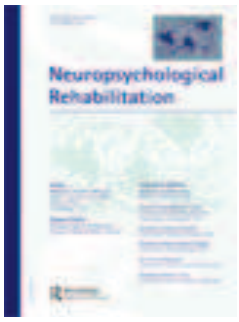

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In-home contextual reality: a qualitative analysis using the Multiple Errands Test Home Version (MET-Home)

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ABSTRACT

Adults with stroke frequently experience executive dysfunction. Despite the range of assessments that examine the effects of executive dysfunction on daily tasks, there remains a paucity of literature that examines the influence of the environment on performance in the community. The MET-Home is an ecologically valid assessment for examining post-stroke executive dysfunction in the home environment. This qualitative study explores the relationship between the environment and MET-Home performance among home-dwelling adults with stroke and matched controls. Using a descriptive qualitative approach, we analysed video, interview, and observation notes from a MET-Home validation study. An overarching theme of *interplay between everyday task performance and the home environment* produced further themes: *naturalistically emerging supports and barriers* and *environment as strategy*. Within *naturalistically emerging supports and barriers*, five contextual sub-themes were discovered: *physical environment*, *social environment*, *temporal context*, *virtual context*, and *personal context*. Within *environment as strategy*, we identified four sub-themes: *reducing distractions*, *using everyday technologies*, *planning in context*, and *seeking social support*. These findings extend the conceptualisation of how we evaluate executive dysfunction in the context of the community to also consider the inherent influence of the environment.

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Introduction

Adults with stroke frequently experience persistent disability which impact engagement in everyday life (Adamit et al., 2015; Schaapsmeerders et al., 2013; Ullberg, Zia, Petersson, & Norrving, 2015). Stroke is one of the leading causes of chronic disability in the United States (Mozaffarian et al., 2015) and adults are frequently discharged home after hospitalisation (Bettger et al., 2015; Dutrieux et al., 2016; Jones et al., 2017). However, persons with stroke may struggle with long-term disability associated with

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neurocognitive impairments such as executive dysfunction. In fact, persons with post-stroke executive dysfunction often experience poor functional outcomes in the context of the community (Motta, Lee, & Falkmer, 2014; Ownsworth & Shum, 2008; Park et al., 2015).

The home environment holds considerable meaning among adults with disabilities (Moloney, 2010; Tanner, Tilse, & de Jonge, 2008). It is comprised of physical and social environments along with cultural, personal, temporal, and virtual contexts that impact participation and performance (American Occupational Therapy Association [AOTA], 2010). Environment and context are critical factors to evaluate with regard to disability and functioning (World Health Organisation [WHO], 2001). Activity limitations and participation restrictions can result from barriers in the environment rather the consequences of the impairments alone (Magasi et al., 2015). Environmental factors that previously may have had minimal influence on performance may contribute to substantial challenges, particularly with regards to environmental demands, supports, and barriers. It is suggested that rehabilitation often perpetuates a deficit-focused approach and lacks consideration of environmental factors – an equally important domain that places external demands on everyday task performance (Magasi et al., 2015). If adults with stroke and executive dysfunction are evaluated without consideration of environmental influence, inherent risks abound in misinterpreting behaviours, lacking consideration of environmental structure and distraction, and developing ineffective treatment plans (Dunn, Brown, & McGuigan 1994; Jackson et al., 2014).

There remains a discord between structured lab-based testing and real-world performance among adults with post-stroke executive dysfunction (Manchester, Priestly, & Jackson, 2004; Morrison, Edwards, & Giles, 2015). One approach to the assessment of executive function in the community is through performance-based assessments which reflect concepts in ecological validity to identify real-world performance problems in naturalistic environments (Burgess et al., 2006; Burns & Neville, 2016; Chaytor & Schmitter-Edgecombe, 2003; Morrison et al., 2015). We posit that post-stroke executive dysfunction is particularly influenced by the external home environment and needs adequate consideration among persons with stroke returning to life in the context of the community. Chaytor and Schmitter-Edgecombe (2003) describe problems with establishing ecological validity in neuropsychological assessments arising from artificial testing environments where well-structured assessments fall short in establishing direct associations with everyday life. Structured testing environments involve limited distractions, one-on-one instruction, prompts and cues, attention to single tasks at any given time, and may not press social cognition (Chaytor & Schmitter-Edgecombe, 2003; Jackson et al., 2014). Generalisation of assessment findings without consideration of environmental/contextual factors is often cautioned because real-world environments have external environmental demands, supports, and barriers that can positively or negatively influence task performance. This is especially true among adults with diminished processing capacity and executive dysfunction (Hayden, Moreault, LeBlanc, & Plenger, 2000).

