracted design principles to apply to future games. *Pokémon GO* can be conducive to productive JME [36, 59, 64] particularly due to the game's intergenerational appeal, its ability to be adapted to families' existing routines, its encouragement of differentiation of player roles, and its dynamic context and social opportunities. *Minecraft* has also been studied in prior work [5, 55, 71], and attributes such as its creative opportunities [55, 71] and low barrier to entry [5] have been found to encourage JME and social play. *World of Warcraft* has been noted for how it foregrounds communication and social connections [13, 44], fosters collaboration [7, 13], and provides opportunities for random acts of fun [44]. We build upon these studies and aim to extend our understanding of family co-play and JME with video games between parent and child by investigating AC:NH as another case where positive JME experiences occur.

2.2.3 *Animal Crossing: New Horizons*.

AC:NH is a simulation game in which the player's character moves to an island and builds a home and town alongside anthropomorphic animal characters. AC:NH has attributes of the slice of life genre [61], meaning the game has a world similar to real life without an overarching storyline and instead the player focuses on mundane, leisurely activities in the gameplay. In this game, "[s]lowness takes on value because it benefits the player through visual and mechanical rewards" [61, p. 76].

While the game has some milestones tied with an overall narrative such as reaching star ratings based on how well the island is decorated, one of the main appeals of the game is that people can play at their own pace. Players can set their own goals within the game such as collecting all the creatures like bugs and fish, planting flowers, decorating homes, and landscaping. The game also has multiple social features including amusing interactions and friendship building with the animal villagers and co-play features with other players within the same household or online.

The *Animal Crossing* franchise has been a subject of scholarly analysis, often tied to its unique gameplay. Comerford [15] highlights game elements like a comforting aesthetic, participatory community, and goals that allow for stability and sense of self. Kim [35] explored the values expressed in *Animal Crossing* which include nurturing, social integration, cooperation, and hard work. Kim [35] also found that players frequently collaborated with one another on game tasks and developed their own narratives within the game. Murphy and Zagal [43] explored the ethics of care expressed by players in these social games and noted that players felt an emotional attachment to the

characters and treated them ethically. Kempton [34] found that players located themselves within the game universe, drew on real world knowledge to negotiate the game world, understood the gestures and emotions as part of the lived experience of the game, and used everyday understandings from their own life to promote connectivity with characters.

3 STUDY DESIGN AND METHODS

We interviewed 27 families, including 33 parents and 37 children from the U.S. The interviews were conducted via *Zoom* video conferencing between August and October 2020. We recruited families in which parents and school-aged children play AC:NH together. Recruitment messages were posted on AC:NH social media and online communities. The interviews were conducted in three parts: 1) interviews with all the participating family members, 2) children only, and 3) parents only. The length of the interviews was about 90 minutes. Each family received a 40 USD gift card for their participation. The study procedure was approved by the Institutional Review Board at [redacted]. Participants are referred to by chosen pseudonyms and random family names assigned by the researchers. Participant demographics can be found in our supplemental materials.

We employed a combination of inductive and deductive coding approaches. The six conditions for productive JME from Takeuchi and Stevens [63] deductively serves as a basis for the six categories of codes with relevant sub-codes. In addition, we inductively coded for instances of other aspects related to JME which are not captured by the six categories. We drafted the initial codebook after the research team coded partial data and the codes were iteratively refined through discussion and additional coding. We followed a consensus model in which two coders coded each interview, discussed the discrepancies between their coded results, and reached a consensus. In cases when two coders cannot come to a consensus, a third team member would have acted as a tie-breaker, but we were able to reach a consensus after discussing each case. After the initial coding, we discussed the results and codes as a team and iteratively refined codes for clarity and consistency in application. Following Hannah and Lautsch [29], quantified modifiers presented in the results are corroborative counting. The full codebook is available in our supplemental materials.

4 RESULTS

4.1 Six conditions for productive JME manifested in AC:NH

4.1.1 Mutual Engagement. All of the families we interviewed described participating in mutual engagement. Parents and children alike shared their delight in playing the game and expressed that they find the game enjoyable. Indeed, a few parents were surprised that a game could be enjoyed by a wide age range. As mom Mae explained, "I think it's really one of the only games that we can actually all play together that we participate together." Similarly, mom Ashley said, "[AC:NH] has been the longest running game that we've consistently played that we (8-year-old Beatrice) both enjoy playing." A few participant families initially purchased the game with a specific family member in mind, but then other family members found the game appealing and played as well. For example, Mom Elizabeth originally purchased AC:NH for 13-year-old Darlene, but shared, "I had no idea I'd get that hooked on it!"

