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**Development of a Transportation Skills Assessment Tool (TSAT) for  
Individuals with Autistic Spectrum Disorder to Aid in Finding Safe and  
Accessible Paratransit Services**

Final Report  
June 2012

Submitted By

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In Cooperation with

Organization for Autism Research  
And  
U.S. Department of Transportation

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16. Abstract  This project was for the development and distribution of a Transportation Skills Assessment Tool (TSAT) for individuals with the Autistic Spectrum Disorder to understand the skills necessary to ride various paratransit and community transportation services. These services include fixed route, complimentary ADA paratransit, special transportation, community transportation, employment transportation and/or Medicaid transportation. The TSAT will evaluate transportation services frequently used by individuals with disabilities for competitive and non-competitive employment sites, education services, shopping, Medicaid/Medicare transportation, non-emergency medical appointments (including any therapies), social and recreational activities, etc. While these services are available to individuals with disabilities, they are often underutilized by individuals on the autism spectrum. Providing a tool to understand necessary skills for various transportation services offered will allow for a larger segment utilize these existing services, some of which are mandated for individuals with disabilities. The TSAT will also furnish individuals as well as educators, caregivers and professionals in the field the skills that are necessary to utilize the least restrictive type of transportation services available. The TSAT can help focus on the current service that matches the current skills the individual has while also determining the requisite skills needed for less restrictive types of transportation. The ability to access safe and appropriate transportation will aid in understanding and training individuals to access various types of transportation options. The development of the will allow for an increase in access to transportation, which can in turn lead access to employment, housing and community life opportunities thus increasing the quality of lives for individuals on the spectrum.			
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# **Final Report:**

## **Development of a Transportation Skills Assessment Tool (TSAT) for Individuals with Autistic Spectrum Disorder to Aid in Finding Safe and Accessible Paratransit Services**

### **1. Executive Summary**

Accessing safe and appropriate transportation is necessary for employment opportunities, shopping, engaging in social and recreational activities, medical appointments, and other quality of life indicators. For some on the autism spectrum, driving a car or using public transit may not be a feasible solution. This segment of the population may need to access some type of public paratransit service that includes additional supports.

In order to assist individuals on the autism spectrum in accessing public paratransit services, a team of researchers from Rutgers University developed and designed the Transportation Skills Assessment Tool (TSAT). The tool was modeled after other assessments that are commonly used to evaluate individuals on the spectrum. The goal of the TSAT is to offer a reliable prediction on the ability of an individual to independently use public paratransit services based on their performance in a controlled testing environment.

The TSAT tool developed by the researchers evaluates 37 separate tasks to determine the capability of an individual to use up to five different types of paratransit services. The paratransit services evaluated are the following: hand-to-hand, door-through-door, door-to-door, curb-to-curb, and ADA complementary. The tool is designed with three hierarchical sections for the five different paratransit types as well as the trip planning and scheduling section. The TSAT is designed to simulate each of the necessary skills, in a class room setting, in order to evaluate the individual's ability to independently travel using one or more of the paratransit services. Of the 37 assessments, 36 were modified from previously validated assessment tools, and one was developed by the Rutgers team.

Once the initial tool was developed, the TSAT was distributed to five expert end users who represent a variety of transit and autism support organizations through a purposive sampling approach. The expert evaluations were helpful in identifying areas of strength and weakness of the TSAT. The experts also provided insight on how to improve the tool.

As part of the development process, a pilot test was conducted with five adults from the Rutgers Douglass Development Disabilities Center. Of the five individuals tested, three were determined to have the ability to ride hand-to-hand services independently and two were determined unable to ride paratransit independently. The pilot test indicated the TSAT was able to predict the capabilities of an individual in a simulated real-world environment based on the in-class results with 100% accuracy.

Future directions for the TSAT include validation and distribution of the tool. Test trials during the validation phase will replicate the pilot study with a statistically determined number of individuals per trial group. The trial groups will include the three hierarchical sections for the five different paratransit types as well as the trip planning and scheduling section and those determined unable to ride independently. After all 37 assessments have been statistically verified as an effective measure of evaluating real world paratransit skills the Rutgers team plans to distribute the TSAT nationally.



## **2. Acknowledgements**

The Transportation Skills Assessment Tool was developed through a grant from the Organization for Autism Research. The research team would like to acknowledge those that contributed time and effort to develop the TSAT. In addition to the main authors, contributors to the TSAT Final Report and TSAT Test Protocol for Understanding and Using Paratransit include Dr. Elizabeth Matheis, Ken Lee, Louis Hoffman and Alisa Matlin from Rutgers University Center for Advanced Infrastructure and Transportation and Christopher Manente from Rutgers University Douglass Developmental Disabilities Center. The TSAT was developed with assistance from travel trainers Melody Bundy and Larry Lindstrom from NJ TIP, Inc., John McGill from Passaic County Para Transit Programs, Steve Fittante and Jeff Gasiewski from Middlesex County Department of Transportation, Susan Olsson and Lydia Peterson from St. Paul Public Schools, Margaret Groce from NYC Dept. of Education District 75, and Traci Resler from The Kennedy Center, Inc. The discrete tasks were reviewed by members of the Association of Travel Instruction and members of New Jersey's Council on Special Transportation. The experts who provided feedback were Toli Anastassiou – Executive Director of Quest Autism (Adult Day Program in Northern New Jersey), Ed Hoff - ADA Services and Eligibility Manager of NJ Transit, Leslie Long - Director of Housing and Adult Services at Autism Speaks, Judy Shanley – Director of Student Engagement and Mobility Management Easter Seals Project ACTION, and Robert Titus – Director of Public Policy at Autism NJ.

### **3. Literature Review**

For individuals on the autism spectrum mobility is a critical factor for independence and community integration. Access to transportation has been an issue for individuals with disabilities since the inception of the Americans with Disabilities Act in 1990. Research indicates that in the more than 20 years since the law was passed, the problem has only increased. If increased independence is the goal, individuals must have access to and be able to safely use various transportation options. Without adequate access to transportation, adults and adolescents with disabilities cannot secure competitive employment opportunities, attend their preferred educational and vocational programs, use health-care services, or participate in integrated community life [1, 2, 3, 4].

In 2009, a survey in New Jersey found that nearly 82% of adults with autism spectrum disorder (ASD) rely heavily or exclusively on their family, friends, and/or caretakers for transportation [5]. This places a burden on caregivers, while significantly hindering the independence, self-determination, and self-sufficiency of the individual. Meanwhile, the same survey found that less than 5% of adults on the spectrum used paratransit services, including ADA Complementary paratransit services [5].

For individuals with disabilities who cannot drive, a variety of types of public transportation services are available [6]. These include publicly funded bus and rail services with their accompanying ADA paratransit services, government-based community transportation services, non-governmental organization community transportation services, private medical access vehicle services, private for-hire vehicles and privately owned autos [7].

Due to the diverse skill levels of the autism spectrum population, not all individuals will be able to operate a vehicle or rely on fixed route public transportation systems independently. It is probable that two individuals with the same diagnosis will not possess the same functional skills [8]. It is important to be certain that individuals on the spectrum, as well as their caregivers and service providers, have access to the latest and best information regarding access to various transportation services and mobility practices so they can directly and positively impact the individual's quality of life.

In the late 1990s, the Functional Assessment of Cognitive Transit Skills (FACTS) was developed to determine whether an individual with cognitive disabilities has the capability to ride a public transit bus or rail service [9]. The FACTS is composed of 33 tasks that assess the cognitive skills required to use fixed route public transit. The FACTS is still used as a key tool in determining an individual's ability to use standard public transit.

The Activities of Community Transportation (ACTs) which developed in 2009 defined the cognitive steps in using paratransit. A research team at the University of Oregon documented a method to assist individuals with cognitive disabilities in using paratransit and fixed route public transit. [10] The ACTs model provides a comprehensive overview of the tasks required for using a general paratransit system.

## 4. Background

Access to transportation is a vital component of daily living and independence. Heavy reliance on parents and families is unsustainable in the long-term, especially as parents and caretakers grow older. This lack of mobility limits the life choices for adults on the autism spectrum. This can influence housing, employment and community life integration including seeking medical help when necessary. By identifying tasks that successfully predict performance of the actual component skills needed for utilizing paratransit, the TSAT could have implications for planning and designing instruction focused on addressing skill deficits.

