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Abstract

Background: Emerging evidence suggests a positive association between relevant aspects of one's psychological identity and physical activity engagement, but the current understanding of this relationship is primarily based on scales designed to assess identity as a person who exercises, leaving out essential aspects of physical activities (e.g., incidental and occupational physical activity) and sedentary behavior.

Objective: The goal of this study is to evaluate the validity of a new physical activity and sedentary behavior identity scale (PA/SB identity scale) using two independent samples of U.S. adults.

Methods: In study 1, participants answered 21 candidate items for the PA/SB identity scale and completed the International Physical Activity Questionnaire-Short Form (IPAQ-SF). Study 2 participants completed the same PA/SB identity items twice over a 1-week interval and completed the IPAQ-SF at the end. We performed factor analyses to evaluate the structure of the PA/SB identity scale, evaluated convergent validity and test-retest reliability (in study 2) of the final scale scores, and examined their discriminant validity using tests for differences in dependent correlations.

Results: The final PA/SB identity measure was comprised of 3 scales: physical activity role identity (F1), physical activity belief (F2), and sedentary behavior role identity (F3), with high test-retest reliability. The F1 and F2 were positively correlated to each other, while both were negatively correlated with F3. Data from study 2 also demonstrate adequate discriminant validity.

Conclusions: This study provided initial empirical evidence from two independent studies on the reliability and validity of the physical activity and sedentary identity scales for adults.

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Introduction

The physical and mental health benefits of being physically active [1] [2] are well-documented. Despite this, however, the vast majority of adults in the United States are insufficiently active [3] and largely sedentary [4]. Although existing physical activity promotion efforts that focus on skill development, barrier reduction, and other important aspects of behavior change have been developed to remedy this, effects of these interventions have been modest [5,6]. Identifying concepts and approaches beyond current behavioral models could potentially enrich future physical activity promotion, and sedentary behavior reduction efforts.

The concept of identity has received increasing attention for its potential to supplement the predominant social-cognitive approaches used in physical activity promotion research [7]. Identity broadly refers to how a person views themselves in a given role (e.g., as an exerciser [8]); it is often posited to serve a critical role for regulating behaviors in that people will generally strive to act in a manner that is consistent with their perceived identity [9]. The dissonance experienced when a person deviates from roles they identify with (identity-behavior discordance) could be an important motivation for individuals to engage in the target behavior. In the context of promoting physical activity and reducing sedentary behavior, the current literature suggests that individuals with stronger exerciser identity are more physically active [7], and emerging evidence indicates that exerciser identity could predict time spent in exercise in the future [7,10]. The current understanding regarding the relationship between identity and physical activity is largely based on measurement tools such as the Exercise Identity Scale [8]. The Exercise Identity Scale consists of 9 items with questions like “I consider myself an exerciser,” “and “I would feel a real loss if I were forced to give up exercising.” Although the Exerciser Identity Scale has been shown to be a psychometrically sound self-report instrument, its focus on exercise is intentionally narrow and does not focus on physical activity more generally or encompass sedentary behaviors at all. According to the “specificity matching principle” [11], the breadth of the concept captured with an identity scale should match the breadth of the behavior it is thought to regulate. The concept of “physical activity” is often construed to include a larger spectrum of activity (e.g., inclusive of incidental physical activities like yardwork or occupational physical activities like walking and lifting for work-related activities), than exercise, which refers to a smaller collection of activities that often require planning and involve repetition (e.g., running on treadmills, engaging in sports), and can provide robust health benefits [3]. Another limitation is that sedentary behavior is increasingly recognized as a unique and key target for promoting health [3], but self-views about being sedentary are not addressed in the Exerciser Identity Scale. Therefore, suitable measurement

instruments that assess identities related to physical activity and sedentary behavior may be important for better characterizing and understanding their role in the context of physical activity promotion and sedentary behavior reduction efforts.