Indeed, both children and parents with different levels of gaming experience told the interviewers they found the game appealing for various reasons like achievement, sense of control, sociability, expression, routine, and distraction. Other research found these types of motivations as well [46]. Mom Meesh talked about how the social aspect of the game allowing her to connect with others was a primary reason to play. Other parents liked the routines associated with completing goals. A number of adult participants said that they used the game to relax or escape. Children generally described the game as "fun."

4.1.2 Dialogic Inquiry. Meaning making through dialogic inquiry is an important condition of productive JME [63] and can involve adults supporting children in their understanding and learning through questioning and investigating. Because this was an interview study, we did not directly observe parents engaging in dialogic inquiry with their children. However, some families did describe times when it occurred. Within AC:NH there are several aspects of the gameplay that afford opportunities for dialogic inquiry; these opportunities were triggered by 1) real-world objects and creatures depicted in game, 2) occurrence of real-life events/activities collectively experienced prior to gameplay, or 3) game mechanics based on real-world systems such as the stock market. For example, when the game's collectibles, which consist of real-world bugs, fish, fossils, and art, are donated to the museum, the museum's curator offers a brief lecture on the item. Multiple families told us that the museum donations sparked larger conversations about the real-life objects, usually tied to bugs, fish, and fossils. But in one family, the in-game paintings provided "a jumping-off point to turn around and to make it into a lesson," said Mom CJ. When her preteen sons would donate art to the museum, CJ stated that they all would go to see the art and "say okay, this is a Vermeer painting, and what makes Vermeer special?" CJ felt that these "lessons" allowed them to "use something from the game." Similarly, Mom Meesh said that the in-game "stalk" market whereby players can generate funds to purchase in-game items provided an unexpected lesson in finance for 11-year-old Danny: "I can't believe I'm having this conversation with my kid but he has a very decent understanding of what investing is and stuff. It's really weird!"

Children also asked game-related questions to their parents to make sense of their meaning. Mom Ashley and 8-year-old Beatrice also had conversations about finance and paying for your AC:NH home. Originally Beatrice did not understand how the in-game mortgage system worked. Mom Ashley noted that Beatrice did not know what her mom and dad were talking about when her parents were buying and selling their physical home. Because Beatrice questioned about the concept of mortgage/rent, Mom Ashley was able to draw parallels from AC:NH. "I explained to her that I get paid money from a job, and then I have X amount of money and then you've got to pay some for food and utilities, rent or mortgage and stuff like that."

We also observed parents describing dialogic inquiry as a form of families wanting to investigate a topic area. Some families also spoke about their individual and collective research and inquiry endeavors into game-related topics like strategies and design inspiration on AC:NH social media, YouTube, and blogs. Sometimes these activities had parents and children learn together, as opposed to the traditional structure of parent teaching the child. In three cases, after researching a game topic, the child would instruct the parent. Mom Monika said her tween and teen children "really beefed up their research skills in the process" of playing AC:NH. However, a handful of parents still provided guidance and scaffolding in these investigations, especially with younger children. In the Rhonda family, each member had a different specialty in the game and were responsible for researching strategies in that area. Mom Meesh said: "we are all kind of knowledgeable in our own specific thing. I know a little bit more about flowers whereas Danny (age 11) knows everything about fish and Rose (age 12) knows everything about clothes and all that stuff, so it depends on what it is and who's passionate about it, who seeks out that information and how it's divulged to the rest of us." She explained that the "expert" then teaches the other members.

4.1.3 Co-Creation. Most families discussed various ways of engaging in co-creation, both within the game itself and outside of it. Co-creation involves building material things or common understanding [63]. The island in AC:NH is shared between players on the same device, and modifications made by any player exist across play sessions. Many families took advantage of this to collaboratively design and decorate their island and discussed their decision-making processes. Mom Flora explained, "we collaborate when we just want to bounce ideas off of each other and so it's a

collaborative process.” Families often worked together; Mom Jean explained that 7-year-old Grace “does the pixel art, and I do the music so we’ll find songs in sheet music and I read music and play.”



Fig. 1. A collaboratively designed Medieval-themed island shared by participants. The theme spans shared spaces (top left, bottom right) and multiple players’ houses (top right, bottom left)

Some families combined delegation of tasks with cooperation and usually one member was the lead decision maker, such as mom Marie: “I’ve done... the majority of the layout... I do ask for their opinions, like when we finally laid out our island where all the residents were on the beaches and stuff and so I asked them... ‘okay guys here’s what I’m thinking of doing. Here’s where I might put your house, what do you think, who do you want to live by’ and so we kind of worked on that together. It was kind of by committee.”

For families who shared accounts or had multiple accounts on a single Nintendo Switch, this co-creation sometimes manifested as collaborative designing and building of spaces on the shared island, combining players’ in-game resources and real-life ideas. In particular, we noted a few families that built in-game creations related to real-world objects and places, like a re-creation of a local pool from the Tia family. This collaborative building may have allowed families to feel connected to spaces beyond their home even when they could no longer visit them. As Mom Mae explained, “we’re just kind of trying to imitate it towards our normal life.”

