

# Can the Wii Fit Balance Board be Used as a Fall Risk Assessment Tool Among Older Adults?

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## PURPOSE

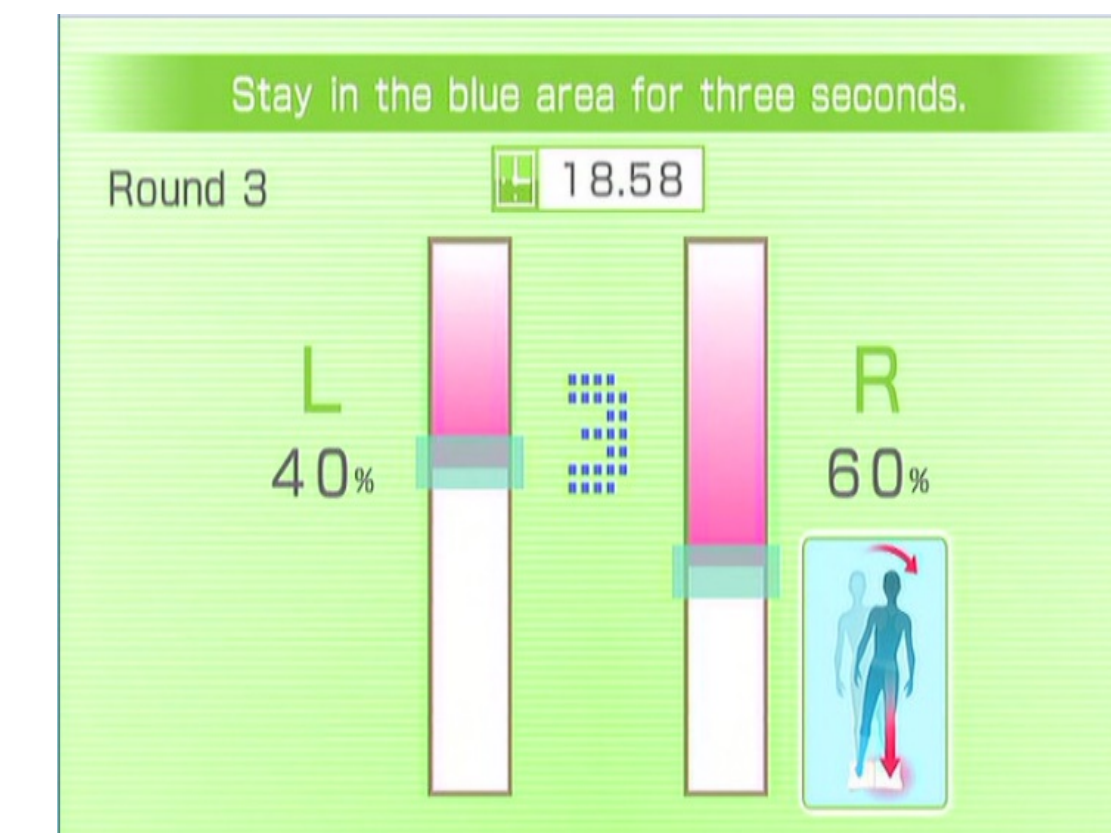
Approximately 35% of those 65 years and older, 42% of those 70 years and older, and 50% of those 80 years and older fall each year.<sup>1</sup> These falls commonly result in injuries that lead to life threatening complications or even death, as well as extensive medical costs to the individual, their caregivers and the healthcare system. Each year, 37.3 million falls are severe enough to require medical attention.<sup>1</sup> An estimated 424,000 people die globally due to falls.<sup>1</sup> In the United States, the average cost per fall injury is \$1,049. Hospitalization costs for fall related injury is estimated to increase to \$240 billion by 2040.<sup>1</sup> Due to the detrimental consequences that associated with falls, it is crucial that researchers and clinicians better identify tools that can assist in determining one's risk for falls in efforts to develop new assessment tools and factors that may be amenable to interventions. To date, there are various standardized functional tests used to assess fall risk in rehabilitation such as the Timed Up and Go test (TUG) and Four Square Step Test (FSST).<sup>2,3</sup> Both the TUG and FSST have found to be sensitive and specific for identifying older adults prone to falling. Due to its growing popularity in recent years and its accessibility in many homes and facilities, the Wii Fit Balance Board (Nintendo of America, Inc., Redmond WA) has also been investigated as a fall risk assessment tool, yet preliminary results are mixed.<sup>4</sup> To build on the successes of previous literature and attempt to address limitations of others, the purpose of this study was to 1) determine if the Wii Fit Balance Board can be used as a fall risk assessment tool among older adults by comparing it to the Timed- Up and Go (TUG) and Four Square Step Test (FSST) and 2) determine its feasibility among older adults.

