ASSESSING THE CONVERGENT VALIDITY OF THE PEAK-E LONG ASSESSMENT AND THE PEAK-E SHORT ASSESSMENT

by

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The current study evaluated the convergent validity of the PEAK-E short pre-assessment versus the PEAK-E long pre-assessment, to determine if the short form of the pre-assessment would be just as effective in identifying potential skill deficits as the long form. This assessment will extend on the current PEAK literature and will indicate in the results the validity between the PEAK-E long pre-assessment and the short pre-assessment. In the current study twenty-four participants were assessed using both the long assessment and the short assessment. The researchers performed both the PEAK-E long pre-assessment and the short pre-assessment with each participant and then a Pearson's correlation was conducted to determine the convergent validity of the two measures. PEAK-E long pre-assessment versus short assessment was significant ($r = 0.92$, $p = 0.0001$). PEAK-E reflexivity long pre-assessment versus the short assessment was significant ($r = 0.91$, $p = 0.0001$). PEAK-E symmetry long pre-assessment versus the short assessment was significant ($r = 0.80$, $p = 0.0001$). PEAK-E transitivity long pre-assessment versus the short assessment ($r = 0.60$, $p = 0.0019$). PEAK-E equivalence long pre-assessment versus short assessment ($r = 0.70$, $p = 0.0002$).These results suggest that the PEAK-E short pre-assessment captures many of the same skills and abilities as the long assessment scores, and that the two assessment produce similar results

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CHAPTER 1

INTRODUCTION

Autism is defined in terms of abnormalities in social and communication developments in the presence of marked repetitive behavior and limited imagination (American Psychiatric Association, 1994). Deficits in social and communication developments may include but aren't limited to difficulty maintaining appropriate eye contact, and difficulties sharing interests or emotions with others or being able to hold a conversation with others. Language and social deficits often persist throughout a lifetime and may profoundly affect the individual and caregiver's quality of life (ADDM 2014). This may become an issue for those that are diagnosed with ASD due to limited social skills and not being able to communicate effectively with others on a daily basis. These deficits can have a profound impact on the autonomy and habilitation of individuals with autism and their families, as well as a salient economic impact on society (Buescher et al. 2014). Data also suggests that 1 in 4 individuals with an autism spectrum disorder do not display vocal language (Autism Speaks 2014), and those who do often demonstrate delays in their language development relative to typically developing peers of the same age (Dixon 2014a). According to the DSM-V characterizes ASD displaying symptoms such as deficits in social communication and social interactions, restricted and repetitive patterns of behavior or interests, impairment in some or all areas of functions, and symptoms being present in the early developmental period (American Psychiatric Association, 2013). Research suggests that receiving a diagnosis when your child is young is beneficial to both them and the caregivers. When children are diagnosed at a young age it gives them more time to seek out treatment and to be able to start learning those crucial socialization or academic skills that they may be lacking. According to the Center of Disease Control and Prevention, as of the year 2014

the prevalence of Autism Spectrum Disorder (ASD) amongst children is estimated to be 1 in 59 children, with boys being more likely to hold the diagnoses than girls, with a ratio of four boys to every girl (Baio et al., 2014). In recent years, the prevalence of children diagnosed with autism has steadily increased, in the year 2012 the prevalence of ASD amongst children was estimated to be 1 in 68 children. With the increase in prevalence of autism and the resulting symptomatic behaviors associated with this diagnosis, there is a growing need for empirically based assessments to identify potential deficits and treatments to address these deficits.

Applied Behavior Analysis

Applied behavior analysis is the scientific approach to understanding and improving socially significant behaviors, and reducing maladaptive behaviors, using procedures derived from the principles of behavior and experimentation to show that the procedures derived from the principles of behavior and experimentation to show that the procedures were responsible to the change in that behavior (Cooper, 2007). When children are diagnosed at a younger age this helps parents or caregivers seek out treatment that is found to be effective and to be able to start early on those deficits in hopes that over time one would be able to correct these deficits. Long term ABA treatment can have large effects on intelligence, language, daily living skills, and social skills of individuals with autism (Virues-Ortega 2010), and data from Lovaas (1987) suggest that intensive behavior analytic intervention can achieve diagnostic elimination for some participants. When individuals begin ABA treatment they can been seen up to forty hours a week ensuring that the individual receives the amount of therapy that will then help them and focus on specific deficits that they may have. The applications employed by behavior analysts are used to change behavior in many ways which include increasing socially appropriate behavior, reducing inappropriate behavior, learning new functional skills, generalizing responses across different

settings, people, topographies and functions and promoting stimulus control (Sulzer-Azaroff & Mayer, 1991). Treatments first require successful identification of those skill deficits that the individual is exhibiting.

Approaches to Language within Behavior Analysis

Assessment of the language deficits associated with intellectual disabilities first requires a theoretical understanding of language processes. Within behavior analysis there are two main approaches to understanding language: the Skinnerian Verbal Behavior approach and a more contemporary approach known as Relational Frame Theory.

Verbal Behavior

Skinner (1957) defined verbal behavior as behavior that is reinforced through the mediation of another person's behavior (whereas nonverbal behavior is reinforced directly through contract with the physical environment (pp.1-2). Skinner (1957) discusses several different types of verbal operants they are: mand, tact, echoic, intraverbal, textual, and transcription. This book was the first behavior analytic account for language. A mand is when the speaker asks, or requests for an item (i.e. "Give me water" or I want the apple"). A tact is when the speaker labels an object or event that they might encounter (i.e. saying "truck" when a truck drive by). An intraverbal involves a conversation between two people by answering a question that was asked of them (i.e. dad says, "A-B-C-D" and the child answers "E-F-G"). An echoic is when the speakers repeats the verbal behavior of another person (i.e. the child says "phone" because sister said "phone"). A textual is when an individual is reading words that are written (i.e. child says "dog" because they read "dog" on the I-Pad). A transcription consists of writing the words that are spoken to you (i.e. the child writes apple because the teacher said

"apple"). These six verbal operants are valuable in helping to tech language skills to children with autism.