The Multiple Errands Test (MET; Shallice & Burgess, 1991) is an ecologically valid assessment that evokes skills such as planning, problem-solving, multitasking, and inhibitory control. The MET contains a list of everyday tasks ranging in complexity and constrained by a set of novel rules – all meant to stimulate executive function. A range of environment-specific MET versions have been developed and psychometrically tested in recent years (e.g., Dawson et al., 2009; Morrison et al., 2013; Raspelli et al., 2009).

The MET-Home (Burns et al., in press) was developed to objectively measure the influence of executive dysfunction on everyday task performance in the home environment. Participants with stroke and individually-matched controls completed the MET-Home and a series of assessments during an in-home visit. The MET-Home demonstrated evidence of reliability and validity and differentiates between adults with stroke and matched controls. Specifically, the MET-Home has evidence of internal consistency and inter-rater reliability. Furthermore, the assessment revealed moderate associations with the Delis-Kaplan Executive Function System (D-KEFS) Tower Test rule violations score and Symbol Digit Modalities Test (SDMT) indicating skills such as planning, inhibition of responses, establishing and maintaining an instructional set, and working memory emerge during the MET-Home (Delis, Kramer, Kaplan, & Holdnack, 2004; Smith, 1968). Additionally, the MET-Home demonstrated moderate associations with the Executive Function Performance Test (Baum et al., 2008), another performance-based assessment reflecting concepts of ecological validity. The MET-Home is comprised of a list of 14 everyday tasks ranging in complexity (e.g., watering a plant, locating the cost of a plumbing service call, ordering a pizza) that are executed while adhering to a list of rules which include not entering a room more than once, not speaking to the evaluator, and completing the assessment as quickly as possible without excessive rushing. The assessment is comprised of several sub-scores. Each task is scored as accurately completed, partially completed, or omitted. Other sub-scores include: time, passes, inefficiencies, rule-breaks, and strategies used. For a more comprehensive description, psychometrics, scoring, and the task list, refer to paper describing development and psychometric analysis (Burns et al., in press). The MET-Home is unique because it enables the evaluator to examine the relationship between executive dysfunction, environment, and strategy use on everyday task performance. The assessment is different from other MET versions as it provides an opportunity for evaluators to make qualitative comments regarding how observed environmental/contextual factors support or hinder task performance. The qualitative component of the MET-Home will be used throughout the current study.

Although the MET-Home emphasises the importance of examining the influence of the home environment, little is known about the relationship between the home and everyday task performance among adults with post-stroke executive dysfunction. Clearly, there is a compelling need to understand how the environment influences performance for this population. Therefore, the purpose of this study was to explore how the environment influenced performance using the MET-Home among home-dwelling adults with post-stroke executive dysfunction and matched controls.

Methods

Design

This article presents the qualitative findings from a study examining the psychometric properties of the MET-Home (Burns et al., in press). The current study sought to gain a rich understanding of how the home environment influences everyday task performance among adults with post-stroke executive dysfunction. We approach this aim from an ecological perspective, Person-Environment-Occupation (PEO; Law et al., 1996), that emphasises the dynamic interaction between the person, environment, and everyday task performance (occupation). A descriptive qualitative approach was

utilised for this study which is particularly useful because it enables the researchers to draw from naturalistic inquiry and results are less interpretive than other qualitative designs. Thus, this method provides a candid description of the phenomenon (Lambert & Lambert, 2012).

Participants

Twenty-three adults with stroke and healthy controls matched for age, education, and sex were recruited using purposive, convenience, and snowball sampling techniques. Refer to the development and psychometric analysis paper for full details regarding participant recruitment (Burns et al., in press). All adult participants with stroke were independent prior to their stroke, had no history of neurological impairments or conditions, and had no severe limitation that influenced safety when carrying out the MET-Home. The control participants had similar inclusion and exclusion criteria but were independent with basic activities of daily living (Barthel Index > 90) at the time of the study. Following study protocol approval by the Institutional Review Board, all participants provided written informed consent prior to study participation.

