Published in final edited form as:

Disabil Rehabil Assist Technol. 2016 ; 11(5): 400–406. doi:10.3109/17483107.2014.984778.

Measurement Properties of the Wheelchair Skills Test Questionnaire for Powered Wheelchair Users

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Abstract

Purpose—To evaluate the test-retest reliability, concurrent validity and responsiveness of the Wheelchair Skills Test - Questionnaire (WST-Q) Version 4.1 for powered wheelchair users.

Methods—A volunteer sample of 72 community-dwelling, experienced powered wheelchair users, ranging in age from 50 to 77 years, participated in this study. Participants completed measures at baseline and 1 month later.

Results—Mean $\pm$ standard deviation total percentage WST-Q scores at baseline and 1 month were 83.7% $\pm$ 10.9 and 86.3% $\pm$ 10.0 respectively. Cronbach's alpha was 0.90 and the 1 month test-retest intraclass correlation coefficient (ICC_{1,1}) was 0.78 (confidence interval: 0.68–0.86). There were no floor or ceiling effects. Percentages of agreement between baseline and 1 month for individual skills ranged from 72.2–100%. The correlations between the WST-Q and the objective Wheelchair Skills Test (WST), WheelCon and Life Space Assessment were $r=0.65$, $r=0.47$ and $r=0.47$ respectively. The standard error of measurement (SEM) and smallest real difference (SRD) were 5.0 and 6.2 respectively.

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Presented in part at: Annual Meeting of RESNA, Baltimore, June 28–July 3, 2012, Baltimore, MD, USA.

Reprints: Not available from the authors.

Clinical Trials Registry Number: NA.

Authors' financial disclosure: We certify that no party having a direct interest in the results of the research supporting this article has or will confer a benefit on us or on any organization with which we are associated and we certify that all financial and material support for this research are clearly identified in the title page of the manuscript. The authors declare that they have no competing interests.

Conclusion—The WST-Q 4.1 has high internal consistency, strong test-retest reliability and strong support for concurrent validity and responsiveness.

Keywords

Wheelchairs; Outcome assessment (health care); Rehabilitation

INTRODUCTION

In 2010, based on the US Census Bureau's Survey of Income and Program Participation, there were approximately 3.6 million community-dwelling wheelchair users in the United States.¹ Recent estimates indicate that between 17–30%² of all wheelchair users use a power wheelchair or scooter. Provision of a power wheelchair is a common rehabilitation intervention for individuals with significant mobility disability and has been shown to increase independence with mobility and ease of mobility-related participation.³ However, power wheelchair use can be limited by many barriers including uneven footpaths, uneven ground, curbs, narrow doorways and aisles, potholes, stairs, hills and crowded places.⁴ Consequences related to these barriers include the need for assistance from family members or caregivers, concerns about safety, decreased participation and injury.^{4–9}

Prescribing a power wheelchair that minimizes the impact of environmental barriers and matches the individual's capabilities, needs, preferences and chosen activities can be a complicated process. The complexity of this process is heightened by the inherent safety concerns associated with power wheelchairs.¹⁰ Assessment is a key step in the World Health Organization's wheelchair service-delivery process.¹¹ The need for validated assessment tools is apparent.¹²

However, clinicians often rely on assessments of an individual's attributes (e.g., cognition, vision) that may lack predictive validity with respect to an individual's suitability for power wheelchair use.¹⁰ This type of assessment may do an injustice to individuals who initially may not appear to be capable of learning to use a power wheelchair. A standardized assessment of wheelchair skills can identify individuals who, with training, may be suitable power wheelchair candidates.^{13,14} Use of standardized assessments can help to evaluate baseline skill level, identify wheelchair skill goals and assess change in wheelchair skill over time.

