FITNESS-TO-DRIVE SCREENING MEASURE SHORT FORM (FTDS-SF)

USER MANUAL

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INTRODUCTION

The approaching "Gray Tsunami"—the rapidly growing population of aging Baby Boomers—has placed renewed importance on the identification of at-risk older drivers. The Comprehensive Driving Evaluation (CDE), the gold standard for assessment, is expensive and is often unavailable to drivers in this age group. Additionally, family members, friends, or caregivers who share lived experiences with older individuals have valuable information to contribute regarding fitness-to-drive. To overcome the limitations of the CDE and to better involve the public in identifying at-risk drivers, researchers, led by Dr. Sherrilene Classen at the University of Florida's Institute for Driving, Activity, Participation, and Technology and the University of Western Ontario's i-Mobile Lab, developed and validated the Fitness-to-Drive Screening Measure (FTDS) and the Fitness-Drive Screening Measure Short Form (FTDS-SF).

OVERVIEW

To enable family members or friends, in the USA and Canada, to detect at-risk older drivers, Dr. Sherrilene Classen and colleagues, developed and tested the Fitness-to-Drive Screening Measure (FTDS)[1-9; 13-14], a user friendly online tool available at fitnesstodrivescreening.com. Family members, caregivers, or friends who have driven with the driver in the last three months, may rate the drivers' driving difficulties by completing 54 screening questions. After completing the questions, a keyform or rating profile of each driver is produced that includes a classification of the driver into one of three categories: *at-risk driver*, *routine driver*, or *accomplished driver*. Based on the specific driver classification, recommendations-- the logical next steps for family members, friends or clinicians-- are suggested for each driver. These recommendations entail guidelines for continued fitness to drive, seeking interventions, or starting conversations about stopping driving. The FTDS has been translated into Japanese and Korean with demonstrated psychometric support for the Korean version [10, 11, 12, 13]. A shorter version has been developed (32 items) with excellent predictive validity of fitness to drive outcomes [15, 16, 17] followed by the development of a 21-item FTDS Short-Form[18]. A Computerized Adaptive Test is currently under way. Testing the efficacy of the FTDS as a clinical decision-making tool in the community, among clinicians (general practitioners, specialty practitioners, nurse practitioners and occupational therapist) and caregivers, are next steps in this research.

THEORETICAL MODELS

Three theoretical models formed the basis for the instrument: the Precede-Proceed Model of Health Promotion (PPMHP) (Green & Kreuter, 2005), Haddon Matrix (1972), and Michon's model of driving behavior (1985). The PPMHP guides assessment of both

personal and environmental factors influencing health and planning targeted interventions. Haddon Matrix provides a framework for crash prevention and injury reduction focusing on interactions among the person, their car and the physical and social environment. Michon's model categorizes driving behaviors as operational (on sub-conscious level), tactical (car handling and driving maneuvers) and strategic (driving decisions and planning). Informed by these models, the researchers established the following domains for item generation: Person-Vehicle (PV), Person-Environment (PE), and Person-Vehicle-Environment (PVE). The PV domain includes behaviors primarily related to use of car controls or features, such as driver's use of emergency brake. The PE domain includes behaviors primarily responsive to physical factors such as terrain or weather; or to social factors such as interaction with passengers. The PVE domain includes behaviors primarily combining a person's skills, attitudes, and behaviors in the use of vehicle features or controls, and in response to environmental factors, such as controlling one's car on an icy road.

DESCRIPTION

The FTDS-SF Measure is a user-friendly web-based tool that proxy raters (family members, friends, or caregivers) and clinician's (e.g., occupational therapists, physicians) can use to identify potentially at-risk older drivers. Located online at www.fitnesstodrivescreening.com, the measure is freely available to anyone with internet access. The tool enables a proxy rater who has observed an older adult's driving during the past three months, to rate the driver's difficulties on any of 21 driving skills. Upon completion of the screening, the FTDS-SF generate a keyform which displays the proxy ratings and includes a classification of the driver into one of three categories, namely at-risk driver, routine driver, or accomplished driver. The definitions for each classification are:

