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Suitability of Public Use Secondary Data Sets to Study Multiple Activities

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Purpose of the Study: The aims of this study were to inventory activity items within and across U.S. public use data sets, to identify gaps in represented activity domains and challenges in interpreting domains, and to assess the potential for studying multiple activity engagement among older adults using existing data. ***Design and Methods:*** We engaged in content analysis of activity measures of 5 U.S. public use data sets with nationally representative samples of older adults. Data sets included the Health & Retirement Survey (HRS), Americans' Changing Lives Survey (ACL), Midlife in the United States Survey (MIDUS), the National Health Interview Survey (NHIS), and the Panel Study of Income Dynamics survey (PSID). Two waves of each data set were analyzed. ***Results:*** We identified 13 distinct activity domains across the 5 data sets, with substantial differences in representation of those domains among the data sets, and variance in the number and type of activity measures included in each. ***Implications:*** Our findings indicate that although it is possible to study multiple activity engagement within existing data sets, fuller sets of activity measures need to be developed in order to evaluate the portfolio of activities older adults engage in and the relationship of these portfolios to health and wellness outcomes. Importantly, clearer conceptual models of activity broadly conceived are required to guide this work.

Key words: Activity, Secondary data sets, Measurement, Content analysis

Scientific interest in activity engagement by older adults has expanded in recent years as researchers have sought to better understand the range of activities older adults engage in and the impact of activity engagement on outcomes such as health and wellness, quality of life, and life satisfaction. However, despite the increased scholarship in the area of activity, there has been less attention to defining what activity means conceptually. This includes determining what counts as an activity—for example, is it anything a person does with his or her time? Additionally, the measurement of different types of activities (e.g., physical, social, psychological, and economic) and knowledge about how to use multiple activity variables in statistical models are both underdeveloped. In general, researchers target a single domain of activity, like physical activity, volunteering, caregiving, employment, or social activities, despite the fact that older adults can and do engage in multiple activities on a daily basis and at any one time. Research also tends to exclude categories of time use that have not traditionally been thought of as activities, but that can consume significant amounts of an individual's time, such as attending medical appointments and

engaging in household chores. Moreover, the relevance of intensity of participation—for example, the difference between involvement and engagement in activities and roles (James, Besen, Matz-Costa, & Pitt-Catsouphes, 2012)—is not always considered in analysis of activities, yet may be important for understanding how individuals balance engagement in multiple activities.

Improving the ability of researchers to study multiple activity engagement can help to generate greater understanding that helps both to clarify the complex relationships between activity and health and wellness outcomes and to better define activity itself. To help move this work forward, we undertook an informed assessment of what our current data resources are for studying multiple activities. We present our study findings here.

Rationale for Assessing Data Resources for Studying Activity

Moving toward understanding activity in a more complex way is supported by continued calls to facilitate healthy and positive aging through public health initiatives and evidence-based practices (U.S. Department of Health & Human Services, 2012; United Nations, 2002; WHO, 2007). The growing body of research literature on specific types of activities have included studies on social engagement, work, caregiving, volunteering, religious activity, leisure, and physical activity and their relationships to health, cognitive function, functional status, and mortality (Buchman, Wilson, & Bennett, 2008; Glass, De Leon, Bassuk, & Berkman, 2006; Hong & Morrow-Howell, 2010; Janke, Payne, & Van Puymbroek, 2008; Karp et al., 2006). In general, activity participation has been linked to positive outcomes (Chipperfield, 2008; Hong & Morrow-Howell, 2010). However, certain activities, like caregiving or employment under certain conditions, have been associated with negative outcomes (Adams, McClendon, & Smyth, 2008; Son et al., 2007). In several studies, older adults themselves have expressed the idea that engagement in activities, from personal hobbies to productive work roles, is vital in the pursuit of a good old age (Bowling & Gabriel, 2007; Clarke, Liu-Ambrose, Zyla, McKay, & Khan, 2005).