Procedure

The MET-Home was completed during a single visit in participants' homes. Each participant was encouraged to inhabit the home as typical to reflect naturalistic experiences. The MET-Home was administered as part of a series of assessments for the previous psychometric analysis study and MET-Home administration was video-recorded using a structured recording system for consistency with analysis. This involved integrating consistent angles and camera placement for recording performance.

After the assessment was completed, participants answered four post-assessment interview questions: (1) What was your overall impression of the exercise? (2) What was easy about the exercise? (3) What was challenging about the exercise? and (4) Looking back, would you have done anything differently? Answers to the interview questions were accepted and recorded even if participants did not elaborate or provide in-depth responses. For qualitative analysis, interview data were transcribed verbatim.

Data analysis

We analysed MET-Home qualitative data from videos, post-assessment interviews, and the qualitative MET-Home scoring component. Integrating the three data sources contributed to a more comprehensive understanding of performance as it enabled perspectives of environmental influence to emerge from the participants, evaluators, and researchers. Data were analysed independently by two researchers (SB and NP). The researchers read and re-read the transcripts, written qualitative comments from score forms, and viewed video-recordings, taking field notes on initial ideas, interpretations, and decisions. The researchers independently conducted initial coding and engaged in dialogues with other members of the research team which contributed to emergent themes from the data. The conceptual content of identified themes was examined in-depth to ensure that each theme was mutually exclusive. From this analysis, an overarching theme emerged with global sub-themes which describe the interplay of the environment and task performance. The methods followed were consistent with

ensuring trustworthiness and included: maintaining a codebook and audit trail for decisions, triangulation of data sources, and discussions with the larger research team regarding findings and decisions (Creswell & Poth, 2017).

Results

The sample of adults with stroke were classified as mild to moderate stroke severity using the National Institute of Health Stroke Scale (NIHSS; 0–15) (Adams et al., 1999; Brott et al., 1989). A majority of the participants lived with a spouse or family member (87%) while others lived independently. The participants were relatively young and had a mean age of 56.7 (±10.6) in the adults with stroke and 56.3 (±9.9) in the control group. Participant ages ranged from 39 to 86 years.

All participants resided in diverse living situations including apartments and single-family homes in either Dallas-Fort Worth, Texas, Albuquerque, New Mexico, or Phoenix, Arizona. While each home is unique, we found some commonalities emerging from the environment among adults with stroke and the control group. For instance, participants lived in single-storey ($n = 31$), two- and two-plus-storey ($n = 12$), and apartment ($n = 3$) homes. Only three participants lived in rural areas, while the rest resided within the greater metropolitan area for each city. Additionally, the neighbourhoods where each home was situated ranged in socioeconomic and built environment conditions (e.g., pavements, parks, age).

We discovered that although the adults with stroke and matched controls encountered similar supports and barriers in the home environment during MET-Home performance, adults with stroke and executive dysfunction demonstrated significantly greater difficulty with the assessment (Burns et al., in press). An initial analysis of the qualitative data yielded two major themes which were *not* identified *a priori*. An overarching theme of *interplay between everyday task performance and the home environment* produced further themes: *naturalistically emerging supports and barriers* and *environment as strategy*. Within the *naturalistically emerging supports and barriers* theme, five contextual sub-themes were discovered: (1) *physical environment*; (2) *social environment*; (3) *temporal context*; (4) *virtual context*; and (5) *personal context*. Within the *environment as strategy* theme, we identified four sub-themes: (1) *reducing distractions*; (2) *using everyday technologies*; (3) *planning in context*; and (4) *seeking social support* (Table 1). Results are presented thematically with the most prevalent theme appearing first. Commonalities and differences among adults with stroke and the control participants were identified and are presented in each sub-theme.

Table 1. Themes and sub-themes.

Overarching theme: ***Interplay between everyday task performance and the home environment***

Naturalistically emerging supports and barriers: describes how supports and barriers in the home environment facilitated or hindered task performance.
Sub-themes:
1. Physical environment
2. Social environment
3. Temporal context
4. Virtual context
5. Personal context

Environment as strategy: describes how participants used self-generated external strategies in the home to support enhanced performance.
Sub-themes:
1. Reducing distractions
2. Using everyday technologies
3. Planning in context
4. Seeking social support

Interplay between task performance and home environment

The overarching theme, *interplay between everyday task performance and the home environment*, describes how adults with stroke impacted by executive dysfunction interact with the environment to complete the MET-Home. The sub-themes reflect how the environment impacts executive function aspects of task performance.