To explicitly assess physical activity identity, a small number of studies have modified the wording of the scale from “exercise” to “physical activity”[12,13]. A limitation of these prior studies is that they were conducted with generally small samples, often of older participants, and the psychometric properties of the modified scale for adults in a broad age range were not reported. Additionally, these modified scales did not include the concept of sedentary behavior identity, even though understanding factors that contribute to prolonged engagement in sedentary behavior could potentially offer valuable targets for behavior intervention. To address these limitations, this article evaluates the psychometric properties of a modified version of the exercise identity scale for the purposes of assessing both physical activity identity and sedentary behavior identity. The first aim of the study is to demonstrate the internal consistency and test-retest reliability using two independent samples. The second aim is to examine the criterion validity of the physical activity and sedentary behavior identity scale by examining the correlation between the scale scores and participants’ self-reported physical activity assessed with the widely used short form of the International Physical Activity Questionnaire [14].

Methods

Measurement

Physical Activity and Sedentary Behavior Identity Scale

The physical activity and sedentary behavior identity scale is modified from the Exercise Identity Scale [8]. We included all 9 items from the original Exercise Identity Scale and modified the wording “exercise” or “exerciser” to “physical activity” or “physically active” where relevant. In addition, we also included 3 new items that were intended to assess whether the individual would describe themselves as physically active, how they place themselves in comparison to other people, and how much they enjoy physical activity engagement during leisure time. To assess sedentary behavior identity, items were newly developed with wording paralleling the physical activity identity items. Not all candidate items from the physical activity identity scale were converted into the sedentary behavior identity scale (a total of 9 sedentary items were created), because the contents tapped by several items were seen as not appropriate for sedentary behavior. The list of candidate items for the physical activity and sedentary behavior identity scale is presented in the supplemental material.

Participants were asked to rate how strongly they disagreed or agreed with each of the 21 statements on a 7-

point Likert scale, with “Strongly Disagree” and “Strongly Agree” anchored at the ends of the scale, and a “Neither Disagree Nor Agree” option presented in the middle of the scale. Response options were presented horizontally.

Self-Reported Physical Activity and Sedentary Behavior

Levels of physical activity over the past week were assessed using the short form of the International Physical Activity Questionnaire (IPAQ-SF). The IPAQ-SF is a well-validated self-report instrument for assessing physical activity and sedentary behavior during the past 7 days in youth and adults 16 to 69 years of age [14]. The total time spent in vigorous physical activity, moderate physical activity, and walking during the past 7 days were assessed with two questions for each activity category. Participants were asked to recall the number of days they engaged in each activity category. If the participant indicated that they engaged in vigorous physical activity, moderate physical activity, or walking for 1 or more days during the past seven days, they were then asked to estimate the amount of time they usually spent doing those activities on one of those days. The total amount of time spent in each category during the past 7 days was obtained by multiplying the responses of the two responses for each category. Sedentary behaviors were assessed by one item that asked participants to estimate how much time they spent sitting on a weekday. For all activity categories, participants were also provided with an option to say “Don’t know/Not sure” when they were asked to estimate the time spent in these activities.

Participants and Procedures

Study 1: A total of 1000 participants were recruited through Amazon Mechanical Turk (MTurk) in November 2021. The study invitation was only available to registered MTurk workers (MTurkers) who had already completed a minimum of 500 approved human intelligence tasks (HITs), had at least a 99% HIT approval rate, and lived in the continental United States. Two additional eligibility criteria for study participation included being at least 18 years of age and English as the first language. Eligible MTurkers were presented with a link to a Qualtrics survey and were asked to only complete the survey using a desktop, laptop, or tablet. Surveys completed on a smartphone were not accepted to ensure that the presentation of survey questions was consistent for all respondents (e.g., surveys presented on smartphones using smaller fonts on a smaller screen may force response options to be presented in substantially altered ways, such as vertically and this may have altered results).