Researchers have found that motivation (Holahan & Suzuki, 2005), higher levels of perceived control, self-esteem, efficacy (Bailis, Chipperfield, & Helgason, 2008), and social support (Wilson & Spink, 2006) are all important positive correlates of individual activity engagement, as are the contexts in which activities are undertaken, including neighborhood characteristics (Mendes de Leon et al., 2009). Lower levels of formal education (Shaw & Spokane, 2008), presence of disease diagnosis (Ashe, Miller, Eng, & Noreau, 2009), and greater fear of falling (Deshpande et al., 2008) have also been related to reduced activity engagement.

Within the body of research on activity and older adults, measurement of activity contains tremendous variation, due in part to the lack of strong conceptual models of activity that are broadly defined. In our review of the public health, gerontology, rehabilitation, and related literatures, we identified three main issues that stymie the development of knowledge related to activity. First, operationalization of specific activity domains is inconsistent across studies. For example, physical activity has been evaluated as a specific single item, like walking (Nagel, Carlson, Bosworth, & Michael, 2008), and as a composite ordinal scale of physical activities that comprise basic activities of daily living (Peri et al., 2008). Second, data collection methods vary widely depending on the aims of the study, producing findings that are difficult to compare or assess. Staying with physical activity, data collection modalities range from self-report in activity diaries (Atienza, Oliveira, Fogg, & King, 2006) to actigraphs (Chipperfield, 2008) and accelerometers (Bailis, Chipperfield, Perry, Newall, & Haynes, 2008), which electronically track physical activity. Third, single activities or domains, like physical activity, are generally not reviewed within the context of larger activity patterns, making it difficult to understand how participation in a given activity domain relates to participation in other domains (e.g., physical activity, volunteering, providing social support, and work) or how such participation collectively supports larger health and wellness outcomes. Of the few studies we found that considered multiple activity engagement, results indicated that when a broad set of activity items were reduced into composite domains, patterns in activity were evident (Burr, Mutchler, & Caro, 2007). Using this approach, analysis of antecedents and outcomes of activity patterns on areas of health and wellness, including incidence of dementia (Paillard-Borg, Fratiglioni, Windbald, & Wang, 2009) and depression (Arai et al., 2007) have been studied.

We believe that to efficiently and effectively advance research on activities and older adults, better approaches to conceptualizing, measuring, and analyzing activities must be developed. The

projected scope of this work is large and involves several components, including (a) improving the conceptual specification of activity, (b) identifying existing measures of activity, (c) assessing measurement properties, and (d) evaluating the use of a collection of activity measures to investigate multiple activity engagement. The analysis we present in this article addresses the second component listed earlier, completing a partial inventory of activity measures available. We premised our work on a broad model of activity and contributors to activity, as described subsequently.

Theoretical Context for Understanding Activity Engagement

A broad look at nearly 50 years of theoretical work on activity and aging shows that interest in activity has fluctuated over time and has somewhat paralleled pathways of empirical research. Havinghurst (1957) first formalized Activity Theory in 1957, and since then, activity has been included either directly or indirectly in a host of significant conceptual models of aging. A recent and global framework of activity receiving widespread attention is the WHO's (2007) model of Active Aging, the centerpiece of its agenda for healthy aging. Although it does not explicitly address the paradigms of successful aging (Rowe & Kahn, 1998) or productive aging (Butler & Gleason, 1985), the WHO's model does posit six determinants of activity engagement—all of which are influenced by culture and gender—that result in active aging. There are three individual-level factors: personal, behavioral, and social determinants; this is consistent with socioemotional selectivity theory (Carstensen, 1992; Hendricks & Cutler, 2004). Also, there are three structural-level factors—the physical environment, economics, and health and social services—that align with public health frameworks, like the social model of disability put forth in the International Classification of Function (WHO, 2007). "Active ageing" is defined as the optimization of "opportunities for health, participation and security in order to enhance quality of life as people age" (WHO, 2007). The Active Ageing Framework guides WHO's global age-friendly communities initiative and is based upon the United Nation's 2002 Madrid International Plan of Action on Ageing (United Nations, 2002).