Inclusion allows peers, in a typical classroom, to model verbal interactions for children with autism (Sundberg & Michael, 2001). When children are growing up they learn to speak from those around them. It is crucial to understand the functions of verbal behavior to then be able to properly teach and better understand these verbal behaviors. Children begin with mimicking what they hear from those around them, and then those verbal utterances are then either reinforced which would increase the likelihood that they will then say those words again in the future, or they are punished which would then reduce the likelihood they would say that word again. For example, if a father says the word "ball" and then the child mimics that same word, and that is followed by the father's praise, then the child is more likely to say "ball" in the future if the father's reaction functioned as a reinforcer to that child. Another example would be a child saying "dog' when shown a picture of a hat. The represents an incorrect tact that would not receive reinforcement therefore would undergo extinction or it would be punished. Skinner's verbal behavior was one of the only behavior analytic guides to teaching language skills to those with disabilities. Most often children with autism display some sort of language deficit with that being non-verbal or not being able to talk in a socially appropriate manner around others. Empirical evidence supports the importance of mands as the primary focus in language acquisition, the notion of establishing operations as an important variable in controlling mands, and the benefits of language that is multiply controlled for the acquisition of more complex language (Sutter & LeBlanc, 2006).

Relational Frame Theory

Relational frame theory is a behavioral account of human language and cognition (Hayes, Barnes-Holmes, & Roche, 2001). During Skinners research in verbal behavior, he developed a definition of verbal behavior that soon became problematic due to it being too broad and not functional. In Skinners definition of verbal behavior, it is developed on the thought of two organisms (the speaker and the listener). Hayes, Barnes-Holmes, and Roche (2001) claims Skinner's definition of verbal behavior is too broad due to most behaviors being socially mediated, which makes it difficult to distinguish between verbal behavior and every other social behavior and it is not functional because it included the behavior history of another organism. Skinners definition of verbal behavior is too broad due to most behaviors being socially mediated, this can cause a problem when discussing and trying to distinguish between verbal behavior and every other social behavior. This can be problematic when others are trying to measure or describe verbal behavior and be able to discuss what is in fact verbal behavior and what every other social behavior is. With that being said this then makes it difficult for practitioners to determine what exactly is considered to be verbal behavior and what definition should they follow. RFT analysis of language is different than that of Skinners analysis. There are two types of relational responses those are arbitrarily applicable, and non-arbitrary. Arbitrary applicable is learned relational responding that can come under the control of arbitrary contextual cues; non-arbitrary responding is based on the physical form of the stimuli. Hayes et al. (2001) characterizes relational responding as having three defining features. Those three features are mutual entailment, combinatorial mutual entailment, and transformation of stimulus functions. Mutual entailment is teaching the participant the A is related to B, ten B is related to A. Combinatorial mutual entailment is teaching the participant that if A is related to B, and B is

related to C, then A and C are also related. Transformation of stimulus functions when the function a stimulus has for a person can then be changed on the basis of how it is related to the other stimuli. Along with features of stimulus responding, there are families of relational frames (Hayes et al. 2001). Those frames are coordination, distinction, opposition, comparison, hierarchical, and deictic. The first frame coordination is relations of sameness, similarity or identity that may be related as same or equal to each other, this is the A=B relation. Distinction is the relations of difference of distinction. Opposition is the relations of opposition. Comparison is the relations of comparison that are usually along a specific dimension. Hierarchical is the relations of comparison along the dimension of a hierarchical class membership. Deictic is the relations specified in terms of the perspective of the speaker.

Behavior Analytic Language Assessments

There are many types of verbal behavior assessments that may be used to help detect language deficits in those with autism some that are used are the assessment of basic learning and language skills (ABLLS), verbal behavior milestone and placement program (VB-MAPP) and the PEAK curriculum.

VB-MAPP

One assessment tool that is used to identify language deficits experienced by individuals with autism is the Verbal Behavior Milestones and Placement Program (VBMAPP; Sundberg 2008). The VB-MAPP measures and individuals' verbal repertoire across three developmental levels. The first level assessed prerequisite language skills that should develop in the first 18-months of age. The second level targets language skills believed to develop between 18 and 30-months of age, therefore expanding on the first level. The third level assesses language skills that are believed to develop between 30 and 48 months. There is a lack of data showing the reliability

or validity of the VB-MAPP, nor does the assessment measure the verbal repertoire of children past the developmental point of a typically developing 4-year -old (Dixon et al., 2014). The VB-MAPP is limited to only measuring and individual's verbal repertoire up to the point of a typically developing child of 48 months. There is no corresponding curriculum for others to use, so program development is left up to the behavior analyst to make, this can be time consuming for individuals. The PEAK curriculum makes it easier to do programing for behavior analysts.

ABLLS

The ABLLS includes an assessment tool, curriculum guide, and skills-tacking system for children with disabilities. This assessment are tools that help to define and track the developmental skills in both children with disabilities and typically functioning children, and the goal is to provide a guideline on how to widen a person's repertoire or verbal operant. Empirical evidence supports the importance of mands as the primary focus in language acquisition, the notion of establishing operations as an important variable in controlling mands, and the benefits of language that is multiple controlled for the acquisition of more complex language (Suttter & LeBlanc, 2006). Additionally, there is no evidence to support the verbal-behavior approach with long-tern applications of language acquisition in children with ASD (Carr et al., 2005).

As you can see both the ABLLS and the VB-MAPP lack sufficient data demonstrating their effectiveness for those with developmental disabilities. Although there is lack of data with both these assessments since there has been a recent developed evaluation and curriculum guide that tries to fill in the gaps of both these assessments. There is little empirical support for both the ABLLS and the VB-MAPP especially in terms of psychometric data. This is a problem because behavior analysis emphasizes empirically based treatments. Both the VB-MAPP and the ABLLS don't have curriculums that, therefore making it more difficult to use.

PEAK

The PEAK materials consist of four modules: direct training (PEAK-DT), generalization (PEAK-G), equivalence (PEAK-E), and transformation (PEAK-T). PEAK relational training system is an assessment and treatment curriculum created for teaching basic and advanced language skills from a behavior analytic approach. The PEAK assessment was designed to be implemented by not only therapist but parents, caregivers and teachers. Given that almost half of the individuals with autism are estimated as having average intelligence (Centers for Disease Control and Prevention, 2014), procedures to teach more complex academic skills are needed. The four modules contain a direct pre-assessment, a 184-itemized skill assessment, and a 184-item curriculum that will simultaneously assist the learner's ability to gain new information and establish new skills (Dixon, 2014a; Dixon, 2014b; Dixon, 2015; Dixon, 2016). The PEAK direct training module and the PEAK generalization module focus on teaching a variety of skills tacting an object, intraverbal skills and mands. The PEAK-DT module uses discrete trial training to teach a variety of skills ranging from basic (motor imitation) to complex verbal and language skills (problem solving) (McKeel et al., 2015). The PEAK-DT also has a large amount of empirical evidence to support its efficacy in both in-between group (McKeel et al., 2015) and with single subjects (McKeel, Rowsey, Belisle, Dixon, & Szelkly, 2015). When implemented, researchers have found that the PEAK-G curriculum not only increased directly trained skills, but also increase generalized language in the majority of the participants (Dunkel-Jackson & Dixon, 2018).