The Wheelchair Skills Program (WSP) includes wheelchair skills assessments for wheelchair users and caregivers of manual wheelchairs, power wheelchairs and scooters.¹⁵ The Wheelchair Skills Test (WST) is an objective measure and the Wheelchair Skills Test Questionnaire (WST-Q) is a subjective, self-report measure.¹⁶ Initially developed for manual wheelchair use, the measurement properties of the WST for manual wheelchair users have been well documented^{17–20} and the WST has been shown to correlate highly with the WST-Q.^{21–23} While there are merits and limitations to both the objective and subjective versions,²⁴ the WST-Q may be the most appropriate assessment of wheelchair skills when objective testing is impractical or impossible. The measurement properties of the WST-Q for powered wheelchair users have not yet been evaluated.

The purpose of this study was to evaluate some of the measurement properties of the WST-Q for powered wheelchair users. We hypothesized that the WST-Q would: (i) have high internal consistency; (ii) have high test-retest reliability; (iii) have positive moderate correlations with relevant existing measures (concurrent validity); and (iv) accurately detect change when it has occurred (responsiveness).

METHODS

Study Design

This study used a one-month test-retest design. The data were collected as part of a 1-year longitudinal study investigating the natural history of power wheelchair use among older adults over time.

Participants

To assess our *a priori* hypothesis that the WST-Q would have moderate correlations with other relevant variables, given an α of 0.05 and a β of 0.80, we determined that a minimum of 68 participants would be needed to provide sufficient power.²⁵ Our sample of convenience consisted of 72 power wheelchair users.

Recruitment and Screening

Participants were recruited from 6 Canadian cities: Vancouver, British Columbia; London, Ontario; Toronto, Ontario; Montreal, Quebec; Quebec City, Quebec; and Halifax, Nova Scotia. Recruitment strategies included sending information, via letter, to potential participants through rehabilitation research databases, clinicians, and seating and mobility services. Advertisements were also posted in locations frequented by power wheelchair users, including medical equipment dealers and community centers, as well as via e-bulletins through community organizations, such as the Canadian Paraplegic Association and peer support groups. To be included in the study, participants had to be at least 50 years of age (an inclusion criterion to be included in the larger longitudinal study that focused on older adults), have at least 6 months of power wheelchair experience, be able to operate their power wheelchairs independently, be using the same power wheelchair for the baseline and follow up assessment, and be able to speak and write in English or French.

Ethical Issues

We obtained ethical approval for each data collection site through the local university or hospital research ethics boards. Each participant provided informed consent.

Wheelchair Skills Test Questionnaire (WST-Q)

We used the WST-Q 4.1 for powered wheelchair users in this study.¹⁶ This self-report test evaluates 32 skills (listed later) ranging from turning the power wheelchair on/off to ascending/descending a 5cm level change. It was administered and scored according to the WST Manual.¹⁶ Although the WST-Q can be used to measure both capacity (what the individual *can* do) and performance (what the individual *does* do),²⁶ we assessed only capacity in this study. Specifically, the WST-Q was conducted using a semi-structured

interview, whereby the individual was asked whether he/she believed himself/herself to be capable of performing each wheelchair skill (capacity). Each skill was scored using a dichotomous response format (pass/fail) according to explicit scoring criteria. Total WST-Q percentage scores were calculated (number of passed skills/number of possible skills $\times$ 100%).

Comparison Outcome Measures

All comparison outcome measures included in this study have previously been used with wheelchair users and are described briefly below.

Life Space Assessment (LSA)—The LSA measures frequency and independency of mobility across a continuum of environments through which a person reports moving during the prior 4 weeks, including within the home, around the home, in the neighborhood, in town and outside of town.^{27,28}

Wheelchair Use Confidence Scale for powered wheelchair users (WheelCon-P)—The WheelCon-P is a 59-item self-report questionnaire that measures confidence with power wheelchair use.^{29,30} Sixty-three percent of the WheelCon-P items are related to negotiating the physical environment.

Wheelchair Skills Test (WST) for powered wheelchair users—The WST 4.1 is a 32-item objective test of wheelchair skills.¹⁶ It evaluates the same 32 skills as the WST-Q and is scored in the same way.

Procedure

Participants who met the study inclusion/exclusion criteria attended data collection appointments at baseline and 1 month later. At baseline, participants completed a demographic questionnaire and the 4 additional measures (described above) in the following order: the LSA, WheelCon-P, WST-Q and WST. There were 6 testers, one at each data collection site. Each tester received training in administering and scoring all outcome measures from the primary investigator (PWR).

