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Technology-Driven Intergenerational Physical Activity Intervention: An Instrumental Case Study

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Abstract: Intergenerational contact offers an under-explored strategic approach to challenging age stereotypes and positively influencing health behaviors in older adults and children. It is postulated that through the application of the constructs of Contact Theory, an effective platform for change could be established. Using an instrumental case study, the experiential effects of the intergenerational contact phenomenon were pragmatically explored from the perspective of a single familial dyad (61-year-old woman; 9-year-old boy). Semi-structured interviews were conducted with each participant, both during and following engagement with a remote, 12-week, technology-driven physical activity intervention focused on using daily step counts (acquired via any activity of their choice, using physical activity trackers) to collaboratively complete virtual walk routes during the COVID-19 pandemic. Through reflexive thematic analysis and interpretation of the data in line with the study's aim and propositions, four core themes were identified: Reciprocal Encounter; Opportunity for Reflection and Re-evaluation; Platform for Change; and COVID-19. In addition to the perceived positive effects on targeted health outcomes (physical activity, sedentary behavior, health-related quality of life), facilitating intergenerational contact through virtual methods could also, through opportunities to nurture and build relationships, challenge age stereotypes.

Keywords: older adults; children; sedentary behavior; age stereotypes; Contact Theory



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1. Introduction

In principle, the term ‘intergenerational’ could refer to any interaction between members of different generations. However, it is more often used to describe ongoing contact between older adults and children, adolescents, or young adults, either through dyadic partnerships or as part of group activities that endeavor to bring about benefits for all involved [1]. Facilitating intergenerational contact, specifically between older adults and children, through the provision of mutually beneficial experiences presents an under-explored approach to influencing health behaviors (e.g., physical activity, sedentary behavior) and targeting stereotypes of aging simultaneously in both generations [2].

The opportunity to jointly set targets for the attainment of shared physical activity goals and the motivation generated from social support is suggested to be a primer for cross-generational benefits [3]. In older adults, intergenerational contact may also protect individuals from experiencing the stress-related responses that develop when they feel at risk of confirming negative stereotypes associated with their age group [4], known as stereotype threat [5]. Furthermore, in children, long-term influences on health, well-being, and perceptions of aging may be gained through intergenerational contact, helping to prevent age stereotypes being internalized into self-perceptions of aging, known as stereotype embodiment [6]. Through the application of the constructs of Contact Theory [7]—namely equal status, cooperation, common goals, and support from social and institutional authorities—it is postulated that intergenerational contact may provide an

effective platform to directly, or indirectly through challenging age stereotype constructs, target health-related behaviors in both older adults and children.

To date, the vast majority of interventions used to explore the effects of intergroup contact have been face-to-face via direct interactions [8]. While facilitating intergenerational contact has been deemed a promising approach [9,10], such contact has previously been identified as difficult to optimally achieve [4]. However, virtual technology-driven methods, which have become increasingly used across society, may offer an alternative way to facilitate contact by reducing inclusion and communication barriers [8]. Indeed, this is an approach that has already been successful when targeting cultural prejudice [11] and provides a novel avenue for exploration with this study.

The COVID-19 pandemic presented the world with an unforeseen set of circumstances. Placing virtual contact and technology at the forefront of daily life, it provided, as per the parameters of case study research, a unique opportunity to holistically explore in depth a specific, complex phenomenon, bound by place and time, in a pragmatic real-world context [12]. Case studies have successfully been undertaken as viable approaches in situations where practical or ethical issues, participant accessibility, and/or logistical constraints have prohibited or restricted other options [13], akin to the circumstances experienced during the COVID-19 pandemic.

This study utilized an instrumental approach, whereby the focus was on generating a wider understanding of the phenomena behind the case of interest [14]. Specifically, the overall aim of this case study was to pragmatically explore the experiential effects of a technology-based intervention driven by the phenomenon that is intergenerational contact. The study explored the intervention's potential to challenge stereotypes of aging [4,15] and positively influence health behaviors [16] in older adults—as the primary focus—and children in a real-world setting. This was explored from the perspective of a single familial dyadic partnership both during and following intervention completion during the COVID-19 pandemic, which, although not the main focus of the study, provided a situation where opportunities for physical activity and social contact were restricted.