In addition to co-creating spaces, we also observed co-creation in the form of developing joint experiences related to the game. Four families created their own “metagames” within AC:NH, defining sets of rules and mechanics for in-game activities and competitions that are not formally scaffolded by the game. These metagames included versions of familiar real-life games like Hide and Seek, Musical Chairs, and Wheel of Fortune, as well as new activities built around existing game mechanics, like a game in which players compete to keep their opponents from talking to certain villagers.

4.1.4 Boundary Crossing. A number of interview participants discussed boundary crossing, accounting for crossing the spatial and temporal boundaries between gameplay and “the real world,”

a notable feature of the game, according to Straznickas [61]. Two families talked about how AC:NH related discussions occurred throughout the day, even when the game was not actively being played. For instance, 10-year-old Scarlet from the Tank family talks about her AC:NH plans “constantly” and is thinking about the game when she is not playing it, according to her parents.

For a couple of families, the game inspired other activities related to AC:NH, like game-themed arts and crafts, and pretend play scenarios inspired by the game. For instance, 8-year-old Beatrice shared that she enjoys digging in a sandbox for fossils, as she does in the game. The Egbert children “played” *Animal Crossing* in the yard and drew chalk drawings of their islands.

One way that AC:NH crossed into real life was children identifying animals and flowers they learned about in the game in the real world. The Egbert family children enjoy pointing out flowers and bugs when they are on hikes. When Lucas (age 8) did not recognize a new fish in the game - the zebra turkeyfish - he asked mom Coco to see a photo of it in reality and they looked it up together.

4.1.5 Intention to Develop. Many families described AC:NH aspects that involve intention to develop, whereby there is an objective for self-development or to help another person develop and grow through the activity [63]. Notably, this requires awareness of needs, which tends to be associated with maturity [63]. Traditionally, intention to develop occurs when an adult facilitates a child’s interest and growth [38]. Family members used AC:NH to support each other in pursuing interests and provide an opportunity to inspire and explore them, such as creating islands and houses with custom themes (e.g., pineapple, Zen, *Star Wars*). In other families, the intention to develop was more academic. Mom Meesh explained that both of her children, 12-year-old Rose, interested in going to art school, and 11-year-old Danny, interested in marine animals, were expanding and broadening their interests. She said Danny is “constantly doing research” about fish in the game and Rose creates various designs. She has been encouraging them to build their interests into a career.

Beyond interests, some parents supported their children in developing a sense of confidence or ability to independently play in AC:NH and were pleased to see the progress of the child. Dad Luke said that 11-year-old Riley has mastered much of AC:NH through YouTube and blogs, and they agreed that Riley is the one who teaches her dad how to play the game. Seeing her expertise, Luke has encouraged Riley to get active in AC:NH social media groups and make new friends online. Luke said it was “a weird nerd dad pride in watching her sort of leave me behind,” and said the feeling of seeing her become more independent was “like watching your kid on the playground be a good person.” Similarly, Dad Leonard felt that 10-year-old Scarlet developed resilience and patience through playing the game, as it allowed her to slowly and continuously work toward something.

Four parents also noted that the game helped encourage reading skills. Mom Janae said that 7-year-old Hazel’s reading has improved. Janae would “make sure that she [Hazel] doesn’t skip through [the text] and I try to get her to read as many words as she could and help her if she needed help with certain words.”

4.1.6 Focus on Content, not Control. AC:NH is a fairly simple game, which allows for greater focus on content, versus control. According to Takeuchi and Stevens [63] this means that the design of the media does not hinder interactions with the content. For children in particular, this allows them to engage with the game without much adult supervision or instruction.

The simplicity of the game’s controls may have played a role, particularly for young children and adults who were new to video games. For example, Mom Beth said “*Animal Crossing* was surprisingly accessible to the kiddos to just dive into it themselves. Olivia (age 4) can’t even read yet and she can play the game no problem.” Mom Marie asked 7-year-old Ann if she ever needed any help in figuring out how to play and Ann confirmed she could always figure it out on her own. Mom Jane shared that the game is easy to pick up and play regardless of previous gaming experience

and while there are numerous game actions and activities, they are introduced to players with a gentle learning curve with a friendly game character guiding the player through each step.

Another element of this condition that some participants noted was the value of enabling lightweight interaction with the game. By this we mean that one can play AC:NH without a long time investment or a great deal of focus.