Data Analysis

We used the Statistical Package for the Social Sciences 21.0 for the data analyses (IBM Corp. Released 2012. IBM SPSS Statistics for Mac, Version 21.0. Armonk, NY: IBM Corp.). Descriptive statistics and total percentages were calculated for the total WST-Q capacity scores. Normal distribution of the data was tested with the Kolmogorov-Smirnov test. The percentages of individuals with the lowest (0%) and highest (100%) scores were determined and values greater than 20% were considered as floor and ceiling effects.³¹ The analyses for the specific components of the study are described below. The level of statistical significance was set at $p < 0.05$.

Internal consistency was calculated using Cronbach's α . One-month test-retest reliability of the WST-Q was evaluated using an intraclass correlation coefficient ($ICC_{1,1}$) with 95% confidence intervals (CI), calculated using one-way analysis of variance (ANOVA).²⁵ We

also calculated the success rates and the percentage agreement for individual WST-Q skills. The percentage agreement for each skill was calculated by comparing each participant's baseline and 1-month score and dividing by the number of participants who were tested on the skill (i.e., excluding the participants for which their power wheelchair did not have the part or function). We defined 75% agreement as clinically significant.^{22,23} The Bland-Altman limits of agreement plot was used to provide a visual assessment of how individual WST-Q scores varied between baseline and 1 month.³²

To assess concurrent validity, associations between the total percentage WST-Q scores and the comparison outcome measures were calculated using Pearson's Product Moment Correlation. We also compared individual wheelchair skills between the WST and WST-Q scores using percentage agreements, as described above.^{22,23} The strength of the associations was interpreted according to Domholdt's classification.³³ The standard error of measurement (SEM)²⁵ and smallest real difference (SRD)³⁴ were used to measure responsiveness.

RESULTS

Participants

The participants' demographic, clinical and wheelchair-use characteristics are presented in table 1. This sample of older adults was equally distributed between men and women and there was a wide range of power wheelchair experience. Among the range of primary diagnoses present in this sample, spinal cord injury and multiple sclerosis were most common.

WST-Q Scores

The WST-Q mean administration time $\pm$ standard deviation (SD) was 16.3 ± 5.2 and 15.7 ± 9.5 minutes for baseline and 1 month respectively. The total percentage WST-Q capacity scores demonstrated a normal distribution, as confirmed by the Kolmogorov-Smirnov ($p > 0.05$). The mean $\pm$ SD for the WST-Q capacity total percentage scores at baseline and 1 month were $83.7\% \pm 10.9$ and $86.3\% \pm 10.0$. In terms of ceiling effects, 5 (6.9%) and 7 (9.7%) participants scored 100% at baseline and 1 month respectively. There were no floor effects (scores of 0) present.

Reliability

Cronbach's alpha coefficient was 0.90. The one-month test-retest reliability ICC_{1,1} was 0.78 with a confidence interval of 0.68–0.86. A scatter plot of the total WST-Q capacity scores at baseline and 1 month is shown in figure 1. The Bland-Altman plot (not shown) displayed the 95% limits of agreement (9.9 to –15.1), the WST-Q mean difference between baseline and 1 month (–2.6), and a fairly equal distribution of scores above and below the mean difference. The limits of agreement represent how far apart the WST-Q scores were likely to be for most individuals and the distribution of scores suggested no systematic bias in score between administrations. There were 5 outliers who did not fall between the 95% limits of agreement. One outlier had a score higher than the 9.9 limit of agreement and 4 outliers had scores less than the –15.1 limit of agreement.

Table 2 presents the percentage success rate and agreement for individual skills between the WST-Q at baseline and 1 month. Success rates for individual skills ranged from 22.2% to 100%. The skills with success rates below 70% represented a mix of indoor, community and advanced skills and included: 'gets from ground to wheelchair', 'disengages and engages motors', 'transfers from wheelchair to bench and back', 'operates battery charger', 'ascends 5cm level change', 'gets through hinged door' and 'picks object up from floor'. Percent agreement between the WST-Q scores at baseline and 1 month ranged from 72.2% to 100%. The skill for which the agreement was 72.2%, 'gets over 15cm pothole', was the only skill that did not meet the threshold of 75% or greater that we had defined for a clinically significant agreement.