2. Materials and Methods

2.1. Research Design

2.1.1. Sample

This study employed a single holistic/instrumental case study design. One dyad, consisting of a 61-year-old woman and a 9-year-old boy, was recruited via convenience sampling from a primary school in South Wales, United Kingdom (UK). Initially part of the intervention arm of a non-randomized control trial (NRCT) that ceased recruitment due to the COVID-19 pandemic, the dyad were the only participants who consented to continued participation. The original NRCT was designed to be a proof-of-concept study to enable a preliminary exploration of the potential interactions and mediations between intergenerational contact, parameters of health (physical activity, sedentary behavior, health-related quality of life), and age stereotype constructs (self-perceptions of ageing, views on ageing, stereotype threat). The intervention's design components and structure were selected for their ability to provide an accessible and flexible mode of physical activity for both dyad members. However, it should be noted that, within this study, the embedded intergenerational element—not the physical activity mode, per se—was the most important factor. Inclusion and exclusion criteria are presented in Supplementary Table S1. The older adult was married, self-employed, self-rated her health status as very good, and had a positive relationship with her grandchildren, who she typically saw a few times per week. The child had no underlying health issues and reported usually being active at a moderate intensity, for 30 min, at least three times per week. The relationship between the dyad members was step-grandparent and grandchild.

2.1.2. Procedures

Participants engaged in an enrolment session with the first author, RLK, which included the collection of demographic data and a review of their completed pre-participation health screening questionnaires (based on American College of Sports Medicine guidelines [17]). Further baseline measures were also completed, but these were part of the original intervention study and, therefore, are not reported here. Participants subsequently completed a 12-week intervention, underpinned by the components of Contact Theory [7], whereby they collaboratively engaged with World Walking—a multi-faceted, interactive, step count-based online platform, accessible via a website or additional downloaded app—to combine their daily step counts (acquired via an activity, or combination of activities, of their choice, recorded via Mi Band 2[®] activity trackers) in order to complete virtual walking routes of their choice across the globe. For further details of the intervention’s structure, the associated behavior change techniques, and how each parameter of Contact Theory [7] was addressed during intervention development, see Supplementary Table S2. However, from week two onwards, in response to the COVID-19 pandemic, the government enforced a national lockdown, which placed restrictions on opportunities for social contact, closed all non-essential facilities, and limited engagement in physical activity outside of the home to one hour per day. These restrictions meant that planned mid (week 6)- and post-intervention measures were not able to be completed; therefore, separate semi-structured interviews were conducted at both time-points with each participant. Moreover, given the fluidity of the pandemic-related situation, it was deemed useful to seek information regarding the effects of COVID-19 on the dyad. Ethical approval for this study was granted by the Institutional Research Ethics Committee (ref: 2018-103A). All procedures were conducted in line with the Declaration of Helsinki. Written informed consent/assent was obtained from each participant and from the parent of the child.

2.2. Binding the Parameters of the Case

In line with the requirements of case study research, it is important to narrow down the focus, depth, and breadth of the case, establishing not just what it will be, but conversely, what it will not [18]. Thus, the boundaries imposed on this case study in relation to each identified parameter are provided in Table 1.

Table 1. Case study boundaries.

Parameter	Definition
Intergenerational contact	Between the dyad, relative to their participation in the intervention and the wider social situation No restrictions or guidance were imposed on how, when, or how often contact should occur
Health-related variables	Physical activity Sedentary behavior Health-related quality of life
Age stereotype constructs	Older adult: views on aging, self-perceptions of aging, stereotype threat Child: attitudes towards aging
Older adult	Aged ≥ 60 years
Child	Middle childhood (approximately 7–12 years old)
Intervention	12-week collaborative technology-driven physical activity-based intervention
Intervention location	Local South Wales community

2.3. Data Collection

Each semi-structured interview was designed to explore the participant's experiences of the intervention in relation to intergenerational contact and any associated perceived value, benefits, and/or limitations. The impacts of social isolation and activity restriction were also explored. An outline of the core topics and open questions covered with the older adult that were identified for discussion prior to the interview, and comparable questions used with the child, are provided in the Supplementary Materials S1 and S2. All questions were reviewed and agreed upon by a second researcher experienced in qualitative research (JH).