Naturalistically emerging supports and barriers

Naturalistically emerging supports and barriers is a theme that describes how elements of the environment and context both positively and negatively influence performance. Given the loosely-structured nature of the MET-Home, participants faced ambiguity during the assessment and thus relied heavily on the naturalistic environment. Examples are provided in relation to each of the sub-themes.

Physical environment: The *physical environment* supported and hindered performance in both adults with stroke and matched controls. The most common characteristics of supportive physical environments included: familiarity with the home and minimal distractions and clutter. For instance, one participant with stroke described her familiarity with use of space, "*It was okay because everything was so easy for me, like the cabinets, I keep [my medicines] in a certain place.*" Additionally, the MET-Home score forms frequently listed organised space and minimal clutter as supportive to performance.

Environmental stimuli created challenges for adults with stroke but not for the matched controls which may be attributed to changes in inhibitory control or selective attention. For instance, one participant with stroke was engaged in the plant-watering task; however, when filling a cup with water he had difficulty ignoring irrelevant information, noticed ice in the sink, and attempted using hot water to melt all the ice before moving to the next step of plant watering. Another participant with stroke demonstrated difficulty with vigilance, frequently became distracted with objects in the immediate environment, and initiated dialogues regarding situations that were irrelevant to the MET-Home. Clutter and object distractions were not a problem for everyone. In fact, several participants with and without stroke had several potentially distracting objects in their space but were still able to carry out MET-Home tasks accurately.

Adults with stroke experienced greater difficulty with accurately completing MET-Home tasks due to barriers in the physical environment. For example, some of the participants with stroke lived alone and had physical involvement preventing safe mobility. The qualitative MET-Home component frequently showed that participants with stroke had trouble with accessibility, primarily emerging with using the stairs or entering the garage.

Each person had expectations about where to locate specific items in their home. Adults with stroke more frequently encountered challenges when others re-organised the physical space or initially organised space if moving to a new residence after the stroke, typically to support transitions from hospital to home. This is a particularly important consideration when understanding predictive environments that support behaviour. One participant omitted a MET-Home task and stated, "*I'm thinking about [locating] the bandage because I have no idea where that stuff is. My mom is the one who put all that stuff up.*" Other participants seemed frustrated when items were moved from familiar spots. One husband and wife couple who both independently participated in the assessment had difficulty locating a hammer. They each looked under the sink to locate the item and realised their adult son had re-organised the space. Moved items were encountered less frequently by control participants, likely because

they did not have recent extended hospitalisations. Although this occurred in some households, a majority of participants with stroke commented about how the familiarity of their home supported MET-Home performance.

Social environment: The *social environment* includes the availability of individuals including spouses, children, and paid caregivers in the home and was frequently used by adults with stroke and matched controls. The social environment surfaced as a support to performance by others in the home independently initiating the provision of assistance. Others in the home occasionally assisted participants with stroke without the person with stroke initiating the request. This was not observed in the control participants. One example of others emerging to support performance presented when a participant was moving a suction grab bar on the counter to support his balance. His wife noticed he was struggling, entered the kitchen, and provided verbal guidance and physical assistance for carrying out the task. The couple later explained that they perform most tasks concurrently since the stroke, and the participant's wife mentioned that it was difficult for her "*not to step-in and assist*."

While the social environment was often viewed as supportive, social distractions also appeared in the home. Some participant's families were in common areas; however, most family members chose to isolate themselves away from the testing scenario, not surprising given the context of a testing visit. Those family members who remained in the testing environment either attempted to keep distance or contributed to environmental distractions. One of the control participants had several auditory distractions from his children playing in the background; however, he could filter irrelevant information and selectively attend to each task. Thus, the distractions did not seem to impact his performance because he completed all of the tasks accurately and had minimal rule breaks on the quantitative assessment component. Another participant resided with his mother after his stroke. During the assessment, he seemed to attempt to filter out his mother's comments and conversation but it was unclear if this type of distraction influenced his performance as he purposefully attempted not to engage in the conversation.

