

Analysis of the Virginia Family Survey Data Addressing

Part C SPP/APR Indicator #4:

Final Report

Report prepared for the

The Social Science Research Center at Old Dominion University

Report prepared by: Randall D. Penfield

Date of Delivery: August 6, 2015

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SECTION 1

EXECUTIVE SUMMARY

In accordance with federal reporting requirements mandated by the U.S. Department of Education, Office of Special Education Programs (OSEP), Part C Lead Agencies under the Individuals with Disabilities Education Act must report annually on 14 performance indicators related to early intervention services for children ages birth to three. This report presents findings of a survey conducted by the State of Virginia to address Indicator #4, the “percent of families participating in Part C who report that early intervention services have helped the family a) know their rights, b) effectively communicate their children’s needs, and c) help their children develop and learn.”

The survey administered by the State of Virginia included one rating scale developed and validated by the National Center for Special Education Accountability Monitoring (NCSEAM), and four additional items pertaining to the family’s experience with early interventions. The 22-item Impact on Family Scale (IFS) measures the extent to which early intervention helped families achieve positive outcomes, including the three outcomes specified in Indicator #4.

Surveys were returned by 2,044 families receiving early intervention services. From these responses, a random sample of 976 families reflecting the distribution of race/ethnicity in the larger population was selected for data analysis.

Data from each of the scales were analyzed through the Rasch measurement framework. For each scale, the analysis produces a measure for each survey respondent. Individual measures can range from 0 to 1,000. For the IFS, each family’s measure reflects the extent to which the family perceives that early intervention has

helped them achieve positive family outcomes. The IFS measures of all respondents were averaged to yield a mean measure reflecting the overall performance of the state in regard to the impact of early intervention on family outcomes.

As noted above, OSEP requires that the state's performance be reported as the *percent* of families who report that early intervention services helped them achieve specific outcomes. Deriving a percent from a continuous distribution requires application of a standard, or cut-score. The State of Virginia elected to apply the Part C standards recommended by a nationally representative stakeholder group convened by NCSEAM. The recommended standards, established based on item content expressed in the scale, were as follows: for Indicator 4a, know their rights, a measure of 539; for Indicator 4b, effectively communicate their children's needs, a measure of 556; and for Indicator 4c, help their children develop and learn, a measure of 516.

The following points represent the major findings related to Indicator #4:

1. Statewide Mean Measure on the IFS

The mean measure on the IFS was 654.8. The standard deviation was 177.7, and the standard error of the sample mean was 5.7. The 95% confidence interval for the population mean was 643.7 – 666.0. This means that there is a 95% likelihood that the true value of the mean is between these two values.

2. Statewide Percent on Indicators 4a, 4b, and 4c

The percent of families who reported that early intervention services helped them *know their rights* (Indicator 4a) was 75.6%. The 95% confidence interval for the true population percentage is 72.8% – 78.2%. This means that there is a 95% likelihood that the true value of the state percentage for Indicator 4a is between these two values.

The percent of families who reported that early intervention services helped them *communicate their child's needs* (Indicator 4b) was 72.1%. The 95% confidence interval for the true population percentage is 69.2% - 74.8%.

The percent of families who reported that early intervention services helped them *help their child develop and learn* (Indicator 4c) was 85.4%. The 95% confidence interval for the true population percentage is 83.0% - 87.5%.

4. Comparison to Target Percentages

The observed percentage of families meeting the standards for Indicators 4a, 4b, and 4c were very similar to those obtained for a sample of families measured in 2014 who were administered the same version of the IFS as was used for the 2015 reporting. Specifically, the observed percentages of 75.6%, 72.1%, and 85.4% for Indicators 4a, 4b, and 4c were very close to the corresponding values of 76.4%, 74.4%, and 83.9% obtained for the 2014 sample.

4. Items Pertaining to the Family's Experience in Early Intervention

The percentage of families responding that they agreed, strongly agreed, or very strong agreed exceeded 70% for each of the four items pertaining to the family's experience in receiving early intervention services. The percentage of families responding that they strongly agreed or very strongly agreed exceeded 93% for each of the four items.

SECTION 2

BACKGROUND

2.1. Federal Requirements

State Lead Agencies under Part C of the Individuals with Disabilities Education Improvement Act (IDEA 2004) are currently required to report data annually addressing 14 key performance indicators. Each state was required to submit a State Performance Plan (SPP) to OSEP detailing its plan to collect data addressing the 14 indicators, as well as baseline data for indicators on which the states had previously been required to report data to the federal government. Indicator #4, the “percent of families participating in Part C who report that early intervention services have helped the family: (a) know their rights, (b) effectively communicate their children’s needs, and (c) help their children develop and learn,” is a new indicator in the federal accountability system. Thus, states did not have to report baseline data on this indicator until February 2007.

State-level performance on the indicator must be reported annually. Data on program-level performance on the indicator must be collected at least once in the 6-year period of the SPP.

2.2. Survey Instrument

The Impact on Family Scale (IFS) was developed by the National Center for Special Education Accountability Monitoring (NCSEAM) to provide states with valid and reliable instruments to measure positive outcomes that families experience as a result of their participation in early intervention. Items were developed with substantial input from families and other key stakeholders across the country.

As part of its National Item Validation Study, NCSEAM collected data from a nationally representative sample of over 1,700 families participating in early intervention. Results of NCSEAM's data analyses supported the high reliability and validity of both scales. It was determined that scale reliabilities of .90 or above could be achieved with 22 items for the IFS. NCSEAM provided states with an appropriate sample item set for each scale, as well as instructions for customizing the scales by drawing on the larger bank of piloted items that NCSEAM made available on its website.

2.3. Standards

The State of Virginia elected to apply the standards recommended by NCSEAM as a way of deriving the percents to be reported for Indicators 4a, 4b, and 4c. To establish a recommended standard, NCSEAM convened a group of nationally representative stakeholders, including parents of children with disabilities, state directors of special education, state early intervention coordinators, district and program personnel, advocates, attorneys, and community representatives. Participants were invited to examine a set of items from the IFS, laid out in their calibration order (see Table 4.2). The items towards the bottom of the scale, having lower calibrations, are items that families tend to agree with most. The items towards the top of the scale, having higher calibrations, are items that families tend to agree with least. Because of the robust structure of the scale, a respondent who agrees with a given statement will have a very high likelihood of agreeing, or agreeing even more strongly, with all the items below it on the scale.

For indicator 4a, the stakeholder group agreed that families needed to endorse all items up to and including the item, "Over the past year, early intervention services

have helped me and/or my family know about my child's and family's rights concerning Early Intervention services.” For indicator 4b, the stakeholder group agreed that families needed to endorse all items up to and including the item, “Over the past year, early intervention services have helped me and/or my family communicate more effectively with the people who work with my child and family. For indicator 4c, the stakeholder group agreed that families needed to endorse all items up to and including the item, “Over the past year, early intervention services have helped me and/or my family understand my child's special needs.” These standards were operationalized by designating as the numerical standard the measure that, in each case, corresponds to the threshold item's calibration. For indicators 4a, 4b, and 4c, the measures representing the standards are 539, 556, and 516, respectively. This ensures that in each case, families with a measure at or above the standard have a .95 likelihood of agreeing with the threshold item.

SECTION 3

CHARACTERISTICS OF THE SAMPLE DATA

Surveys were returned by 2,044 families. A random sample of 976 cases was drawn to yield a final sample with a distribution of race/ethnicity that was representative of that observed in the population of families served under Part C for the State of Virginia.

3.1. Distribution of Race/Ethnicity in the Sample

The two tables below display the distribution of race/ethnicity in the total survey sample of 2,044 (Table 3.1), and the representative sample of 976 (Table 3.2). As can be seen in the Table 3.2, the distribution of race/ethnicity in the sample is highly reflective of the distribution of race/ethnicity in the population of families receiving early intervention services in Virginia.