The interviews, ranging in duration from 13 to 43 min, were conducted remotely via the online Zoom Inc. platform (San Jose, CA, USA), and audio and video were recorded (Zoom record function; Phillips Digital Voice Recorder). They were transcribed verbatim from the audio files, using the video files where necessary to gain clarity, with identifying markers removed and pseudonyms applied. During the interviews with the child, one of the child's parents remained in the room whilst the interviews were being conducted.

2.4. Data Analysis

Following transcription, thematic analysis of the four interviews was undertaken, drawing on the processes discussed by Braun and Clarke [19,20]. An iterative approach was used, such that whilst the coding process remained deductively driven by the study's aim, research questions, and propositions (specifically regarding the phenomenon of intergenerational contact and its experiential effects on health-related variables and stereotypes of aging), codes were subsequently allowed to emerge inductively from observations within the data, in this instance, with both the semantic and latent meanings of the data explored [20].

Initial coding was conducted manually by RLK, with subsequent categorization, organization, and re-checking and refinement of codes, themes, and sub-themes conducted within Microsoft Word (Office 365). For credibility, transparency, rigor, and quality purposes [21], these processes were completed in collaboration with a 'critical friend' (JH), who additionally blindly crosschecked 10% of the data extracts against the generated codes. This process enabled the primary analyst to reflect on the overall coding decisions and theme formation and, where appropriate, engage in dialogue to challenge and explore these further. One discrepancy was identified, discussed, and reviewed back to the original data set until an agreement was reached. A comprehensive and transparent data analysis audit trail was maintained.

2.5. Reflexivity

This research was undertaken during a period of time that subjected both the participants and the researcher to the same underlying, unique set of circumstances and rules. This situation made it difficult at times for the researcher to maintain an objective, neutral position within the interviews. Without intent, the dialogue sometimes became a two-way discussion. Despite this, it was not felt that this in any way influenced responses or hindered the process; indeed, having this common ground could have inadvertently improved the fluidity of the interview.

3. Results

Four core themes were identified: Reciprocal Encounter; Opportunity for Reflection and Re-evaluation; Platform for Change; and COVID-19, which are outlined along with their associated sub-themes in Figure 1. All themes and sub-themes were present across both the mid- and post-intervention time-points. However, the strength of some sub-themes within the theme Platform for Change, namely those relating to age stereotype constructs, was greater at week 12. Within the following section, the labels Older Adult (OA) '-Mid' or '-Post', and Child (CH) '-Mid' or '-Post' have been used to distinguish between each participant and the mid- and post-intervention interview time-points.