We propose that the concept of active aging implies engagement in multiple domains of activities simultaneously, which requires greater understanding of a person's activity portfolio. We distill the idea of an activity portfolio from Birren and Feldman's (1997) larger concept of a life portfolio, a tool for individuals to plan and review life investments. In its broadest sense, an activity portfolio would be composed of things a person does or spends time doing, ranging from sleeping to thinking to exercising. In a more focused approach, an activity portfolio might have domains that are evaluated for their relevance in understanding health and wellness outcomes.

Our ability to assess multiple activity engagement and activity portfolios using existing data sets, however, is limited to the availability of activity measures in these data sets. To begin the process of determining the range and scope of measures available to researchers, we completed a content analysis of activity measures in five U.S.-based public use data sets commonly used to study older adults. Our aims were to inventory discrete activity measures and group them into conceptual domains representing areas of activity engagement. Through this qualitative review, we intended to identify potential gaps in activity domains, to understand challenges in interpreting measurement domains, and to assess data set potential for advancing research on activity and activity patterns and portfolios among older adults.

Design and Methods

Our analysis was guided by these research aims: (a) To determine the number of activity-related variables in the sample of secondary data sets, (b) to determine for each data set whether discrete activity variables can be grouped into cogent conceptual domains, (c) to identify gaps in activity domains and challenges in interpreting domains, and (d) to determine which of the data sets assessed seemed most appropriate for pursuing analysis of activity patterns and portfolios in future research on activity and older adults.

Sample

We selected public use data sets readily available and regularly used by gerontology researchers. Criteria for initial data set selection were: self-report survey, nationally representative population of the United States, inclusion of older adults (65+), and survey content covering at least one area of activity recognized in the literature (e.g., physical activity and volunteering). Our initial sample included nine data sets: the Health and Retirement Study (HRS),

Americans' Changing Lives Study (ACL), Midlife in the United States (MIDUS), National Health Interview Survey (NHIS), Panel Study of Income Dynamics survey (PSID), American Time Use Survey (ATUS), Behavioral Risk Factor Surveillance System (BRFSS), American Community Survey (ACS), and Longitudinal Studies of Aging (LSOAs). From this sample, we chose five longitudinal data sets (HRS, ACL, MIDUS, NHIS, and PSID) that contained similar measures of physical and emotional health for purposes of modeling outcomes of activity participation. Descriptions of these are presented in Table 1. Three data sets (ATUS, ACS, and BRFSS) were excluded because data are cross-sectional only. LSOAs were excluded because the sample starts at age 70 and limits assessment of activity at younger ages. To meet our research aims, we reviewed the two most recent waves of data collected at the time of our analysis. Earlier waves of some data sets may be reviewed in future analyses to better understand longitudinal patterns of activity engagement.

Measures

For the purposes of this study, we intentionally defined activity broadly, and we did not select measures using an existing theory or model of activity. Instead, we wanted to identify the widest universe of activity measures without prejudice and to determine a data set's potential to inform subsequent analyses of multiple activity engagement. Although we understand the relevance of existing conceptual schematics of participation to the project, including the International Classification of Function (WHO, 2001), we determined not to make this link for this analysis.