Table 3.1. Distribution of Child's Race/Ethnicity in the Total Sample		
Gender	N	Percentage
White	1260	61.6%
Black or African-American	249	12.2%
Hispanic or Latino	197	9.6%
Asian	82	4.0%
American Indian or Alaskan Native	6	0.3%
Pacific Islander or Hawaiian Native	4	0.2%
Two or more races	203	9.9%
Refused	43	2.1%
Total	2044	100%

Table 3.2. Distribution of Child's Race/Ethnicity in the Representative Sample

Gender	N	Percentage
White	564	57.8%
Black or African-American	183	18.8%
Hispanic or Latino	107	11.0%
Asian	44	4.5%
American Indian or Alaskan Native	1	0.1%
Pacific Islander or Hawaiian Native	1	0.1%
Two or more races	76	7.8%
Total	976	100%

Note. The distribution of race/ethnicity for the children receiving early intervention services in Virginia under Part C are: White = 57.8%, Black/African American = 18.8%, Hispanic or Latino = 11.0%, Asian = 4.5%, American Indian or Alaskan Native = 0.1%, Pacific Islander of Hawaiian Native = 0.1%, Two or more races = 7.8%.

3.2. Distribution of Child's Gender in the Sample

Tables 3.4 and 3.5, below, display the distribution of child's gender in the total and representative samples, respectively.

Table 3.4. Distribution of Child's Gender in the Total Sample

Gender	N	Percentage
Male	1246	61.0%
Female	764	37.4%
Missing	34	1.7%
Total	2044	100%

Table 3.5. Distribution of Child's Gender in the Representative Sample		
Gender	N	Percentage
Male	612	62.7%
Female	360	36.9%
Missing	4	0.4%
Total	976	100%

SECTION 4

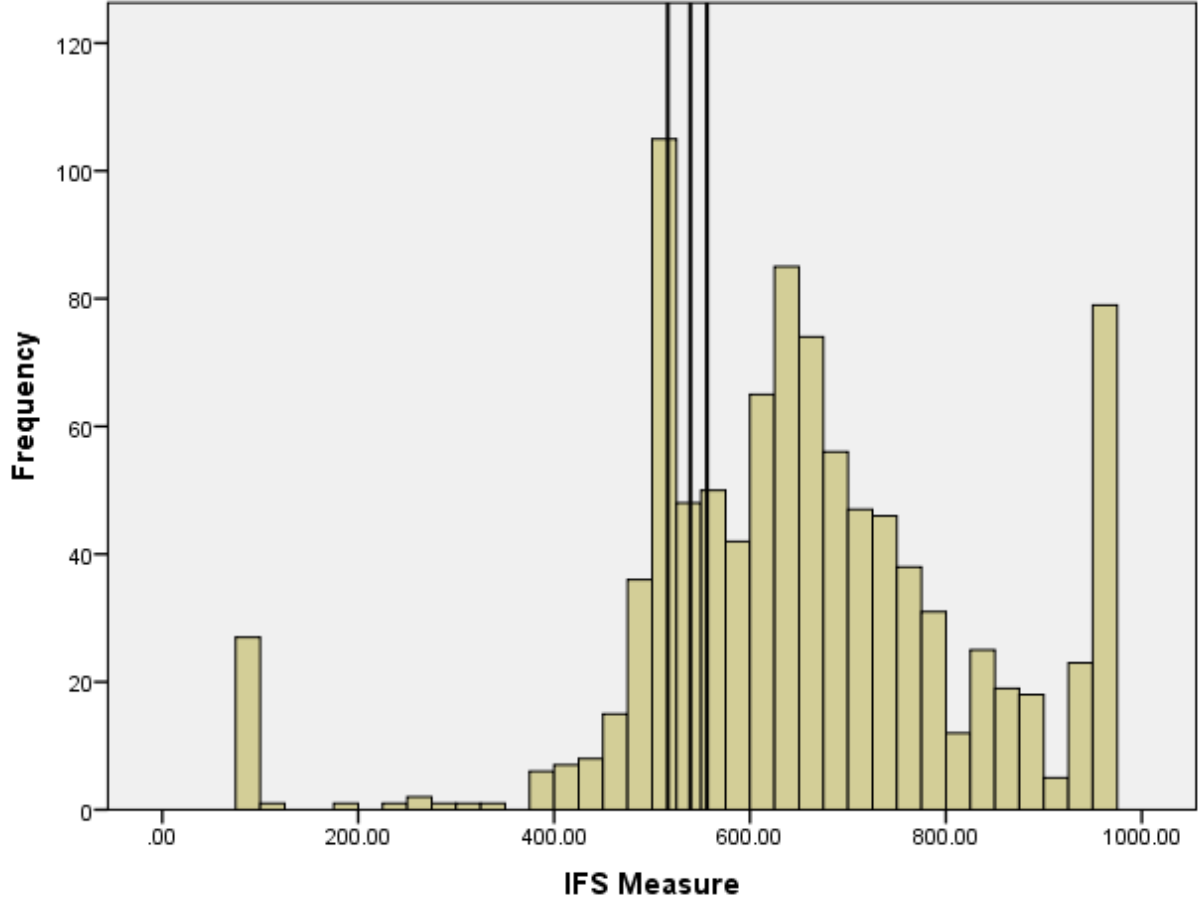
RESULTS PERTAINING TO INDICATOR #4

4.1 Distribution of IFS Measures

Of the 976 respondents in the representative sample, 975 had valid responses to the IFS. The distribution of IFS measures for the 975 respondents is shown in the figure below.

Each bar indicates the number of respondents with measures at the value indicated on the x-axis. The vertical black lines correspond to the three standards applied to Indicator 4a (539), 4b (556), and 4c (516).

Figure 1. Distribution of IFS Measures



As can be seen in Figure 1, the values representing the three standards lie in the lower half of the measure distribution. That is, the majority of respondents reported a level of impact (i.e., had an IFS measure) that exceeded the three standards.

The distribution of measures approximates a normal distribution, with two exceptions. The first exception is the unexpectedly high number of respondents with measures at the extreme positive end of the scale, represented by the high bar at the extreme right of the graph. These individuals responded in the “very strongly agree” category to each and every item. The second exception is the

unexpectedly high number of respondents with measures at a value close to the standard values, represented by the high bar at the lowest standard value. Many of these individuals responded in the “agree” category to each and every item.

The statistical properties of the IFS measures are displayed in Table 4.1 below.

Table 4.1. Properties of IFS Measures for the Representative Sample			
Sample Mean	Standard Deviation	Standard Error of the Sample Mean	95% Confidence Interval for the Population Mean
654.8	177.7	5.7	643.7 – 666.0

4.2. Interpretation of the Mean IFS Measure

The state’s performance on the IFS conveys information that goes beyond the three outcomes that are addressed in OSEP’s Indicator #4. A mean measure of 654.8 on the IFS indicates that the Virginia early intervention system is helping families to achieve many positive outcomes. These positive outcomes are evident from the response percentages displayed in Table 4.2, below. (The table also displays each item’s calibration value, to be discussed in Section 5.)

Table 4.2. Percent of Families Expressing Agreement with IFS Items

Item Calibration	Item Stem: Over the past year, Early Intervention services have helped me and/or my family:	% Strongly/ Very strongly agree	% Agree in any category
678	...participate in typical activities for children and families in my community.	41%	84%
656	...know about services in my community.	48%	88%
640	...know where to go for support to meet my FAMILY's needs.	51%	86%
625	...keep up friendships for my child and family.	47%	83%
609	...know where to go for support to meet my CHILD's needs.	57%	91%
577	...find information I need.	54%	91%
570	...improve my family's quality of life.	55%	92%
565	...feel that I can get the services and supports that my child and family need.	62%	93%
559	...feel more confident in my skills as a parent.	62%	93%
559	...feel that my child will be accepted and welcomed in the community.	60%	94%
557	...know how to make changes in family routines that will benefit my child.	61%	92%
556	...communicate more effectively with the people who work with my child and family.	60%	94%
554	...feel more confident in finding ways to meet my child's needs.	63%	94%
553	...understand how the Early intervention system works.	61%	93%
546	...feel that I can handle the challenges of parenting my child with his/her needs.	63%	93%
546	...understand the roles of the people who work with my child and family.	61%	94%
540	...figure out solutions to problems as they come up.	57%	93%
539	...know about my child's and family's rights concerning Early Intervention services.	60%	93%
534	...be able to evaluate how much progress my child is making.	63%	93%
526	...understand my child's needs.	69%	94%
498	...feel that my efforts are helping my child.	72%	95%
498	...do things with and for my child that are good for my child's development.	71%	95%

As seen in the table, over 95% of families agreed, with over 69% expressing strong or very strong agreement, that early intervention helped them do things with and for their child that are good for their child's development, feel that their efforts are helping their child, and understand their child's special needs.