## METHODS

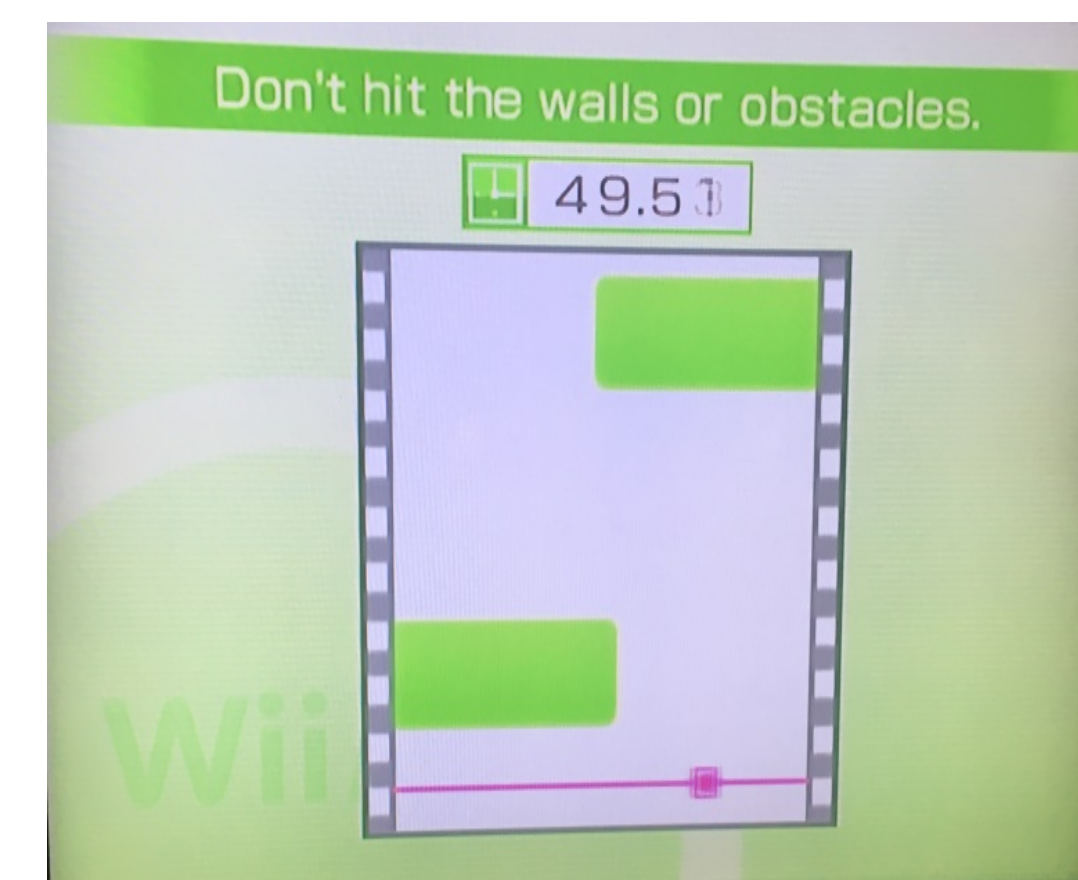
An observational study was conducted in which a convenience sample of 39 healthy community-dwelling older adults, 82.5% females and 17.5% males, mean age 78.1 years old (8.5 SD). Participants performed balance and gait assessments including the FSST, TUG, 8-foot walk test, 30 sec chair stand test, Wii basic balance test, and Wii prediction test. Additional outcome measures were given including the Activities Specific Balance Confidence (ABC) scale and Falls efficacy international (FES-I). To determine the feasibility of the Wii Fit Balance Board among older adults, a feasibility and acceptability questionnaire was administered.

## ANALYSIS

Data analysis was performed with SPSS version 22. Descriptive statistics were determined for age, gender, number of medical conditions, and number of falls in the past year. Bivariate correlations, using Pearson's product coefficient, were used to examine the association of the Wii Balance Board as compared to the TUG and FSST. Additionally, bivariate correlations examined relationships between the Wii Balance Board and the other self-report and performance-based measures: 8 foot walk normal pace, 8 foot walk fast pace, 30 sec chair stand test, ABC scale, and FES-I. Descriptive statistics were used to examine the acceptability of the Wii Balance Board in the current sample.