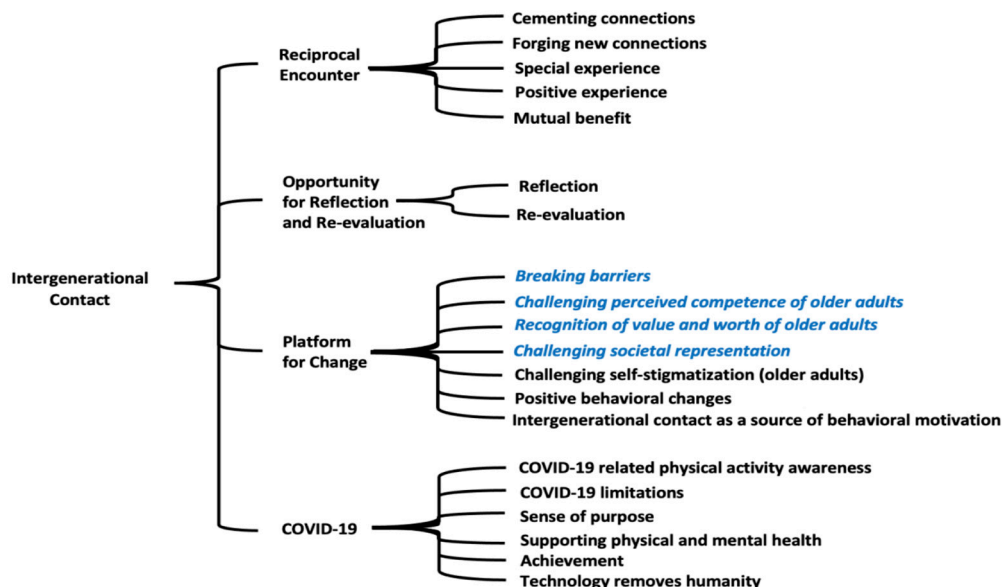


Figure 1. Model of the core themes and sub-themes related to the experiential effects of the intergenerational contact phenomenon. Highlighted sub-themes were more prominent at the post-intervention follow-up.

3.1. Themes

3.1.1. Theme 1: Reciprocal Encounter

Mutual benefits of intergenerational contact were revealed. In addition to stimulating physical activity in both dyad members through the processes of collaborative goal planning—“The plan was for [partner] to do ten so hopefully [they] did ten yesterday . . . and for me to do twenty ‘cause all we needed was thirty thousand steps more” (CH-Mid)—several relationship-related sub-themes emerged.

The dyad was provided with an avenue to forge new, and cement existing, connections through a special, positive experience. For the child, a potential opportunity to connect with older relatives was identified: “If you choose someone [to participate with] who, your older relative who you haven’t connected, for. . .well, it will be good just to connect with them because you’re working with them” (CH-Post), and they were able to personalize their picture of their older adult partner through being able to: “learn more about them and stuff” (CH-Post). For the older adult, it was a chance to build a relationship with a child new to their family: “I saw it as an ideal opportunity where I had that sort of special connection with [them] to hopefully develop the relationship as well” (OA-Mid). It also sparked a wider involvement in the child’s life, confirming to the older adult their worth to the child:

“[They] had a project to do for school, part of [their] schoolwork, and [they] were like ‘oh come and see this, come and do this’ you know, and I don’t know whether that is specifically as a result of the project. I think that would have helped. Or whether it’s the circumstances or whether, well you don’t know where it can lead you, you know. It’s got to be positive” (OA-Post)

The concept was perceived to have provided the dyad with a “common bond” (OA-Post) and a unique opportunity: “this was a real chance for me and [them], just the two of us to do something together” (OA-Post). This left the older adult dyad member in particular with hope that this relationship would continue into the future: “I just hope that from [child’s] point of view [they] would be able to ask me to do other things as well” (OA-Post).

Overall, both dyad members found the experience to be positive and enjoyable. From being “a good thing” and “really fun” (CH-Post), to “absolutely great” and “a real feel-good factor” (OA-Post), participating stimulated positive emotions: “I was chuffed to bits that [child] even considered asking me” (OA-Post). The intervention and intergenerational concept

were also deemed to be an effective way to target the specified outcomes: *“It’s worked. It’s worked and it’s worked really well”* (OA-Post).