The PEAK equivalence and the PEAK transformation modules focus on stimulus equivalence and relational frames. Learners will be taught to interpret new information from previously learned information (Dixon, 2015). For example, in the direct training module a

client may learn to say the word "dog", when a picture of a dog is shown. Then in the PEAK generalization module that same client may then learn that there are many different types of dogs (ex. Big vs. Small) and then will learn to respond to a variety of pictures of dogs in the same way. Next in the equivalence module the client may learn that the word "dog", the text d-o-g, and the picture of a dog are all the same thing and are able to respond to questions about the dog in the same way without being directly trained to do those skills. Finally, in the relational framing module the client may learn that dogs are more fun than cats. The next time the family is out the client may suggest to their parents that they want a dog rather than a cat without ever being trained to do so. PEAK has been compared to other well-established standardized language assessments and intelligence tests, results of these comparisons have yielded strong correlations (Dixon et al. 2014d ; Mckeel at al. 2015b). Although the PEAK system has generated a large amount of data, there are still areas that could benefit from further empirical exploration. One area is that of psychometric data. Again, although there are many psychometric studies on the PEAK system in general, some aspects of PEAK are lacking in data. One aspect in particular has to do with the PEAK-E pre-assessment.

Purpose of the Present Study

Currently, there are two forms of the PEAK-E pre-assessment, but little is known as to the extent to which the two actually measure the same results. The PEAK-E long pre-assessment can take a long period of time to run versus the short form being able to be run in a very short or small amount of time. This would be easier for individuals to run in which they have several clients to run this assessment on. It is assumed they measure the same, but there is no data suggesting they do. This study will be addressing the lack of support or data on this topic. This study will be addressing this limitation and will be assessing the convergent validity of the two

pre-assessments. Lastly, we will analysis will reveal the convergent validity of these two pre-assessments. This pre-assessment will extend on the current PEAK literature and will indicate in the results the validity between the PEAK-E long pre-assessment versus the short pre-assessment. The primary purpose of this research was to examine the convergent validity of the long pre-assessment form versus the short pre-assessment form in the PEAK Relational Training System to determine if the short form would be just as effective as the long form.

CHAPTER 2

METHOD

Participants and Setting

Participants in the present study included twenty- four students (7 females and 17 males) from a specialized clinic for children with autism in the Midwest. Participants' ages ranged from 4 to 18 years of age. All participants had a previous autism diagnosis or similar diagnosis. All assessments were completed within each of the child's therapy sessions with the typical therapist members regularly present within each room. The rooms in which the session took place typically consisted of a small table with three chairs, a filing cabinet, and one room was completely padded. The long pre-assessment took on average thirty-three minutes to perform and the short pre-assessment took on average eleven minutes to perform.

Materials

Assessments that were used in the current study included the PEAK Equivalence short pre-assessment and long pre-assessment forms with script. The PEAK-E pre-assessment is used to test the level of relational complexity that the child can currently do when given the pre-assessment and then provides areas in which a therapist should target in therapy sessions. The PEAK-E pre-assessments are designed to measure an individual's repertoire when responding in accordance with relations of sameness. The PEAK-E long and short pre-assessment has four different sections that correspond to the different types of relations in stimulus equivalence, which are reflexivity, symmetry, transitivity, and equivalence. Within each of these relations, there are three areas of skill difficulty with those being basic, intermediate and advanced. Each section contained six questions two basic, two intermediate, and two advanced. In the PEAK-E long pre-assessment there are 96 questions and, in the PEAK-E short pre-assessment there are 24 questions. In the PEAK-E long pre-assessment there are four questions per type of

relation/difficulty. A high score is recorded when the participant receives a two for the desired task and a low score is recorded when the participant answers none of the questions correctly. The participants can either score a zero, one, or two on the desired sections each section has two questions if the participant gets neither question correct they receive a zero, if they answer one question correct they will receive a one, and if the participant gets both questions correct they receive a two.

The researchers used a pen or pencil along with a score sheet during the assessments. For the PEAK-E long pre-assessment the researcher used skittles and M&M for the gustatory part of the assessment and the flip book with the arbitrary words and symbols in them. The researcher also used a coin, a yellow highlighter, five paperclips, three spoons, two small cups, two bottles containing butter rum and orange cranberry scents, five crayons, a box with hand holes in both sides and a dry erase board and marker these are all used as stimuli for the assessment. For the PEAK-E short pre-assessment researchers used the flip book with the pictures and the script contained in one booklet. This assessment doesn't require any other stimuli that aren't located in the book.

Procedure

All of the assessments were completed by the author of the present study, who were familiar with the participants prior to conducing the assessments. Assessments were completed in the child's therapy room to minimize distractions and to help ensure that stimuli that the participants were familiar with could be used in the assessment. They were brought into the room and placed across from the experimenter and then the experimenter began administration of the assessments. The authors administered the short form first on thirteen of the participants and the long form first on eleven of the participants. When the sessions began,

the participants were asked to sit at the table facing the assessor, therefore the assessor could perform the assessment. Both the long and short pre-assessments were run all the way through for every participant, there was no cutoff criteria that the researcher used both of the pre-assessments were performed all the way through. During some pre-assessments participants refused to try the edible stimuli therefore resulting in a zero for that category. Some participants also had learning deficits that would affect their assessments such as not being able to read or write on the assessment, therefore resulting in a zero for that category. Each assessment the assessor would score and the therapist in the room would record IOA and procedural fidelity. The participants could either receive a zero, one or two on each category. The participant would receive a zero if they answered both questions wrong or were not able to answer those question and would receive a 1 if they got one of the two questions correct, and finally the participant would receive a 2 if they got both the questions correct in that category. A correct response was when the assessor would ask a question the participant would follow with the correct answer. The participant was given 5-10 seconds before moving on to the next question. An incorrect response was when the assessor would ask a question the participant would either answer the question wrong or wouldn't respond to the assessor's question. Some of the participants received breaks during the assessment the participants were allowed to watch videos on an iPad, throw a ball, or play with different stimuli that was in the room. During some of the sessions the researcher used reinforcers such as the iPad, different edible stimuli or letting the participants earn a break for a few minutes. The researchers promoted compliance by letting the younger participants work to earn a break or time on the iPad like they would earn in their regular therapy sessions. Once each assessment was complete the researchers used the PEAK-E long and short scoring sheet that is located in the

PEAK-E book to score the assessment.