4.2 Additional conditions in AC:NH that support productive JME

Overall, it was apparent from the interviews that AC:NH was good at fulfilling each of the six conditions for productive JME discussed in Takeuchi and Stevens [63]. This section explains how the design of AC:NH creates additional conditions that support productive JME. Understanding the context in which JME occurs is an important theoretical extension [19, 21]. Answering RQ2, we consider how the AC:NH game environment uniquely scaffolds for productive JME through three additional conditions: 1) variety and flexibility in play styles, 2) indirect jointness and disengagement, and 3) scaffolding affective interactions.

4.2.1 Variety and Flexibility in Play Style. AC:NH's gameplay and design are distinctive compared to other games [61], offering a variety of ways to play the game. The game does not provide explicit goals for the player, and players are free to change how they play the game as often as they want. This freedom was also identified as a major appeal of the game in a survey of 1,898 AC:NH players [15].

Varied and Well-defined Game Activities. Within AC:NH, players can choose to participate in as many or as few of the game activities and tasks as they wish. In general, players' choices do not infringe on one another. For example, a child can spend all of their time fishing, while their sibling designs clothing, one parent breeds flowers, and another parent landscapes. Many families we interviewed talked about playing in ways that complemented each other. In many families, tasks were delegated to particular members. This varied style of gameplay makes it particularly appealing for families because it allows individuals to specialize in different tasks and come together in interesting ways. For example, 7-year-old Grace's pixel art allowed her family members to enjoy wearing fashion that featured Grace's designs. Because player actions in the game are generally reversible or repairable, this further allowed for playing jointly without infringement. Similarly, the resources within AC:NH, while not infinite, are easily renewed. This encouraged exploration of new activities and allowed family members to not be too concerned about other members' unique play styles since it is not too difficult to recover the resources.

Varied Co-play Options. The game offers multiple modes to play together. This includes simultaneous multiplayer co-playing, turn-taking co-playing, and co-viewing; multiple people playing together with multiple Switch consoles; playing together on a single console but with different individual avatars and sharing the game environment; or playing together on a single account with the main player and the spectator(s). All of these co-play modes were represented across participant families. These options allow families to determine what play style works best for their specific wants and needs, with no implicit pressure from the game to choose one play style over another. Parents Monika, Star, and Steve specifically talked about how being able to play cooperatively together, not in a competitive environment was refreshing.

Flexibility of Goals and Co-play Options. Finally, we note the ease with which families and individual players could change their play styles: game activities were easy to transition between, and co-play modes could be changed freely. In contrast to other games which include activities that require players to improve a skill through repeated engagement, or that are unavailable to players until they achieve a prerequisite, AC:NH allows players to participate in different activities whenever they want. This meant, for example, that a player who had previously only focused

on the social aspect of the game could begin fishing and not have to worry about “catching up” to players who were more experienced with fishing. This feature encourages players to try new activities within the game without fear of struggling, which supports them in collaborating with their other family members to have a nice island as well as bonding over a shared interest.

Furthermore, the flexibility to change co-play styles helped families engage with the game despite changes in their needs or circumstances. This was particularly helpful for families spread across multiple homes or when family members traveled. However, some families did experience conflicts when sharing a single Switch and purchased additional consoles to resolve them.

4.2.2 Indirect Jointness and Disentrainment. Within gameplay, being able to play in both entrained or disentrained ways provides new opportunities for productive JME. Much gameplay and indeed, much JME, is understood to take place through entrained interactions, with some notable exceptions like a case in Takeuchi and Stevens [63] where adults recorded bedtime stories for children.

With AC:NH, most families explained various ways they played “jointly” without being in the same physical or temporal space. We posit that these various configurations provide an extension of what is understood by “joint” in joint media engagement. Interview participants provided examples of having a sense of playing together when they were apart. Most often parents talked about playing AC:NH after their children’s bedtimes to not only play for their own enjoyment, but also to facilitate their children’s gameplay. Mom Emma called these her “housekeeping” tasks in the game. Mom Betty would do some of the more laborious tasks after Lisa, age 5, was asleep. This was both to relax and to focus on the tasks without distractions. Both of these parents preferred to keep the more fun aspects of the game to when their children were awake.

The design of the game allows players to be keenly aware of others’ presence in the game through evidence of work they had done (e.g., a freshly weeded island, objects left near the house) or from an animal villager recollecting the time when another player visited the island, or randomly asking about how another player might be doing in the conversation with the player.

Participants said that they also consciously thought about their family members who would play at a different time. Sometimes, this was done with the expectation that the other member would play again and appreciate the actions taken, even if there was no conversation about it. While conscious actions were seen, a few families also reported independently doing things for each other with the expectation that it would go unnoticed. We elaborate more on this in the following section.