3.1.2. Theme 2: Opportunity for Reflection and Re-Evaluation

Life priorities, including maintaining intergenerational relationships, and their impacts on decisions and choices made were evaluated and reflected upon by the older adult. Self-perceived as the *“sandwich generation”*, whereby carer responsibilities extend to generations both above and below, such priorities conflict with being able to maintain adequate levels of physical activity: *“I have been aware that when the pressure is on the first thing that goes, is exercise”* (OA-Mid). For these individuals, it is a balancing act between the time available, and appreciating and embracing the life and family connections that they have: *“It is the time constraints on everything . . . you’ve got to weigh it up if I didn’t have the children around but is that the life I want to lead?”* (OA-Mid). Whilst the intergenerational element of the intervention provided the opportunity to combine priorities (physical activity and interaction with grandchildren), concerns about not being able to find a balance and *“keep this up after you know after the project ends and after all this”* (OA-Mid) were raised. These concerns were counteracted by a heightened awareness of previous positive habits that could be re-started to facilitate ongoing collaboration: *“I used to swim before work, and I got out of the habit of doing it . . . you gotta get it part of your daily living”* (OA-Mid), as well as unused opportunities for physical activity within pre-existing routines: *“I think it’s about using my time more constructively sometimes”* (OA-Mid).

Engagement with the intergenerational contact intervention also led to reflection on an individual level about how their perceptions affect themselves: *“It has given me time to reflect on things I knew, but I couldn’t really do a lot about as well”* (OA-Mid), and as a consequence of raised awareness the impact of modern life on sedentary behavior in children:

“I’m very conscious that again I spent my childhood out and . . . the number of times I’ve been out walking and thinking that this reminds me of my childhood. No cars. No, hardly any people, sort of freedom as well but it’s a different lifestyle for some of these kids you know, . . . long periods of time on laptops and goodness knows what” (OA-Mid).

3.1.3. Theme 3: Platform for Change

The phenomenon of intergenerational contact was also viewed as an ideal way to break barriers and challenge age stereotype-based views and perceptions. For the older adult, it allowed the opportunity to positively change their own self-perceptions of aging: *“I think it’s made me realize that yeah, I can, I still can compete with [child] if needs be. I can keep going”* (OA-Post). For the child, it provided a platform to challenge their perceptions of older adults’ competence, and societal representations of older adults.

Whilst the capability of older adults to use technology was raised—*“[they] can work some stuff on the computer but other stuff [they] can’t”* (CH-Post)—technology was still viewed as being useful to older adults, and a modality that they could, and potentially would, use more. Indeed, it was perceived that older adults can still learn new things but need to be shown, *“I think if there was like an online class actually got old people, people who are not used to using Skype or anything, used to using Skype more technology stuff, I think they would get better at it”* (CH-Post). However, for physical activity, it was perceived that children were much more active than older adults: *“we would probably have like sixty thousand steps if I did it with one of my friends, a day”* (CH-Mid). Although, almost surprisingly to the child, older adults were viewed to be *“actually pretty fun”* (CH-Post), and their partner was seen to be someone that it was possible to have shared views with: *“there’s one thing that I actually was talking to [step-grandparent] about I actually agree with her computers should get rid of spell check”* (CH-Post).

From the perspective of both dyad members, the experience also stimulated recognition of the value and worth of older adults. It was acknowledged by the child that, in general, children do not talk to older adults enough, and that they provide an opportunity to connect with the past: *“it’s basically a good time when you’re talking to them to ask them what it was like in their generation, to actually learn more about the history of this world”* (CH-Post).

Although conflicting with their perception that children were the more active population, older adults were still viewed as being a good option as a co-participant as, unlike children, they are not 'slaves to their computers': *"If I was doing it with my friends, I wouldn't, I wouldn't know who to choose because all my friends will obviously spend their day on the computer"* (CH-Post). Conversely, there was a sense of realization that, as an older adult, they were not only in a position to be a positive role model, but that intergenerational contact generates teachable moments and situations in which to transfer knowledge:

"I love the water, so I walk in the pool, and I walk a mile, I do sixty four lengths and I said to [child] I've done eight thousand and odd steps today in the pool 'how do you know that' [they] said, well I said, I counted one and I times it by sixty four and that gave me the answer, and you know, absolutely amazed that you like because I couldn't wear my watch in the pool, that I couldn't count the steps as well you know I mean it's we're just old school" (OA-Mid).