Concurrent Validity

Correlations between the WST-Q and other variables are presented in Table 3. All correlations were in the direction hypothesized and statistically significant correlations were found between the total percentage WST-Q capacity scores and life space travelled (LSA), wheelchair confidence (WheelCon-P), and objective wheelchair skills (WST). The highest correlation found was between the WST-Q and the WST ($r=0.65$).

Table 4 presents the percent success rate and agreement for individual skills between the WST-Q and the WST. There were 4 skills that did not meet the threshold of 75% or greater for a clinically significant agreement: 'operates battery charger', 'maneuver sideways', 'rolls 2m on soft surface' and 'gets over 15cm pothole'. The lack of agreement for the 'operates battery charger' skill was, for the most part, a result of the number of participants who scored 'no part' on this skill because they did not have their battery charger with them for objective testing, but were able to describe how to perform this skill on the self-report testing. Lack of clinically significant agreement on the other 3 skills appears to be a result of a true discrepancy between perception of skill and actual skill.

Responsiveness

The SEM and SRD were 5.0 and 6.2 respectively.

DISCUSSION

We accomplished our objective of providing evidence about the measurement properties of the WST-Q. The four hypotheses were verified. We found that the WST-Q has high internal consistency and good test-retest reliability. There is also support for concurrent validity and responsiveness. Participants in this study were older adults with a variety of diagnoses. Generally, this highly experienced sample reported themselves as being quite skilled in power wheelchair use with mean total percentage WST-Q capacity scores of 83.7 (range: 54.8–100) at baseline and 86.3 (range: 54.9–100) at 1 month.

The WST-Q items had a high degree of internal consistency with a Cronbach's alpha of 0.90. This finding confirms that the WST-Q items are consistent in measuring power wheelchair skills in this sample of older adult power wheelchair users.

The WST-Q retest reliability was good²⁵ with an ICC_{1,1} of 0.78, but the 95% confidence interval was wide (0.68–0.86). That the second WST-Q was administered after the objective WST may provide a possible explanation for the large confidence interval given the demonstrated training effect induced by simply administering the WST in training studies.^{35–39} Overall, however, the percent agreement for individual skills between baseline and 1 month indicated that there was a clinically significant agreement between time points.

Our results corroborate our hypotheses regarding the direction of the relationships between the WST-Q and the LSA, WheelCon-P and WST. The correlation between the WST-Q and WST for powered wheelchair users ($r=0.65$) is less than that for manual wheelchair users ($r_s=0.89$).²¹ Both the WST-Q and the WST have strengths and limitations. The self-report WST-Q has certain advantages over the objective WST.²⁴ It requires less time, equipment, and space to administer, it may provide a more realistic portrayal of an individual's skill as it relates specifically to his/her own environment, it is not subject to certain limitations associated with use of objective testing (e.g., failing of a skill due to a technicality, such as crossing over a line), it does not induce a training effect, it avoids a training-to-the-test effect, and there is no risk of injury. It is also sometimes the only option in situations where objective testing is not possible (e.g., telephone follow up, busy outpatient clinic) or is impractical (e.g., individual is on bed rest). Further, the WST-Q can capture information on both capacity and performance.²⁶

The WST-Q also has limitations. As discussed above, it is reliant on the respondent's ability to understand the questions and provide valid answers. Further, individuals often slightly overestimate their capacity,²¹ as shown in our results where the mean objective total percentage WST score was slightly lower than the mean total percentage WST-Q score. Finally, details regarding how a skill is performed are not provided, which limits its usefulness as a training guide. This limitation of the WST-Q is the primary strength of the WST in that with objective assessment the tester can observe how a skill is being performed and provide intervention in accordance with the limiting factors (e.g., technique or wheelchair set up). However, there are many factors that may influence skill capacity on any given day, such as motivation or fatigue. Given the merits and limitations of both the WST-Q and WST, there are situations in which one may be more appropriate than the other, but perhaps using them in conjunction with each other provides the most comprehensive representation of an individual's wheelchair skill.