Based on this approach, we devised a simple test to identify an activity measure. First, we determined whether the intent of a survey item was to inquire about "doing" something, regardless of how it was phrased. This is in comparison to inquiring about feeling, thinking, believing, having, getting help with, or similar question stems. Second, if it seemed a survey item was about "doing," we tested our assessment by rephrasing the survey question to see if it was possible to reword it as "do/did you do X" or "how much/often do you do X?" If it was not possible to rephrase the measure into either of these two ways, we determined it was not an activity measure. Third, we reviewed the time period of the activity. If the question was about whether an activity was done or not within the standard look-back range of the survey (e.g., the HRS inquires about activities done the year of the survey and the year prior), we included it. If the question asked "did you *ever* do X. . .," but did not ask when that activity was done, we logged it in our notes but excluded it from the analysis because we could not assign it a specific temporal frame that would permit it to be analyzed as part of an activity portfolio that included measures with the same look-back period. Measures that asked about the experience of doing the activity (e.g., where/when the activity is done, effort required to complete the activity, or any other description of the activity or the context within which it was performed) were also noted in our logs but not included in the analysis. In sum, inclusion criteria required that it was possible to recode the measure into either a binary or ordinal variable that could be empirically assessed to indicate whether a person was doing an activity or not.

Data Collection and Analysis

We selected content analysis as a method of data collection and analysis because of its suitability for reviewing discrete items systematically and reporting findings of counts, categories, and subdomains (Krippendorff, 2004; Neuendorf, 2002). Data collection involved identifying all activity items within the five data sets (ACL, 1994, 2002; HRS, 2007, 2009; MIDUS, 1994, 2004; NHIS, 2009, 2010; PSID, 2007, 2009) and data collection waves listed in Table 1. Data analysis involved sorting measures into categories and generating descriptive statistics (Elo & Kyngäs, 2008). Reliability was based on intercoder agreement (Burla et al., 2008). Our analysis met four primary standards of rigorous content analysis including purposive sampling of a defined population (publicly available secondary data sets with nationally representative samples of older adults), variable selection based on past research or theory (activity domains and measures), defined medium of review (electronic files), specific research aims (Aims 1 and 2 above), and operationalized definitions of critical analysis variables (activity measures are defined in Measures section earlier).

In Part 1 of the content analysis, two reviewers compiled lists of all activity-related variables in each wave of the data set under review and then grouped them into general domains according to like variables. They assigned each survey item to only a single domain. For survey items with a single root question, all subquestions (e.g., 20, 20a, 20b, 20c) were reviewed as individual variables. Only

Table 1. Summary of National Survey Data Sets Evaluated

Data set and survey purpose	Data waves collected	Data collection	Sample age parameters	Sample size and unit
ACL Explores the role of psychosocial and economic factors over the adult life course in health and function outcomes.	Panel data: 1986, 1989, 1994, 2002 (study closed)	Face-to-face interviews	Age stratified: 25 years and older	Individuals: 1986: 3,617 1989: 2,867 1994: 2,562 2002: 3,617
HRS Explores changes in labor force participation and health transitions toward the end of work lives and after.	Panel data: Biannual 1992–2010 (ongoing) Additional off-year studies including activity supplements.	Face-to-face interviews	Age stratified: 50 years and older	Varies by year. In 2010, 15,372 individuals, 10,754 households.
MIDUS Investigates social, behavioral, and psychological factors in accounting for age-related variations in health and well-being.	Panel data: 1995–96 2004–2006 (Wave III pending*)	Telephone interview, mailed questionnaire	Age stratified: 25–74 years	Individuals: 1995–1996: 7,108 2004–2006: 4,963
NHIS Monitors U.S. population health.	Cross-sectional, annual: 1957–2012 (ongoing)	Face-to-face interviews	Age stratified: children and adults	Varies by year. Estimated in 2011 to be 87,500 individuals, 35,000 households.
PSID Explores socioeconomics and health over the life course and across generations.	Panel data: 37 Waves 1968–2011 (ongoing)	Face-to-face and telephone interviews, social security, and census data	Age stratified: children and adults.	Varies by year. In 2009, more than 24,000+ individuals and 8,500+ families.