- At-risk driver: A*lthough the driver can perform some basic driving skills, there are safety concerns that need immediate attention.*
- Routine driver: *The driver shows early signs of needing intervention. There are driving skills that are causing concern.*
- Accomplished driver: *Driving is overall good, but difficulty may be experienced with some challenging driving situations.*

Included in the keyform are examples, taken from the proxy ratings, of items that present difficulty for the driver. Depending on the driver classification, recommendations are suggested for the driver. Recommendations include evaluations by a physician and an occupational therapist who is also a certified driver rehabilitation specialist (OT-CDRS) for At-risk or Routine drivers. For Accomplished drivers we provide guidelines for maintaining fitness-to-drive such as receiving regular health care check-ups and taking a class for mature drivers. In addition to recommendations, we also provide resources to assist in the transition to driving retirement, such as how to locate Eldercare and local transportation options.

The FTDS-SF has three sections: Section A.1., Demographics or general information about the rater; Section A.2., Demographics or general information about the driver; Section B, Driving history profile; and Section C, Ratings of driving difficulty pertaining to 21 driving skills. Informed by Item Response Theory (IRT) principles, the driving skills included in the FTDS range from easy to challenging items.

COMPLETING THE FTDS-SF

Follow the next steps to complete the FTDS-SF.

1) Rater selection. Before using the FTDS-SF, decide who will complete the rating. The FTDS-SF must be completed by a proxy rater, a family member, friend, or caregiver who has observed the driver's driving in the last three months and is able to answer questions about difficulty the driver may have with everyday driving skills.

2) Review and accept the liability statement, which reads:

The Fitness-to-Drive Screening Short Form (FTDS-SF) Measure is not a diagnostic instrument and is intended to be used by caregivers and/or family members of the driver to assist with identification of driving difficulty and next steps for addressing driving fitness. Completion of the FTDS-SF may take place in a home or community setting, or during a visit with a health care provider. The University of Florida disclaims any liability, loss, or risk incurred as a consequence, directly or indirectly, from the use and application of any of this material. The FTDS-SF is provided for educational or health screening as described above, any other use requires the explicit permission of the University. Except for as outlined above, no production, distribution, or reverse engineering (process of discovering the technological principles of a device, object, or system through analysis of its structure, function, and operation) is permitted without written permission from University of Florida. Questions or requests for permission should be sent to ftds@phhp.ufl.edu.

3) Duration. The FTDS-SF took between 14-16 minutes from start to finish when completed by team members at the Institute for Mobility, Activity, and Participation. Team members consisted of a group of individuals with various degrees of exposure to the FTDS-SF.

4) Instruction. The web-based FTDS-SF includes both instructional text and video instruction for the proxy rater.

5) Administration.
    a) All ratings should be based on the proxy rater's best judgment of the driver's skills.

    b) General history and driving habits information can be obtained directly from the driver.

c) Test environment. To complete the FTDS the proxy rater needs to have a computer with internet access and a printer. A color printer is preferable as it will display the color-coded ratings of the keyform.

d) The FTDS-SF has three sections:

Section A – Section A.1 (Demographics for the Proxy Rater) and A.2 (Demographics for the Driver): Information about the person completing the rating is important to us – so we ask a set of general information questions about the proxy rater in addition to questions we ask about the driver.

Section B – Driving History profile: The proxy rater will provide information about the driver's history. For example, one of the questions asks how many days a week they drive, and what (if any) types of driving they avoid.

Section C – Rating of Driving Skills: The proxy rater will use their best judgment and use the driver's past experiences to rate the level of difficulty the driver has with 21 driving skills. The rating scale is:

> **Very Difficult** – the driving skill presents a major challenge
> **Somewhat Difficult** – the driving skill presents a moderate challenge
> **A Little Difficult** – the driving skill presents a minor challenge
> **Not Difficult** – the driving skill presents little or no challenge

e) Data collection. The information collected during completion of the FTDS-SF does not identify the driver or the proxy rater.

f) User Satisfaction Survey. After completing the FTDS-SF, we request that end users give feedback following the link for the User Satisfaction Survey.

g) Support. Live support is not available, but questions can be e-mailed to ftds@phhp.ufl.edu.

h) Keyform. Recommendations are given based on the driver profile. When difficulties with skills are identified, or if you have concerns about driving not addressed by this screening, seek the assistance of an OT-CDRS. A link to find an occupational therapist who is a CDRS is shown on the recommendations page after you complete your rating of the driver.

i) Scoring. Scoring is completed automatically using an algorithm and software built into the website. FTDS-SF ratings are based on the difficulty of the driving skill. A rating for each driver: a) assigns an overall number between 1 and 100,

and b) categorizes the driver in one of the three driver categories. Our research has shown that most drivers fall in the Accomplished driver category (54.5%), then the Routine driver category (39.5%) and next the At-risk driver category (6%).