Additionally, the ability to use the least restrictive method of transportation possible will enhance the geographic scope and social possibilities available to an individual, while still ensuring their safety and reducing anxiety for all concerned. The TSAT provides a description of the various public paratransit services that may be appropriate for the individual while providing documentation of the skills needed to ride other, less restrictive vehicles. By gaining a better understanding of paratransit alternatives, and leading to improved mobility, the TSAT has the potential to enhance the quality of life of both individuals with ASD and those who care for them.

The current assessment tool that helps transit providers determine whether an individual possesses the ability to use fixed route services or should be deemed eligible for paratransit services is the FACTS. The FACTS allows transit operators and travel trainers to evaluate the cognitive skills and highlight skill deficits of an individual for the independent use of fixed-route transit. However, the FACTS is intended to test for fixed route public transportation, not paratransit services.

The ACTs model provides a general understanding of the tasks required for using paratransit services but does not distinguish the specific skills needed for different paratransit services. While the ACTs model does not provide any assessment features, it does provide a comprehensive description of the tasks needed to use a general paratransit system. The FACTS and the ACTs model provide the framework for formulating and developing an assessment tool for using paratransit services.

The goal of the TSAT project is to provide a thorough understanding of skills that may be missing for an individual to ride *independently* on the various types of paratransit services. The TSAT is designed to provide information on which paratransit services are appropriate for the individual's current skill set and which skills may need to be addressed in order to utilize other available options. The TSAT was developed to help educators, program directors, transition counselors, family members and the individual themselves identify and understand skills required for each transportation mode.

The TSAT is designed to identify which skills are necessary to use various paratransit options, help determine the most appropriate choice of transportation, address the level of skill required, and illuminate possible skill deficiencies. The TSAT contains task analysis of the many crucial skills for using appropriate paratransit options safely. The five paratransit options that will be addressed in the TSAT will include:

- ADA Complementary Paratransit Services
- Curb-To-Curb Paratransit Services
- Door-To-Door Paratransit Services
- Door-Through-Door Paratransit Services
- Hand-To-Hand Paratransit Services

Through the development of the TSAT, a window to public paratransit options will be opened to the population of adults with ASDs. With caregivers' involvement, the TSAT can give individuals with autism for whom other transit options are not possible the ability to benefit from existing publicly funded paratransit services. The TSAT can be conducted in conjunction with annual Individualized Health Plans and Individualized Education Plans. This can increase mobility options, which can, in turn, increase employment opportunities and integration in the community. It also has the potential to reduce the burden on families and caregivers in providing safe, accessible and appropriate transportation choices.

## 5. TSAT Development

The Rutgers team developed the Transportation Skills Assessment Tool (TSAT) through a 2010 Organization of Autism Research grant. The TSAT is designed to determine which of the skills required for riding the various public paratransit services an individual possesses and which skills may need to be developed. The TSAT allows for these skills to be evaluated in a controlled environment.

In order to differentiate the skills required to be used in the TSAT for the different types of paratransit services, an overview of paratransit services was completed by the research team. The research team evaluated ADA complementary, curb-to-curb, door-to-door, door-through-door and hand-to-hand services. To assess and document the required skills the team conducted interviews with paratransit drivers, operators, and dispatchers. The team also directly observed paratransit services by riding in the vehicles with other passengers and monitoring paratransit reservation and dispatch operations. Upon conclusion of the overview, a separate procedure was developed for using each type of paratransit service. The procedure includes the complete list of tasks and the sequence in which the tasks should be completed.

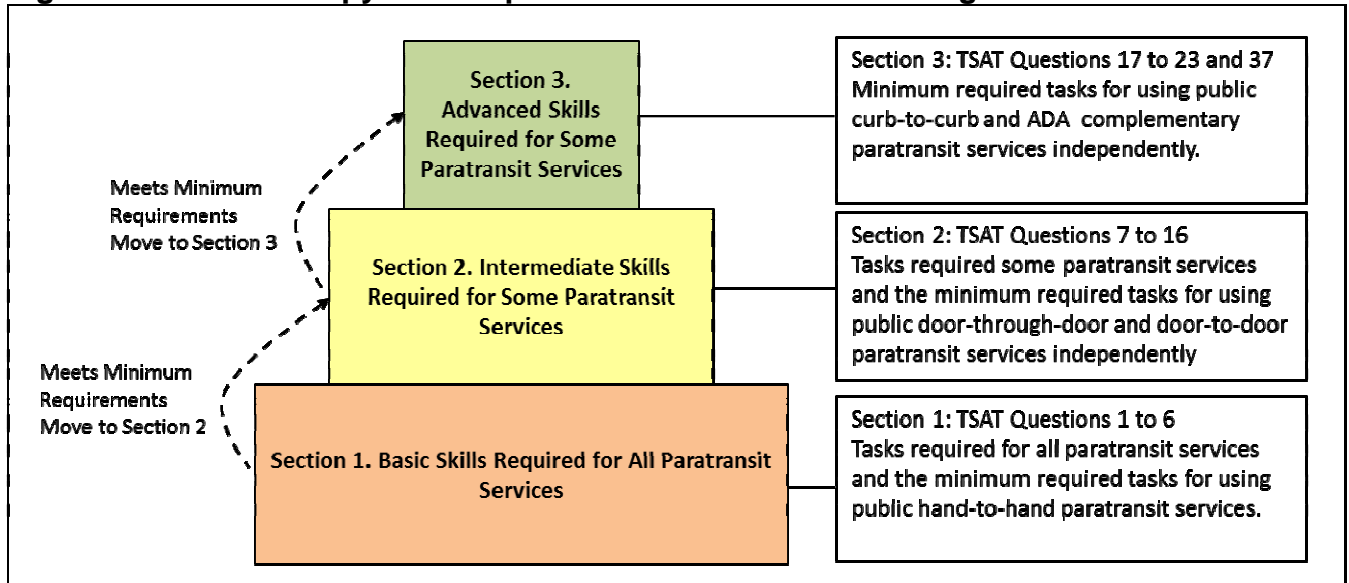
The next step in the development of the TSAT was to evaluate the procedures for clarity and accuracy. The team reached out to members of the Association of Travel Instruction to review the tasks and sequence for riding paratransit services. The travel trainers were requested to participate because many work on developing paratransit use skills, either for transition from paratransit services to fixed route travel or for exclusive paratransit use. The travel trainers brought a unique perspective because of their knowledge of the transit industry terminology, the education system, and the disability community. A comprehensive procedure required for each paratransit service type is located in Appendix A.

Following review with the travel trainers, the next step was to independently review each of the tasks to ensure that they follow current professional standards for working with adults and adolescents on the autism spectrum. After the review of each set of tasks, the separate procedures were collapsed down into a single hierarchical procedure encompassing all five types of paratransit services. The procedure would become the foundation of the final TSAT. The team then reviewed this list of tasks to ensure the description was up to date with the current standards and protocols.

The hierarchical procedure consists of a nested set of skills composed of a foundation of basic skills (Section 1) building to intermediate skills (Section 2) and culminating in advanced skills (Section 3). The hierarchical procedure of the TSAT is displayed in a

pyramid with the foundational skills as the base, as illustrated in Figure 1. Section 1 includes a review of the basic tasks required for all types of public paratransit service. Section 2 includes the minimum requirements for using a service in which the vehicle operator comes through or to the door for pick-up and drop-off. Section 3 of the assessment involves the skills needed for taking a curb to curb service such as the common ADA complimentary paratransit service. An independent list of skills needed for trip planning and scheduling (Section 4) was also developed.

**Figure 1. Hierarchical pyramid representation of the TSAT design**



To determine the protocol, including the preferred format, evaluations, procedures, and testing methodologies, the team reviewed approximately 18 different assessment tools currently used by professionals to assess the functional skills of individuals with cognitive impairments. The final design of the TSAT utilizes tasks modified from the following: Functional Assessment of Cognitive Transit Skills (FACTS), the Brigance Transition Skills Inventory, the Assessment of Basic Language and Learning Skills – Revised (ABLLS-R), and the Verbal Behavior Milestones Assessment and Placement Program (VB-MAPP) as well as one task assessment developed by Rutgers. The list of required tasks and the discrete assessments from which they were adapted are listed in Appendix B.

After identifying the set of task assessments, each one was individually modified to address the specific requirements for travelling via paratransit. The modified set of discrete tasks was revised to ensure that the assessments mirrored the real-world tasks. Several iterations of the TSAT discrete tests were conducted to evaluate language, content and flow. The language usage in the test was reviewed with a focus on selecting words and phrases that were as clear and precise as possible.