Over 93% of families agreed, with somewhat over 57% expressing strong or very strong agreement, that early intervention helped them be able to evaluate how much progress their child is making, figure out solutions to problems as they come up, understand the roles of the people who work with their child and family, understand how the early intervention system works, and communicate more effectively with the people who work with their child and family.

Between 92% and 94% of families agreed, with over 55% expressing strong or very strong agreement, that early intervention helped them feel that their family will be accepted and welcomed in the community, feel that they can get the services and supports that their child and family need, and improve their family's quality of life.

Approximately 87% of families agreed, with about 50% expressing strong or very strong agreement, that early intervention helped them keep up friendships for their child and family, know where to go for support to meet the family's needs, and know about services in the community. 84% of families agreed, with 41% expressing strong or very strong agreement, that early intervention helped them participate in typical activities for children and families in their community.

For reference, the frequency distribution of responses to all the items in the IFS is provided in Appendix A.

4.3. Percentage Meeting Each of the Standards for Indicator #4

Of the 976 respondents in the representative sample, 975 had an IFS measure. Table 4.3 presents the percentage of these 975 respondents in the representative sample for which the IFS measure meets or exceeds each of the three standards for Indicator #4, as well as a 95% confidence interval for the true population percentage. Note that the confidence interval is asymmetric about the sample percentage, in that there is a greater distance in the confidence interval below the sample percentage than above the sample percentage. The asymmetric confidence interval represents a more accurate confidence interval for percentages than normal-distribution based symmetric confidence intervals (due to the fact that percentages are bounded between 0 and 100). The asymmetric confidence interval reported here is the Score interval proposed by Wilson (1927), and described in greater detail in Agresti (1996) and Penfield (2003).

Table 4.3. Percent of Respondents Meeting or Exceeding Each of the Standards for Indicator #4 (Using Representative Sample of n = 1,023)		
Indicator 4A Percent of families who report that early intervention services helped them know their rights	Indicator 4B Percent of families who report that early intervention services helped them effectively communicate their children's needs	Indicator 4C Percent of families who report that early intervention services helped them help their child develop and learn

Percentage	75.6% 737 of 975 met standard	72.1% 703 of 975 met standard	85.4% 833 of 975 met standard
95% Confidence Interval	72.8% - 78.2%	69.2% – 74.8%	83.0% – 87.5%

4.4 Percentage Meeting Each of the Standards by Race/Ethnicity

Table 4.4. presents the percentage of respondents with IFS measures that met or exceeded each of the three standards, by racial/ethnic category.

Table 4.4. Percent of Respondents Meeting or Exceeding Each of the Standards for Indicator #4%, by Race/Ethnicity			
Race/Ethnicity	Indicator 4A Percent of families who report that early intervention services helped them know their rights	Indicator 4B Percent of families who report that early intervention services helped them effectively communicate their children’s needs	Indicator 4C Percent of families who report that early intervention services helped them help their child develop and learn

White/Caucasian (N = 1,259)	74.4% 95% CI: 71.9% - 76.7%	71.5% 95% CI: 68.9% - 73.9%	83.5% 95% CI: 81.3% - 85.4%
Black or African American (N = 249)	74.7% 95% CI: 69.0% - 79.7%	70.7% 95% CI: 64.8% - 76.0%	86.4% 95% CI: 81.6% - 90.1%
Hispanic or Latino (N = 196)	81.6% 95% CI: 75.6% - 86.4%	77.0% 95% CI: 70.6% - 82.3%	89.3% 95% CI: 84.2% - 92.9%
Asian (N = 82)	79.3% 95% CI: 69.3% - 86.7%	73.2% 95% CI: 62.7% - 81.6%	87.8% 95% CI: 79.0% - 93.2%
American Indian Or Alaskan Native (N = 6)	66.7% 95% CI: 30.0% - 90.3%	66.7% 95% CI: 30.0% - 90.3%	66.7% 95% CI: 30.0% - 90.3%
Pacific Islander or Hawaiian Native (N = 4)	100% 95% CI: ---	100% 95% CI: ---	100% 95% CI: ---
Two or More Races (N = 203)	74.4% 95% CI: 68.0% - 79.9%	69.5% 95% CI: 62.9% - 75.4%	80.8% 95% CI: 74.8% - 85.6%

4.5. Percentage Meeting Each of the Standards by Program Location

Table 4.5 presents the percentage of respondents with IFS measures that met or exceeded each of the three standards, by program location.

Table 4.5. Percent of Respondents Meeting or Exceeding Each of the Standards for Indicator #4%, by Program Location				
Program Location	N	Indicator 4A	Indicator 4B	Indicator 4C
Alexandria	50	66.0%	62.0%	74.0%
Alleghany Highlands	7	85.7%	71.4%	100.0%
Arlington	88	78.4%	76.1%	81.8%
Augusta-Highland	15	73.3%	73.3%	80.0%
Central Virginia	68	75.0%	70.6%	85.3%
Chesapeake	61	78.7%	73.8%	85.2%
Chesterfield	71	70.4%	67.6%	81.7%
Crater	19	52.6%	47.4%	68.4%
Cumberland	27	77.8%	77.8%	85.2%
Danville Pittsylvania	18	94.4%	94.4%	94.4%
Dilenowisco	18	72.2%	66.7%	88.9%
Eastern Shore	9	66.7%	66.7%	77.8%
Fairfax-Falls Church	351	78.3%	72.9%	85.2%
Goochland	15	73.3%	73.3%	80.0%
Hampton-Newport News	52	61.5%	61.5%	82.7%
Hanover	28	78.6%	75.0%	85.7%
Harrisonburg-Rockingham	29	65.5%	65.5%	65.5%
Heartland	27	96.3%	88.9%	100.0%
Henrico	83	66.3%	60.2%	75.9%
Highlands	19	94.7%	89.5%	100.0%
Loudon	44	75.0%	72.7%	81.8%
Middle Peninsula Northern Neck	28	75.0%	75.0%	85.7%
Mt. Rogers	29	69.0%	69.0%	79.3%
New River Valley	41	80.5%	78.0%	87.8%
Norfolk	49	73.5%	69.4%	79.6%
Piedmont	27	66.7%	66.7%	81.5%
Portsmouth	29	72.4%	62.1%	86.2%
Prince William	116	76.7%	71.6%	87.1%
Rappahannock Area	75	78.7%	77.3%	88.0%
Rappahannock Rapidan	37	78.4%	78.4%	89.2%
Richmond	55	74.5%	70.9%	87.3%
Roanoke Valley	63	73.0%	69.8%	88.9%
Rockbridge	20	90.0%	90.0%	95.0%
Shenandoah Valley	61	80.3%	77.0%	85.2%
Southside	9	77.8%	77.8%	88.9%

Staunton-Waynesboro	25	76.0%	72.0%	88.0%
The Blue Ridge	98	77.6%	74.5%	83.7%
Virginia Beach	105	64.8%	61.0%	78.1%
Western Tidewater	35	74.3%	71.4%	80.0%
Williamsburg	38	81.6%	81.6%	89.5%

4.6. Meeting the Established Performance Targets

Table 4.6 presents the observed percentage of families meeting indicators 4a, 4b, and 4c, along with the values obtained for the representative sample in the 2014 study. The obtained percentage of families meeting indicators 4a, 4b, and 4c (75.6%, 72.1%, and 85.4%, respectively) were very similar to the values obtained in the 2014 study (76.4%, 74.4%, and 83.9%, respectively).