The magnitude of the relationship between the WST-Q and the WheelCon-P ($r=0.48$, $p<0.001$) is similar to that between the WST-Q and the WheelCon for manual wheelchair users ($r_s=0.58$, $p<0.001$).³⁰ Given that approximately half of the WheelCon-P items are related to negotiating the physical environment, this correlation was expected. Similarly, the magnitude of the relationship between the WST-Q and the LSA ($r=0.48$, $p<0.001$) is consistent with the relationship between manual wheelchair skills and wheeled distance ($r=0.32$, $p<0.05$)⁴⁰ and is consistent with previous research findings that the life space mobility of middle-aged and older adults increases after power wheelchair use, especially within their neighborhoods.²⁸

The SEM of 5.0 and the SRD of 6.2 represent the minimal change in WST-Q score that reflects a meaningful change beyond measurement error for a group and an individual respectively. These values meet Smidt et al's⁴¹ standard of 10% or less of the possible score range.

There were limitations to this study, some of which have already been noted. All participants in our sample were experienced power wheelchair users. Although this characteristic was necessary in order to evaluate test-retest reliability, it limited the generalizability of our results. The ICC value might have been higher if there had been a broader range of WST-Q values to evaluate. Second, the sample was one of convenience, a volunteer sample. As such, the characteristics of our sample may differ from that of the general population of older adult power wheelchair users. Third, the 1-month time frame between test and retest may have allowed for learning and/or changes to occur. Although it is unlikely that the participants learned new skills through completing the WST-Q, because a training-to-the-test effect is improbable with a questionnaire, it is possible that participants may have chosen to independently learn about features of their chair for which they were uncertain during the testing. Further, completing an objective WST between the two WST-Q administrations may in itself have had a training effect.^{34–38} However, the WST-Q difference score of 2.6% between baseline and 1 month does not suggest much of a learning effect. Finally, in this study, the WST-Q was used to assess capacity only and not performance.

Future study is warranted, in particular exploring additional measurement properties, including inter- and intra-rater reliability and construct validity (e.g., relationship between power wheelchair use and previous experience, effect of different types of power wheelchair chairs). As well, capturing both capacity and performance using the WST-Q in future studies will provide a more comprehensive view of power wheelchair skills. The WST-Q will need to continue to evolve and studies like this one will assist this development.

Despite the study limitations and need for further study, this was the first study to investigate the measurement properties of the powered wheelchair version of the WST-Q. These data will help to interpret studies using the WST-Q as an outcome measure and will guide further research in this important area.

CONCLUSIONS

There is support for reliability, validity, and responsiveness for the WST-Q 4.1 with this population of experienced, older adult power wheelchair users. Further study is warranted.

Acknowledgments

This study was funded by the Canadian Institutes of Health Research CanWheel team in Wheeled Mobility for Older Adults grant (100925-1). Salary/scholarship funds were provided by: the Canadian Institutes of Health Research (PWR) and the Fonds de recherche du Québec – Santé (FRQS) (FR). We thank Elmira Chan, MEdu, Sarah McCuaig, BA, Jennifer Querques, BPh, Laura Titus, PhD, Fabrizio Farronato, BA, Elise Busilacchi, MSc, Valerie Lemay, MSc, Marie-Pierre Johnson, BSc, Deborah Stewart, PT/OT Asst. Dip, and Lori Kennedy, BSc(Kin) for their assistance with data collection.

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Implications for rehabilitation

There is evidence of reliability, validity, and responsiveness of the Wheelchair Skills Test Questionnaire (WST-Q) among experienced older adult powered wheelchair users.

The WST-Q can be used to measure powered wheelchair skill, guide intervention, and measure change over time.