The TSAT was devised to evaluate the appropriate level of ability to use paratransit and can be administered in a variety of environments such as a home, a conference room or other testing environment. The flexibility of the testing environment can facilitate widespread and simple implementation of the TSAT. The TSAT can be conducted in a location with fewer distractions and stress to the administrator and the applicant than an assessment aboard an actual paratransit vehicle. This would allow the administrator to be more attentive during the testing and accurate in their scoring. For the applicant, this allows them to fully demonstrate their true abilities within a controlled environment. This may be superior to alternative assessments by providing less risk of injury to the individual being assessed. It should be noted that after the TSAT paratransit determination is made applicants are encouraged to practice the sequence and a test-run prior to independent travel.

The TSAT outlines the skills an individual has for using public paratransit services and what skills are needed to ride that various options that may be available. Knowledge of the key skills required for independent travel can greatly enhance the quality of life for adults on the spectrum. The TSAT also includes a description of the types of paratransit and/or public transportation that may be available. This can help the caregivers and service providers determine the availability of the particular transit service appropriate for the individual, in their area.

After the first version of the TSAT was developed, the team conducted both a pilot test with adults on the autism spectrum and conducted a survey with a purposive sample of reviewers who represent potential end-users of the TSAT. The feedback received from the expert reviews assisted the Rutgers team in making the appropriate and necessary revisions. Details of the review can be found in part “5. Expert Users Review” of this report.

The research team conducted a pilot test of the TSAT with clients of the Rutgers Douglass Development Disabilities Center. The primary purpose of pilot test whether the TSAT could reliably predict the ability of an individual to perform the required tasks in a real world paratransit environment. The project team focused on the consistencies and discrepancies that occurred between predictions derived from TSAT and the performance on public paratransit services in a field test. Details of the review can be found in part “6 Pilot Test” of this report.

The TSAT Test Protocol includes the following information: Definitions Used in the Transportation Skills Assessment Tool for Type of Travel, Paratransit Service Definitions, and Finding Local Paratransit Services. These are intended to provide an understanding of the language and terminology often affiliated with paratransit and community transit services.



As a reliable tool, the TSAT has the potential to assist a larger segment of individuals on the autism spectrum in utilizing existing paratransit services, including those mandated to be available for individuals with disabilities. After validation, the tool would improve access to transportation, which would, in turn, lead to access to employment, housing and community life opportunities and thus increase the quality of life for individuals on the spectrum.

The latest version of the Transportation Skills Assessment Tool: Test Protocol for Understanding and Using Paratransit Services as well as the accompanying Test Score Sheet booklet can be found in Appendix C, which is under a separate cover.

## **6. Expert Users Review**

In order to understand how the population of potential assessors would interpret the TSAT, a group of prospective users who had expertise in either paratransit or autism were asked to review the complete TSAT portfolio (composed of the TSAT Test Protocol for Understanding and Using Paratransit Services, the TSAT Test Score Sheet, and the 3 accompanying Trip Sequence booklets for using the various paratransit services) through an online survey. The experts were chosen using a purposive sampling approach to ensure that a large variety of potential TSAT users would be represented. The research team reached out to approximately 18 individuals to confirm that the reviewers had the time and interest to participate in the survey. Of those 18, 10 stated they would be able to review the TSAT during the required time window. The experts were requested to review the TSAT as well as the accompanying pictures used in the pilot test and to answer a short survey about their overall impressions. Out of the 10 who agreed to participate, five were able to complete the survey within the allotted time frame. The experts who provided feedback for the TSAT include Toli Anastassiou, Executive Director of Quest Autism (Adult Day Program in Northern New Jersey); Ed Hoff, ADA Services and Eligibility Manager of NJ Transit; Leslie Long, Director of Housing and Adult Services at Autism Speaks; Judy Shanley, Director of Student Engagement and Mobility Management at Easter Seals Project ACTION; and Robert Titus, Director of Public Policy at Autism NJ. Although the purposive sample included a self-advocate, the individuals contacted were unable to complete the request within the required time frame. An image of the on-line survey is located in Appendix D.

The reviewers were provided with the TSAT portfolio and a brief letter that explained the survey, the materials used, and how the product was developed. They were not provided with formal training for administering the TSAT. The reviewers were informed that the individual responses would be anonymous to foster a candid evaluation of the TSAT.

The first question asked if after reviewing the TSAT the reviewers were able to “conceptualize an appropriate form of paratransit service for an individual on the autism spectrum.” Of the five reviewers, two felt that the TSAT helped determine the appropriate tasks ‘to a high degree’, and three felt it helped ‘moderately’.

The second question asked whether after reviewing the TSAT the reviewers were able to understand the skills needed to utilize various forms of paratransit services. The results revealed that three of reviewers indicated that the TSAT helped them understand 'to a high degree', and two felt to respond the TSAT helped 'moderately'.

Two reviewers 'agreed' that the TSAT results accurately assessed an individual's capability to use the appropriately determined level of transportation, while two were 'neutral' and one 'disagreed'. Two reviewers 'agreed' the content was developmentally appropriate while three were 'neutral'. When the reviewers were asked whether the level of knowledge required to implement the TSAT is consistent with other assessments currently being utilized, two 'agreed' and three were 'neutral'. When the reviewers were asked whether they would add the TSAT to the assessments they currently conduct or would recommend using the TSAT one 'agreed', three were 'neutral' and one 'disagreed'.

The next set of questions focused on the format of the TSAT. All of the respondents felt that the TSAT clearly expressed the ideas intended. When asked about the thoroughness of the content one reviewer thought it was 'excellent', three felt that it was 'good', and one thought it was 'fair'. When the respondents were asked whether they felt the TSAT had a logical progression of abilities, four indicated that the TSAT was 'good' while one responded 'fair'. When asked whether the explanations of the outcomes were effective, three responded they were 'good' and two felt they were 'fair'.

The reviewers were asked three free response questions. Some of the reviewers' responses to these open-ended questions along with the author's comments are presented below. First, the reviewers were asked what they liked about the TSAT. The responses included:

*Reviewers Comment:* "It appeared to be comprehensive; providing cues to observations that may not be obvious."

*Authors Commentary:* The TSAT is designed to interpret both verbal and non-verbal forms of communication. The cues and prompts assist in deciphering the difference between communication barriers and the inability to complete the task.

*Reviewers Comment:* "It was a comprehensive curriculum for understanding the skills that need to exist or be taught for para-transit use."

*Authors Commentary:* The research team spent several months formally and informally interviewing paratransit drivers and operators as well as conducting

field observations with numerous paratransit providers. The intent was to record every step of the paratransit trip to ensure that all the required tasks were thoroughly documented and subsequently vetted by paratransit services providers.

*Reviewers Comment:* “Overall, I like the direction of this document. It appears quite thorough and geared towards a broad spectrum of individuals. It encompasses a thorough review of the various forms of transportation - and their putative requirements. Nice job!”

*Authors Commentary:* The TSAT is intended to evaluate the diverse range of characteristics and skills of adults on the autism spectrum who are not able to drive or use a fixed route bus independently. It focuses on the required tasks needed for paratransit and the ability to perform those tasks through 37 independent, complementary and sequential assessments.

The second open-ended question was to identify areas where the TSAT needed improvement. Some responses were as follows:

*Reviewers Comment:* “Simulated assessment tools are not as effective for people with autism and other developmental disabilities. You will not know if the person is able to use para-transit without an actual community-based assessment for validity.”

*Authors Commentary:* The research team agrees with this comment. However the TSAT can reduce the time, risk and challenges involved with real world assessment by conducting the initial evaluation in a controlled environment. In the scoring component of the test protocol it is recommended that prior to any real world trips the individual practice the trip sequence to ensure that the individual understands and masters all of the demands required for independent travel.

*Reviewers Comment:* “I am not clear if the sequence listed (e.g., Sequence 1: Task 7 in "Door to Door") is a suggested pre-requisite to using "Access Link" or equivalent. If so, my recommendation would be to re-sequence based on practicality of what is "absolutely necessary" to have a ride. Start with the bare necessities to being able to use the service (i.e., 1. sitting for duration of trip; 2. paying driver independently + step 1; etc.). My concern is that the current sequence would potentially delay access to adaptive transportation that could otherwise be accommodated (by caregivers; staff; etc.)”