Data Analysis

Once both assessments had been delivered to all participants, the scores from each assessment were then compared to each other to evaluate the convergent validity of the two. The data obtained from each assessment with the participants was analyzed using a correlational analysis. Data were analyzed to determine the extent to which the two forms of the PEAK-E produced similar results. Additionally, researchers evaluated the degree to which the two forms produced similar results for each of the different types of relations (reflexivity, transitivity, symmetry, equivalence). To evaluate this several correlational analyses were conducted to determine the relationship between the two forms. First, a Pearson correlation was conducted with the PEAK-E short pre-assessment and the PEAK-E long pre-assessment. Next, the author conducted a Pearson correlation between each of the four categories(reflexivity, transitivity, symmetry, and equivalence) to determine the correlation between those specific categories on the short pre-assessment and the long pre-assessment.

Measures of Reliability

To determine the extent to which independent observers score the PEAK pre-assessment consistently, scores were compared across two scorers one being the individual administering the assessment and one being the participants therapist that was in the room during the scheduled sessions. Two trained individuals independently scored the assessment for 100% of the participants. The researcher always had the participants therapist in the room therefore were able to get 100% of IOA. The mean IOA for PEAK-E short pre-assessments was 98% and for the long assessments was 95% reliability. This indicates a high level of agreement across implementers. This also shows great validity suggesting that the implementers where performing

the assessment the correct way and were also following to the script. On the fidelity checklist that the researchers had the therapist fill out a common one that they scored as a zero was reinforcing the client. Many were confused on this question thinking it meant allowing the child to have breaks or giving a preferred toy when they have finished so many questions. But the question was refereeing to reinforcing for the correct response desired on the assessment.

CHAPTER 3

RESULTS

A scatter plot of the PEAK-E long pre-assessment and short assessment scores are displayed in Fig 1. The assessment scores were analyzed in the current study across each participant within the study. This was done to determine whether the PEAK-E long pre-assessment scores correlated with the PEAK-E short pre-assessment scores. The relationship among the PEAK-E long pre-assessment and the PEAK-E short pre-assessment scores were examined using Pearson correlations test. According to Fig1. the long pre-assessment scores have a strong positive correlation with the short assessment scores on the PEAK-E pre-assessment. The scores regarding the PEAK-E long pre-assessment was significant ($r = 0.92$, $p = 0.0001$) and showed a strong correlation with the PEAK-E short pre-assessment. This indicates a strong correlation between the short pre-assessment and the long pre-assessment for the PEAK-E module. A mean score for the long assessment was a 11 and the short assessment was 12 across all participants. Showing that most of the participants received the same or close to the same score in the long assessment as they did in the short assessment. There were a few participants that received both a zero in the short assessment as in the long assessment. The PEAK-E long pre-assessment took approximately 33 minutes to perform, and the short assessment took approximately 11 minutes to perform. As you can see the short assessment takes a lot less time to perform then the long form. The researchers also analyzed each of the four PEAK categories separate (Symmetry, Equivalence, Transitivity, and Reflexivity). Between the short assessment and the long assessment for the reflexivity module shows strong positive correlation between the two assessments. This shows that there is not a significance between the reflexivity short assessment scores and the long assessment scores. The scores regarding the PEAK-E reflexivity

long pre-assessment were significant (r = 0.91, p = 0.0001) and were correlated strongly with the PEAK-E reflexivity short assessment. These scores are displayed in Fig 2. on the scatter plot showing the participants percentage total on both the assessments. A mean score for the reflexivity long pre-assessment was a 4 and the reflexivity short assessment was a 5 across all participants. Between the short assessment and the long pre-assessment for the symmetry module shows a strong positive correlation between the two assessments. This shows that there is not a significance between the symmetry short pre-assessment and the long pre-assessment scores. Scores regarding the PEAK-E symmetry long pre-assessment were significant (r = 0.80, p = 0.0001) and had a strong correlation with the PEAK-E symmetry short pre-assessment. These scores are displayed in Fig 3. on the scatter plot showing the participants percentage total on both the pre-assessments. A mean score for the long assessment symmetry was a 3 and the short assessment symmetry was a 3 across all participants. Between the short pre-assessment and the long pre-assessment for the transitivity module shows a moderate positive correlation between the two pre-assessments. This shows that there is a slight significance between the transitivity short pre-assessment and the long pre-assessment scores. Scores regarding the PEAK-E transitivity long pre-assessment (r = 0.60, p = 0.0019) and had a moderate correlation with the PEAK-E transitivity short pre-assessment. These scores are displayed in Fig 4. on the scatter plot showing the participants percentage total on both of the pre-assessments. A mean score for the long pre-assessment transitivity was a 1 and the short pre-assessment transitivity was a 2 across all participants. Between the short pre-assessment and the long pre-assessment for the equivalence module shows a moderate positive correlation between the two pre-assessments. This shows that there is a slight significate between the equivalence short pre-assessment and the long pre-assessment scores. Scores regarding the PEAK-E equivalence long pre-assessment (r =

0.70, p = 0.0002) and had a moderate/strong correlation regarding the PEAK-E equivalence short pre-assessment. These scores are displayed in Fig 5. on the scatter plot showing the participants percentage total on both of the pre-assessments. A mean score for the long pre-assessment equivalence was 2 and the short pre-assessment equivalence was a 2 across all participants.

CHAPTER 4

DISCUSSION

Taken together, the current findings suggest that the PEAK-E short and long pre-assessment forms both produce similar assessment results. The data show that the two measures are valid in terms of convergent validity. The current finding supports previous findings on PEAK by providing additional support for the psychometric properties of the PEAK relational training system. Additionally, the current study extends on the previous literature by providing evidence of the convergent validity of the two forms of the PEAK-E pre-assessments. Although the PEAK system has generated a large amount of data, there are still areas that could benefit from further empirical exploration. One area is that of psychometric data. Again, although there are many psychometric studies on the PEAK system in general, some aspects of PEAK are lacking in data. One aspect in particular has to do with the PEAK-E pre-assessment. There has been some psychometric data with PEAK comparing the PEAK-E-PA and the QABF with children with challenging behavior. Research has shown that the overall scores of the QABF were significantly lower for participants who could derive mutually entailed and/or combinatorial entailed relations and that in a great proportion of cases, the QABF failed to isolate a single behavior function for individuals who could derive either mutually entailed or combinatorial entailed relations (Belisle, Stanley & Dixon, 2017). These results add to the development of understanding in regard to the relational abilities and challenging behavior in this population. Psychometric evaluations of the QABF suggest that the instrument is a valid and reliable assessment of behavior function that yields similar results to the experimental functional analysis (Healy, Brett, & Leader, 2013), and in many cases, leads to effective function-based intervention strategies (Matson, Bumburg, Cherry, & Paclawskyj, 1999). Another area of psychometric data in regard to PEAK is a study looking at