Pertaining to changes in health-related behavior, although potentially more relevant to the older adult, it emerged that within this context, intergenerational contact acted as a source of motivation for behavior. Engagement and participation were facilitated by teamwork: *"I think it's working together, it's working as part of a team"* (OA-Mid); not wanting to disappoint the child: *"It's not wanting to let [child] down as well, you know, and I think no I gotta do it you know, I can't let [them] down"* (OA-Mid); reciprocal encouragement: *"I don't think that's competitiveness. I think it's more of a sort of trying to egg each other on"* (OA-Post); co-monitoring of progress and participation: *"I've been having less steps [step-grandparent's] been having more steps"* (CH-Post); and *"they certainly know that I'm doing it and they [child] knows I'll be on [their] back as well if [they] don't do it as well"* (OA-Post). Additionally, the intervention as a whole acted as a direct driver of behavior for the older adult:

"I don't know whether I would have been driven to get out and do it every day you know or perhaps if I was having a bit of a bad day or if it was a bit wet or of it was this or that" (OA-Mid).

Finally, positive effects on behavior were identified. Both dyad members reported increased physical activity levels: *"I've continued getting out there walking. I've certainly upped my steps considerably. Some days I've even got up to about eighteen, nineteen thousand"* (OA-Post), and *"I am finding it helpful because it gets me walking more it does it does get me walking"* (CH-Mid). The effects of increased self-awareness of behavior, and understanding what behaviors should be changed to prioritize physical activity, were also noted:

"Well, the weather wasn't particularly good yesterday, but I was up to about eight and a half thousand. And when [husband] got back from work we had to go to deliver a birthday card [by car] to his son and it was picking to rain and I said no, these steps are too low, drop me [to walk part of the journey]. So easily it was up to nearly twelve thousand you know. Which I feel more comfortable doing now. So, it does make you really aware. It has made me really aware" (OA-Post).

Also recognized was the potential to stimulate longer-term physical activity goals and aspirations: *"After the rainbow run, I want to do the whole entire world"* (CH-Mid).

3.1.4. Theme 4: COVID-19

Several sub-themes emerged that interlinked with the COVID-19 pandemic's stay-at-home order and related social restrictions. These factors contributed to the observed heightened awareness of physical activity behaviors. The child identified not only the limitations that restrictions were having on both their own and their partner's ability to keep active: *"[They do] go out a lot but just because we are in this isolation thing [step-grandparent] can't go out that much"* (CH-Mid), but also an awareness that without the restrictions, their partner could be more active: *"If it wasn't for this [they] would probably hit thirty thousand a day [they] probably would if we weren't in this"* (CH-Mid). A loss of opportunity was identified from changes to their routine: *"I would have done my thirty thousand steps I tell you why err I'd*

probably be going down the park with [family member] erm probably get a load of steps in school" (CH-Mid), a factor also related to the importance normally placed on the social element of physical activity: "when [friend] comes back from [their] school, we go down the park. . .we would probably be outside" (CH-Post). For the older adult, there was an awareness of the benefits of physical activity during the period of restrictions: "Under the current regime, I'm just so glad they've allowed us to continue exercising" (OA-Post).

Participation in the intervention through a major segment of the first COVID-19 pandemic 'lockdown' provided the dyad with a number of valuable benefits. It was perceived to have provided a source of "focus" (OA-Mid), and an overall sense of "purpose" (OA-Mid), even when motivation was waning:

"I think it's given me more of a purpose as well, it's made me more determined you know. . .oh I can't be bothered to go out for a walk, yes I am because I need to do this' so I think it's influenced that as well" (OA-Mid).

On a basic level, it provided "something to do in the day" (CH-Post), a conscious reason to be active, and made physical activity a source of entertainment: "It would be boring. . . now I actually get challenges to do" (CH-Mid). These factors translated into positive achievements for both the child—"since we've been isolating, I've hit thirty thousand steps" (CH-Mid)—and the older adult: "I think during the circumstances it has given me something to think well yeah, I've done something really positive during that very, very, difficult time" (OA-Post). Furthermore, participation supported not just the physical, but also mental, health of the older adult, providing a form of escape and an avenue to "forget what's going on in the real world" (OA-Post).