Figure 1.
Total WST-Q percentage scores plotted at baseline and 1 month (ICC=0.78)

Table 1

Participants' Demographic, Clinical and Wheelchair-Use Characteristics

Characteristic	Value
Age in years, mean (SD)	60.7 (7.3)
Range	50–77
Men (n, %)	36 (50.0%)
Language (n, %)	
English	53 (73.6%)
French	18 (25.0%)
Other	1 (1.4%)
Marital Status (n, %)	
Married/common-law	28 (38.8%)
Single	25 (34.7%)
Separated/divorced/widowed	19 (26.3%)
Living Situation (n, %)	
Alone	38 (52.8%)
With spouse	24 (33.3%)
With others	10 (13.9%)
Education (n, %)	
Less than high school	9 (12.6%)
High school	12 (16.7%)
More than high school	51 (70.9%)
Employment Status (n, %)	
Employed	4 (5.6%)
Unemployed	18 (25.0%)
Retired	46 (63.9%)
Volunteer	21 (29.2%)
Diagnosis (n, %)	
Multiple sclerosis	17 (23.6%)
Spinal cord injury	14 (19.4%)
Muscular Dystrophy	5 (6.9%)
Stroke	4 (5.6%)
Arthritis	4 (5.6%)
Lower limb amputation	2 (2.8%)
Other	26 (36.1%)
Years with diagnosis	
Median	25.8
Range	1.8–72.6

Characteristic	Value
Years using power wheelchair	
Median	10.0
Range	0.5–39.0
Primary Mobility Device (n, %)	
Power wheelchair	62 (86.1%)
Manual wheelchair	7 (9.7%)
Other	3 (4.2%)
Powered wheelchair frame (n, %)	
Front wheel drive	4 (5.6%)
Mid wheel drive	40 (55.6%)
Rear wheel drive	28 (38.9%)
Power Wheelchair Use (n, %)	
At home	54 (75.0%)
In the community	71 (98.6%)
For leisure activities	47 (65.3%)

Note: For the employment status and power wheelchair use variables, participants had the option to choose all answers that apply. Also, for continuous data, we report the mean value ($\pm$ SD) when the data were normal. When the data were non-normal, we report the median value and the range.

Table 2
WST-Q 4.1 Percentage Success Rates and Agreement for Individual Wheelchair Skills Between Baseline and 1 Month

Skill	WST-Q Time 1		WST-Q Time 2		% Agreement
	N	% Success	N	% Success	
1. Moves controller away and back	59	98.3	60	98.3	94.4
2. Turns controller on and off	72	95.8	72	97.2	98.6
3. Selects drive modes and speeds	72	100	72	100	100
4. Controls tilt function	48	97.9	47	97.8	98.6
5. Control recline function	7	85.7	6	83.3	97.2
6. Disengages and engages motors	71	36.6	72	38.8	86.1
7. Operates battery charger	72	61.1	72	66.6	93.0
8. Rolls forward 10m	72	100	72	100	100
9. Rolls forward 10m in 30 sec	72	97.2	72	100	97.2
10. Rolls backward 5m	72	94.4	72	100	94.4
11. Turns 90° while moving forward	72	100	72	100	100
12. Turns 90° while moving backwards	72	91.6	72	95.8	90.2
13. Turns 180° in place	72	98.6	72	97.2	95.8
14. Maneuver sideways	72	97.2	72	94.4	91.6
15. Gets through hinged door	72	65.2	72	72.2	81.9
16. Reaches 1.5m high object	72	81.9	72	93.0	88.8
17. Picks object from floor	72	69.4	72	75.0	86.1
18. Relieves weight from buttocks	72	86.1	72	87.5	83.3
19. Transfers to bench and back	72	54.1	72	57.5	91.6
20. Rolls 100m	72	100	72	100	100
21. Avoids moving obstacles	72	94.4	72	98.6	95.8
22. Ascends 5° incline	72	100	72	100	100
23. Descends 5° incline	72	100	72	100	100
24. Ascends 10° incline	72	91.6	72	97.2	88.8
25. Descends 10° incline	72	93.0	72	98.6	94.4