Note: *MIDUS Refresher data collection in 2012 will replenish the sample with new members; MIDUS III data collection begins in 2013.

questions pertaining to the individual respondent (i.e., "did you. . .") were counted; those that asked the respondent to provide a proxy respondent for a spouse or other individuals were not evaluated. Thus, within surveys that collect data on multiple members in a household, like the PSID, we examined only items related to the primary respondent to standardize comparisons across surveys. In surveys with skip patterns (e.g., "if yes, go to. . ." and "if no, skip to. . ."), we counted all questions in the "yes" pattern in order to capture all of the activity measures under a single question line. Surveys that sought to validate responses by asking multiple questions about the same activity were noted in our data files, but these items were not multiply counted. In the age-stratified data sets, we did not select any questions related to activity that were asked of younger adults but not asked of older adults.

In Part 2, findings from each data set were reviewed in a series of conference calls with four researchers and discussed until agreement was reached regarding inclusion or exclusion of activity items for each wave. The researchers simultaneously engaged in review of categorization of individual items into conceptual domains. During this review process, we recorded decision rules for identification of activity items and definitions of categories and established guidelines for categorizing measures into conceptual domains. We added and further refined rules throughout the process. After a final rule book was established, we retroactively applied all rules to each wave of each data set and completed a comparative review of its application by two researchers. Any discrepancies in application of the final rule set were discussed until agreement was reached.

Results

Table 2 presents the 13 domains identified in the analysis and their definitions. Findings for research

Table 2. Activity Domain Names and Definitions Schematic

Activity domain name	Domain definition
A. Employment activities	Activities related to paid work, full or part time.
B. Health risk behavior activities	Activities that increase risk of disease or injury (e.g., smoking, alcohol consumption, and drug use).
C. Basic living activities	Activities that are routine and related to regular function (e.g., sleep, grooming, and sexual engagement).
D. Civic activities	Activities that require individuals to actively participate in formally organized events, meetings, programs, or events (e.g., volunteering and going to meetings or clubs).
E. Leisure activities	Activities done by choice during an individual's free or discretionary time (e.g., reading, watching TV, listening to music, dining out, and attending lectures). In this analysis, leisure does not include activities specified in other domains, like physical activity, although some people may view these as leisure.
F. Household chore activities	Activities done to as part of personal and household administration, maintenance, and improvement (e.g., preparing meals, cleaning the home, taking care of pets, maintaining the yard, and fixing an automobile).
G. Helping others' activities	Activities that have, as their main purpose, providing informal assistance to other individuals including family members, friends, and neighbors (e.g., providing emotional support, running errands for others, and providing assistance with household chores or transportation).
H. Religious activities	Activities that are related to religious engagement (e.g., attending a service, praying, or meditating).
I. Interpersonal exchange activities	Activities that involve person-to-person contact as the primary mode of the action (e.g., visiting neighbors, telephone conversations, showing affection, and e-mailing friends or family).
J. Help-seeking activities	Activities related to obtaining assistance or support for physical or mental health or other care needs (e.g., going to see a doctor, attending a support group, seeking professional assistance in a community or hospital setting).
K. Physical exercise activities	Activities related to physical exercise (e.g., walking, participating in sports, gardening, and light housework).
L. Financial management activities	Activities related to household fiscal administration and personal money management (e.g., paying bills, managing financial accounts, and managing medical expenses).
M. Computer activities	Activities related to general computer use (e.g., sending e-mails and searching the internet) that are not otherwise identified as having an explicit purpose, such as e-mailing a doctor or a family member.

aims 1 and 2 are reported in Table 3, which presents numerical counts of measures by domain and data set wave. The number of activity measures identified across the five data sets ranged from 39 (HRS 2009) to 109 (MIDUS 1994, 2004). The two data sets with the most domains were MIDUS (n = 12) and HRS (n = 12). Employment/paid work and physical activity were the only domains present in all five data sets. Health risk behavior activities were present in four of the five data sets.