*Authors Commentary:* This suggestion is incorporated by the three defined travel types (hand-to-hand, door-through-door/door-to-door, and curb-to-curb/ADA complementary) and notations of which tasks can be completed by a caregiver for independent paratransit use. The basic skills required for all types of paratransit are the foundation of any independent travel and can be found in Section 1. Consultations with paratransit providers and travel trainers helped to determine that the 37 tasks identified in the TSAT are those that are essential for various degrees of independent travel.

*Reviewers Comment:* “It was difficult for me to know whether this is a good tool - because I don't have any objective evidence about what skills would be needed for each particular mode of paratransit. I think this assessment definitely helps understand the skill level of individuals - but, to go the next step to say that because a person has this certain skill level, they can use paratransit mode X, I am not sure I could confidently say this about the TSAT. Perhaps, this is the validation step you speak of.”

*Authors Commentary:* The research team has determined that the TSAT needs to be validated through testing in a controlled environment with subsequent observations in the real world to confidently determine if an individual can ride independently. By design the TSAT does not have a cumulative score; rather the applicant must meet the minimum requirement for every assessment in order to prevent any accidental oversight of the inability to perform a required real-world task.

The last open-ended question asked for any additional comments, these include:

*Reviewers Comment:* “1. Responds to greeting: this is a nicety, but should not be viewed as a necessity to transportation. If so, I suggest placing this near the end of the sequence of training ... 6. Identify all of the target behaviors - is it just eating, smoking, sleeping, and sitting correctly? Perhaps video would also be good - a photo may not be a sufficient exemplar, and a video example would be fairly easy to include. ...”

*Authors Commentary:* As the responses can be both verbal and non-verbal, any appropriate response was determined to be necessary for *independent* travel. If an applicant is adversarial or non-responsive, the research team would not recommend the individual for any type of independent *public* paratransit. Therefore the ability to respond to a greeting was determined to be one of the first required tasks to ride independently. For example, an individual traveling alone may need to interact with the driver or a police officer in a non-adversarial way. The research team agrees with the recommendation to include additional target behaviors such as eating. The materials that the research team provided

for review were examples of the test materials used during the Douglass pilot test. The research team recommends that materials be customized for regional paratransit services.

*Reviewers Comment:* “Honestly - because it took me almost four hours to get through the first manual - I did not pick up the next three manuals. Also - how did you make decisions regarding which specific steps would qualify someone across paratransit modes? Do you have any objective evidence that says - if an individual has skills 1-6 - that’s hand to hand; and having skills 1-16 were aligned with door to door, etc.?”

*Authors Commentary:* The reviewer conducted a thorough evaluation that led the research team to make numerous updates and corrections that clarified several of the assessments. The average TSAT execution is roughly 30 to 45 minutes. Regarding the TSAT tests and their relationships to specific service type (hand-to-hand, etc.), the actual tests were derived from existing assessment tools with input from various practitioners (travel trainers and a psychologist). A thorough validation beyond the scope of this project would be required to fully vet the TSAT.

The consensus by the reviewers was that having the three separate Trip Sequence books for specific types of paratransit did not provide any added value. The majority of the reviewers indicated that the task sequences and their explanations should be part of the TSAT Protocol. The modification has been completed and this information is integrated into the “Scoring Results” section of the protocol.

## **7. Pilot Test**

The most important aspect of the TSAT is to determine the accuracy of the predictions. The most important aspect of the pilot test is to determine the validity of the Transportation Skills Assessment Tool. The TSAT is designed to simulate real world tasks. The pilot test was designed to determine whether the tool will accurately predict the ability of an individual with ASDs to perform the tasks in the real world.

The pilot test was divided into three parts. The first was the conducting the TSAT in an in-class test and reviewing the results and determining the appropriate type of paratransit service for an individual. The second part was to conduct an in-vehicle field test that simulated the real world experience of riding on the TSAT determined type of paratransit. The data collected in the real-world test was conducted by a number of trained observers and the scores were then averaged. The final part of the pilot test was to analyze the results of the TSAT in-class test against the averages from the observers.

### **7.1 TSAT In-Class Pilot Test**

The first part of the pilot study was to conduct the TSAT as per protocol in a safe and familiar testing environment. The in-class test was conducted and scored by a specially trained tester who is also a special education teacher and travel trainer, who trains individuals with cognitive disabilities to use public transportation including paratransit. A passing score is a minimum of “1” for every task in a section. In order to complete a section every task in the section must receive a passing score. These tests were observed by at least 3 other team members and recorded for review in case of any discrepancies in testing.

The team tested five adults with diagnoses on the autism spectrum in a private meeting room at the Rutgers Douglass Developmental Disabilities Center in New Brunswick (Douglass). The raw test scores are provided for all 5 subjects in Table 1, color coded by section. Section 1 (red section) determines to the ability to use hand-to-hand paratransit services. After completing Section 1, hand-to-hand, three of the individuals were determined to have passed the section as each question received a passing score. One of the individuals chose not to participate after Section 1 and left the testing room. The four remaining individuals were tested on Section 2 (yellow section, door-to-door) of the TSAT. Section 2 determines the ability to use door-to-door and door-through-door services. For Section 2 none of the individuals were able to achieve passable scores for all the required tasks. The in-class assessor determined Task 12 to be not applicable. Another one of the individuals chose not to continue after Section

2, and three individuals remained to complete Section 3. Section 3 (green section) determines the ability to use curb-to-curb and ADA complementary paratransit services. For the individuals who chose not to continue the test scores are left blank in Table 1. The remaining chose not to participate in the testing of Section 4: Trip planning and trip scheduling skills (Tasks 24-36, blue section) so the scoring section is not included in Table 1.



**Table 1. In Class TSAT Test Scores for Pilot Test**

	In -Class Score				
	Subject 1	Subject 2	Subject 3	Subject 4	Subject 5
Task 1 Greeting	1	1	1	0	1
Task 2 Follow Direction	2	2	2	1	1
Task 3 Sit Appropriately	2	2	2	1	2
Task 4 Know Identification	1	2	1	0	0
Task 5 Identify Self	1	1	1	0	1
Task 6 Bus Behavior	1	1	1	0	2
Task 7 Time Window	NA	2	0		0
Task 8 Dress Appropriately	1	2	1		1
Task 9 Ready on Time and Wait Appropriately	0	0	0		0
Task 10 Out of Door with things	1	0	1		0
Task 11 Board Vehicle/Pay	0	0	2		0
Task 12 Communicate Special Info to Driver	NA	NA	NA		NA
Task 13 Select Seat	2	2	2		2
Task 14 Secure Belt	2	2	2		2
Task 15 DeBoard Vehicle	NA	2	0		0
Task 16 Pick-Up Window Problems	0	1	0		0
Task 17 Pick-Up Spot	0	2	0		
Task 18 Walk to Spot	0	1	0		
Task 19 Stand/Wait for Vehicle	1	1	0		
Task 20 Identify Bus	2	2	2		
Task 21 Emergency-Strangers	0	2	0		
Task 22 Emergency - Lost on Bus	0	0	0		
Task 23 Emergency -Lost off bus	0	0	0		
Task 37 Return to Departure Spot	NA	NA	0		

2 = Pass and exceed requirements

1 = Pass and meets minimum requirements

0 = Fails to meet minimum requirements

NA = Determined not applicable during test

## 7.2 In-Vehicle Field Pilot Test

The second part of the pilot test was to determine if the three individuals who passed Section 1 had the ability to use hand-to-hand public paratransit services independently. According to Douglass policies, the three subjects were required to be accompanied by at least one Douglass staff member for the field test. The Douglass staff members had

minimal contact with the individual and were requested to refrain from prompting or assisting the individual in completing the tasks. For this test, each subject was observed riding the form of paratransit determined as appropriate by the TSAT. Present for each in-vehicle test were between two and four trained observers, who documented the subjects' ability to complete each task. The three in-vehicle field tests were completed on two separate occasions over a two week span. The same Middlesex County Area Transit bus and driver were utilized for all three in-vehicle field tests. The driver was given a specific script to ensure the same level of interaction with each of the subjects. Prior to the in-vehicle test the driver completed a scripted run-through of the full field test with a member of the Rutgers staff. The bus departed from the Rutgers Douglass campus. The destinations were chosen to be places that subjects wanted to visit.

The behavior observed during in-vehicle tests was scored and averaged across the observers for each of the three subjects. This data is presented in Table 2. The score field is left blank when no recorded scores were provided by any of the observers. The same tasks are presented in the field test as in the in-class test but in a different sequence. For analysis purposes the data collected in the field test is presented in the format of the classroom test, using Section 1 and Section 2 definitions. The table is divided into hand-to-hand, as Section 1, for the first six tasks and the door-to-door, as Section 2, for the remaining ten tasks required for hand-to-hand paratransit. For hand-to-hand services tasks 7 to 16 still have to be completed but do not necessarily independently.