Table 4.6. Comparing the Obtained Outcomes in 2015 to the Values Obtained in 2014			
	Target % for Indicator 4A Percent of families who report that early intervention services helped them know their rights	Target % for Indicator 4B Percent of families who report that early intervention services helped them effectively communicate their children's needs	Target % for Indicator 4C Percent of families who report that early intervention services helped them help their child develop and learn
Obtained Outcomes in 2015 for Representative Sample	75.6%	72.1%	85.4%

Obtained Outcomes in 2014 for Representative Sample	76.4%	74.4%	83.9%
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SECTION 5

MEASUREMENT FRAMEWORK FOR THE IFS

The measurement approach used by NCSEAM, known as the Rasch framework, applies a series of parametric models to estimate the properties of each survey item and each respondent in a way that places individuals and items on a common metric (Bond & Fox, 2001; Fischer & Molenaar, 1995; Rasch, 1960; Wright & Masters, 1982). The Rasch approach offers many advantages over typical approaches to survey development. First, it is possible to test whether the items administered belong together, that is, whether they are all related to the construct that the scale is supposed to measure. Ongoing

confirmation of the fit of the items helps to maintain the quality of the measurement system. It is also possible to test whether the response categories are operating in the expected fashion. Often, the way in which respondents actually use the response categories does not correspond to the equidistant way in which they are laid out on paper. Extreme categories (e.g., “very strongly disagree”) are sometimes used so infrequently that it makes sense to combine them with an adjacent, less extreme, category (“very strongly disagree/strongly disagree”).

Second, it is possible to determine where each item is located on the measurement ruler. The item’s location is referred to as the item’s “calibration.” Typically, items in a test or survey are not all equal with respect to the amount of the attribute or quality that the items are measuring. It has been empirically demonstrated, in fact, that items in the IFS are not all of equal agreeability. Items range from those that are most likely to draw agree responses to those that are least likely to draw agree responses. Highly agreeable items have low calibrations; less agreeable items have higher calibrations. Table 5.1, below, displays the IFS items in calibration order.

Table 5.1. IFS Items in Calibration Order	
Item Calibration	Item <u>Stem:</u> Over the past year, Early Intervention services have helped me and/or my family:
678	...participate in typical activities for children and families in my community.
656	...know about services in my community.
640	...know where to go for support to meet my FAMILY's needs.
625	...keep up friendships for my child and family.

609	...know where to go for support to meet my CHILD's needs.
577	...find information I need.
570	...improve my family's quality of life.
565	...feel that I can get the services and supports that my child and family need.
559	...feel more confident in my skills as a parent.
559	...feel that my child will be accepted and welcomed in the community.
557	...know how to make changes in family routines that will benefit my child.
556	...communicate more effectively with the people who work with my child and family.
554	...feel more confident in finding ways to meet my child's needs.
553	...understand how the Early intervention system works.
546	...feel that I can handle the challenges of parenting my child with his/her needs.
546	...understand the roles of the people who work with my child and family.
540	...figure out solutions to problems as they come up.
539	...know about my child's and family's rights concerning Early Intervention services.
534	...be able to evaluate how much progress my child is making.
526	...understand my child's needs.
498	...feel that my efforts are helping my child.
498	...do things with and for my child that are good for my child's development.

The fact that items have highly stable calibrations (agreeability levels) regardless of the population that is asked to respond to the items is a very important attribute of well-constructed measurement scales. This stability means that items with similar calibrations are, for all intents and purposes, interchangeable. As an example, this is why the SAT is the “same” test each time it is administered, even though it contains different items each time. The score achieved on any particular version of the SAT is comparable to the score achieved on any other version. Thus, a state can change some of the items on the survey from year to year, and still have validly comparable IFS measures across successive years.

Third, a Rasch analysis condenses information from a person's responses to all the items in a scale into a single number. That number is the person's measure on the scale. Since the Rasch framework puts measures on the same metric as item calibrations, a person's measure on a scale can be meaningfully interpreted in terms of the items on the scale. A person with a higher measure is expressing more agreement with items, overall, than a person with a lower measure. When IFS measures from a representative sample of parents are aggregated, the average value represents a reliable and highly interpretable measure of the extent to which schools are facilitating parent involvement.

Fourth, a Rasch analysis yields an estimate of the reliability of both the calibration values (related to the items) and the measures (related to people's responses). Scientific approaches to measurement require that the amount of "error," or imprecision, in the system be estimated, so that interpretations based on the measures can take this into consideration.

For a more detailed explanation of these concepts, please refer to Bond and Fox (2001) and Wright and Masters (1982).

SECTION 6

RESULTS PERTAINING TO THE PSYCHOMETRIC PROPERTIES OF THE IMPACT ON FAMILIES SCALE (IFS)

6.1 Psychometric Properties of the IFS Measures

In assessing the quality of the person-level measures derived from the IFS, it is germane to consider the issues of reliability and validity. The reliability of the obtained IFS measures pertains to the extent to which a particular individual is expected to attain the same IFS measure if the IFS were to be administered to the individual multiple times. That is, reliability concerns the stability of the IFS measure¹ (Crocker & Algina, 1986; Lord, 1980; Traub, 1994); low reliability coincides with a low level of stability, and high reliability coincides with a high level of stability. Reliability can range from 0 (lack of any stability) to 1 (perfect stability). In contrast to reliability, the validity of the IFS measures concerns the extent to which they are actually representative of the intended trait (i.e., level of impact on family).² The validity of the IFS measures can be assessed using numerous approaches, several of which are described below.

Statistics used to express measurement reliability range from 0 (indicating lack of any stability) to 1 (indicating perfect stability). The reliability of the IFS

¹ A definition of reliability that is more theoretically accurate describes reliability as the extent to which a given respondent's measure is determined by random error versus his or her true level of the trait being measured; low reliability coincides with a high level of measurement error, and high reliability coincides with a high low level of measurement error (Crocker & Algina, 1986; Lord, 1980; Traub, 1994).

² This definition of validity is a simplification of the definition now endorsed by the technical measurement community. The contemporary definition of validity describes it as the extent to which evidence and theory support the interpretations of the scale measures entailed by the proposed use of the scale (AERA/APA/NCME, 1999; Osterlind, 2006). That is, the validity of the IFS measures is based on how much evidence we have that the measures support the intended purposes of the use of the measures (i.e., are the measures behaving as they are supposed to behave, and leading to the correct decisions about individuals).

measures for the Virginia sample was measured in the Rasch framework to be .93. An alternative approach to estimating the reliability of the IFS measures is to employ Cronbach's alpha, which makes no assumptions about the fit of the responses to any particular model (Cronbach's alpha is based on the simpler true score model, and is commonly used in the behavioral sciences as a model-free index of reliability). The value of Cronbach's alpha was 0.99, which is consistent with the value of .93 obtained from the Rasch analysis. These results suggest that the measures obtained from the IFS serve as stable measures of the underlying trait.

Support for the validity of the measures obtained by the IFS comes from several lines of evidence. First, items for the IFS were developed in consultation with multiple groups of individuals, including parents, school personnel, district-level administrators, and advocates, with direct and extensive experience related to schools' efforts to encourage parent involvement and to ensure that parents are active participants in decision-making related to their child's education. Subsequent review of the items by expert panels, researchers, and NCSEAM's Parent/Family Involvement Workgroup confirmed that the item content maps onto the intended content domain of the IFS. Second, dimensionality analysis (i.e., principal components analysis and factor analysis) indicates that the items of the IFS are all measuring one primary construct, which is likely the intended one, i.e., positive family outcomes achieved as a result of early intervention services. A third line of evidence is related to a characteristic of items known as discrimination, discussed in section 6.1 below. The high discrimination indices of

the IFS items (see Table 6.1) indicate that the items are providing useful information concerning the construct that is intended to be measured. All of these types of evidence support the claim that the measures obtained using the IFS are valid.

6.2 Psychometric Properties of the IFS Items

Table 6.1, below, gives the calibration of each item (previously presented in Table 5.1 above), along with indices of the item's fit to the Rasch model. The column labeled "Item Calibration" provides the value of the location parameter of the item. The higher the value of the item calibration, the greater the overall positive impact of early intervention services on family outcomes. The "Infit" and "Outfit" columns provide two measures of how well the Rasch model fits the responses provided to each item. In general, values of 1.0 indicate very good fit. Values approaching 2 suggest poorer fit (Bond & Fox, 2001).