The number of measures that are the same across waves of a data set is also reported by domain in Table 3. In most cases, the survey measures across waves are identical. In others, the wording may be slightly different (e.g., ACL 1994: "Including paid vacations and sick leave, how many weeks altogether were you employed during the past 12 months?" and ACL 2002: "How many weeks altogether were you employed during the past 12 months, including paid vacations and sick leave?"). Survey items that address similar concepts but either have distinctly different wording that changes the focus of the question or include different examples of activities were not counted as being the same (e.g., MIDUS 1994/95: "During the summer, how often do you engage in moderate physical activity [e.g., bowling or using a vacuum cleaner?]" and MIDUS 2004–2006: "How often do you engage in moderate physical activity, that is not physically exhausting, but it causes your heart rate to increase slightly and you typically work up a sweat? [Examples leisurely sports like light tennis, slow or light swimming, low-impact aerobics, or golfing without a power cart; brisk walking, mowing the lawn with a walking lawn mower]."). Additional details of the data analysis not presented in this article are available from the authors.

Limitations

Limitations for this analysis included a small sample size and our assessment of only 2 years of survey instruments. We recognize that our coding of some items as activities (such as health risk behaviors) may be questioned, but we believed it was important to include them in this initial activity item review. Despite these limitations, we find that the content analysis provided the benefit of creating a replicable example of assessing activity items within secondary data sets that could be applied to other surveys. It also yielded a broad range of activity domains for consideration in empirical work.

Discussion of Findings

Results from our analysis showed that each data set contained multiple activity domains. Although no data set contained all of the identified domains, HRS and MIDUS contained most of them. Within each data set we reviewed, the number of activity items per domain varied. The specific activity items within domains also differed across data sets. Moreover, in cases where similar activities were inquired about (i.e., volunteering), often the measures themselves were not the same across data sets. One reason that there might be more activity items in a particular domain may be extensive triangulation of information in some data sets, such as the PSID, which rigorously measures employment so that fluctuations in employment and employment trends over time can be confidently investigated. A reason that very few items may exist in a domain may be that these activity domains were not considered to be essential to the mission of the study. That said, we recognize that a small number of items does not necessarily equate to limitations in measurement, and item quality is highly relevant to obtaining adequate and meaningful data. Additionally, we note that some items, such as "helping neighbors" or "helping others manage medications," may represent complex activities that include social, physical, psychological, and other components (e.g., financial management and time spent on a computer).

Still, we found the analytical grouping of activity measures into domains to be useful in understanding data resources available to assess multiple activity engagement. In the following sections, we consider the implications of identified gaps in domains and variance in activity items within and across data sets, as well as challenges in interpreting the domains. This is followed by recommendations for this work going forward.

Gaps in Activity Domains and Variance in Activity Items

As noted earlier, our findings resulted in the identification of a broad set of activity domains across the five data sets but clearly showed gaps within and between data sets in terms domain representation and content. The only universal domain across surveys was employment although the number of items within this domain that fit the "do you do" criteria ranged from 32 in the PSID to just 2 items in the HRS. The PSID inquires extensively about status, nature, and time spent in employment, triangulating data to ensure both rigor and ability