4.2.3 Scaffolding Affective Interactions. One area that Ewin et al. [21] found in their systematic review was JME for scaffolding affective interaction, emotionally supporting a dyad partner through affection or an interaction [41, 62]. Wood et al. [73] identifies four types of support from parents scaffolding young children while engaging with mobile technology: physical, verbal, emotional-verbal (e.g., showing excitement through vocalization), or emotional-physical support (e.g., thumbs-up). We found that in addition to enabling Wood et al.’s four types of support, the game enables non-verbal and non-physical forms of emotional support, particularly through the game feature called “reactions.” These in-game gestures emulate certain physical expressions used for emotional-verbal or emotional-physical support, such as joyful laughter or applause, but present them in a digital form mediated by the game. A few families shared that these were used for various reasons during co-play, including humor and non-verbal communication with family members that were not physically co-located.

In addition to scaffolding these types of support, the design of AC:NH particularly affords what we term “indirect” affective interactions: asynchronous interactions where one family member performs an action to support or show affection for another family member who plays at a future time. A number of families noted a form of indirect affective interaction involving gifting in-game items to family members. Mom Marie often bought gifts for her daughters and left them by their

in-game home doorstep for them to find the next time they log onto the game. 5-year-old Lisa insisted that her mom share a birthday cupcake in-game with her dad, who did not continue playing beyond creating a character on the island. A few parents left out of in-game money for children to find without any explicit communication about having left the funds.

The in-game postal service also afforded indirect affective interactions for a few families. The Muffy family sent jokes to each other through the postal service and mom Odie kept all of the letters from her family members, “well, this came from my kids and I save anything like that from my kids... or my husband.” When 7-year-old Hazel sent a letter to her mom Janae, Janae was impressed because, as she explained, Hazel has struggled with reading and writing.

Some parents supported their children by doing more tedious tasks for them. Some actively collected in-game resources for their children so that their children would not have to worry about resource management. Mom Zelda proudly described this role as “the Bank of Mom,” saying “I give everybody all my stuff because that’s fun for me, seeing the kids enjoying the game... without the grinding.”

In other families, this support was more subtle. Dad Steve stated, “I ended up being like Jake’s (age 10) assistant... I would [play] Animal Crossing on his behalf, I would be the one shaking the trees and gathering the fruit and digging and hitting all the rocks.” Mom Elizabeth said that she does almost everything that her child does not want to do in the game, “I do everything else. I pay all the loans. I do all the terraforming. I fill the museum...” This was particularly common for parents of younger children. After 8-year-old Beatrice mentioned that she had never been stung by a bee in the game, mom Ashley later said privately to the interviewers, “it’s because I’m the one who gets stung because I’m the one shaking the trees!”

A few family members also noticed subtle acts of kindness and courtesy. An example came from the Tucker family where Lucas (age 8) playfully “trolled” his mom Coco by stepping on her flowers, but did not step on the flowers of the memorial that Coco had made for her father. Coco described how she first showed the memorial to Lucas, “when I built it [the memorial], I was like ‘Oh Lucas, let me show you what I made’ and he gets emotional. Those are the only flowers he didn’t run through.” When the interviewer asked if she had specifically requested that Lucas not run through those flowers, Coco replied, “I don’t think I even said that to him, but he just don’t. I think he got respect.”

4.3 JME During the COVID-19 Pandemic

In this section, we provide additional insight on conditions brought about by the COVID-19 pandemic and how they affected JME around AC:NH. The most notable impact on JME was that families were spending more time together than they would have otherwise and that AC:NH provided something to do together. Additionally, as noted earlier with mutual engagement, the entire family could enjoy AC:NH. The increased time together and need for something to do that was enjoyable by all, increased the opportunities for JME.

An additional pandemic-specific consideration is parental and child stress. Indeed, given parental [8] and child [40, 66] stress experienced during the pandemic, and the resulting greater need for emotional support [32], some families also turned to JME with AC:NH as a means of engaging in affective interaction. As previously discussed, some parents sought to make it easier for their children to enjoy and fully engage with the game by providing them with in-game resources or completing tedious tasks the children did not want to do. This may have been tied to a desire to reduce children’s stress. In a different example, a few families used the game to distract children from pandemic stressors. In one instance, Mom Janae explained that she used AC:NH to distract 7-year-old Hazel from being upset about not being allowed to play with neighbor children.

A handful of participant families had changes in living arrangements during the pandemic. However, AC:NH's flexible co-play options enabled these families to continue playing together, even when physically distant. Though online multiplayer is not unique to AC:NH, the flexibility to change between co-play modes allowed families to continue in their routines even when their living arrangements changed.

Finally, we saw that a few families turned to co-creation as a way to grieve loss due to the pandemic. A couple of participants described building memorials for the family member who passed away or hosting a funeral within AC:NH. Media reports have documented these memorials as well [24]. One participant family had to close down their family business, and another family experienced a job loss at a cherished location, but in both cases, the families re-created the physical business space within AC:NH. Other families recreated their favorite physical places: a bowling alley or a restaurant to "visit" within the game. These became places they visited to remember the people and locations they had lost or could not access.