Table 6.1. Calibration, Fit, and Discrimination of the IFS Items				
Item	Item Calibration	Infit	Outfit	Discrimination
Q1	677.5	1.79	2.33	0.77
Q2	656.0	1.59	1.65	0.79
Q3	569.8	1.12	1.30	0.82
Q4	608.8	1.02	1.00	0.85
Q5	639.8	1.03	1.04	0.85
Q6	545.9	0.90	1.01	0.84
Q7	559.3	0.94	1.01	0.84
Q8	624.8	1.24	1.26	0.83
Q9	576.8	0.94	0.90	0.85
Q10	556.8	0.81	0.78	0.86
Q11	540.4	0.85	0.94	0.86
Q12	564.5	0.75	0.72	0.86
Q13	552.9	0.92	0.88	0.84
Q14	534.4	0.85	0.88	0.85

Q15	559.1	0.90	0.92	0.85
Q16	553.9	0.57	0.52	0.88
Q17	555.9	0.78	0.78	0.86
Q18	545.5	0.74	0.74	0.87
Q19	538.9	0.94	0.88	0.84
Q20	497.8	0.73	0.66	0.84
Q21	526.1	0.70	0.64	0.85
Q22	498.1	0.83	0.86	0.84

The rightmost column of the table presents an index of discrimination for each item, calculated as the item-measure correlation coefficient. The values in this column are all relatively high (> 0.7), indicating that each item is discriminating well between respondents who had more positive versus more negative perceptions of schools' facilitation of parent involvement.

While Item Q1 ("Over the past year, early intervention services helped me and/or my family participate in typical activities for children and families in my community") displays a less than ideal level of fit, it nevertheless has a strong discrimination index, which provides evidence that it is a useful item. Therefore, this item appears to be measuring the intended construct relatively well, but is not a very good fit for the Rasch framework, which employs specific assumptions concerning the properties of the items.

SECTION 7

RESULTS OF THE FOUR ITEMS PERTAINING TO THE FAMILY'S EXPERIENCE IN EARLY INTERVENTION

The survey contained four items that were not part of the IFS, but that addressed family's experiences with the early intervention services they received. These items were:

1. What I say about my child and family is understood and respected.
2. The people who work with my child and family answer our questions.
3. I can easily get in touch with my service coordinator.
4. The services provided to my child and family help reach the outcomes/goals that are important to my family.

Table 7.1 displays the percentage of families reporting: (a) strongly or very strongly agreeing with each of the four items, and (b) any category of agree for each of the four items. Across the four items, the percentage of families strongly or very strongly agreeing exceeded 70%, and the percentage of families agreeing in any category was above 93%. The percentage of respondents in each of the possible response categories for each item is displayed in Appendix A.

Table 7.1. Percent of Families Expressing Agreement with Items Pertaining to Experiences with Early Interventions

Item	% Strongly/ Very strongly agree	% Agree in any category
What I say about my child and family is understood and respected.	71%	95%
The people who work with my child and family answer our questions.	74%	95%
I can easily get in touch with my service coordinator.	72%	93%
The services provided to my child and family help reach the outcomes/goals that are important to my family.	71%	93%

SECTION 8

CALIBRATION METHODOLOGY FOR THE IFS

The Rasch calibrations of the IFS were conducted using the Winsteps software program. All items were fit using the Rating Scale Model (Wright & Masters, 1982). The metric of the current calibration was set by fixing the parameters of all items to those obtained in the previous year's analysis. Note that previous calibrations fixed the parameters for 18 of the 22 items to calibrated values obtained by Dr. William Fisher, Consultant to NCSEAM, for a large dataset of five states. Four new items were added to the IFS scale (Items 6, 10, 16, and 21), and the parameters of these four items were estimated during an initial calibration of the updated IFS scale in the 2012 equating study. The parameters of the IFS items for this year's analysis were fixed to those established in the 2012 equating study. The mean and logit scale of the current calibration were also set equal to those generated in the larger analysis on five states conducted by Dr. Fisher. These equating procedures were conducted so that the scale measures obtained in the current calibration have equivalent meanings across multiple years and to those of other states' data calibrated by Dr. Fisher.

Based on the analysis of the current data and on the results of Dr. Fisher's combined multi-state analysis, it was decided to combine the response categories "very strongly disagree" and "strongly disagree" into a single category. The rationale for combining the two categories was based on two factors: (a) low response rates (i.e., < 5%) in these two categories making their corresponding threshold parameter estimates relatively unstable, and (b) the two category

threshold estimates were not far enough apart to indicate that the two categories served to meaningfully distinguish between individuals having substantially different levels of the trait being measured. As a result, the final analysis was based on five-category response structure for each item. The control file used in the current analysis is given in Appendix B. The pertinent output related to the Rasch analysis of the IFS is given in Appendix C.

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Appendix A: Item Response Frequencies for the Items of the Survey

...participate in typical activities for children and families in my community.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very strongly disagree	71	3.5	3.5	3.5
	Strongly disagree	31	1.5	1.5	5.1
	Disagree	172	8.4	8.6	13.7
	Agree	611	29.9	30.4	44.1
	Strongly agree	244	11.9	12.2	56.3
	Very strongly agree	332	16.2	16.5	72.8
	Does not apply	546	26.7	27.2	100.0
	Total	2007	98.2	100.0	
Missing	System	37	1.8		
Total		2044	100.0		

...know about services in my community.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very strongly disagree	67	3.3	3.3	3.3
	Strongly disagree	45	2.2	2.2	5.5
	Disagree	126	6.2	6.2	11.8
	Agree	754	36.9	37.2	49.0
	Strongly agree	386	18.9	19.1	68.0
	Very strongly agree	446	21.8	22.0	90.1
	Does not apply	201	9.8	9.9	100.0
	Total	2025	99.1	100.0	
Missing	System	19	.9		
Total		2044	100.0		

...improve my family's quality of life.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very strongly disagree	62	3.0	3.1	3.1
	Strongly disagree	19	.9	.9	4.0
	Disagree	68	3.3	3.4	7.4
	Agree	711	34.8	35.1	42.5
	Strongly agree	448	21.9	22.1	64.7
	Very strongly agree	558	27.3	27.6	92.2
	Does not apply	157	7.7	7.8	100.0
	Total	2023	99.0	100.0	
Missing	System	21	1.0		
Total		2044	100.0		

...know where to go for support to meet my CHILD's needs.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very strongly disagree	66	3.2	3.2	3.2
	Strongly disagree	21	1.0	1.0	4.3
	Disagree	98	4.8	4.8	9.1
	Agree	687	33.6	33.8	42.9
	Strongly agree	448	21.9	22.0	65.0
	Very strongly agree	616	30.1	30.3	95.3
	Does not apply	96	4.7	4.7	100.0
	Total	2032	99.4	100.0	
Missing	System	12	.6		
Total		2044	100.0		

...know where to go for support to meet my FAMILY's needs.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very strongly disagree	63	3.1	3.1	3.1
	Strongly disagree	25	1.2	1.2	4.3
	Disagree	169	8.3	8.3	12.7
	Agree	645	31.6	31.8	44.5
	Strongly agree	379	18.5	18.7	63.2
	Very strongly agree	470	23.0	23.2	86.4
	Does not apply	276	13.5	13.6	100.0
	Total	2027	99.2	100.0	
Missing	System	17	.8		
Total		2044	100.0		

...feel that I can handle the challenges of parenting my child with his/her needs.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very strongly disagree	63	3.1	3.1	3.1
	Strongly disagree	23	1.1	1.1	4.2
	Disagree	55	2.7	2.7	6.9
	Agree	609	29.8	29.9	36.8
	Strongly agree	477	23.3	23.4	60.3
	Very strongly agree	733	35.9	36.0	96.3
	Does not apply	76	3.7	3.7	100.0
	Total	2036	99.6	100.0	
Missing	System	8	.4		
Total		2044	100.0		