The study survey began with questions about demographic and socioeconomic status and then the participants were presented a paragraph defining physical activity, differentiating exercise from physical activity, and defining sedentary behavior to minimize the potential impact of individual differences in the definition of physical activity,

sedentary behavior, and exercise. The definitions of physical activity and sedentary behavior were as follows: “Physical activity is defined as any movement you do with your muscles that requires your body to use energy. The term "physical activity" should not be mistaken for "exercise." Exercise is only one type of physical activity that you do; it is oftentimes planned, structured, repeated, and is intended to improve your physical fitness or to keep you fit. We are asking about physical activity, which not only includes exercise, but also other activities that involve bodily movement and are done as part of playing, working, active transportation, house chores and recreational activities. Sedentary behaviors are times when you are awake; when you are sitting, reclining, or lying down; and when your body uses very little energy. For adults, examples of sedentary behaviors include using electronic devices (e.g., television, computer, laptop, tablet, phone) while sitting, reclining or lying; reading, writing, or talking while sitting; sitting in a bus, car, or train.”

The definition of physical activity was meant to conform to how the World Health Organization defines physical activity. After the page with definitions, participants were presented with the 21-item physical activity and sedentary behavior identity scale on three separate screens. On each screen, participants were presented with 7 items designed to measure physical activity and sedentary behavior identity, plus one item that directed participants to pick a specific response option as an attention checker. Each of these three screens was timed, and the item order within each screen was randomized. After completing the identity scale, participants were asked to complete the International Physical Activity Questionnaire (IPAQ-SF, the short form version). Participants who completed all parts of the survey were provided with a completion code to submit on their HIT for approval. MTurkers, whose HIT was approved, received $3 compensation via Amazon MTurk.

Study 2: The study sample included participants of a study that involved collecting multiple physical activity assessments over the course of a week. Data from study 2 were used for evaluating the test-retest reliability of the physical activity and sedentary behavior identity scale. A total of 359 participants were recruited through the Understanding America Study (UAS) panel between January and July 2023. The UAS is a probability-based Internet panel that longitudinally tracks a sample of approximately 10,000 U.S. residents (https://uasdata.usc.edu/). UAS Panelists are recruited through address-based sampling. For potential panelists without Internet access, the UAS provides a tablet and broadband access to ensure that the panelist pool achieves coverage in populations typically underrepresented in opt-in or volunteer online panels. A stratified random sample of the full UAS panel based on gender, race, and age, were invited to participate in the study. There were 1363 panelists over the age of 18 who responded to an invitation to participate in the study. Among these, 342 panelists did not meet the eligibility criteria for study participation, including having visual or audio impairment (n=209), require assistive-mobility device (n=60), no Wi-fi access(n=26), no stable

access to e-mail (n=32), work a night shift (n=75), not English fluency (n=12), under age of 18 (n=1), or on bed rest (n=13). Among the 1021 eligible panelists, 407 (approximately 40% of eligible) provided consent and started the study activity and 359 (approximately 88% of those consented) completed all the study related activities.

Study 2 participants completed the physical activity and sedentary behavior identity scale twice: at baseline and 7 days later. At 7 days after the baseline, study 2 participants also completed the IPAQ-SF. All instructions, definitions, and presentation for physical activity and sedentary behaviors, the identity scale, and the IPAQ-SF in study 2 were identical to those in study 1.

The procedures for both studies were approved by the University of Southern California and BRANY Institutional Review Board (study IDs: UP-21-00713 and #22-183-1044). All participants provided informed consent before completing study procedures.

For both studies, we applied data cleaning procedures and criteria for removing outlying observations following the IPAQ-SF scoring guidelines recommended by the IPAQ Research Committee[15]. Accordingly, participants who met any of the following conditions were excluded from the analytic dataset for both studies: 1) reported “Don’t know/Not sure” for the time spent walking, engaged in moderate physical activity, or in vigorous physical activity and 2) the sum of daily time spent walking, engaged in moderate physical activity, and in vigorous physical activity exceeded 960 minutes (16 hours; which was deemed unreasonably high assuming on average an individual of 8 hours sleep duration per day). This yielded analytic samples of n = 848 (84.8% of study 1 participants who completed the study) and n = 278 (77.4% of study 2 participants who completed the study) for study 1 and study 2, respectively.