**Table 2. TSAT In-Vehicle Field Test Observer Average**

	Observer Average		
	Subject 1	Subject 2	Subject 3
Task 1 Greeting	1		
Task 2 Follow Direction	2		
Task 3 Sit Appropriately	2	2	2
Task 4 Know Identification	1	1	2
Task 5 Identify Self		2	2
Task 6 Bus Behavior	1.5	2	2
Task 7 Time Window	1	2	2
Task 8 Dress Appropriately	1	2	2
Task 9 Ready on Time and Wait Appropriately	1	2	2
Task 10 Out of Door with things	1	2	2
Task 11 Board Vehicle/Pay	2	2	2
Task 12 Communicate Special Info to Driver		1	2
Task 13 Select Seat	1.75	1.75	2
Task 14 Secure Belt	2	1.75	2
Task 15 DeBoard Vehicle	1.5	2	1.75
Task 16 Pick-Up Window Problems			

Note – Subject 1 had 2 observers scoring the test, Subjects 2 and 3 had 4 observers scoring the test.

To analyze the quality and consistency of the recorded data the interobserver agreement was reviewed. In the field test, the agreements were calculated as the ratio of high to low scores per task, averaged across all completed tasks. The range of agreements for each subject is shown in Table 3. The scoring agreements indicates the reliability and accuracy of the observers. The percent of overall interobserver agreement ranged from 57% to 83% across three subjects. To determine the chance-adjusted measure of agreement, the kappa statistic was calculated. A kappa statistic that is close to 0.0 indicates that the agreement is due to chance, while 1.0 indicates a true effect of agreement. The kappa statistic for the observers indicate a moderate agreement for Subject 1 and a substantial agreement for Subjects 2 and 3.

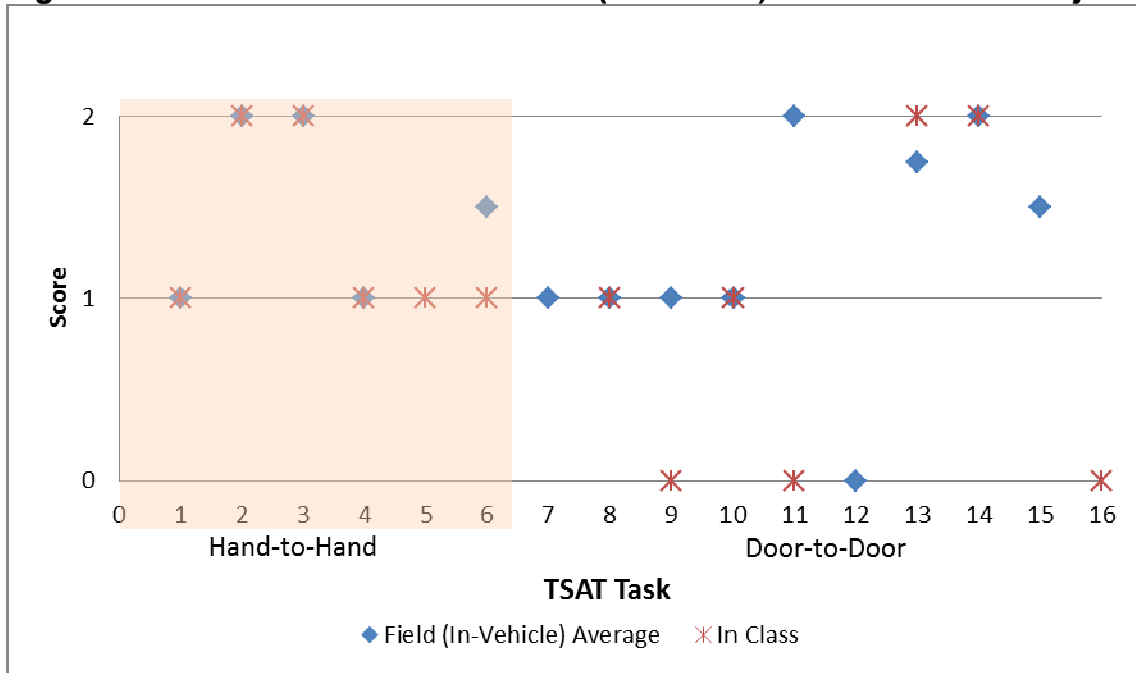
**Table 3. Interobserver Agreements**

	Subject 1	Subject 2	Subject 3
Percent of overall agreement	57%	81%	83%
Free-marginal kappa statistic	0.464286	0.708334	0.750001

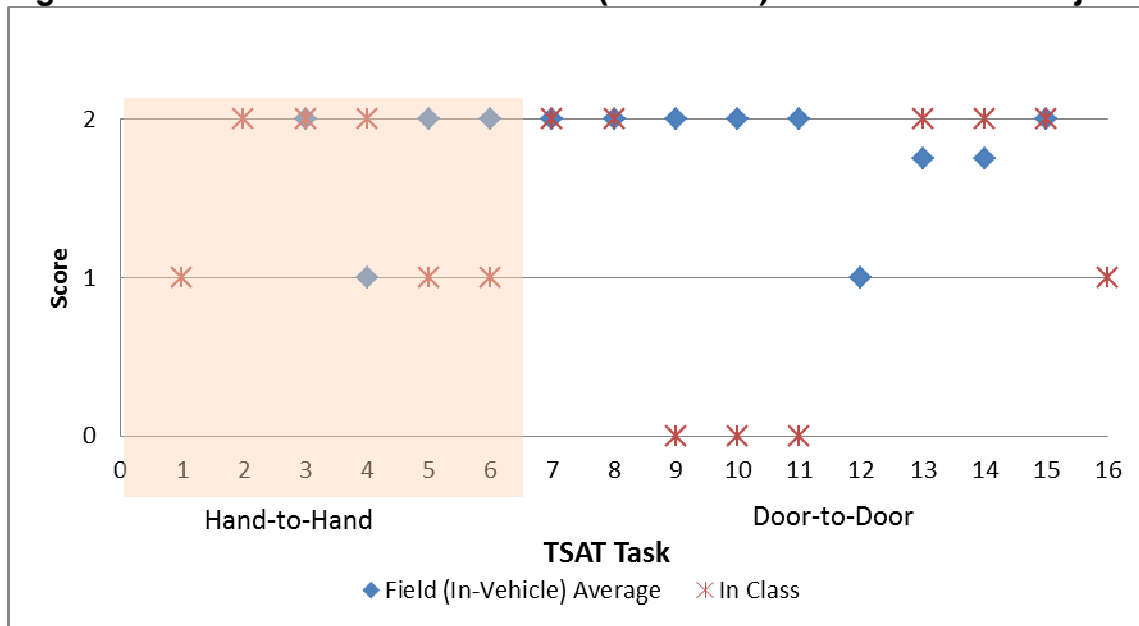
### 7.3 TSAT In-Class and In-Vehicle Pilot Test Comparison

For the three individuals who were part of the pilot study, the scores from the in-class and the field tested, in-vehicle average are illustrated in Figure 3 for Subject 1, Figure 4 for Subject 2, and Figure 5 for Subject 3. The field (in-vehicle) is the average scores whereas the in-class score is based on the results of a single observer. Based on the results of the in-class study the first 6 tasks, hand-to-hand were determined to be the primary measures of the in-vehicle test. The remaining 10 tasks, titled door-to-door, were considered to be secondary measures. The results are indicated in Figures 3, 4 and 5 for the primary and secondary measures of the in-vehicle test. For tasks 7 to 16 whether or not the subject received assistance is not reflected in the scoring. Tasks 7 to 16 include pre-trip skills such as getting ready on time, waiting appropriately, and paying attention to the time window. When a score indicator is not presented in Figures 2, 3 and 4 either the in-class test was not completed or the activity was not observed in the field.