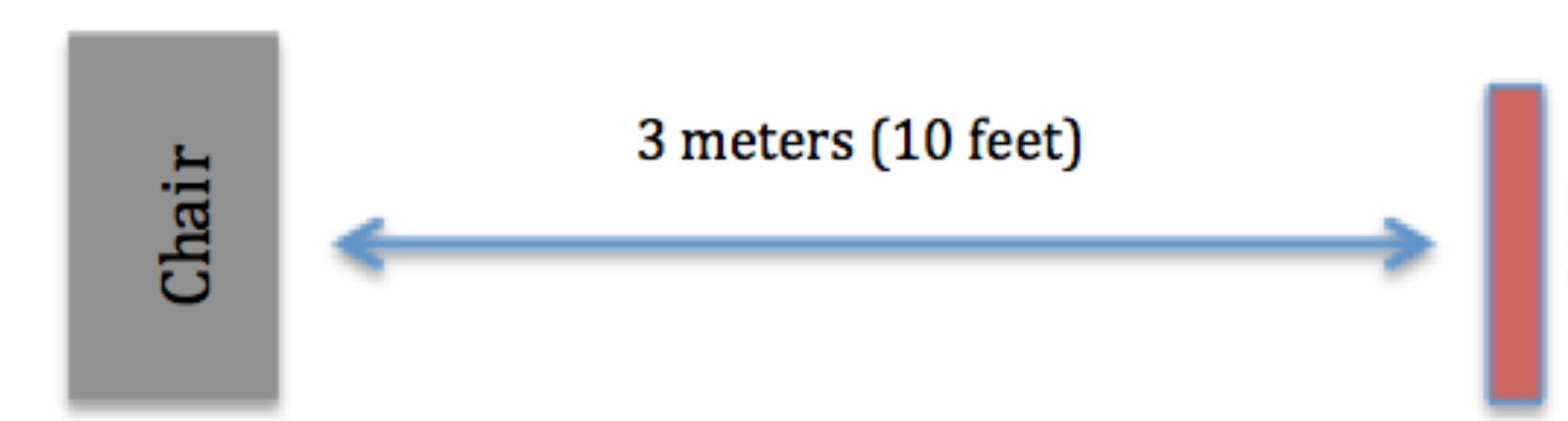
Wii basic balance test



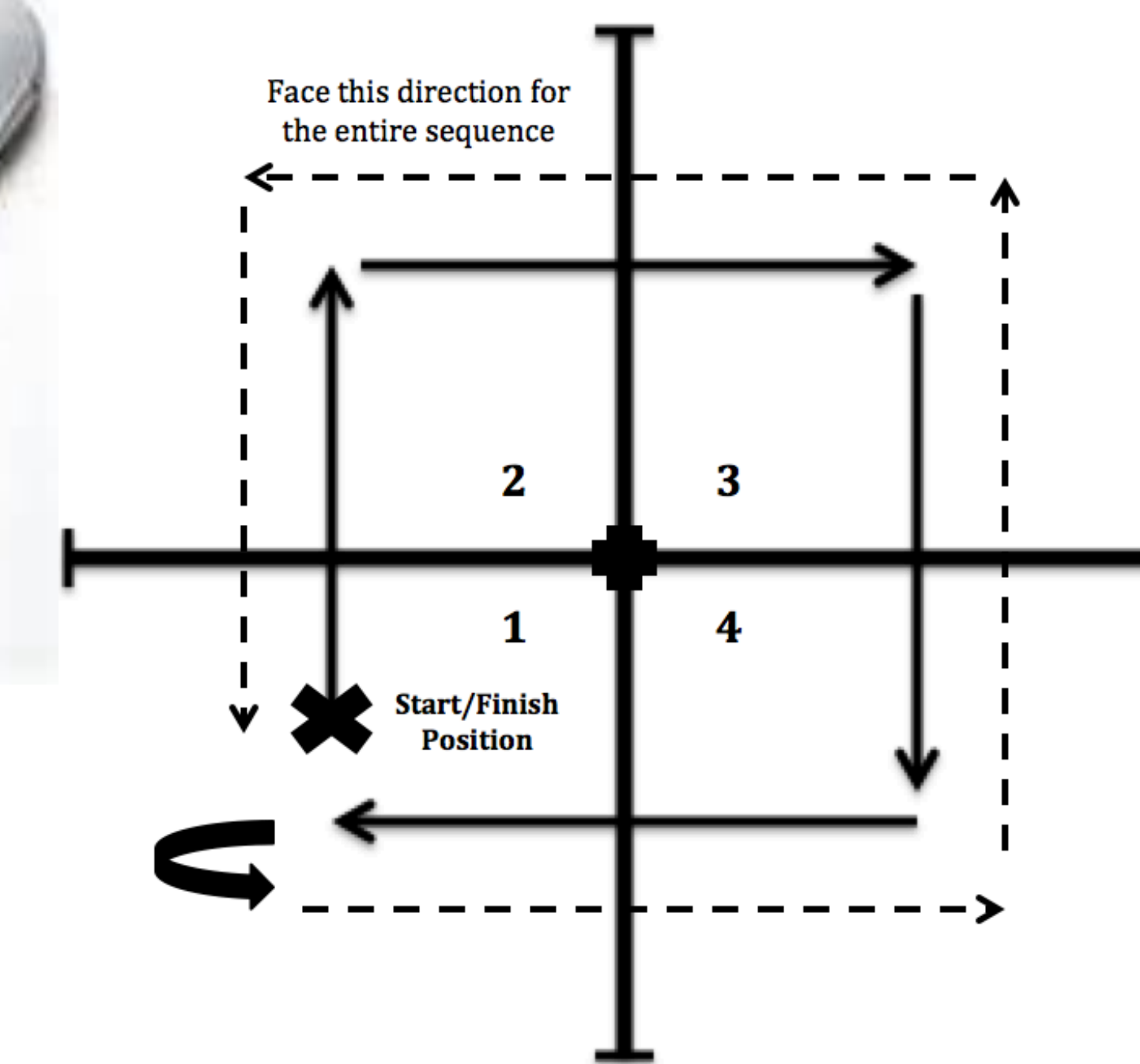
Wii prediction test



Wii Fit Balance Board



Timed Up & Go (TUG) Set-up



Four Square Step Test (FSST) Set-up

## RESULTS

The Wii Fit age significantly correlated with the TUG ( $r=.34, p=.03$ ) and approached significance with the FSST ( $r= .26, p= .11$ ) indicating a lower Wii Fit age was associated with faster performance on the TUG and FSST. Neither the Wii basic balance test or Wii prediction test significantly correlated with the TUG or FSST. Additionally, the Wii fit age moderately correlated with the 8-foot walk test, normal and fast pace ( $r= .36, p= .02; r= .41, p=.01$  respectively). Finally, no Wii Fit balance assessments significantly correlated with the ABC scale or FES-I.

## DISCUSSION

The Nintendo Wii Fit is a readily accessible and cost effective tool that does not require a skilled healthcare professional to administer. This makes it possible for informal caregivers to easily perform a balance assessment at home, fitness centers, and senior living facilities. Early identification of fall risk can potentially reduce the number of falls and the detrimental impacts that they have on health, as well as decrease the substantial costs often associated with falls. The Wii may be implemented more often in fall risk assessments to identify those who are at risk. Early identification of fall risk can potentially reduce the number of falls and the detrimental impacts that they have on health, as well as decrease the substantial costs often associated with falls. Further research is needed to determine its predictive validity and possible correlation with other fall risk assessments to determine which is most suitable as a fall risk assessment.

## CLINICAL RELEVANCE

Use of the Nintendo Wii Fit as a fall risk assessment tool may help improve early detection of fall risk and subsequently reduce the number of falls and medical costs associated with fall related injuries.

## REFERENCES

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## Pearson's product correlation coefficient (r values)

	TUG	FSST	Wii fit age	8-foot walk (norm)	8-foot walk (fast)
TUG	1				
FSST	0.769**	1			
Wii fit age	0.338*	0.259	1		
8-foot walk (norm)	0.578**	0.532**	0.363*	1	
8-foot walk (fast)	0.663**	0.678**	0.409**	0.827**	1

Note: TUG= timed up and go, FSST= four square step test, 8-foot walk (norm)= normal pace and 8-foot walk (fast) = fast pace; \* $p<.05$ , \*\* $p<.01$