The major driver underpinning the delivery of the intergenerational intervention was technology. Despite its positive application, during the restrictions, virtual, technology-driven contact methods were not viewed as a substitute for face-to-face contact. "Just not seeing actual people" (CH-Mid) stimulated feelings of sadness, and a lack of humanity: "this is okay, but it only gives me part of the full experience really. I would much rather see you in person" (OA-Post). With regard to the intervention, it was not deemed to have made maintaining intergenerational contact any easier:

"it's a little bit haphazard at the minute and we're just hoping that when we, you know, we're out, hopefully we're out of lockdown, and things will ease off a bit, then we can have more in depth discussions on exactly what we are doing" (OA-Mid).

Other limitations to the success of the intervention were also linked to COVID-19. The lack of ability to maintain intergenerational contact due to a change in their housing situation was perceived to have led to a lack of ongoing participation and a degree of disengagement and loss of initial benefits (for the child) between mid- and post-intervention: "I have noticed a reluctance from [child] to walk and stuff since [they're] back" (OA-Post).

4. Discussion

This instrumental case study aimed to pragmatically explore the experiential effects of a technology-based intervention driven by the intergenerational contact phenomenon. Indeed, the themes identified within our results support the idea that intergenerational contact has the potential to provide reciprocal health-related benefits for older adults and children; be a platform to challenge stereotypes of aging; and, for older adults, be a trigger to reflect on and re-evaluate factors that impact health behavior-related decisions.

4.1. Intergenerational Contact: More Than Meets the Eye?

The targeted outcomes of the intervention focused on its ability to positively affect health behaviors (physical activity, sedentary behavior, health-related quality of life) and challenge stereotypes of aging. An increased awareness of physical activity, and indeed inactivity, was observed, along with questioning of existing perceptions, views, and attitudes towards and about older adulthood, with the latter appearing to gain more traction as time progressed. These findings add support to those of previous research, where significant correlations have been found between the frequency of contact per month with

grandchildren and health-related quality of life [16], as well as between the frequency of positive contact and the effect of stereotype threat on cognitive performance [4]. However, it has become apparent that intergenerational contact also has other important benefits. The boundaries of modern families, and the variety of different dynamics, family members, and relationships that may be involved can often complicate or inhibit certain bonds from being established [22]. For the dyad within this case study, participation offered a unique opportunity to build and nurture their relationship.

In Western societies, older adults—and, moreover, grandparents—are not always as revered or valued as they are within other cultures [23]. Children are losing out on the opportunity to learn from the experience, wisdom, and knowledge that older adults have to share [24]. The logistics of establishing the level of confidence and trust needed in another individual to create adequate bonds and appreciate such a privilege could be facilitated by technology, or more specifically, using virtual methods. Digital communication played a significant role in mitigating the negative impacts of physical distancing measures during the COVID-19 pandemic, with higher levels of virtual intergenerational contact noted in older adults regardless of socio-economic factors or perceived technological capability [25]. However, in some situations, this may not be the most appropriate, or preferred, choice. Preferences might be influenced by both individual perceptions and opinions about technology removing the ‘human element’ of face-to-face interactions, resulting in a need for higher quality contact, rather than increases in the frequency or ease thereof, in order to bring about greater gains, as identified in previous research [26]. Indeed, perceptions of how such contact is achieved and what ‘quality’ contact is may vary between individuals and across different geo-cultural spaces; such factors warrant further exploration.

4.2. *Older Adulthood: The Balancing Act*

While later life was previously thought to represent a fixed point of retirement with fewer personal and financial responsibilities, this is now not always the case. For some, it is a time of conflicting priorities, such as the need to remain employed while facing increased caring responsibilities. In the UK, 10% of people aged over 65 years are estimated to still work [27], and in England and Wales, almost 1.3 million people aged 65 years and over are long-term carers—a figure that increased by 11% between 2001 and 2019 [28]. All of these factors may limit opportunities to be active and engage with lifestyle choices that facilitate health and well-being. It has been suggested that caregivers may feel that exercising takes away the energy needed for other activities [29]. In contrast, it has more recently been reported that older adults who gave help to others within the previous 12 months were 2.8 times less likely to be physically inactive [30].