...feel more confident in my skills as a parent.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very strongly disagree	60	2.9	2.9	2.9
	Strongly disagree	20	1.0	1.0	3.9
	Disagree	76	3.7	3.7	7.7
	Agree	611	29.9	30.0	37.6
	Strongly agree	492	24.1	24.1	61.7
	Very strongly agree	677	33.1	33.2	94.9
	Does not apply	103	5.0	5.1	100.0
	Total	2039	99.8	100.0	
Missing	System	5	.2		
Total		2044	100.0		

...keep up friendships for my child and family.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very strongly disagree	66	3.2	3.3	3.3
	Strongly disagree	24	1.2	1.2	4.4
	Disagree	174	8.5	8.6	13.0
	Agree	509	24.9	25.1	38.1
	Strongly agree	296	14.5	14.6	52.7
	Very strongly agree	368	18.0	18.2	70.9
	Does not apply	590	28.9	29.1	100.0
	Total	2027	99.2	100.0	
Missing	System	17	.8		
Total		2044	100.0		

...find information I need.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very strongly disagree	66	3.2	3.3	3.3
	Strongly disagree	19	.9	.9	4.2
	Disagree	106	5.2	5.2	9.4
	Agree	701	34.3	34.5	43.9
	Strongly agree	432	21.1	21.3	65.2
	Very strongly agree	585	28.6	28.8	94.0
	Does not apply	121	5.9	6.0	100.0
	Total	2030	99.3	100.0	
Missing	System	14	.7		
Total		2044	100.0		

...know how to make changes in family routines that will benefit my child.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very strongly disagree	69	3.4	3.4	3.4
	Strongly disagree	10	.5	.5	3.9
	Disagree	74	3.6	3.6	7.5
	Agree	600	29.4	29.5	37.0
	Strongly agree	467	22.8	23.0	60.0
	Very strongly agree	671	32.8	33.0	93.0
	Does not apply	142	6.9	7.0	100.0
	Total	2033	99.5	100.0	
Missing	System	11	.5		
Total		2044	100.0		

...figure out solutions to problems as they come up.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very strongly disagree	66	3.2	3.2	3.2
	Strongly disagree	13	.6	.6	3.9
	Disagree	72	3.5	3.5	7.4
	Agree	649	31.8	31.8	39.2
	Strongly agree	477	23.3	23.4	62.5
	Very strongly agree	634	31.0	31.0	93.6
	Does not apply	131	6.4	6.4	100.0
	Total	2042	99.9	100.0	
Missing	System	2	.1		
Total		2044	100.0		

...feel that I can get the services and supports that my child and family need.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very strongly disagree	67	3.3	3.3	3.3
	Strongly disagree	18	.9	.9	4.2
	Disagree	68	3.3	3.3	7.5
	Agree	640	31.3	31.4	38.9
	Strongly agree	469	22.9	23.0	61.9
	Very strongly agree	726	35.5	35.6	97.5
	Does not apply	50	2.4	2.5	100.0
	Total	2038	99.7	100.0	
Missing	System	6	.3		
Total		2044	100.0		

...understand how the Early intervention system works.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very strongly disagree	66	3.2	3.2	3.2
	Strongly disagree	20	1.0	1.0	4.2
	Disagree	62	3.0	3.0	7.3
	Agree	646	31.6	31.7	39.0
	Strongly agree	459	22.5	22.5	61.5
	Very strongly agree	764	37.4	37.5	99.0
	Does not apply	20	1.0	1.0	100.0
	Total	2037	99.7	100.0	
Missing	System	7	.3		
Total		2044	100.0		

...be able to evaluate how much progress my child is making.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very strongly disagree	71	3.5	3.5	3.5
	Strongly disagree	18	.9	.9	4.4
	Disagree	70	3.4	3.4	7.8
	Agree	585	28.6	28.6	36.4
	Strongly agree	493	24.1	24.1	60.6
	Very strongly agree	793	38.8	38.8	99.4
	Does not apply	12	.6	.6	100.0
	Total	2042	99.9	100.0	
Missing	System	2	.1		
Total		2044	100.0		

...feel that my child will be accepted and welcomed in the community.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very strongly disagree	64	3.1	3.1	3.1
	Strongly disagree	18	.9	.9	4.0
	Disagree	50	2.4	2.5	6.5
	Agree	585	28.6	28.8	35.3
	Strongly agree	374	18.3	18.4	53.7
	Very strongly agree	661	32.3	32.5	86.2
	Does not apply	281	13.7	13.8	100.0
	Total	2033	99.5	100.0	
Missing	System	11	.5		
Total		2044	100.0		

...feel more confident in finding ways to meet my child's needs.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very strongly disagree	65	3.2	3.2	3.2
	Strongly disagree	17	.8	.8	4.0
	Disagree	47	2.3	2.3	6.3
	Agree	615	30.1	30.2	36.5
	Strongly agree	501	24.5	24.6	61.1
	Very strongly agree	720	35.2	35.3	96.5
	Does not apply	72	3.5	3.5	100.0
	Total	2037	99.7	100.0	
Missing	System	7	.3		
Total		2044	100.0		

...communicate more effectively with the people who work with my child and family.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very strongly disagree	64	3.1	3.1	3.1
	Strongly disagree	17	.8	.8	4.0
	Disagree	59	2.9	2.9	6.9
	Agree	631	30.9	31.1	37.9
	Strongly agree	415	20.3	20.4	58.4
	Very strongly agree	647	31.7	31.8	90.2
	Does not apply	199	9.7	9.8	100.0
	Total	2032	99.4	100.0	
Missing	System	12	.6		
Total		2044	100.0		

...understand the roles of the people who work with my child and family.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very strongly disagree	62	3.0	3.0	3.0
	Strongly disagree	11	.5	.5	3.6
	Disagree	55	2.7	2.7	6.3
	Agree	644	31.5	31.6	37.9
	Strongly agree	434	21.2	21.3	59.3
	Very strongly agree	681	33.3	33.5	92.7
	Does not apply	148	7.2	7.3	100.0
	Total	2035	99.6	100.0	
Missing	System	9	.4		
Total		2044	100.0		

...know about my child's and family's rights concerning Early Intervention services.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very strongly disagree	66	3.2	3.2	3.2
	Strongly disagree	15	.7	.7	4.0
	Disagree	54	2.6	2.7	6.6
	Agree	655	32.0	32.2	38.9
	Strongly agree	428	20.9	21.1	59.9
	Very strongly agree	774	37.9	38.1	98.0
	Does not apply	41	2.0	2.0	100.0
	Total	2033	99.5	100.0	
Missing	System	11	.5		
Total		2044	100.0		

...do things with and for my child that are good for my child's development.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very strongly disagree	70	3.4	3.4	3.4
	Strongly disagree	13	.6	.6	4.1
	Disagree	32	1.6	1.6	5.7
	Agree	467	22.8	22.9	28.6
	Strongly agree	461	22.6	22.7	51.3
	Very strongly agree	956	46.8	47.0	98.2
	Does not apply	36	1.8	1.8	100.0
	Total	2035	99.6	100.0	
Missing	System	9	.4		
Total		2044	100.0		

...understand my child's needs.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very strongly disagree	72	3.5	3.5	3.5
	Strongly disagree	11	.5	.5	4.1
	Disagree	44	2.2	2.2	6.2
	Agree	517	25.3	25.4	31.6
	Strongly agree	482	23.6	23.7	55.3
	Very strongly agree	870	42.6	42.7	98.0
	Does not apply	40	2.0	2.0	100.0
	Total	2036	99.6	100.0	
Missing	System	8	.4		
Total		2044	100.0		

...feel that my efforts are helping my child.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very strongly disagree	68	3.3	3.3	3.3
	Strongly disagree	12	.6	.6	3.9
	Disagree	34	1.7	1.7	5.6
	Agree	474	23.2	23.3	28.9
	Strongly agree	512	25.0	25.1	54.0
	Very strongly agree	908	44.4	44.6	98.6
	Does not apply	29	1.4	1.4	100.0
	Total	2037	99.7	100.0	
Missing	System	7	.3		
Total		2044	100.0		

What I say about my child and family is understood and respected.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very strongly disagree	73	3.6	3.6	3.6
	Strongly disagree	9	.4	.4	4.1
	Disagree	26	1.3	1.3	5.4
	Agree	477	23.3	23.7	29.1
	Strongly agree	436	21.3	21.7	50.7
	Very strongly agree	983	48.1	48.8	99.6
	Does not apply	9	.4	.4	100.0
	Total	2013	98.5	100.0	
Missing	System	31	1.5		
Total		2044	100.0		