Data Analysis

Analyses to evaluate the factor structure underlying the responses to the physical activity and sedentary behavior identity items were conducted sequentially using data from study 1. Results from previous studies conducted using the original exerciser identity items suggested either one [8] or two [16] factors underlying the responses to the original scale, and we had added a set of items targeting sedentary behavior identity, which we expected to be indictors of one or two additional factors. Correspondingly, we examined exploratory factor analysis (EFA) models with one to four factors with oblique geomin rotation and compared models with increasing numbers of factors using likelihood-ratio tests. The preferred model was selected based on interpretability (high factor loadings of >.40 on conceptually interpretable item combinations with cross-loadings <.40) and on model fit. Global model fit was evaluated using the chi-square goodness of fit test, Comparative Fit Index (CFI >.95 for good model fit), Tucker-Lewis Index (TLI >.95 for a good fit), and root

mean square error of approximation (RMSEA < .06 for a good fit) (Hu & Bentler, 1999).

The EFA results in study 1 were used to inform the number and composition of factors in subsequent confirmatory factor analysis (CFA) models. CFA was used to evaluate the global fit of a measurement model without cross-loadings (i.e., each item was allowed to load only on one factor). Items with substantial cross-loadings in EFA were excluded from the CFA. Because we aimed to generate brief scales with well-fitting measurement models, modification indices were examined to identify potentially problematic items that should be eliminated from the final models. The final (best fitting) CFA model from study 1 was subsequently applied to the data collected in study 2 to evaluate whether the factor structure replicated across independent samples. The internal consistency reliability estimates of the resulting scale, descriptive statistics, and bivariate correlations among the subscales were examined using data from both study 1 and 2. Convergent validity was assessed using the bivariate correlation between variables of the same constructs (e.g., the correlation between physical activity identity scale and each of the three physical activity variables). Discriminant validity was assessed by comparing the correlation coefficient of the same construct (e.g., the correlation between PA identity and PA behavior) to the correlation coefficient of a different construct (e.g., the correlation between SB identity and PA behavior) using tests for differences in dependent correlations [17]) using data from study 1 and the week 2 data of study 2 when both IPAQ-SF and physical activity and sedentary behavior identity data were collected. The test-retest reliability of the resulting scale was examined using Pearson correlations and Intraclass correlation coefficients using data from study 2. Descriptive statistics, internal consistency indices, and bivariate correlations were conducted using SAS 9.4. The factor analyses were conducted in Mplus version 8.7 [18] using maximum likelihood estimation. Comparisons of correlation coefficients were conducted using the online application developed by Lee and Preacher [19].

Results

Descriptive Statistics

Demographic characteristics of participants in studies 1 and 2 are presented in Table 1. On average, study 1 participants reported engaging in 177.2 (SD:266.1, range: 0-270) minutes of vigorous physical activity, 325.84 (SD: 436.33,range: 0-2940) minutes of moderate physical activity, and 382.77 (SD: 479.75, range: 210-3360) minutes of walking during the past week. Study 1 participants reported an average daily sitting time during weekday of 389.67 (SD: 222.24, range: 0-1230) minutes. Study 2 participants reported engaging in 101.4 (SD: 190.7,range 0-1260) minutes of vigorous physical activity, 263.3 (SD: 342.7, range 0-1260) minutes of moderate physical activity, and 431.7 (SD: 408.6, range 0-1260) minutes of walking during the past week. Study 2 participants reported an average daily sitting time during

weekday of 448.6 (SD: 236.9, range 30-1440) minutes.