Pets are a component of the social environment and seemed to be a major distraction for the adults with stroke only. One participant with stroke gave her pet a treat from the refrigerator as a reward during the assessment while others encountered challenges with safe functional mobility. Another participant with stroke attempted to carry out a task but had to call to her dog several times before he would move, distracting her from the associated MET-Home task. While carrying out a task she said,

> *Look out Benji, Benji move, move Benji, move, move. This is my challenge every day! I don't want him to trip me. Look out, move, move, move, move Benji. When you're walking and he stops constantly … you could trip over him if you're not watching him at all times.*

Another participant with stroke attended to her cat's needs during the assessment where she stopped the assessment momentarily to pet the cat and filled up her food and water bowl. During the interview, she commented on the assessment,

> *… it's stuff I do pretty much on a daily basis so it's easy for me to see how and what order I want to do [the tasks] in. The only hard part is avoiding the cat, but that's on a daily basis, she follows me everywhere.*

Temporal context: The *temporal context* is related to time use or sense of time. We found that adults with stroke demonstrated less press for maintaining the time constraints associated with the MET-Home. For instance, one participant decided to write a follow-up email on her computer to the service call task she carried out prior.

Other participants with stroke also demonstrated less press to maintain temporal constraints and efficiency instructions. Another example that emerged was with a participant with stroke who halted MET-Home performance mid-way through the assessment to answer a phone call. Although this can be viewed as a typical interruption to everyday task performance, not all participants had interrupted performance. For instance, one MET-Home score form stated, "*received text messages but ignored for the most part*." Control participants who received phone calls during task performance tended to ignore the incoming call or answer and quickly respond that they would return the call at a later time.

Virtual context: The *virtual context* is related to technology use. Analysis revealed that while adults with stroke and matched controls used everyday technology (i.e., smartphone, telephone, computer, alarm clocks, egg timers) to support MET-Home performance, adults with stroke who experienced technology challenges had more difficulty completing tasks and problem-solving technology errors. For example, one participant with stroke used her smartphone to locate information for plumber and pizza price quotes but struggled with navigating the internet and websites. During the post-assessment interview, she said, "*calling the pizza place was a pain in the [explicit], so was calling a plumber … I mean, once I got them on the phone they were great and easy to handle*." Another participant with stroke told his wife that he could not use his voice-activated phone programme to get information because the internet was down. She attempted to talk him through steps and then eventually plugged in his phone so he could carry out the task as he typically would. An additional participant with stroke also had tremendous difficulty carrying out tasks on his phone. On two separate occasions, he retrieved his mobile phone to look up information but accessed his picture gallery, scrolled within the pictures, and seemed to have forgotten his initial intention.

Although control participants also encountered challenges with everyday technology use, they seemed to be better able to problem-solve the associated challenges. For example, a control participant reported her experience with internet connectivity. Upon reflection, she stated, "*my internet isn't working [consistently] right now so that was challenging. I had to unplug and re-plug in [the wifi] to get it to work*." Another control participant experienced issues with the internet search on her desktop computer and decided to use her mobile phone phonebook to look up a frequently used pizza delivery service instead. During the post-assessment interview, she stated,

> *The ease [of this exercise] is that [the tasks] are everyday things, but then there are the little glitches that happen. Like you know for some reason [my internet] wouldn't pull up the [business] phone number. But you know, it gives you a true-to-life problem-solving [experience] …*

While the adults with stroke more frequently encountered technology problems resulting in omitted or partially completed tasks, it is important to note that adults with and without stroke both had difficulty with technology use. This is noteworthy because even though persons with stroke may experience challenges operating technology, this may also be the case in neurologically healthy adults that either have limited use of or experience with technology. One participant explained her challenge would have been experienced prior to her stroke,

> *… I'm just not very technologically savvy and so it takes me a minute just to figure out what's the easiest way to get that information. I really had a pretty close figure in my head [for the cost], but I assume that [as] part of the task … you wanted me to do it on the internet. So, that's … probably the trickiest, 'cause it doesn't come naturally to me, but it didn't before the stroke either!*

Personal context: The *personal context* explains the unique experiences that surround each person. We found that while the sample of adults with stroke had *mild to moderate* stroke severity, this group seemed to experience greater challenges within the home environment than the control participants. Many adults reflected on changed abilities since the stroke and discussed how this contributed to difficulty with the MET-Home and everyday life. For instance, one participant with *mild* stroke said,

> *Numbers are a problem and I don't do a lot of calling, I mainly receive calls. I really don't [have] a lot of phone activity aside from listening to music because my speech has been impeded and my conversations are not up to par in my own opinion. So, I think the [task to call] businesses is the most complicated.*

Additionally, several adults with and without stroke felt confident with their performance. A sense of empowerment emerged for many participants with stroke who completed the assessment. Participants repeatedly reflected on their familiarity of the space and how it contributed to re-establishing their life. One participant with stroke stated,

> *It was reassuring, it was very easy, and the instructions were very clear. I'm very happy I'm familiar where everything is in my house, particularly when I was first home. It was very, very helpful in making me feel safe and secure around my environment and now it's just very common place so it's good.*

Environment as strategy

Environment as strategy, describes how participants used self-generated external strategies in the home to support enhanced performance. The primary contextual strategies that seemed to support performance emerged from the evaluator score forms and video-recorded performance. Typical exemplars of using environment as strategy included reducing distractions, using everyday technology, planning in context, and seeking out others in the social context for support.