5 DISCUSSION

5.1 Conditions and contexts that support productive JME

As expected in our findings, Takeuchi and Stevens's six conditions for productive JME were well present in the design of AC:NH. Most studies in JME focus on ecosystems of digital technologies in families [21], like video games [27], and mobile devices [21]. Our study focused on a specific game on one platform (Nintendo Switch) in multiple family contexts. While JME studies have looked at single games in multiple contexts (e.g., *Pokémon GO* on different mobile devices [59] or *Minecraft* on multiple platforms [3]), by focusing on both the same hardware (Nintendo Switch) and software (AC:NH), we were able to understand more specifically how families adopt similar strategies across different spaces and contexts. With this framing, we found three design features of AC:NH that bolstered its support of productive JME.

First, we found that AC:NH offers varied and flexible play styles that are particularly beneficial for JME scaffolding for families. The different ways in which people can play - with many choices, few obligations, and the opportunity to support or complement each other's gameplay - were productive for JME because families could tailor their play to individual and group needs. We argue that these flexible play styles allow for the amplified mutual engagement we observed between parents and children. Unlike other examples of mutual engagement in JME, such as Sesame Street having a celebrity guest, AC:NH is not for either adults or children, but for *both* adults and children.

Our second condition is the ability to play jointly in different physical and temporal spaces. Consistent with Balmford et al.'s study of families playing *Minecraft* [5], we found that the opportunities to play with family members remotely and asynchronously blurred the boundaries of the home, allowing the AC:NH island to serve as an extension of the home independent from the physical constraints of the space. By reframing what "joint" can look like in "joint media engagement," designers can better accommodate families' diverse needs, and researchers can better understand and describe how families interact and support each other with media.

Our third condition, scaffolding of affective interactions, emphasizes the opportunity for JME to build on interpersonal relationships to feel supported. In AC:NH, parents would engage in gameplay with their children and alone, but often think of their children's in-game needs. AC:NH provides many ways to engage in affective interactions through direct gifting of objects, providing in-game funds, and less tangible affective interactions like giving up control, cleaning up, and "grinding" to reduce the children's labor. In addition to facilitating children's gameplay, these affective interactions can help strengthen relationships among family members and contribute to children's emotional development.

5.2 Investigating JME under duress

The affective interaction scaffolded by AC:NH was extended to the specific context of the COVID-19 pandemic. With individuals and families having greater emotional needs [32], AC:NH afforded unique opportunities for parents to affectively interact with their children.

Prior JME studies have typically not taken stress into consideration, although there is much research on using media, including video games, to cope with stress [51, 54, 72], as well as work on stress and parental mediation [68]. As such, we drew from JME studies that discussed affective interaction [21]. Certainly, the COVID-19 pandemic offered an opportunity to understand JME during a stressful time. All participant families had to adjust to new realities in their households, with some experiencing illness and loss. Parents provided their children with needed affective interactions through AC:NH. This provided opportunities to understand productive JME, affective interactions, and the addition of stress.

We argue that productive JME is not just about designing for better user experience in learning outcomes and collaboration, but for facilitating affective interactions, that may lead to ways families can convey and demonstrate their emotions, support, and affect to each other, directly or indirectly. The combination of various direct and indirect affective interactions during the pandemic allows families flexibility in ways of showing affection.

Other work in studying productive JME can look at times in people's lives in which families cope jointly and the varied ways in which technology affords families to communicate, including verbal and non-verbal, direct and indirect, entrained and disentrained, etc. Beyond the COVID-19 pandemic, we advocate for more studies examining specific technologies in families during contexts of stress and greater need for affective interaction.

5.3 Designing for productive JME

Based on our findings, we identify three key elements of AC:NH that contribute to supporting productive family JME: its persistent shared space, its flexible in-game progress, and its framing as a social life simulator. We elaborate on each of these elements below, and present design recommendations related to each element for game designers looking to promote productive JME through their games.

5.3.1 Persistent and shared digital space. For families that played AC:NH together, particularly those who shared an island, a prominent aspect of the experience is interacting with the game's island, which is both persistent and shared. By persistent, we mean that modifications to the island persist across play sessions, or until they are reversed or replaced by a new modification. For instance, AC:NH villagers asked players about events that happened in the past, many tasks on the island are persistent (e.g., farming, fishing, exploring, etc.), and the museum preserves the memory of particular moments. By shared, we mean that modifications to the island made by one player are also manifested when a different player is playing, even if the original player is no longer present.