Table 3. Summary of Activity Domains Found in Five National Data Sets

Data set Survey wave and number of total activity measures	Number of activity domains	Employment	Health risk behavior	Basic living	Civic	Leisure	Household chore	Helping others	Religious	Interpersonal exchange	Help-seeking	Physical exercise	Financial management	Computer
NHIS														
2010 Survey of adults (N = 37)	6	7	9	1	1						14	5		
2009 Survey of adults (N = 41)	6	7	9	1	1						18	5		
Number of items same across waves		7	9	1	1						12	5		
PSID														
2009 Family survey (N = 38)	6	27	5				2			1		3		
2007 Family survey (N = 46)	6	32	5				2	3		1		3		
Number of items same across waves		27	5				2			1		1		
ACL														
2002 Survey (N = 51)	9	7	6		8		12	8	3	2	3	2		
1994 Survey (N = 54)	9	8	5		7		12	11	1	4	4	2		
Number of items same across waves		5	4		7		12	7	1	2		2		
HRS														
2009 Activity supplements (N = 39)	12	2		3	2	9	8	3	2	3	2	2	2	1
2007 Activity supplements (N = 39)	12	2		3	2	9	8	3	2	3	2	2	2	1
Number of items same across waves		2		3	2	9	8	3	2	3	2	2	2	1
MIDUS														
2004–2006 (N = 109)	12	14	10	4	16	5	1	11	4	5	20	18		1
1994/1995 (N = 109)	10	25	10	1	16		1	11	4	5	19	4		
Number of items same across waves		5	10	1	14		1	11		5	15			

Note: Detailed tables with survey items can be obtained by contacting the corresponding author.

to evaluate employment in-depth (PSID, 2009). In contrast, the HRS asks only about current employment status and hours spent per week working for pay. The other surveys fall somewhere in the middle, asking additional questions about type, nature, and specifics of employment. Depending on what a researcher's aims are, variables providing dynamics of employment may be particularly relevant when investigating the interaction of employment factors and other life activities. On the other hand, if formal employment status (employed and not employed) is the only variable of interest, the one or two employment items may be enough. In an empirical analysis exploring multiple activity engagement, employment status and hours spent working may be the most salient measures.

Civic activities and religious activities were covered in four of the five data sets, with MIDUS having the greatest number of items in each category overall. In MIDUS, ACL, and HRS, items related to civic and religious activities were similar in what they measured (e.g., volunteering and attending religious services). MIDUS more extensively measured what type of organizations or population groups individuals volunteered to work with and collected more details regarding religious engagement.

The fact that PSID had no civic activity items and NHIS had only one was disappointing given current interest in volunteering and productive aging and their relationships to positive health outcomes. This limits investigation of patterns of employment and transition to or inclusion of civic activities in retirement and their relationship to positive health outcomes using these data sets. The lack of religious activities in these data sets similarly stymies researchers' ability to investigate relationships between health and spiritual and/or activities like volunteering. As noted earlier, these omissions may be attributed to the original mission of each survey, and the survey developers, therefore, should not be faulted for exclusion; rather, survey developers could be encouraged to consider the possibility of adding items in unrepresented activity domains to facilitate research exploring complex interactions of multiple activity engagement.

Household chore activities were assessed by many items in ACL and HRS, but very few in the other data sets. In many of the physical activity items, engagement in housework and exterior yard work were used as examples for explaining distinctions between light, moderate, and vigorous physical activity and/or exercise. With the exception of the 2004 wave of MIDUS, only a few items in each data set inquire about physical exercise. Given the likely empirical correlation of household chores and physical activity, understanding how these domains differ (if they do) becomes important to delineate. Helping others may also link closely to activities in both the aforementioned domains. In creating all three of these domains (household chores, physical activity, and helping others), our research team felt interpreting the intent of what each survey item was trying to assess was useful in assigning each item to a single domain. At the same time, we recognize that what these items measure specifically may overlap (e.g., physical engagement), suggesting the need for greater conceptual and measurement work in these cases and others of a similar nature.

Financial management and computer activity domains are not routinely included. In each, the items are somewhat generic (time spent managing bills and using a computer) but do capture activities that can consume large amounts of time. From a similar viewpoint, help-seeking activities, present in four of the five data sets, may range from barely any time spent to significant time spent. In all of the domains, fluctuations in time spent may influence time or effort available for other domains of activities. The larger number of items in NHIS and MIDUS ask specifically about types of help sought (e.g., physician, psychologist, and dentist), offering more detail about the range of help seeking. In contrast, the time spent using a computer, a single item in this domain, only generically inquires about use of the machine, not what it was used for. In trying to asses this, our research team returned to what became a familiar refrain for us during this analysis: It likely depends on the specific research aims as to whether the number of items and their quality are strong enough to produce a meaningful analysis of multiple activity engagement.