RATIONALE FOR DRIVER CLASSIFICATION

This research was based on 200 drivers from Florida and Ontario, Canada, aged 65-85 years who were healthy community dwelling licensed drivers, representing a variety of ethnic and racial groups, economic and educational levels, and who were actively driving in the three months prior to being rated. Each driver was rated by a proxy rater, who was a caregiver, family member, or friend.

The researchers examined patterns of driving difficulty and developed characteristics of drivers who fit each of the three driver groups: accomplished driver (fit to drive), routine driver (some difficulty with driving skills), and at-risk driver (at risk and potentially unfit to drive). In some cases the ratings for the driver may not match these patterns, and the driver cannot accurately be assigned to a group. Yet, based on the driver's score, he/she still receives a profile and a set of tailored recommendations.

RESEARCH STUDIES

This measure was developed since 2007, with initial testing at the University of Florida in Gainesville Florida, and the Centre for Safe Driving at Lakehead University in Thunder Bay, Ontario, Canada. In consecutive studies through 2012, the researchers conducted 200 comprehensive driving evaluations on older drivers and collected data from 200 proxy raters (family members or friends) to determine measurement properties for the 54-item Fitness-to-Drive Screening Measure, including face, content, construct and criterion validity, factor structure, dimensionality, and item/person-level psychometrics [1-3; 5]. We determined the rater reliability and rater severity of the three rater groups (older driver, caregiver/family member, and driving evaluator) [4]. In 2018, the number of items in the original 54-item FTDS was reduced to construct the 21-item FTDS Short Form [6]. More details on results of these studies and psychometric properties of the FTDS and FTDS-SF can be found in the references listed below.

IMPLICATIONS

Our findings suggest that this measure may be useful in: (1) helping family members/caregivers identify at-risk older drivers and providing logical next steps based

on key form recommendations; (2) aiding OT practitioners in identifying an entry point for further general intervention or referrals; and (3) allowing a CDRS to develop realistic and targeted intervention goals to promote driver fitness.

PSYCHOMETRICS

Psychometrics for the 54-item FTDS were established as follows. Through focus groups, we have established *face validity.* We established *content validity* by achieving 84% on a final content validity index completed by four expert reviewers. We determined the *construct validity* via Rasch analysis, identifying the person-and-item fit hierarchy of the items, structure of the rating scale, and homogeneity of the fitness to drive construct. We determined *unidimensionality* with factor analysis. We also determined *rater reliability* among three rater groups (older drivers, family members/caregivers, and the driving evaluator), and *rater effects* (level of leniency or severity in rating the driver on the items) among these groups. We have showed through *concurrent criterion validity* that the older drivers showed statistically significant, yet poor, concurrent criterion validity compared to the family members/caregivers, who showed good concurrent criterion validity to the on-road driving test.

Psychometrics for the 21-item FTDS-SF were established as follows. The Rasch based FTDS-SF was constructed using a mixed methods design [6]. Rasch analysis was used to determine the critical items and a qualitative content validity method was used to verify and select the items from Section C with the most clinical relevance. Receiver operator characteristics curve results indicated the FTDS-SF demonstrated good concurrent criterion validity with the gold standard on-road driving test [6].

FIELD TESTING

We tested the usability, appearance, and acceptance of the original web-based 54-item FTDS through focus groups with occupational therapists, certified driver rehabilitation specialists, and family members/ caregivers. Lastly, we developed a keyform, or visual output summary of the caregiver ratings. Based on their ratings, this output summary (i) classifies a driver in one of four main groups; (ii) provides personalized examples of real world driving challenges; (iii) recommends logical next steps for the caregiver; and (iv) suggests general health and fit-to-drive strategies.