In AC:NH, more elaborate projects do not need to be completed in a single play session; the game encourages players to collect items they may use in the future. We believe this persistent and shared space allowed for a stronger sense of jointness. Player actions have consequences for others and persist across sessions, making all players more aware and mindful of others' needs. This is interesting for JME, whereby the presumption of others' needs is typically understood as parents' desire for a child's development. Among our participants, consulting other players before making a substantial change in island design or inviting villagers was a norm.

Additionally, having a persistent shared space in AC:NH allows some certainty and familiarity. For instance, the families used AC:NH to replace aspects of life that were lost during the COVID-19

pandemic, like partaking in routines, and choosing to build memorials or replicas of locations and people they missed.

Design recommendations: For multiplayer games, options to preserve the memory of prior co-play can be provided to strengthen shared experiences, such as a shared archive to showcase collaborative outcomes and achievements, non-player character referencing players' previous actions, or having one player's action impact the other in a noticeable way without altering the gameplay significantly. In single-player games, designers can consider adding elements of the game that respond to player actions on other save files, to create a sense of shared world-building across players.

5.3.2 Flexible in-game progress. AC:NH is unusual in that it does not require goals to be met in ways that many other games do. Goals and milestones do exist, but the player can choose when and if they want to work towards the goals or just spend time engaging in other game activities. Families could collaboratively engage in whatever tasks they wanted.

Moreover, they could focus on elaborate design tasks to be completed over longer periods of time. Players could revisit and iterate on old projects as often as they wanted. Furthermore, this allowed creativity to be sparked by an ephemeral experience, such as seeing a specific furniture item in the island's store: families could start design projects with the intention of adding more elements over time, even if they could not achieve their completed vision right away. In fact, collaboratively discussing and designing the island was a very prominent activity among our participants.

For AC:NH, the opportunity to see projects in development or the intermediate stages in these creations may have allowed family members to feel more involved with the creation process over time, which enabled discussion, brainstorming, and collaboration.

Design recommendations: In addition to a flexible timeline and structuring game tasks without specific deadlines, designers can support co-creation beyond the "main story" plotlines in narrative games. To enable players to jump in and out of the project at any time and work at their own pace, these activities can be made available to players early in the game, independent of players' progression through the game. When creating open-ended design opportunities, designers can give players tools and creative opportunities early in the game, and allow them to easily revisit, develop, and iterate on past projects.

5.3.3 Social life simulation. We argue that designers can look to social life simulators (e.g., AC:NH, *The Sims*, *Stardew Valley*) to help facilitate affective interaction, particularly tied to uncertainty, similar to what some families experienced during the pandemic. The ability to engage virtually in activities otherwise not possible, like visiting places and socially interacting with others outside of the home (e.g., during the COVID-19 pandemic), was also found to be helpful for coping [51]. For some families, the game provided opportunities for family members to see each other in new social contexts, which allowed them to learn more about each other (e.g., artistic talent, interest in topic, or working style). They were also able to care for each other in nuanced ways, similar to how they would in real life, such as by cleaning up, doing chores, saving items that the other family member may like. Facilitating design that supports these pro-social outcomes tied to the simulation of social life has real world effects.

Design recommendations: When designing multiplayer games, designers should consider offering more options for indirect affective interactions to allow users to show care in addition to direct communication or action. Designers can create a persistent social environment which allows asynchronous co-play through mechanisms such as conversations with NPC's about other players or creating challenges or explicit opportunities to do things in-game for other players. Additionally, game developers can provide opportunities for other members to contribute to the

player's design projects by enabling players to create a shared list of tasks and resources to which the other players can contribute, thus facilitating a sense of co-creation.

6 LIMITATIONS AND FUTURE WORK

There are several limitations of the current study. First, given the context of this study, we are presuming some aspects of our findings to be related to AC:NH's design and others to be related to the circumstances of the pandemic. We cannot isolate either of these contexts. As such, we relied on literature about game design and about families during crises and the COVID-19 pandemic specifically to determine which aspects could be attributed to the latter. We hope that we were able to do this satisfactorily, but we acknowledge this is a limitation. Second, we only talked to families about their JME and rarely observed it ourselves. Future studies could do more direct observation of family gameplay that would provide different types of evidence for JME which was impossible in the pandemic situation. Third, although the ongoing pandemic at the time of data collection afforded a unique opportunity to interview families in the middle of this stressful time in their lives, we anticipate that later studies will allow families time to reflect upon their pandemic experience differently, thus warranting further investigation. Finally, we primarily recruited families from AC:NH social media groups, and we recognize our sample may be limited due to this. Their gameplay and experiences may not reflect the experiences of all players of AC:NH, especially for those who do not engage with social media. We also may not have been able to speak with AC:NH playing families that did not have time or desire to participate in an interview study. We do note, however, that the demographics of participant families are fairly varied in terms of race/ethnicity, income, and education.