Difficulty in Interpreting Domains

In terms of interpreting domains, we struggled in determining whether health risk behavior was a legitimate domain of activity. In the literature, health behaviors are treated distinctly from physical and social activities. However, in our iterative discussions, we found that we could make the case for including health risk behavior as these activities are sometimes done with singular focus (e.g. taking a smoking break) or done in tandem with

other activities (drinking alcohol and socializing). Within our formula of asking "do you do X?", we determined health risk behavior qualified as an activity domain, but we recognized much more thought would be required if this domain was to be included in a broad conceptual model of activity.

Leisure, unexpectedly, also became a troubling domain for our research team. We determined that only two data sets, HRS and MIDUS, include leisure items, because most other activity items fit into domains with sharper parameters. One person's leisure activity is not always another's; personal preference and interpretation of activity seem important in deciding what exactly leisure is. Similarly, within the basic activity domain, items like sleeping, eating, and having sex fit our inclusion criteria but may or may not be useful items in investigating an activity profile unless put into a specific context.

Implications for Studying Multiple Activities or Activity Domains Simultaneously

Based on our findings, we suggest that it is possible to categorize activity items within existing data sets into domains and that the resulting domains lend themselves to the study of multiple activity engagement (activity portfolios) and older adults. As for the question of whether or not there are currently enough activity items within the data sets reviewed to begin to study activity portfolios, we would answer *yes* based on the quality of the data sets and the fact that at least two—HRS and MIDUS—contain most of the identified domains. We offer a strong note of caution, however, in that it is unclear whether the best measurement of activity items is presented in these surveys and whether enough items exist within each domain to truly capture what a domain might represent. Depending on the research aims, missing domains or limited items within each domain may be handled differently by researchers. Despite these challenges, next steps in this work might include assessing the potential to create composite measures based on activity domains and exploring the existence of activity patterns and portfolios. Examining activity change over time using multiple waves of the longitudinal data sets assessed here also holds potential for better understanding activity engagement over the life course.

Our findings also highlight the need to better conceptually align measures of functional limitations (activities of daily living) and measures of activity engagement. Arguably, the "Do you do X?" criterion we employed in this analysis to identify activity variables within data sets is broad enough that it could capture some functional capacity items. In most surveys, the intent of functional limitation questions are differentiated by inquiring "can you do X?" versus "do you do X?". However, it is possible that future work assessing activity portfolios may help researchers better understand the relationship of functional limitation to multiple activity engagement among older adults by exploring its role as an antecedent and outcome of health and wellness across a broad range of activity domains.

Finally, although our findings identified 13 distinct domains in the five data sets we examined, we believe there are likely more domains relevant to the development of activity portfolios. These include areas that range from more internal activities, like thinking or self-reflection, to more external activities like pursuing educational opportunities. We also believe that there may be utility in subdividing our identified domains to create more refined categories of activity that more adequately capture motivation or intent of activities. For example, attending religious services may be quite different than meditation despite the fact that both might be viewed as spiritual. Empirical analysis of activity domains can help determine activities that are similar enough to become composite variables for a single domain within a data set, but it will not identify missing components of domains. For this, more attention should be given to the development of a conceptual model of activity portfolios.

Conclusion

Our analysis highlights the need for greater attention to creating strong data resources for studying multiple activity engagement among older adults. Our assessment of five of the most commonly used data sets in gerontology research suggests that there is potential to use them in this work, but that inclusion of a fuller range of domains, attention to the items included within each domain, and the measurement of those items is essential for generating robust research findings. Moreover, our analysis draws attention to the lack of conceptual clarity around activity, broadly defined, and the distinct need for development of stronger theoretical models of activity to support investigation of activity portfolios.

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