the PEAK-E Pre-assessment and IQ with individuals with autism or other related disabilities. This research has shown a strong significant correlation between participant scores on the PEAK-E-PA and IQ both in terms of raw IQ as well as full scale IQ (Dixon,Belisle, & Stanley, 2018). This is an important area to look into with the PEAK-E short pre-assessment. Very little research has been done with the PEAK-E short pre-assessment. This study would be interesting to determine if the PEAK-E short pre-assessment would yield the same results in regard to comparing the assessment scores with IQ. The primary purpose of this research was to examine the convergent validity of the long assessment form versus the short assessment form in the PEAK Relational Training System to determine if the short form would be just as effective as the long form. The results of the current study lend support to the validity of the PEAK-E long and short pre-assessment tool. These results suggest that the PEAK-E short pre-assessment captures many of the same skills and abilities as the long assessment scores, and that the two assessment produce similar results. Convergent validity was obtained with the Pearson's correlational test. The assessment of convergent validity resulted in high agreement between the PEAK-E long pre-assessment and the PEAK-E short pre-assessment.

The results of the present study have implications for selecting the PEAK-E short pre-assessment under certain constraints over the long assessment. Research has previously focused on the use of PEAK with children with disabilities and not the use of the forms and assessments with each other. Unfortunately, some procedures are often not practical to use when assessing children with disabilities. The present authors have found the results of the PEAK-E short pre-assessment to have a strong agreement, with the PEAK-E long pre-assessment. The PEAK-E pre-assessment is used to help identify skill deficits for individuals with disabilities. This assessment can help therapist know what skill deficits that they should be working on in therapy sessions to

help better the child. Parents or teachers may also use these assessments to determine what they could be working on with the child and to help target those skill deficits that may not be known to others. Given that almost half of the individuals with autism are estimated as having average intelligence (Centers for Disease Control and Prevention, 2014), procedures to teach more complex academic skills are needed. The PEAK modules are trying to address this, and to be able to identify those deficits in one assessment to then be able to work on those skills in the therapy setting to then ensure that clients have those skills before moving on to the next deficit ensuring that they fully understand the first. PEAK has been compared to other well-established standardized language assessments and intelligence tests, results of these comparisons have yielded strong correlations (Dixon et al. 2014 ; Mckeel at al. 2015b). With many studies that have been published discussing this topic and all results are showing strong correlations suggesting that PEAK is a good assessment tool to help determine different deficits that individuals with disabilities may be having. There is a gap in the literature between the two forms of the PEAK-E pre-assessment, but little is known as to the extent to which the two actually measure the same results. The PEAK-E long pre-assessment can take a long period of time to run versus the short form being able to be run in a very short or small amount of time. This would be easier for individuals to run in which they have several clients to run this assessment on. It is assumed they measure the same, but there is no data suggesting they do. The data from this study show that there is a strong correlation between the PEAK-E long pre-assessment and the short assessment. These results show that in certain circumstances that therapist should use the PEAK-E short pre-assessment that would result in the same results. The PEAK-E short pre-assessment yields the same results as the long assessment. This study addressed the lack of support or data on this topic.

This study addressed this limitation and will be assessing the convergent validity of the two pre-assessments.

Limitations

Despite the results, there were several limitations to the current study. First, there were children that would refuse the gustatory stimuli that are required in the assessment therefore resulting in a zero for those categories. If children refused the gustatory stimuli there was one set of questions in each of the four categories therefore resulting in a zero in a category that they could have the skill in. This is a limitation because you could accurately assess those scores with those from the short assessment because in the short assessment the participant didn't have to taste a stimulus to get the question correct. The researchers were then not able to see if they obtained those skills on the assessment. There were also several skill deficits that resulted in a zero on the assessment. Some of those were not being able to read or write words, some participants were non-verbal therefore resulting in zeros for those categories. This is a limitation because the overall PEAK scores would then be significantly lower than those that had the skill. There was also one participant that was deaf therefore her assessment was run using sign language therefore her therapist would have to use sign language to perform the assessment. Therefore, IOA data was difficult to obtain due to the second individual not being able to sign. Another limitation would be that most of the participants had an autism diagnoses or similar diagnoses, research doesn't know what the results would be like on typically developing children to see if the results were the same. Another limitation would be a limited sample size in the current study there weren't enough participants, it is important to have a larger sample size to show stronger validity within the study. The current study was also limited to certain disabilities mostly those diagnosed with autism. Therefore, another limitation is that research hasn't been

done with other types of disabilities or typically developed peer groups. Lastly, current research only assessed convergent validity for the PEAK-E assessments and not the PEAK-T assessment. Therefore, future research should assess the PEAK-T expressive and receptive subtests.

Future research could include a wider range of participants regarding age, developmental disability, functioning levels, and environmental effects. If further research had a more diverse group of participants, the results may show a stronger correlation between the short assessment and the long assessment and may enhance the generalizability of the results to other populations. Future research should also look at the correlation between the PEAK-T expressive and receptive subtest to see if they yield the same results. This would then conclude that in certain circumstances such as not having a lot of time to run an assessment, having to run several assessments on one person that researchers may use the short assessment and yield the same results. Future research should consider those children that are able to perform all the skills on the assessment and not having deficits with reading and writing. Future research should also consider finding preferred gustatory stimuli for the children therefore they would attempt at those programs. Considering performing a preference assessment on those children before the actual assessment. Future research should also look into increasing the sample size of the population. Future research should consider accommodations for those who are deaf, who can't read, or those who use an AAC device. This would be important to have a procedure to accommodate those individuals in case one was to include an individual with these needs within the study to ensure that it is consistent across all individuals. Future research should look at comparing the PEAK-E short pre-assessment and IQ scores for individuals with autism or other related disabilities.