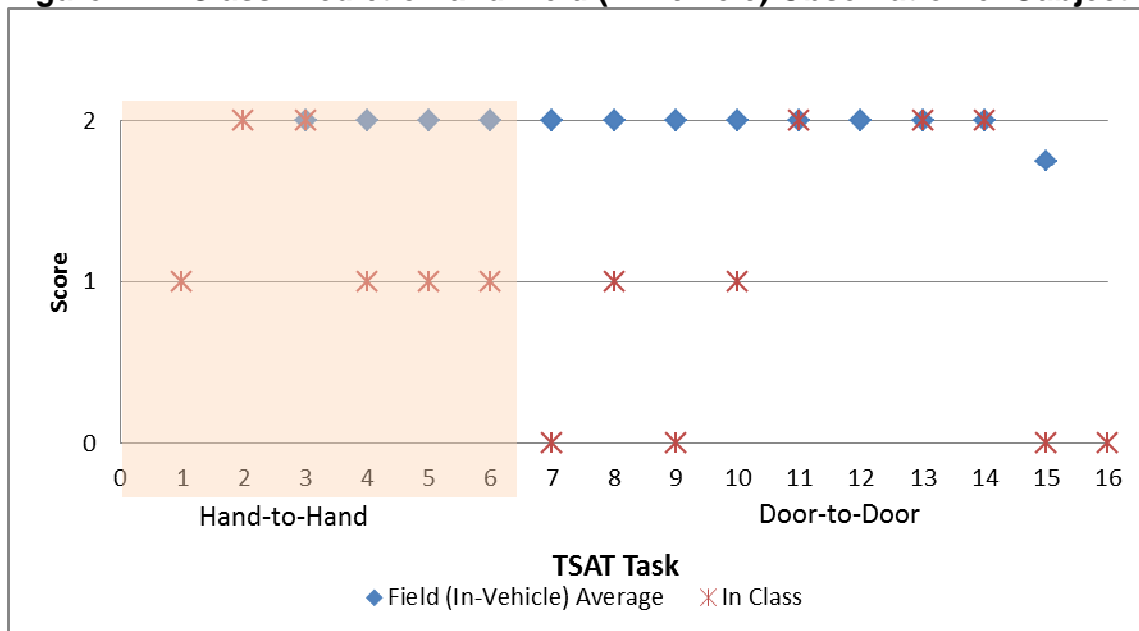
**Figure 2. In-Class Prediction and Field (In-Vehicle) Observation of Subject 1**



**Figure 3. In-Class Prediction and Field (In-Vehicle) Observation of Subject 2**



**Figure 4. In-Class Prediction and Field (In-Vehicle) Observation of Subject 3**



The Wilcoxon signed rank test was conducted for each Subject to compare the in-class TSAT and the in-vehicle field test results. The Wilcoxon signed rank test was selected because of the small sample size and the fact that the data is non-parametric. As presented in Table 4, the P-value of the test statistic for Subject 1 and Subject 2 were above 0.05 and therefore found to be non-significant. That is the results showed no

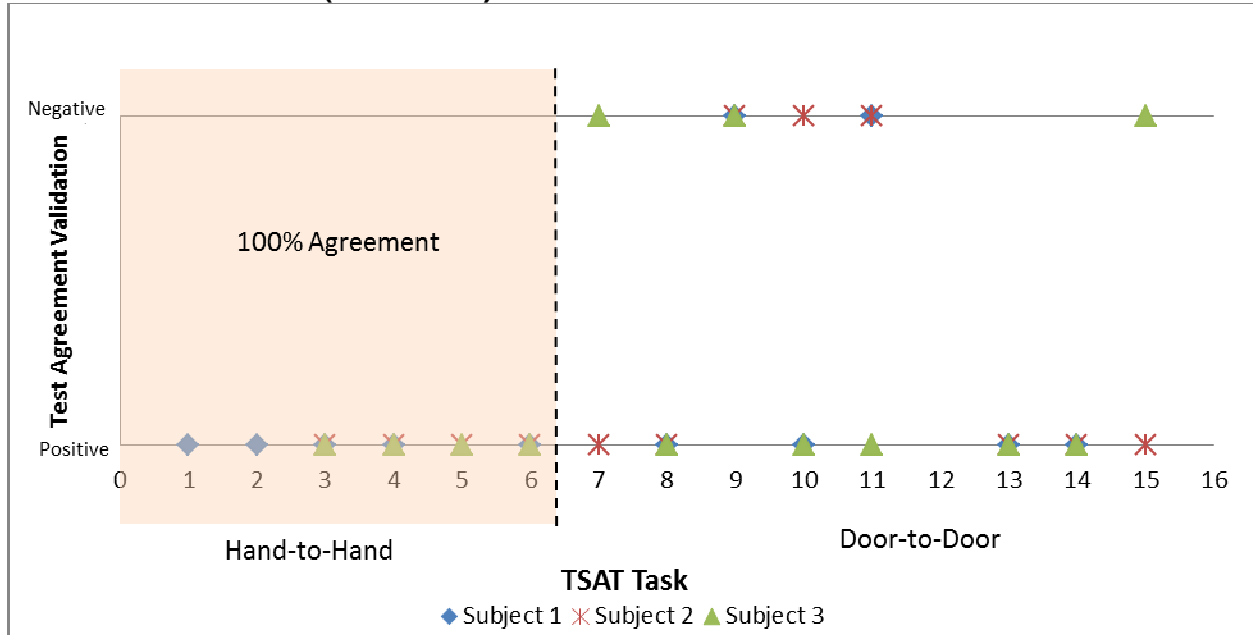
difference between how the subjects performed for the in-class test and in the field test. These results support the objective of the study which was to show that the in-class test accurately predicts performance for the in-vehicle test. The p-value for Subject 3 was found to be significant however it is important to note that the scores for the in-vehicle test were all consistently “2”.

**Table 4. t-Test for Hand-to-Hand Field (In-Vehicle) Test and In-Class Test**

	Subject 1	Subject 2	Subject 3
Two-Sided P-Value	0.144	0.123	0.012

The goal of the TSAT is to accurately determine if the skills an individual can perform in a testing environment reflect the skills displayed during independent paratransit travel in the real world. It is critical for the TSAT to accurately predict the capability of an individual on the autism spectrum. Therefore the difference between the in-class and field (in-vehicle) scores should be as small as possible, which is supported by the results of the t-test. To display the difference in the scores the tests were collapsed into a binary pass-fail scale by rating any score above “0” as a “pass” and a score of “0” as a “fail”. These results are then plotted for each subject in Figure 5 which displays the overall agreement between in class and the field (in-vehicle) tests. For the three individuals in the pilot test, the first 6 tasks were the primary focus of the field (in-vehicle) test. The 100% agreement seen on the primary measures supports the rationale for the development and further validation of the TSAT. For the case of Tasks 7-16, the data collected is not a reliable indicator since the individual did have assistance with paying attention to the time window, waiting and watching for the vehicle, and the TSAT is focused on the ability to complete the activities independently.

**Figure 5. Binary Pass-Fail Representation of the Difference Between In-Class Prediction and Field (In-Vehicle) Observation**



### 7.4 Pilot Test Summary

The pilot test was composed of conducting the TSAT through an in-class test. Although the TSAT was conducted on five individuals, only three attained passable scores to use paratransit independently. These three individuals then participated in a field (in-vehicle) test that simulated a real-world environment. Multiple observers collected data to determine the ability of each subject to ride paratransit independently. This data was averaged across observers for each task. The statistics indicate that the agreement among observers was greater than expected by chance.

The two sets of collected data were then compared for each individual subject. The overall results were then evaluated through a Wilcoxon signed rank test and a binary scale. The results both indicated that the in-vehicle observations matched the predictions of the TSAT in-class test. Due to the limits of the testing population, the analysis of the pilot test only focused on the first 6 tasks. The pilot test did determine that for each individual the TSAT was able to predict with 100% accuracy an individual's capability in a simulated real-world environment.

## **8. Conclusion**

The TSAT was designed to identify tasks that serve as predictors of successful performance on the component skills involved in utilizing *public* paratransit services. The TSAT, along with the testing materials and testing protocols, were developed to provide an in-class assessment for the specific type of paratransit that could reliably be used with their current skill sets. It also provides an outline of the needed skills, with the corresponding order in which they must be completed, for using the five different types of paratransit services. It also highlights any individual deficits in the skills required for using paratransit independently and can be used as a guide for further, pointed instruction.

Through real world observations, the researchers identified and documented 37 separate tasks that are required to take five different types of paratransit services. Through a thorough review of 18 existing and validated assessments, the research team was able to put together an assessment for using public paratransit services. The TSAT utilizes tasks modified from the Functional Assessment of Cognitive Transit Skills (FACTS), the Brigance Transition Skills Inventory, the Assessment of Basic Language and Learning Skills – Revised (ABLLS-R), and the Verbal Behavior Milestones Assessment and Placement Program (VB-MAPP) as well as one Rutgers developed task assessment.