Table 1: Participant Demographic Characteristics

		Study 1 (N=848)	Study 2 (N=278)
	Female (%)	43.2%	50.4%
Age group	18-39	58.1%	29.9%
	40-59	33.6%	41.0%
	60-79	8.3%	27.0%
	80>	0%	2.2%
Ethnicity	Non-Hispanic White	74.1%	71.2%
	Hispanic White	8.5%	9.7%
	Asian	6.2%	5.4%
	Black or African American	7.2%	6.1%
	American Indian or Alaska Native	0.4%	0.7%
	Native Hawaiian or Pacific Islander	0.1%	0.7%
	Multiracial	3.6%	6.1%
Education	High school degree or less	11.9%	14.8%
	Some college-Associate or No degree	25.6%	28.1%
	Bachelor's degree or higher	61.9%	57.2%
	Prefer not to reply	0.6%	0%
Income	<25K	17.2%	8.6%
	25- <50K	29.1%	14.8%
	50K- <75K	24.4%	16.2%
	75K-<100K	13.9%	14.8%
	>100K	14.0%	45.7%
	Prefer not to reply	1.3%	0%
Marital Status	Married	47.7%	64.4%
	Never married	41.9%	21.2%
	Divorced, Separated, or Widowed	9.3%	14.4%
	Prefer not to reply	1.1%	0%
Employment Status	Employed (Full-Time/Part-Time/Self-Employed)	88.0%	66.9%
	Student	0.9%	0%
	Homemaker	3.1%	0%
	Retired	3.1%	16.9%
	Unemployed (Out of work/Not working by choice/ Unable to work)	3.9%	15.8%
	Prefer not to reply	1.1%	0.4%

Factor analysis

Using data from study 1, the initial EFA models suggested that retaining one or two factors resulted in poor model fit, even though the rotated solution of the 2-factor model was consistent with factors representing “physical activity identity” and “sedentary behavior identity” (see Supplemental Material Table 1). A model with 3 factors showed a near-acceptable fit with few cross-ladings (Table 2). The 3-factor model preserved the sedentary behavior identity factor, whereas items tapping physical activity identity loaded on two separate factors (see Supplemental Material Table 1). A 4-factor EFA model showed an acceptable fit, but the solution was difficult to interpret with many items loading substantially on multiple factors. Thus, the 3-factor model was retained (where 3 items with cross-loadings >.40 were

removed) and tested using CFA. Global fit indices in this CFA indicated near-acceptable fit (goodness of fit chi-square = 1042.8, df = 132, p < .01, CFI = 0.94, TLI = 0.93, RMSEA = 0.084), but inspecting modification indices suggested that the fit could be further improved by eliminating 6 additional items. After this reduction, the final model fit the data well (goodness of fit chi-square = 207, df = 51, p < .01, CFI = 0.98, TLI = 0.98, RMSEA = 0.056) and it was comprised of 4 items for each of the 3 factors. The factors were labeled "physical activity role identity," "physical activity beliefs" (consistent with the labeling in [16] who found evidence for a similar factor structure), and "sedentary behavior identity." Standardized loadings of the items in the final model are shown in Table 3.

When the final CFA from in study 1 was applied to the data in study 2, the model showed acceptable fit in study 2 at baseline (goodness of fit chi-square = 111.81, df = 51, p < .01, CFI = 0.98, TLI = 0.98, RMSEA = 0.058) and 1 week later (goodness of fit chi-square = 178.00, df = 51, p < .01, CFI = 0.96, TLI = 0.94, RMSEA = 0.084).

Table 2: Exploratory factor analysis model fit

Model	Number of Parameters	Chi-Square	Degrees of Freedom	CFI	TLI	RMSEA
1-factor	63	5855.677	189	0.66	0.63	0.17
2-factor	83	1410.88	169	0.92	0.91	0.09
3-factor	102	774.81	150	0.96	0.95	0.07
4-factor	120	475.592	132	0.98	0.97	0.05

Table 3. Standardized loadings of the final factor solution

	Items included	Standardized loading
Factor 1: Physical Activity Role Identity	I consider myself to be a physically active person.	0.94
	Others see me as someone who is physically active regularly.	0.91
	I would describe myself as someone who is physically active.	0.94
	I would describe myself as someone who is more active than what's typical for people like me.	0.83
Factor 2: Physical Activity Beliefs	I need to be physically active to feel good about myself.	0.79
	I have numerous goals related to physical activity.	0.81
	For me, being physically active means more than just performing physical activity.	0.64
	I would feel a real loss if I were not able to be physically active.	0.66
Factor 3: Sedentary Behavior Identity	I consider myself as a sedentary person.	0.86
	Others see me as a couch potato.	0.81
	When I am home, I want to sit, recline, or lie down more than anything else.	0.82
	I consider myself someone that sits (without standing) for long durations of time.	0.81