Conclusions

PEAK has been compared to other well-established standardized language assessments and intelligence tests, results of these comparisons have yielded strong correlations (Dixon et al. 2014d ; Mckeel at al. 2015b). There is a gap in the literature between the two forms of the PEAK-E pre-assessment, but little is known as to the extent to which the two actually measure the same results. The PEAK-E long pre-assessment can take a long period of time to run versus the short form being able to be run in a very short or small amount of time. This would be easier for individuals to run in which they have several clients to run this assessment on. It is assumed they measure the same, but there is no data suggesting they do. This study will be addressing the lack of support or data on this topic. This study addressed this limitation and assessed the convergent validity of the two pre-assessments. Lastly this study analyzed the convergent validity of these two pre-assessments. This assessment extended on the current PEAK literature. The primary purpose of this research was to examine the convergent validity of the long assessment form versus the short assessment form in the PEAK Relational Training System to determine if the short form would be just as effective as the long form. The PEAK-E short pre-assessment and long pre-assessment tool both encompasses and expands existing assessment and curriculum's used for individuals with developmental disabilities. The current study looked at the overall scores of the PEAK-E short pre-assessment versus the PEAK-E long pre-assessment scores. The author performed the PEAK-E short pre-assessment and the long pre-assessment on every participant within the study. Then the researcher did a Pearson's correlational analysis to determine if there was a strong correlation between the two assessments. Overall, the data from the current study indicate that the PEAK-E long pre-assessment has a strong correlation to the short assessment. Implications of this study suggest that you in certain situations may be able to

use the PEAK-E short pre-assessment over the long pre-assessment. Some of those situations might be limited time frame, many clients to perform pre-assessments on, those individuals that are lower functioning or have skill deficits such as reading or writing.

EXHIBTS

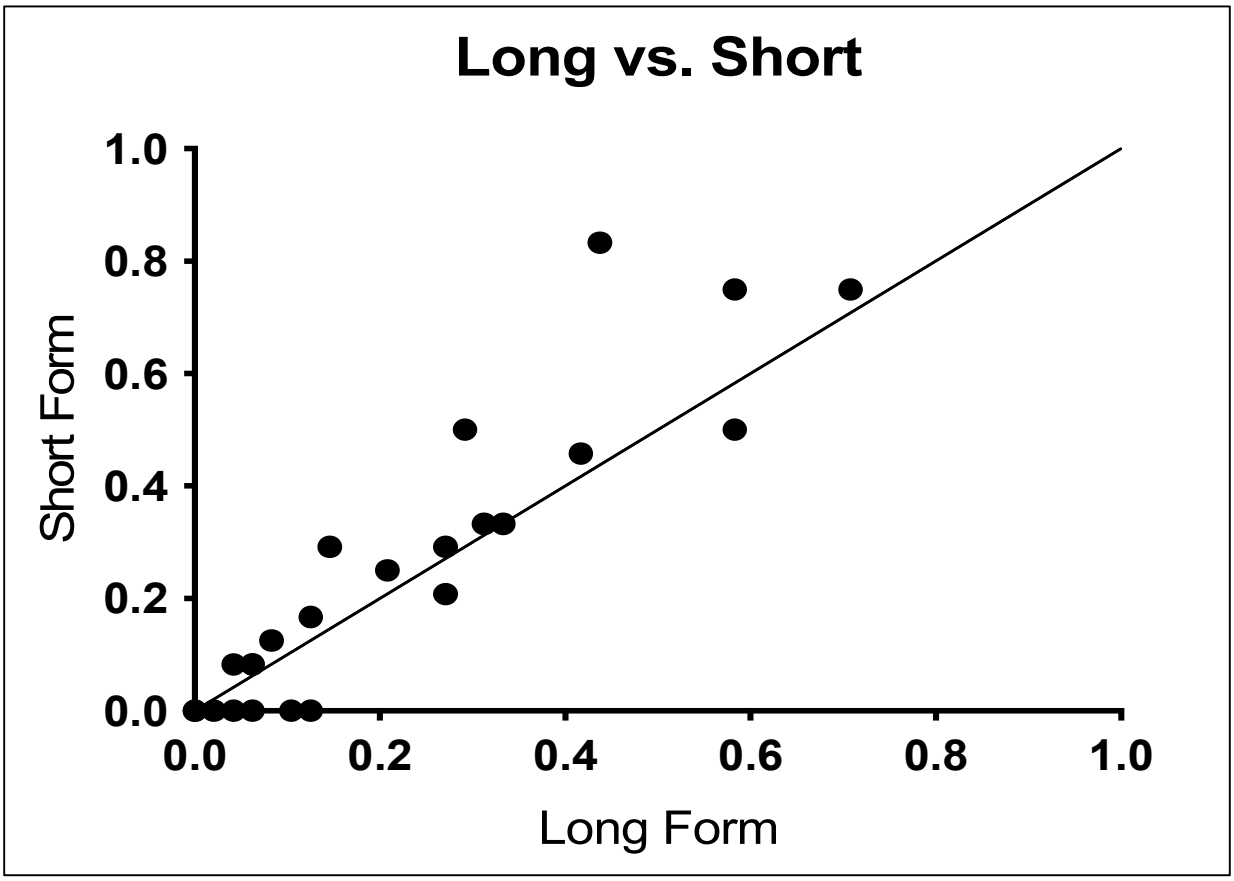

Figure 1. Relationship between PEAK-E long form and the PEAK-E short form. The line represents a linear regression fit to the data.