The research team conducted both an expert users review and a pilot test to determine the quality and reliability of the TSAT. The users review was to provide input on the format and content from experts in the paratransit field and in the autism community. The pilot test developed validation procedures that will be used to further determine the reliability of the TSAT. The results from the pilot test illustrated that the TSAT was able to predict the capabilities of an individual in a simulated real-world environment based on the in-class results with 100% accuracy.

The reliability of the TSAT will continue to be evaluated, and revised if necessary, until the project team can demonstrate that the assessment is valid. Through this validation process the research team will use statistical methods to establish the accuracy and reliability of the TSAT in predicting an individual's ability to ride the determined type of paratransit. Since the pilot program was deemed successful, the development of a full-scale validation is recommended by the research team.

## **9. Recommendations/Future Actions**

The next step of the development of the TSAT will be the validation phase followed by distribution of the tool to the end use population. The validation will to determine the



accuracy in predicting independent behavior. The distribution will include a downloadable PDF format and an online version.

The pilot test will serve as the model for the validation process. As in the pilot test, the first part will be an in-class test conducted per established protocol. The second part of the validation process will include an in-vehicle field test with observations recorded by two to four trained observers, as done in the pilot test. The data obtained from the in-class and in-vehicle tests will be statistically analyzed to evaluate whether the TSAT is a reliable measure for determining the appropriate type of paratransit service. The statistical analysis will be applicable for establishing validity for both the full format and the discrete parts of the TSAT.

The validation phase of the TSAT will be conducted a population of adults over 18 years old with an autism spectrum diagnosis. The study pool will be sought through individuals registered with the Interactive Autism Network (IAN) that meet the study criteria. The number of participants will be determined based on statistical heuristics for large samples. The TSAT is designed with three hierarchical sections for the five different paratransit types as well as the trip planning and scheduling section. With these four sections of the TSAT and those unable to complete the basic skills section, there will be five test groups. Large-sample, Gaussian distribution statistical heuristics recommend a minimum of 12 subjects per group for analysis.

The results of the validation process will be reviewed and analyzed by the entire project team. The validation phase will demonstrate that the assessment is an accurate measure to provide a statistically significant level of accuracy to levels as to what the tool predicts and the individual's capabilities. The TSAT will determine through evidenced based data and significant iterations in order to illustrate correlations and the validity. This level of research is required to demonstrate a statistically significant level of accuracy meeting or exceeding industry norms. Following the validation, public outreach regarding the tool will begin.

After validation, the TSAT will be widely distributed through a web-based interactive program and also available as a PDF. The future goal of integrating the assessment tool with a web-based program will allow for a two-fold benefit. Firstly, it will be available to a greater number of professionals and caregivers. Secondly, it will allow for the accumulation of a large set of data, which can be analyzed to determine the overall strengths and weaknesses of individuals on the spectrum and paratransit services. Utilizing the aggregate data, the team can identify areas of paratransit that are difficult for large segments of the target population. This will provide detailed information on areas that may need to be modified to accommodate more individuals on the spectrum. The data may reveal that a large percentage of individuals with ASDs lack the key skills

required to access currently available paratransit options. For example, the collected data might expose that a significantly large percentage of all participants are unable provide the correct fare then the appropriate accommodation for this specific task could be addressed. Transportation engineers, planners and policy makers can use the aggregate data to identify transit barriers to those on the autism spectrum and ensure that appropriate procedures and accommodations are established to mitigate those barriers.

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## Appendix A

### Required Skills to Complete ADA Complementary and Curb-to-Curb Paratransit Trips

	<b><i>Skill</i></b>
A	<i>Pre-Trip Skills</i>
	<i>Responds to Greeting</i>
	<i>Provides Identification</i>
	<i>Follows Directions</i>
1*	Know and communicate pick-up location (address and cross streets)
2*	Know and communicate destination (address and Cross streets)
3*	Know and communicate telephone number of destination address
4*	Know and communicate date and day of week of your trip
5*	Know and communicate departure and arrival times
6*	Plan and schedule trip
6a*	Use phone or computer system for scheduling trip
6b*	Know ID info and/or number if required
6c*	Provide special instructions, example vehicle operator announce presence if visually impaired (ask for specific type of vehicle i.e. car/accessible bus)
6d*	Provide your cell phone number, if applicable (Keep cell phone charged and on, prepared)
6e*	Provide info if you will be travelling with a PCA, PSAP or guest
6f*	Provide necessary info for a return trip
7*	If possible, advise responsible caregiver/service provider trip info
8	Get out door on time with items - include fare for all trips if required
8a	If possible, bring your cell phone charged and on or other communication device
8b	If possible, bring Identification
8c	Dress appropriately for weather and trip
9	Identify correct pick-up spot
9a	Safely navigate to the correct pick-up spot, avoid obstacles and barriers
10	Stand at pick-up spot or in a visible appropriate place (know how to deal with inclement weather)
11	Be ready and waiting
11a	Pay attention to your environment and what is going on around
12	Identify correct Vehicle
13	Identify self to driver
14	Board vehicle and indicate destination, know where you are going for every trip

15	Show driver a bus pass or deposit the correct fare or provide ticket if required
16	Communicate any special needs to the driver
17	Select a seat
18	Secure seatbelt if available, may be required
19	Obey the rules of the bus and exhibit appropriate behavior (talk to driver only when appropriate)
20	Recognize when arrival at destination is imminent (can direct driver to correct spot if necessary)
21	Prepare to exit, check seat to make sure you have all your belongings
22	Exit the bus appropriately (deals with physical changes at destination i.e. construction/snow cover)
23	Travel to destination through the safest and the most direct route (Street/Parking Lot Safety)
24	Identify and navigate to return pick-up spot
25	Dial or ask for assistance when utilizing the phone
26	Respond and act correctly in emergencies (know when to use 911 or non-emergency numbers or identify first responders)
27	Cancel trip if necessary (cancel trip without getting a no-show i.e. more than 90 min before or more depending on operator policy)
28	Know what to do if the vehicle does not arrive in pick-up window

\* Indicates tasks that could be completed by a caretaker – i.e. not the rider or the transit provider.

## Required Skills to Complete Door-to-Door and Door-through-Door Service Paratransit Trip

	<b><i>Skill</i></b>
A	<i>Pre-Trip Skills</i>
	<i>Responds to Greeting</i>
	<i>Provides Identification</i>
	<i>Follows Directions</i>
1*	Know and communicate pick-up location (address and cross streets)
2*	Know and communicate destination (address and Cross streets)
3*	Know and communicate telephone number of destination address
4*	Know and communicate date and Day of Week of your trip
5*	Know and communicate departure and Arrival Times
6*	Plan and schedule trip
6a*	Use phone or computer system used by phone system
6b*	Know ID info and/or number if required
6c*	Provide special instructions, example vehicle operator announce presence if visually impaired (ask for specific type of vehicle i.e. car/accessible bus)
6d*	Provide your cell phone number, if applicable (Keep cell phone charged and on, prepared)
6e*	Provide info if you will be travelling with a PCA, PSAP or guest
6f*	Provide necessary info for a return trip
7*	Advise Responsible caregiver/service provider trip info
8	Prepare to depart time window with items - include fare for all trips if required
8a	If possible, Bring your cell phone charged and on or other communication device
8b	If possible, Bring Identification
8c	Dress appropriately for weather and trip
9	Be ready and waiting
9a	Pay attention to your environment and what is going on around
10	Identify self to driver
11	Board Vehicle and indicate destination, know where you are going for every trip
12	Show driver a bus pass or deposit the correct fare or provide ticket if required
13	Communicate any special needs to the driver
14	Select a seat
15	Secure Seatbelt if available, May be Required
16	Obey the rules of the bus and exhibit appropriate behavior (talk to driver only when appropriate)
17	Prepare for stop, Check seat to make sure you have all your belongings

18	Exit the bus appropriately (deals with physical changes at destination i.e. construction/snow cover), If necessary assist or allow driver to help disembarkation
19	Dial or ask for assistance when utilizing the phone
20	Respond and act correctly in emergencies (know when to use 911 or non-emergency numbers or identify first responders)
21*	Cancel trip if necessary (Cancel trip without getting a no-show i.e. more than 90 min before or more depending on operator policy)
22*	Know what to do if the vehicle does not arrive in pick-up window

\* Indicates tasks that could be completed by a caretaker – i.e. not the rider or the transit provider.