Skill	WST-Q Time 1		WST-Q Time 2		% Agreement
	N	% Success	N	% Success	
26. Rolls 2m across 5° side slope	72	88.8	72	97.2	88.8
27. Rolls 2m on soft surface	72	76.3	72	80.5	77.7
28. Gets over 15cm pothole	72	70.8	72	68.0	72.2
29. Gets over 2cm threshold	72	91.6	72	91.6	91.6
30. Ascends 5cm level change	72	62.5	72	66.6	79.1
31. Descends 5cm level change	72	80.5	72	86.1	88.8
32. Gets from ground to wheelchair	72	22.2	72	23.6	93.0

WST-Q = Wheelchair Skills Test Questionnaire

Note: Skills for which the sample size was less than n=72 were either the result of the participant's power wheelchair not having the part or function (e.g., no tilt or recline function), participant error, or tester error.

Table 3

Mean Scores and Correlations for the Study Measures

Study Measures (maximum score)	Mean (SD)	Correlation (<i>r</i>) with WST-Q, <i>p</i> value
WST-Q (baseline) (/100)	83.6 (10.9)	N/A
LSA (assisted life space) (/5)	2.0 (0–5)	0.47, <i>p</i> <0.001
WheelCon-P (/100)	76.6 (13.5)	0.47, <i>p</i> <0.001
WST (/100)	80.1 (10.5)	0.65, <i>p</i> <0.001

WST-Q = Wheelchair Skills Test Questionnaire; LSA = Life Space Assessment; WheelCon-P = Wheelchair Use Confidence Scale for powered wheelchair users; WST = Wheelchair Skills Test.

Table 4

Percentage Success Rates and Agreement for Individual Wheelchair Skills Between the WST-Q and WST

Skill	WST-Q		WST		% Agreement
	N	% Success	N	% Success	
1. Moves Controller away and back	59	98.3	57	96.4	94.4
2. Turns Controller on and off	72	95.8	72	95.8	97.2
3. Selects drive modes and speeds	72	100	71	92.9	91.6
4. Controls Tilt Function	48	97.9	48	95.8	95.8
5. Control Recline Function	7	85.7	6	83.3	95.8
6. Disengages and Engages Motors	71	36.6	71	30.9	88.8
7. Operates Battery Charger	72	61.1	34	44.1	45.8
8. Rolls Forward 10m	72	100	72	100	100
9. Rolls forward 10m in 30 sec	72	97.2	72	100	97.2
10. Rolls backward 5m	72	94.4	72	98.6	93.0
11. Turns 90° while moving forward	72	100	72	98.6	98.6
12. Turns 90° while moving backwards	72	91.6	72	88.8	87.5
13. Turns 180° in place	72	98.6	71	91.5	88.8
14. Maneuver sideways	72	97.2	70	62.8	62.5
15. Gets through hinged door	72	65.2	71	71.8	77.7
16. Reaches 1.5m high object	72	81.9	72	84.7	91.6
17. Picks object from floor	72	69.4	71	56.3	81.9
18. Relieves weight from buttocks	72	86.1	70	82.8	84.7
19. Transfers WC to bench and back	72	54.1	72	44.4	93.0
20. Rolls 100m	72	100	72	100	100
21. Avoids moving obstacles	72	94.4	71	92.9	88.8
22. Ascends 5° incline	72	100	71	100	98.6
23. Descends 5° incline	72	100	71	100	98.6
24. Ascends 10° incline	72	91.6	71	98.5	91.6
25. Descends 10° incline	72	93.0	71	98.5	91.6
26. Rolls 2m across 5° side slope	72	88.8	71	94.3	84.7

Skill	WST-Q		WST		% Agreement
	N	% Success	N	% Success	
27. Rolls 2m on soft surface	72	76.3	70	87.1	73.6
28. Gets over 15cm pothole	72	70.8	70	52.8	65.2
29. Gets over 2cm threshold	72	91.6	70	95.7	93.0
30. Ascends 5cm level change	72	62.5	71	54.9	66.6
31. Descends 5cm level change	72	80.5	71	81.6	80.5
32. Gets from ground to wheelchair	72	22.2	70	10.0	84.7

Note: Skills for which the sample size was less than n=72 were either the result of the participant's power wheelchair not having the part or function (e.g., no tilt or recline function), participant error, or tester error.