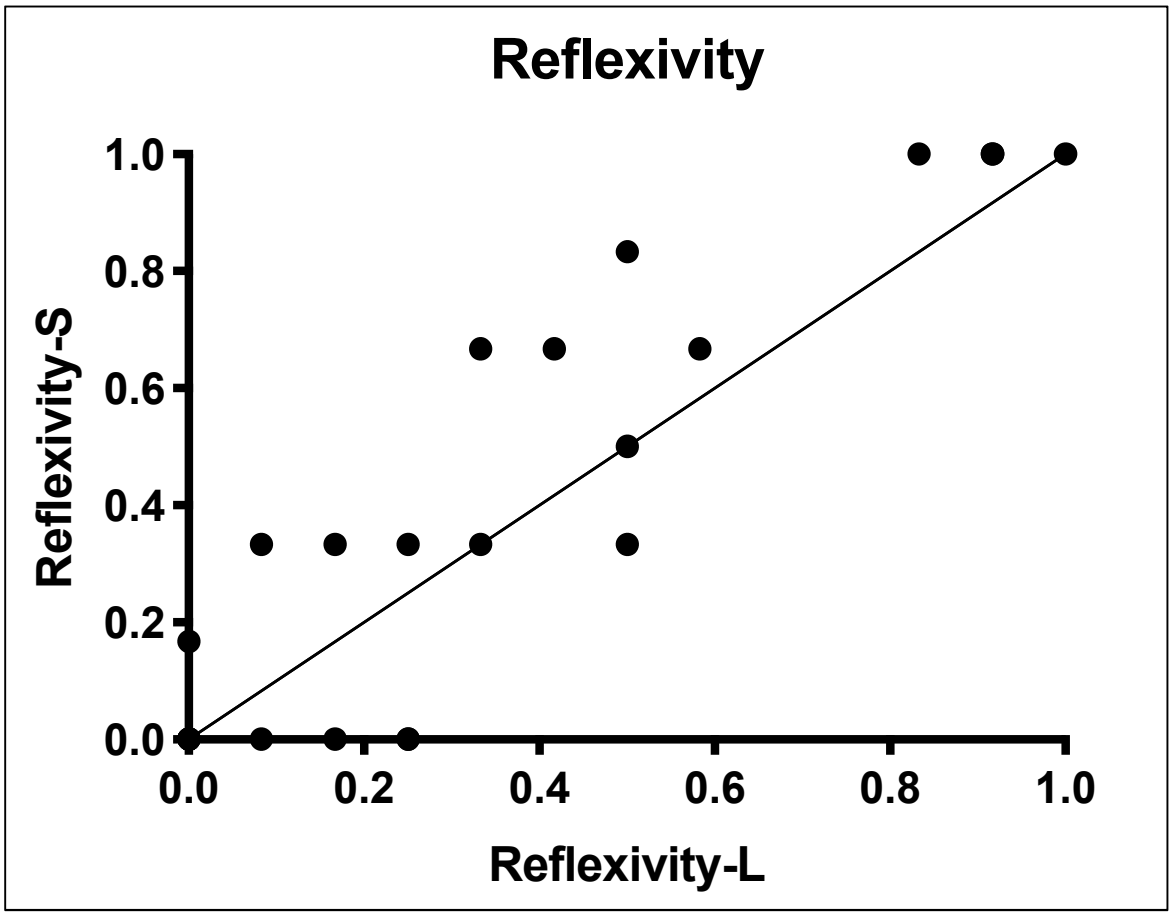

Figure 2. Relationship between PEAK-E long reflexivity form and the PEAK-E short reflexivity form. The line represents a linear regression fit to the data.

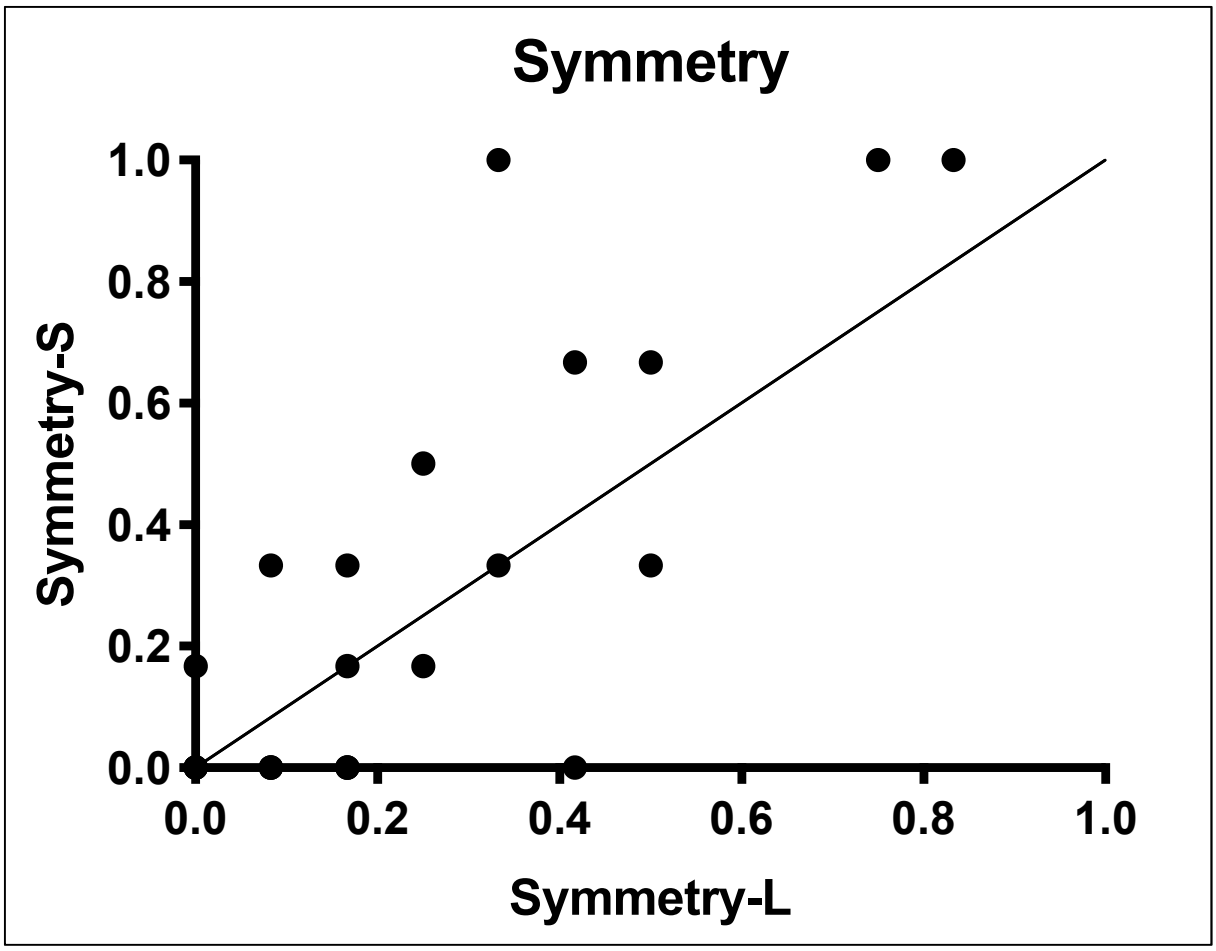

Figure 3. Relationship between PEAK-E long symmetry form and the PEAK-E short symmetry form. The line represents a linear regression fit to the data.