For grandparents, care provision often extends to grandchildren, namely those in the ‘school-age’ group. Interactions associated with the provision of this care have been associated with positive health-related gains, including enhanced psychological status [31] and a better quality of life [16]. Future research needs to consider designing interventions that (i) are flexible and can be incorporated into pre-established daily routines; (ii) embrace and utilize streams of intergenerational contact that already exist; and (iii) provide the older adults fulfilling these roles with a way to intertwine such responsibilities, removing barriers to engagement and participation. The combination of World Walking, interactive technology, and the intervention structure underpinned by Contact Theory [7] used within this study provides one such approach.

4.3. *Moving Together: A Coping Mechanism during COVID-19*

Globally, the restrictions on ‘life’ had a negative impact on both physical activity and sedentary behavior (for a review, see [32]). Another significant issue identified was the correlated implications for mental health [33]. The bi-directional relationship between mental health—either the overall concept, or a specifically defined condition (i.e., depression)—and physical activity and/or sedentary behavior is well established [34]. Engaging in more sedentary behavior and being less active can negatively impact mental health, whilst poor

mental status can lead to being less active and more sedentary [34]. Within this case study, maintaining intergenerational contact and engagement with the intervention not only had a direct impact on awareness of physical activity and sedentary behavior, but also provided a strategy to cope with, and occasionally escape from, the realities of the situation.

4.4. Strengths, Limitations, and Rival Explanations

This research successfully implemented methods to remotely collect data pertaining to intergenerational contact during a period of time when social contact, and the continuation of established research, was extremely limited. Within health-related contexts, case studies are deemed to be an under-utilized resource. This is particularly the case when an enhanced understanding of the mechanisms behind a phenomenon that underpin any observed effects could be vital to the success of long-term implementation strategies [35]. However, the data only being generated from the views and opinions of one intergenerational dyad restricts the wider conclusions that can be drawn; therefore, future research should extend this work to larger-scale studies that include greater numbers and diversity of dyads.

It is also pertinent to note potential alternative or rival explanations. The impact of changing social boundaries during the period of data collection precludes direct comparisons to studies conducted prior to the pandemic or generalizations to non-pandemic populations. During the first two weeks of participation, there were no social restrictions in place, only growing concern and unease over the developing situation. For the remaining ten weeks, only one hour of exercise away from home was permitted, and this had to start and finish at home. Furthermore, from mid- to post-intervention there were changes to the child's home situation that altered the pattern of engagement and intergenerational contact. The observed changes in behavior, particularly for the older adult, could have been secondary to changes in their routine, namely not being able to work, provide childcare, or socialize with friends and family. These changes provided more time and freedom to engage with the intervention. Indeed, it has been found that during the pandemic, despite restrictions, some older adults did maintain [36] or increase [37] pre-lockdown physical activity levels. It is also important to acknowledge that the mid-intervention interviews could inherently be viewed as an additional intervention component that may have had an influence over the behavior of the dyad participants from the mid-intervention time-point, and that the presence of the child's parent during the interviews may have affected the openness of his responses.

5. Conclusions

This instrumental case study presents the findings of a unique data set that, whilst not replicable, provides additional support for the currently limited body of evidence that advocates for the development of intergenerational interventions that target changes in health behavior. Applying the constructs of Contact Theory [7] through virtual methods appears to be a feasible, though not necessarily optimal, way to facilitate intergenerational contact. It provides a way to target health behaviors such as physical activity and, by introducing opportunities to nurture and build relationships, challenge age stereotypes.

Supplementary Materials: The following supporting information can be downloaded at: <https://www.mdpi.com/article/10.3390/jal4030013/s1>, Table S1, Participant inclusion/exclusion criteria; Table S2, Intervention development and structure—Moving Together; Supplementary Material S1, Interview topic and question guide, older adult; Supplementary Material S2, Interview topic and question guide, child.

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