The people who work with my child and family answer our questions.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very strongly disagree	72	3.5	3.6	3.6
	Strongly disagree	6	.3	.3	3.9
	Disagree	25	1.2	1.2	5.1
	Agree	410	20.1	20.3	25.4
	Strongly agree	447	21.9	22.2	47.6
	Very strongly agree	1045	51.1	51.8	99.4
	Does not apply	13	.6	.6	100.0
	Total	2018	98.7	100.0	
Missing	System	26	1.3		
Total		2044	100.0		

I can easily get in touch with my service coordinator.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very strongly disagree	72	3.5	3.6	3.6
	Strongly disagree	16	.8	.8	4.4
	Disagree	48	2.3	2.4	6.8
	Agree	422	20.6	21.0	27.7
	Strongly agree	432	21.1	21.4	49.2
	Very strongly agree	1005	49.2	49.9	99.1
	Does not apply	19	.9	.9	100.0
	Total	2014	98.5	100.0	
Missing	System	30	1.5		
Total		2044	100.0		

The services provided to my child and family help reach the outcomes/goals that are important to my family.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very strongly disagree	79	3.9	3.9	3.9
	Strongly disagree	9	.4	.4	4.4
	Disagree	44	2.2	2.2	6.5
	Agree	438	21.4	21.7	28.3
	Strongly agree	417	20.4	20.7	49.0
	Very strongly agree	1012	49.5	50.2	99.2
	Does not apply	17	.8	.8	100.0
	Total	2016	98.6	100.0	
Missing	System	28	1.4		
Total		2044	100.0		

Appendix B: Control File for the Winsteps Rasch Analysis of the IFS

```
&INST ; THIS FILE MUST BE SAVED AS ASCII DOS TEXT BEFORE USE WITH WINSTEPS
Title="Virginia Impact all individuals, 2016 Data New Form"
ITEM1=2
DELIMITER=TAB ; specifies a tab as a delimiter
;FITI=7
;FITP=7
ITLEN=15 ;max length of item label
LCONV=0.0001
RCONV=0.001
RESCOR=2
NEWSCR="112345"
DATA=C:\Users\rdpenfie\Documents\Consulting\Virginia\2016\Virginia_2015_Merged_Data.txt;
Name of data file
NI=22
XWIDE = 1
CODES = "123456"
IAFILE=*
1 677.5
2 656.0
3 569.8
4 608.8
5 639.8
6 545.9
7 559.3
8 624.8
9 576.8
10 556.8
11 540.4
12 564.5
13 552.9
14 534.4
15 559.1
16 553.9
17 555.9
18 545.5
19 538.9
20 497.8
21 526.1
22 498.1
*
SAFILE=*
2 = -220.93
3 = -147.88
4 = 55.95
5 = 128.99
*
NAME1 = 1; Column containing person name
NAMLEN = 15; Length of person name
PRCOMP=S
UDECIM=2
UMEAN=568.3
USCALE=58.91
CSV=S
HLINES=N
IFILE=ItemStats.sav ;Name of file containing item-level statistics
PFILE=PersonStats.sav ;Name of file containing person-level statistics
REALSE=Y
TABLES=1110000001001100000000100011
&END
q1
q2
q3
q4
q5
q6
q7
q8
q9
```

q10
q11
q12
q13
q14
q15
q16
q17
q18
q19
q20
q21
q22
END NAMES

Appendix C: Selected Winsteps Output for the IFS

TABLE 1.2 Virginia Impact all individuals, 2016 ZOU930WS.TXT Jul 31 20:20 2015
 INPUT: 2044 PERSON 22 ITEM REPORTED: 2042 PERSON 22 ITEM 5 CATS WINSTEPS 3.74.0

```
-----
MEASURE    PERSON - MAP - ITEM
          <more>|<rare>
900 .##### +
      .
      .
      . T
      .#
      .
      .#
800 .# +
      .#
      .#
      .#
      .## S
      .#
      .##
700 .## +
      .##
      .## q1
      .###
      .##### T q2
      .### q5
      .## M q8
      .### S
600 .### + q4
      .###
      .### q9
      .## M q12 q15 q3 q7
      .## q10 q13 q16 q17 q18 q6
      .## q11 q14 q19
      .##### S q21
500 .## S + q20 q22
      .#
      ##
      .#
      #
      .
      .
      .
400 . T+
      .
      .
      .
      .
300 . +
      .
      .
      .
200 . +
      .
      .
100 .### +
      <less>|<frequent>
EACH "#" IS 21. EACH "." IS 1 TO 20
-----
```

TABLE 3.1 Virginia Impact all individuals, 2016 ZOU930WS.TXT Jul 31 20:20 2015
 INPUT: 2044 PERSON 22 ITEM REPORTED: 2042 PERSON 22 ITEM 5 CATS WINSTEPS 3.74.0

SUMMARY OF 1731 MEASURED (NON-EXTREME) PERSON

	TOTAL SCORE	COUNT	MEASURE	REAL ERROR	INFIT		OUTFIT	
					MNSQ	ZSTD	MNSQ	ZSTD
MEAN	75.7	20.2	627.86	25.61	.95	-.5	.96	-.5
S.D.	18.5	2.7	114.30	9.68	.69	2.1	.81	2.0
MAX.	109.0	22.0	897.28	75.05	8.53	7.5	9.90	7.5
MIN.	9.0	3.0	194.72	18.06	.04	-5.7	.04	-5.1
REAL RMSE	27.38	TRUE SD	110.97	SEPARATION	4.05	PERSON RELIABILITY	.94	
MODEL RMSE	24.74	TRUE SD	111.59	SEPARATION	4.51	PERSON RELIABILITY	.95	
S.E. OF PERSON MEAN = 2.75								

MAXIMUM EXTREME SCORE: 246 PERSON
 MINIMUM EXTREME SCORE: 65 PERSON
 LACKING RESPONSES: 2 PERSON
 VALID RESPONSES: 92.0% (APPROXIMATE)

SUMMARY OF 2042 MEASURED (EXTREME AND NON-EXTREME) PERSON

	TOTAL SCORE	COUNT	MEASURE	REAL ERROR	INFIT		OUTFIT	
					MNSQ	ZSTD	MNSQ	ZSTD
MEAN	77.0	20.2	650.17	38.18				
S.D.	22.2	2.8	182.11	30.98				
MAX.	110.0	22.0	969.89	110.12				
MIN.	9.0	3.0	79.68	18.06	.04	-5.7	.04	-5.1
REAL RMSE	49.17	TRUE SD	175.34	SEPARATION	3.57	PERSON RELIABILITY	.93	
MODEL RMSE	47.97	TRUE SD	175.67	SEPARATION	3.66	PERSON RELIABILITY	.93	
S.E. OF PERSON MEAN = 4.03								

PERSON RAW SCORE-TO-MEASURE CORRELATION = .87 (approximate due to missing data)
 CRONBACH ALPHA (KR-20) PERSON RAW SCORE "TEST" RELIABILITY = .99 (approximate due to missing data)

SUMMARY OF 22 MEASURED (NON-EXTREME) ITEM

	TOTAL SCORE	COUNT	MEASURE	REAL ERROR	INFIT		OUTFIT	
					MNSQ	ZSTD	MNSQ	ZSTD
MEAN	7149.5	1879.5	567.41	2.51	.95	-2.3	.99	-1.3
S.D.	859.7	156.9	45.74	.27	.27	5.4	.38	5.1
MAX.	8172.0	2030.0	677.50	3.49	1.79	9.9	2.33	9.9
MIN.	4915.0	1437.0	497.80	2.34	.57	-9.9	.52	-9.9
REAL RMSE	2.53	TRUE SD	45.67	SEPARATION	18.06	ITEM RELIABILITY	1.00	
MODEL RMSE	2.42	TRUE SD	45.67	SEPARATION	18.84	ITEM RELIABILITY	1.00	
S.E. OF ITEM MEAN = 9.98								