Descriptive Statistics, Reliability Estimates, and Bivariate Correlation Among the Scale Scores and IPAQ-SF

Descriptive statistics of the three resulting scale scores are presented in table 4. The three scale scores exhibited high internally consistency. Cronbach's alphas for PA role identity, PA belief, and SB role identity were 0.95, 0.81, and 0.89, respectively, for study 1 participants. Similar internal consistency for the three subscales were observed both at

baseline (Cronbach's alpha of 0.94 for PA role identity, 0.81 for PA belief, and 0.84 for SB role identity) and 1 week later (i.e., Cronbach's alpha of 0.94 for PA role identity, 0.79 for PA belief, and 0.84 for SB role identity) among study 2 participants. The test-retest reliability was 0.87 for PA role identity, 0.75 for PA belief, and 0.85 for SB role identity applying Pearson correlations, and 0.85 for PA role identity, 0.75 for PA belief, and 0.84 for SB role identity when applying Intraclass Correlation Coefficients.

For both studies, the scale scores for factor 1 (physical activity role identity) and factor 2 (physical activity belief) were strongly positively correlated (Pearson correlation coefficients of 0.76 for study 1 and 0.69 for study 2). Factor 1 was moderately to strongly negatively correlated with factor 3 (sedentary behavior role identity, Pearson correlation coefficient of -0.58 for study 1 and -0.73 for study 2). Factor 2 was moderately negatively associated with factor 3 (Pearson correlation coefficient of -0.46 for both studies). As shown in Table 4, both PA role identity and PA belief scores were positively correlated with IPQA-SF assessed time spent walking, in moderate physical activity, and in vigorous physical activity, and both were negatively correlated with time spent sitting, with correlations ranging between r=.16 to r=.41 in absolute magnitude. The sedentary behavior identity scale score was positively associated with time spent sitting and negatively associated with time spent walking, in moderate physical activity, and in vigorous physical activity, with correlations ranging between r=.16 to r=.38 in absolute magnitude.

Discriminant Validity

Several significant differences were evident when comparing the 3 identity scales on the magnitude of their correlations with self-reported physical activity levels, see Table 4. Comparing PA role identity with PA belief, the PA role identity scale showed significantly larger correlations with time in vigorous and moderate activities (in study 1) as well as with time walking and sitting (in studies 1 and 2) compared to the PA belief scale. Comparing PA role identity with SB role identity, the PA role identity scale showed significantly larger correlations with time in vigorous and moderate activities (in studies 1 and 2) compared to the SB role identity scale; contrary to expectation, the PA role identity scale also showed a larger correlation with time spent sitting (in study 1) compared to the SB role identity scale. Comparing PA belief with SB role identity, the PA belief scale showed a larger correlation with time in vigorous activities (study 1) and a lower correlation with time walking (study 1) compared to the SB role identity scale.

Table 4: Pearson Correlations among the Identity Scale Scores, Self-Reported Physical Activity and Sedentary Behavior

	Study 1				Study 2			
	Mean±SD	1	2	3	Mean±SD	1	2	3
1. Factor 1: PA Role Identity	4.59 ± 1.70	-	-	-	3.98 ± 1.72	-	-	-
2. Factor 2: PA Belief	4.97 ± 1.36	0.76	-	-	4.70 ± 1.36	0.69	-	-
3. Factor 3: SB Role	3.71 ± 1.66	-0.58	-0.46	-	3.56 ± 1.53	-0.73	-0.46	