Reducing distractions: Some participants *reduced distractions* by turning off the television, while others shut doors to create a barrier from distractions abounding from other rooms (e.g., family conversations). Several participants seemed to recognise limitations associated with environmental distractions. Adults with stroke and controls took steps to reduce distractions in the environment such as turning off televisions and asking others in the home to move or remain quiet. Some participants in both groups did not attempt to reduce this type of distraction but it is unclear whether or not this influenced performance.

Using everyday technologies: Another example of using the environment as strategy is the *use of everyday technology*. Participants frequently used mobile devices to access information, complete tasks, and self-monitor. Voice-activated features such as the iPhone's Siri and Android "Ok Google" were frequently used to locate information and set alarms. Other participants had smart-home technologies linked to their mobile devices and were able to complete multiple tasks with the press of a button. One participant stated, "*for one, I got my temperature inside my house off of it. Yeah, I mean, if it could've found socks for me, I might have not had to even do this*" when describing his approach to completing one of the tasks while attempting not to return to a room more than once. Another way everyday technology was used as a strategy was with setting alarms. Participants used a range of devices to set alarms to support tasks with prospective memory components.

Planning in context: Another finding within environment as strategy involved a high degree of spatial planning. While this is also a skill, *planning in context* seemed to emerge with how participants conceptualised the task and rule list. One participant with stroke stated,

> *Well, as you can see, I learned this [approach] down at rehab. Try to get things you need along the way. Don't go making yourself insane by going here, there, and yonder. Get it in your mind what needs to be done and do several things on the way to getting it done. It's something I've been practicing all my life since the stroke.*

Another participant with stroke agreed and described a change he would make when planning in context,

> *I'd probably get better organised about it. I'd put all the kitchen things next to them before I started, and then all I need to do in the bedroom which is where the medicine cabinet and socks are, and I kind of had that in my head but I didn't actually write it out. Yeah, I had a mental plan that works, but I would've written it down where I was gonna go and do this again.*

Seeking out social support: Lastly, participants with stroke sought out assistance from person-supports to support MET-Home performance. The MET-Home rule break of not entering a room more than once was often prevented by asking others in the home for instrumental support. A common example of participants using person-supports as a strategy involved asking family members to locate and give items to the participant. Identifying opportunities to integrate the social environment as a strategy seems to support performance for both adults with stroke and controls participants.

Discussion

The MET-Home was designed to reflect real-world experiences with the use of everyday task demands in a naturalistic environment to examine the effect of executive dysfunction in the home. In our initial study, we found that adults with stroke and matched controls demonstrated significant differences in MET-Home performance (Burns et al., in press) and realised the performance problems may have been partially related to both traits within and interaction with the environment/context. The interplay between everyday task performance and the home environment was dynamic and multifaceted among participants. Understanding environment as strategy and the influence of the environment, structure, and distraction on everyday task performance is a critical component in the development of intervention plans to support home and community integration.

Our study revealed that both adults with stroke and matched controls encountered similar traits in the environment that positively or negatively contributed to MET-Home performance. First, the physical and social environments emerged as major sub-themes that both supported and hindered performance. In particular, distractions in the physical and social environment contributed to performance challenges on the MET-Home. In previously reported findings, we found the MET-Home demonstrated moderate correlations with the D-KEFS Tower Test Rule Violations score which is indicative of challenges with self-monitoring and inhibition (Burns et al., in press; Yochim, Baldo, Kane, & Delis, 2009). We found that the home environment contained stimuli, that for some, may have activated urges that did not fit the objectives for MET-Home. Although we did not compare these qualitative findings with the scores from the quantitative study, our results suggest environmental distractions may negatively contribute to

MET-Home performance. Jackson et al. (2014) suggest that adults who are susceptible to distraction or those with impulsive behaviours may benefit from structured environments where less complex and competing information is present.