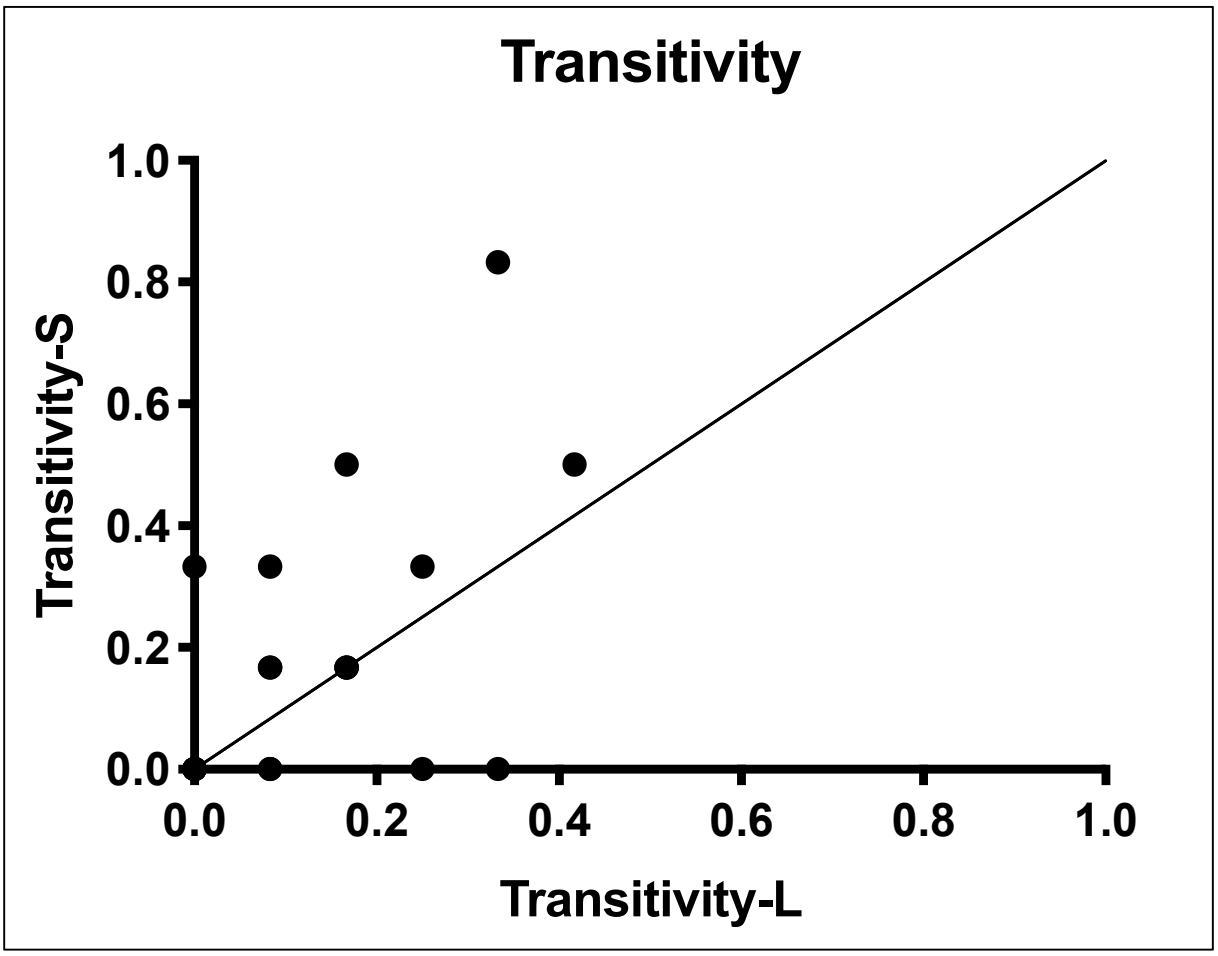

Figure 4. Relationship between PEAK-E long transitivity form and the PEAK-E short transitivity form. The line represents a linear regression fit to the data.

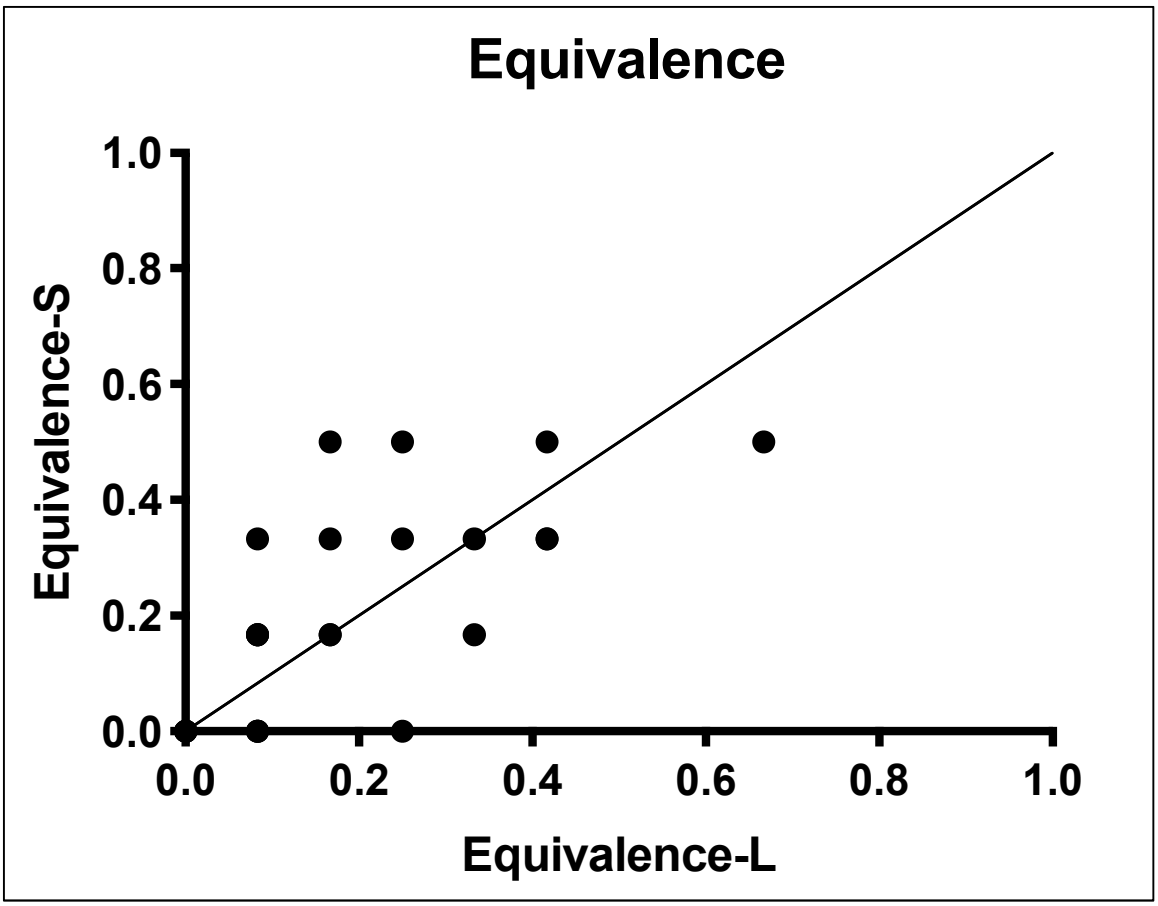

Figure 5. Relationship between PEAK-E long equivalence form and the PEAK-E short equivalence form. The line represents a linear regression fit to the data.

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Thesis Title: Assessing the Convergent Validity of the PEAK-E Long Assessment and the PEAK-E Short Assessment

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