Identity								
4. Weekly Time Spent in Vigorous Physical Activity	177.23 ± 266.06	0.40 [ab]	0.28 [ac]	-0.16[bc]	101.4 ± 190.7	0.41 [b]	0.34	-0.33 [b]
5. Weekly Time Spent in Moderate Physical Activity	325.84 ± 436.33	0.27 [ab]	0.21 [a]	-0.20 [b]	263.3 ± 342.7	0.37 [b]	0.34	-0.28 [b]
6. Weekly Time Spent Walking	382.77 ± 479.75	0.26 [a]	0.16 [ac]	-0.23 [c]	431.7 ±408.6	0.27 [a]	0.17 [a]	-0.30
7. Weekday Daily Time Spent Sitting	389.67 ± 222.24	-0.48 [ab]	-0.34 [a]	0.38 [c]	448.6 ±236.9	-0.33 [a]	-0.23 [a]	0.38
All correlation coefficients differ significantly from zero, p <0.001. Row correlations sharing the same superscript within each study differ significantly from each other in absolute magnitude, p<.05. Because SB role identity was negatively correlated with PA role identity and PA belief, correlations were compared after reverse scoring SB role identity.								

Discussion

The purpose of these studies was to develop the revised physical activity and sedentary behavior identity scale, followed by examining the psychometric properties, convergent and discriminant validity, and test-retest reliability of the scale. We found evidence for three factors underlying the items, with two factors representing distinguishable facets of physical activity-related identity and one representing sedentary behavior role identity. Scale scores derived for all three factors were internally consistent. The scales presented in these studies also exhibited criterion validity, such that individuals scored high on the physical activity role identity and physical activity belief subscales also reported spending more time in physical activity and less time sitting, while those who scored high on sedentary behavior role identity reported more time sitting and less time engaged in physical activity.

In prior research, Wilson and Muon [16] identified two factors underlying the Exercise Identity Scale, and the physical activity role identity factor and physical activity belief factor identified in this study are in line with this two-factor model. Similar to results by Wilson and Muon, the current study also observed that, although both of these identity scales were positively correlated with self-reported time spent in physical activity, the correlation was consistently stronger for physical activity role identity than for physical activity belief.

Findings from this study extend the existing literature in at least two ways. First, the study extends evidence for the utility of the physical activity identity scale [12] to a wider age range. Like the results reported by Strachan et al., the current study also found a moderate positive correlation between physical activity identity and self-reported moderate and vigorous physical activity. This result may further suggest that physical activity identity is positively associated with physical activity behavior in adults in general, rather than just within the elderly population. Secondly, the current study provided evidence that sedentary behavior identity can be distinguished from physical activity identity; sedentary behavior identity emerged as a separate factor in factor-analysis models and it was positively associated with sedentary behavior whereas negatively associated with physical activity behavior. Although preliminary, these results support the

potential validity of the sedentary behavior identity scale, which might be used to help understand factors that contribute to prolonged engagement in sedentary behavior and potentially serve as a target for behavior change.

Results of this study offer initial evidence on the psychometric properties of the physical activity and sedentary behavior identity scale. However, there is a notable limitation of this study. Although participants in this study were adults from a wide age range, they were recruited from online participants and may be different from the general public. For example, workers from Amazon Mturk may differ from the general population in various ways (e.g., younger, better educated[20], and lower life satisfaction [21]. Similarly, although, while the full Understanding America Study panel is a probability sample that represents the US general population, the panelists that were included in this study may differ from the general public; for example, over 40% of the panelists included in this study were from higher income household. Therefore, future studies using samples from other age groups, ethnic composition, and income levels could potentially expand the current understanding of the characteristics of the physical activity and sedentary behavior identity scale.

In conclusion, these studies provide initial empirical evidence on the reliability and validity of the physical activity and sedentary identity scales for adult participants across the age spectrum using two independent studies. Emerging evidence has demonstrated the utility of identity in promoting physical activity engagement[7]. The scales described in the current study could provide a useful measurement approach for identities related to physical activity and sedentary behavior to enrich current understanding of the role of physical activity and sedentary behavior identity in the field of physical activity promotion and sedentary behavior reduction efforts.

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