Participants with stroke in our study seemed to demonstrate poorer performance when the environment was modified or re-organised upon return home after hospitalisation. Participants expressed their frustration when they were unable to locate items and their space was no long familiar. Although future research is needed to more closely examine this potential problem, it seems that a potential intervention may be to educate family members or caregivers of adults with stroke on potential problems with re-organising space.

The influence of structure is widely integrated in clinical settings but understudied in community environments for adults with stroke and residual executive dysfunction. Scaffolding is a component of structure which includes using supports and aids in the environment to support task performance (Jackson et al., 2014). First, we found that person-supports in the social environment both naturalistically emerge and are used as an external strategy to enhance task performance. Similarly, Bottari, Shun, Le Dorze, Gosselin, and Dawson (2014) identified a self-generated external strategy of seeking cues from the social environment in an unstructured shopping experience in the community among adults with brain injuries. The MET-Home did not limit the role of family members or care partners during performance, but instead, accounted for unique supports that may best reflect true-to-life functioning. Co-occupation is a concept abounding from the occupational therapy literature that describes shared engagement in everyday tasks that involves shared aspects of physicality, emotionality, intentionality, and meaning (Pickens & Pizur-Barnekow, 2009). A compelling finding from this study was the role that family members and care partners played in the social environment. The concept of co-occupation emerged in both the adults with stroke and matched controls indicating that the social environment is an inherently important consideration during assessment. The role of social supports in stroke outcomes in the context of the community is gaining traction (e.g., Kruithof, van Mierlo, Visser-Meily, van Heugten, & Post, 2013; Northcott, Moss, Harrison, & Hilari, 2016; Villain, Sibon, Renou, Poli, & Swendsen, 2017) and may be an especially important concept among adults with post-stroke executive dysfunction.

The virtual context emerged as a major sub-theme and can also be used to support performance. However, difficulty with scaffolding aids such as mobile phones and alarms which emerged in the virtual context, seemed to impact performance. Nygård, Kottorp, and Rosenberg (2015) define everyday technology as items such as mobile phones and computers used in homes and communities. Everyday technology use can be particularly difficult after stroke for various reasons and difficulty with everyday technology is associated with limitations in activities of daily living (Lund, Nygard, & Kottorp, 2014). Our findings suggest both adults with stroke and matched controls use a variety of technologies to support MET-Home performance; however, they may also encounter challenges using everyday technology that hinders task execution.

The MET-Home is dissimilar from other MET versions because it integrates a qualitative component where the evaluator is prompted to comment on environmental/contextual influence on performance. This added component proved fruitful and provided important details that exemplified true-to-life experiences in the home environment. Although each home was unique, we found environmental/contextual similarities that emerged to support or hinder performance through our in-depth

analysis. Future iterations of the MET-Home may benefit from adding a structured approach for identifying how the environment influences performance. Additionally, other MET versions may benefit from incorporating a qualitative component that can supplement findings with a more comprehensive interpretation of true-to-life environmental influence.

Limitations

It is important to note that the sample size was relatively small and constrained to the Southwest United States. This is a limitation because the participants, homes, and cultures may be unique compared to varying regions in the United States and other countries. Future studies should examine the potential for executing the MET-Home task list and influence of unique home environments in varying areas beyond the Southwest United States. The findings of this study specifically address environmental factors that arise during a single performance-based assessment. It is important for other studies to explore naturalistic strategies and environmental factors and structure in the home through other methods of inquiry to understand environmental influence on everyday task performance for adults with stroke and executive dysfunction. Additionally, the data used in this study were not collected to answer this qualitative research question, and thus this study has a lack of authenticity. The authors who analysed the data have a strong interest in environment/context and despite attempts to bracket potential bias and integrate techniques for authenticity and auditability, it is possible that their environmental lens influenced the findings.

Conclusion

The MET-Home is an in-home assessment that facilitates understanding the influence of executive dysfunction on everyday task performance in the home for adults with stroke. The results of this study are an initial step in understanding the influence of the naturalistic home environment with everyday tasks among adults with post-stroke executive dysfunction. Our analysis revealed a compelling interplay between environment and MET-Home task performance among adults with post-stroke executive dysfunction and matched controls. The integration of ecologically valid assessments with environmental consideration is warranted to extend the understanding of environmental influence on complex or novel task performance that occurs in the lived environment.

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