UMEAN=568.3000 USCALE=58.9100
 ITEM RAW SCORE-TO-MEASURE CORRELATION = -.87 (approximate due to missing data)
 35028 DATA POINTS. LOG-LIKELIHOOD CHI-SQUARE: 57852.34 with 33273 d.f. p=.0000
 Global Root-Mean-Square Residual (excluding extreme scores): .5937

TABLE 3.2 Virginia Impact all individuals, 2016 ZOU930WS.TXT Jul 31 20:20 2015
 INPUT: 2044 PERSON 22 ITEM REPORTED: 2042 PERSON 22 ITEM 5 CATS WINSTEPS 3.74.0

SUMMARY OF CATEGORY STRUCTURE. Model="R"

CATEGORY LABEL	SCORE	OBSERVED COUNT	OBSVD %	SAMPLE AVRG	EXPECT	INFIT MNSQ	OUTFIT MNSQ	ANDRICH THRESHOLD	CATEGORY MEASURE
1	1	1874	5	-202.3	-257	1.29	1.33	NONE	-295.89
2	2	1765	4	-99.79	-120	1.03	1.01	-220.93A	-185.38
3	3	13546	33	-10.20	-5.08	.98	1.13	-147.88A	-45.97
4	4	9574	23	87.43	81.53	.84	.78	55.95A	93.44
5	5	14590	35	191.83	197.3	1.00	1.03	128.99A	(203.95)
MISSING		3054	7	15.75					

OBSERVED AVERAGE is mean of measures in category. It is not a parameter estimate.

CATEGORY LABEL	STRUCTURE MEASURE	S.E.	SCORE-TO-MEASURE AT CAT.	---ZONE---	50% CUM. PROBABILITY	COHERENCE M->C C->M	RMSR	ESTIM DISCR	OBSERVED-EXPECTED RESIDUAL DIFFERENCE
1	NONE		-295.89	-INF -247.18		70% 39%	1.2124		-20.8% -113.3
2	-220.93A	3.00	-185.38	-247.18-127.29	-233.39	40% 34%	.8719	.92	-30.9% -545.5
3	-147.88A	1.43	-45.97	-127.29 35.36	-137.30	74% 71%	.5496	1.11	6.9% 931.4
4	55.95A	.90	93.44	35.36 155.24	45.40	51% 65%	.5006	1.06	2.4% 227.0
5	128.99A	.97	(203.95)	155.24 +INF	141.45	80% 67%	.6219	1.04	-5.2% -499.6

M->C = Does Measure imply Category?
 C->M = Does Category imply Measure?

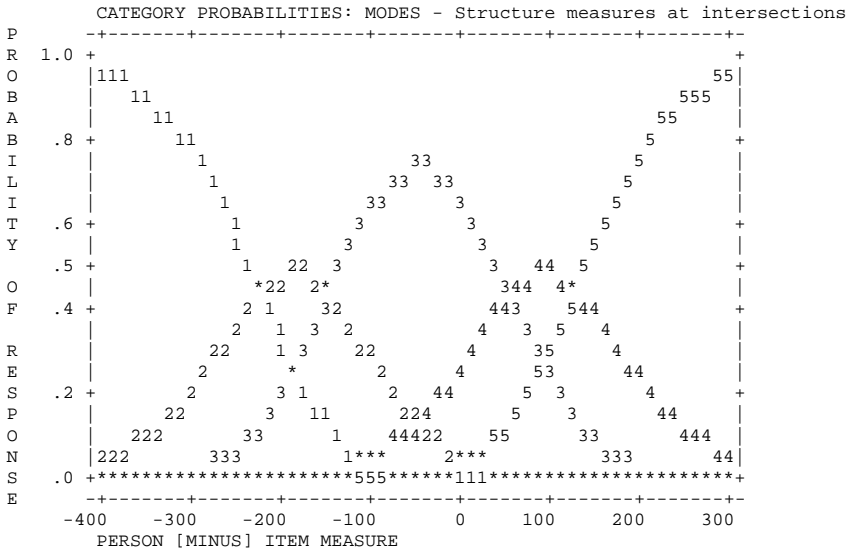


TABLE 10.1 Virginia Impact all individuals, 2016 ZOU930WS.TXTm Jul 31 20:20 2015
 INPUT: 2044 PERSON 22 ITEM REPORTED: 2042 PERSON 22 ITEM 5 CATS WINSTEPS 3.74.0

PERSON: REAL SEP.: 3.57 REL.: .93 ... ITEM: REAL SEP.: 18.06 REL.: 1.00

ITEM STATISTICS: MISFIT ORDER

ENTRY NUMBER	TOTAL SCORE	TOTAL COUNT	REAL MEASURE	REAL S.E.	INFIT MNSQ	INFIT ZSTD	OUTFIT MNSQ	OUTFIT ZSTD	PT-MEASURE CORR.	PT-MEASURE EXP.	EXACT OBS%	MATCH EXP%	DISPLACE	ITEM
1	4915	1461	677.50A	3.49	1.79	9.9	2.33	9.9	A .77	.85	43.4	57.7	-36.03	q1
2	6400	1824	656.00A	2.94	1.59	9.9	1.65	9.9	B .79	.84	43.7	57.3	-37.78	q2
3	6932	1866	569.80A	2.54	1.12	3.1	1.30	6.0	C .82	.83	61.6	60.5	11.33	q3
8	4989	1437	624.80A	3.00	1.24	5.3	1.26	5.2	D .83	.86	57.6	58.3	-1.30	q8
5	6227	1751	639.80A	2.46	1.03	.9	1.04	1.0	E .85	.85	58.2	58.5	-27.78	q5
4	7216	1936	608.80A	2.35	1.02	.6	1.00	.0	F .85	.84	63.0	59.2	-29.28	q4
6	7596	1960	545.90A	2.39	.90	-2.7	1.01	.2	G .84	.83	67.7	61.6	6.77	q6
7	7418	1936	559.30A	2.38	.94	-1.6	1.01	.2	H .84	.83	65.7	61.2	2.71	q7
11	7248	1911	540.40A	2.42	.85	-4.2	.94	-1.1	I .86	.82	67.2	61.5	27.26	q11
19	7736	1992	538.90A	2.38	.94	-1.6	.88	-2.5	J .84	.82	68.4	61.7	11.68	q19
9	7053	1909	576.80A	2.37	.94	-1.7	.90	-2.2	K .85	.84	66.4	60.2	10.49	q9
13	7804	2017	552.90A	2.34	.92	-2.4	.88	-2.6	k .84	.83	69.7	61.3	.12	q13
15	6738	1752	559.10A	2.51	.90	-2.6	.92	-1.7	j .85	.83	67.6	61.3	.91	q15
14	7921	2030	534.40A	2.36	.85	-4.4	.88	-2.5	i .85	.82	67.7	61.7	12.49	q14
22	8158	2008	498.10A	2.46	.83	-5.0	.86	-2.4	h .84	.80	71.2	63.6	18.89	q22
10	7250	1891	556.80A	2.41	.81	-5.5	.78	-5.0	g .86	.83	68.1	60.9	3.26	q10
17	6987	1833	555.90A	2.45	.78	-6.3	.78	-4.9	f .86	.83	70.2	61.1	9.87	q17
12	7647	1988	564.50A	2.34	.75	-7.6	.72	-6.8	e .86	.83	70.4	61.0	-6.95	q12
18	7256	1887	545.50A	2.44	.74	-7.9	.74	-5.6	d .87	.83	72.5	61.8	13.48	q18
20	8172	1999	497.80A	2.47	.73	-8.1	.66	-6.2	c .84	.80	71.7	63.6	12.61	q20
21	8000	1996	526.10A	2.40	.70	-9.3	.64	-7.7	b .85	.82	73.0	62.0	.91	q21
16	7625	1965	553.90A	2.37	.57	-9.9	.52	-9.9	a .88	.83	74.3	61.1	-1.42	q16
MEAN	7149.5	1879.5	567.41	2.51	.95	-2.3	.99	-1.3			65.4	60.8		
S.D.	859.7	156.9	45.74	.27	.27	5.4	.38	5.1			8.1	1.6		