FINDINGS MEETINGS

Three findings meetings were conducted with proxy raters between October 2012 and January 2013, to test the original web-based 54-item FTDS. In the findings meetings, raters completed the FTDS, guided by on-line video instruction, and received scoring and recommendations for the driver they rated. Raters then provided feedback via a visual analog scale (VAS) on the FTDS formatting, instructions, wording, appropriateness of web features, clarity, and understandability. The researchers captured raters' comments and suggestions for further enhancements and obtained a mean VAS score of 9.13, SD=±0.52, suggesting excellent ratings for the current version of the FTDS. Based on the ratings, we concluded that FTDS revisions and modifications led to a more user-friendly, useful, and acceptable screening tool.

FEEDBACK FROM AAA and the AARP

In evaluating the use of the 54-item FTDS, our partners at AARP and AAA provided feedback to improve wording of the FTDS, clarify concepts, and suggest additional features to make the 54-item FTDS user-friendly for older adults and caregivers.

CONSTRUCTING THE FTDS-SF

In 2016, the research team used Google analytics (n.d.) to explore and establish the 54-item FTDS' user patterns and trends [7]. This study determined that although at the time 43,000 users had accessed the 54-item FTDS, the users failed to spend the recommended 20 minutes to complete the tool. To overcome this concern, our research team recommended decreasing the completion time of the 54-item FTDS by reducing the number of items in the tool [7]. Using Rasch analysis and content validity index scores the 54-item FTDs was reduced to a 21-item Short Form [6]. Validity testing of the FTDS-SF indicated the 21-item tool could correctly discriminate between drivers who passed or failed the on-road assessment (AUC = 0.75, $p < 0.05$, 95% CI [0.65, 0.84] [6].

The 21-item version of the FTDS includes the following changes:

SECTION B

Fourteen items (items B.14-B.29) were removed from Section B (Driving History Profile) of the FTDS.

Two items related to the use of in-vehicle technologies and advanced driver assistance systems were added to gather information about the use of the increasingly available in-vehicle technologies (items B.17 and B.18)

SECTION C

34 items (items C.1-12, C.14-24, C.27, C.28, C.30-33, C.36, C.39, C.53, C.54) were removed from Section C (Driving items) of the FTDS.

CANADIAN VERSION OF THE FTDS-SF

Since becoming available online in 2012, the FTDS has provided resources and recommendations specific to the United States of America (U.S.) only. On September 1, 2015 a Canadian version of the 54-item FTDS, specific to the Canadian context with Canadian resources and recommendations also became available online [8]. In 2020, the Canadian version of the FTDS-SF also became available.

The Canadian version of the FTDS-SF differs from the American FTDS-SF in the following ways:

SECTIONS A.1 AND A.2

Race and ethnicity items of Section A.1 and A.2 (Demographics or general information about the rater or driver) of the U.S. version of the FTDS were modified to fit the Canadian context.

The following items were modified:

a) Items A.1.3 and A.2.3 (What is your ethnicity? Do you consider yourself to be?) and its corresponding options were replaced with (Which population group(s) do you the caregiver, family member or friend identify with) and its corresponding options.
b) Items A.1.4 and A.2.4 (What is the driver's race? (Choose one)) were removed from Sections A.1 and A.2.

SECTION C

The Canadian resources and recommendation sections were added to the Canadian 54-item FTDS site. Resultant Canadian resources were obtained through a study conducted by Dr. Sherrilene Classen and team at the University of Western Ontario [9]. The study investigated relevant Canadian resources for at-risk drivers from the perspective of key stakeholders such as occupational therapists, doctors, certified driving rehabilitation specialists, and advocacy organizations. Resulting Canadian resources were matched to its equivalent U.S. resource and added as a Canadian resource on the Canadian FTDS. These resources were also used for the FTDS-SF.

CUSTOMER SATISFACTION SURVEY

The 1-minute customer satisfaction survey is a 10-item questionnaire that FTDS users may use to rate their interaction with the tool.

Three items were added to the customer satisfaction survey.

a) 2.0 Did you watch the videos?
b) If no, 2.1 indicate the main reason for not watching the videos.
c) 2.3 Indicate the main reason for dissatisfaction

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