Our work focuses on aspects supporting JME, but a few participants did report experiencing some challenges and conflicts arising from collaborative gameplay. For instance, a few families discussed their children's playful digital trolling behavior such as walking over flowers or scaring bugs away. Some tensions between siblings were also present, with the older sibling finding themselves fixing things the younger sibling changed or the younger sibling deleting the design pattern the older sibling was using. Some families reported conflicts tied to sharing a single device. Exploring this aspect more in future work could help identify design implications for minimizing conflicts to further support JME. Additionally, we note that despite our focus on interactions between parents and children, our study clearly demonstrated that interactions between siblings also contributed to families' JME with AC:NH; future work could further explore how sibling dynamics affect JME, and how they affect the conditions for productive JME. In future work, researchers could also conduct a survey to better understand how generalizable our findings are among the wider group of players.

Furthermore, future work can pay greater attention to contexts that may affect the players' interactions (e.g., families in different countries, families who regularly play games together versus families who are new to playing games together). Given the COVID-19 pandemic's impact on how families engaged with video games and with each other, future work should explore how these newly observed JME conditions persist or change after the pandemic has resolved. Also by focusing on AC:NH, we do not have a broader sense of the media environment in these homes. Future research could do more comparative studies.

7 CONCLUSION

Animal Crossing: New Horizons launched at the beginning of a historic public health crisis. This study considers how families jointly engaged with this game, supporting existing conditions of JME while adding three new conditions and considering the effect of the pandemic. The study extends theory on how families engage together to support learning and growth as well as how design aspects can support productive JME, particularly affective interaction. It also provides an

example of how research in an extreme situation allows for theoretical development. The stress of the pandemic provided a glimpse into choices made by parents regarding supporting children's development and well-being, which in this study was scaffolded by the game AC:NH.

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A RECORDED FAMILY COUNTS

Below are the recorded counts for how many families were being described in instances of quantified language throughout the paper.

Statement	Families
All of the families interviewed described participating in mutual engagement.	27/27
Indeed, a few parents were surprised that a game could be enjoyed in many ways by a wide age range.	3/27
A few participant families initially purchased the game with a specific family member in mind, but then other family members found the game appealing and played as well.	6/27
Other parents liked the routines associated with completing goals.	11/27
A number of adult participants said that they used the game to relax or escape.	16/27 (relaxation) 12/27 (escapism)
Because this was an interview study, we did not directly observe parents engaging in dialogic inquiry with their children. However, some families did describe times when it occurred.	18/27
Multiple families told us that the museum donations sparked larger conversations about the real-life items, usually tied to bugs and fossils.	11/27
Some families also spoke about their individual and collective research and inquiry endeavors into game-related topics like strategies and design inspiration on AC:NH social media, YouTube, and blogs.	6/27
Sometimes these activities had parents and children learn together, as opposed to the traditional structure of parent teaching the child.	9/27
In three cases, after researching a strategy, the child would instruct the parent	3/27
However, a handful of parents still provided guidance and scaffolding in these investigations, especially with younger children.	5/27
Most families discussed various ways of engaging in co-creation, both within the game itself and outside of it.	22/27
Many families took advantage of this to collaboratively design and decorate their island and discussed their decision-making processes.	19/27
Some families combined delegation of tasks with cooperation and usually one member was the lead decision maker,...	10/27
In particular, we noted a few families that built in-game creations related to real-world objects and places, like a re-creation of a local pool from the Tia family.	3/27

Statement	Families
Four families created their own “metagames” within AC:NH, defining sets of rules and mechanics for in-game activities and competitions that are not formally scaffolded by the game.	4/27
A number of interview participants discussed boundary crossing,...	18/27
Two families talked about how AC:NH related discussions occurred throughout the day, even when the game was not actively being played.	2/27
For a couple of families, the game inspired other activities related to AC:NH, like game-themed arts and crafts, and pretend play scenarios inspired by the game.	2/27
One way that AC:NH crossed into real life was children identifying animals and flowers they learned about in the game in the real world.	11/27
Some actively collected in-game resources for their children so that their children would not have to worry about resource management.	12/27
In other families, this support was more subtle.	6/27
A few family members also noticed subtle acts of kindness and courtesy.	10/27
Some families also turned to JME with AC:NH as a means of engaging in affective interaction.	18/27
As previously discussed, some parents sought to make it easier for their children to enjoy and fully engage with the game by providing them with in-game resources or completing tedious tasks the children did not want to do.	14/27
In a different example, a few families used the game to distract children from pandemic stressors.	4/27
A handful of participant families had changes in living arrangements during the pandemic.	4/27
Finally, we saw that a few families turned to co-creation as a way to grieve loss due to the pandemic.	3/27

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