## Required Skills to Complete Hand-to-Hand Service Paratransit Trip

	<b>Skill</b>
1*	Know and communicate pick-up location (address and cross streets)
2*	Know and communicate Destination (address and Cross streets)
3*	Know and communicate telephone number of destination address
4*	Know and communicate Date and Day of Week of your trip
5*	Know and communicate Departure and Arrival Times
6*	Plan and Schedule Trip
6a*	Use Phone or Computer System used by phone system
6b*	Know ID info and/or number if required
6c*	Provide special instructions, example vehicle operator announce presence if visually impaired (ask for specific type of vehicle i.e. car/accessible bus)
6d*	Provide your cell phone number, if applicable (Keep cell phone charged and on, prepared)
6e*	Provide info if you will be travelling with a PCA, PSAP or guest
6f*	Provide necessary info for a return trip
7*	Advise Responsible caregiver/service provider trip info
8*	Prepare to depart time window with items - include fare for all trips if required
8a*	If possible - Bring your cell phone charged and on or other communication device
8b*	If possible - Bring Identification
8c*	Dress appropriately for weather and trip
9*	Be ready and waiting at door
9a*	Pay attention to your environment and what is going on around
10*	Identify self to driver
11*	Board Vehicle or and indicate destination, know where you are going for every trip
12*	Show driver a bus pass or deposit the correct fare or provide ticket if required
13*	Communicate any special needs to the driver
14*	Select a seat, if necessary assist or allow driver or caretaker to help with seat selection
15*	Secure Seatbelt or allow driver or caretaker to secure, if available, May be Required
16	Obey the rules of the bus and exhibit appropriate behavior (talk to driver only when appropriate)
17*	Prepare for stop, Check seat to make sure you have all your belongings
18*	Exit the bus appropriately (deals with physical changes at destination i.e. construction/snow cover), If necessary assist or allow driver to help



	disembarkation
19*	Dial or ask for assistance when utilizing the phone
20	Respond and act correctly in emergencies (know when to use 911 or non-emergency numbers or identify first responders)
21*	Cancel trip if necessary (Cancel trip without getting a no-show i.e. more than 90 min before or more depending on operator policy)
22*	Know what to do if the vehicle does not arrive in pick-up window

\* Indicates tasks that could be completed by a caretaker – i.e. not the rider or the transit provider.

## Appendix B

### Hand to Hand/Door through Door

Task #		Task	Adapted From
1		Responds to greeting	FACTS Item 1
2		Follows instructions	FACTS Item 3
3		Sits appropriately	ABLLS-R N-3
4	±	Identify self or be able to provide proper identification	FACTS Item 2
5		Providing identification to bus driver, police officer or other first responders	FACTS Item 22
6		Knows and exhibits appropriate bus behavior	FACTS Item 15

### Door to Door and Hand to Hand (with Assistance)

Task #		Task	Adapted From
7	±	Prepare to depart time window with items - include fare for all trips if required	FACTS Item 4
8	±	Dress appropriately for weather and trip	FACTS Item 17
9	±	Be ready, wait appropriately and pay attention to your environment	FACTS Item 4/32 ABLLS-R N-5 and ABLLS-R L-23
10	±	Get out of door on time with items; include fare for all trips and cell phone charged or other communication device	VB-MAPP Group 7-M
11	±	Board vehicle, show driver a bus pass or deposit the correct fare or provide ticket, if required	FACTS Item 7
12	±	ONLY IF APPLICABLE - Communicate any special needs to the driver	Brigance B-2 - 12
13	±	Select a seat, if necessary assist or allow driver or caretaker to help with seat selection	FACTS Item 14
14	±	Secure seatbelt or allow driver or caretaker to secure, if available	Rutgers CAIT Developed
15	±	Deboarding: Recognize when near destination and exit the bus appropriately (deals with physical changes at destination i.e. construction/snow cover), If necessary assist or allow driver to help disembarkation	FACTS Item 8
16	*	Respond to Emergency - Know what to do if the vehicle does not arrive in pick-up window	Brigance H-1

### Curb to Curb and ADA Complementary Paratransit

Task #		Task	Adapted From
17		Identify correct pick-up spot	FACTS Item 5
18	‡	Identify and safely navigate to the correct pick-up spot (parking lot/sidewalk safety)	FACTS Item 19‡

19		Stand at pick-up spot or in a visible and appropriate place (know how to deal with inclement weather)	FACTS Item 18
20		Identify correct vehicle	FACTS Item 6
21		Respond to Emergency – Interaction with strangers	FACTS Item 16
22		Respond to Emergency - Lost on the bus, driver at wrong drop-off spot	FACTS Item 20
23		Respond to Emergency - Lost off the bus	FACTS Item 21
37	§	Identify and navigate to return pick-up spot	FATCS Item 33

### Trip Planning and Trip Scheduling Skills

Task #		Task	Adapted From
24	*	Ability to use phone )	Brigance H-1
24A	*	Ability to use computer system (alternate)	
25	*	Know and communicates ID info and/or number if required	Brigance H-1
26	*	Know and communicate pick-up address (address and cross streets)	ABBLs-R H5
27	*	Know and communicate destination (address and Cross streets)	ABBLs-R H5
28	*	Know and communicate destination telephone number	ABBLs-R H46
29	*	Know and communicate date and day of trip	ABBLs-R H46
30	*	Know and communicate departure and arrival times	ABBLs-R H46
31	*	Know and communicate return trip information, if applicable	Brigance H-1
32	*	Provide special instructions, example vehicle operator announce presence if visually impaired (ask for specific type of vehicle i.e. car/accessible bus)	Brigance H-1
33	*	Provide your cell phone number (keep cell phone charged and on, prepared), if applicable	Brigance H-1
34	*	Provide info if you will be travelling with a PCA, PSAP or guest, if applicable	Brigance H-1
35	*	Advise responsible adult or caregiver/service provider trip info	Brigance H-1
36	*	Cancel trip if necessary (prior to required operator policy to prevent “no show” status)	Brigance H-1

\* Indicates tasks that could be completed by a caretaker – i.e. not the rider or the transit provider.

± Indicates tasks that could be completed by a caretaker – i.e. not the rider or the transit provider for Hand to Hand Services Only.

‡ Indicates same task is required for pre-vehicle and post-vehicle boarding.

§ Indicates that the Task is required for Curb to Curb type of travel but must be the last Task Conducted

**Appendix C (Under Separate Cover)**

# Appendix D

Exit this survey
**Transportation Skills Assessment Tool (TSAT) Reviewers Survey**

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**TSAT Reviewers Survey**

Thank you for participating in the review of the Rutgers Center for Advanced Infrastructure and Transportation's Transportation Skills Assessment Tool. The project is sponsored through a grant from the Organization for Autism Research.

Please fill out the following evaluation after as part of your reviewing process.

The results from your evaluation will be critical in the final TSAT development. With the input you provide we will modify the TSAT where necessary, and look to begin the validation process of the TSAT.

**1. Upon completion of using the TSAT, I was able to:**

	Completely	To a High Degree	Moderately	Minimally	Not at all
Conceptualize an appropriate form of paratransit service for an individual on the autism spectrum	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Understand the ranges of skills needed to utilize various forms of paratransit services	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**2. Overall Assessment of the TSAT**

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
The TSAT results appear to be an accurate assessment for the individuals capability to use the appropriate level of transportation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The content of the TSAT was developmentally appropriate	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The level of knowledge required to implement the TSAT is consistent with other assessment tools currently being utilized	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I would add the TSAT to the list of assessments I conduct or recommend for an individual on the autism spectrum	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**3. Format of the TSAT:**

	Excellent	Good	Fair	Poor
Ideas are expressed clearly	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Content is thorough	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
There is a logical progression of abilities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Explanations of the outcomes are effective	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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**3. Format of the TSAT:**

	Excellent	Good	Fair	Poor
Ideas are expressed clearly	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Content is thorough	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
There is a logical progression of abilities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Explanations of the outcomes are effective	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**4. What did you like about the TSAT? Please explain.**

**5. What areas of the TSAT are in need of improvement? Please explain.**

**6. Additional Comments**

If you have any questions or need additional information please contact Cecilia Feeley at [Cfeeley@rci.rutgers.edu](mailto:Cfeeley@rci.rutgers.edu) or [973-356-3582](tel:973-356-3582).

Thank you for your time and assistance on developing the TSAT.

Done