A Guide to Analyzing Data from the Family Outcomes Survey

Melissa Raspa

Kathleen Hebbeler

Don Bailey

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Introduction

The Family Outcomes Survey (FOS)[1] provides a way for state and local programs serving young children to assess the extent to which families have achieved a variety of outcomes. This document provides suggestions on how to analyze the data from the survey; the analyses can then be used to plan for program improvement. The document is written for state agency staff, but many of the suggested analyses could be carried out at the local level as well.

Background

The Family Outcomes Survey was developed by researchers (Bailey, Hebbeler, & Bruder, 2006) from the Early Childhood Outcomes (ECO) Center to measure five recommended family outcome areas:

1. Families understand their children's strengths, abilities, and special needs.

2. Families know their rights and advocate effectively for their children.

3. Families help their children develop and learn.

4. Families have support systems.

5. Families access desired services, programs, and activities in their communities.

The five family outcomes were identified through a consensus building process that began with a review of existing frameworks for conceptualizing family outcomes and included multiple meetings with groups of stakeholders to refine the outcomes. More information about the background of the survey is available on the ECO website.[2]

The FOS consists of 15 outcome items, 3 for each of the five outcome areas, and 3 additional items that provide information for reporting to the Office of Special Education Programs (OSEP).

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[1] The Family Outcomes Survey is available on the ECO website at
http://www.fpg.unc.edu/~eco/pages/tools.cfm#SurveyVersions.

[2] Information on background of the survey is available at
http://www.fpg.unc.edu/~eco/assets/pdfs/fos_overview.pdf.

The instrument is a self-report survey intended to be completed by one or more family members. Each item is based on a 7-point scale with descriptors for 1, 3, 5, and 7. Families are asked to read each question and circle the number that "best describes your family right now." The three items that provide data for OSEP for Part C early intervention ask families to rate their perceptions of the helpfulness of early intervention with regard to knowing and understanding their rights, effectively communicating their child's needs, and helping their child develop and learn. The three items that provide the data for Part B preschool address three dimensions of parent involvement. Slight modifications in the survey have been made to create versions that can be used with all families, including those whose children do not have disabilities.

The ECO Center has translated these instruments into Spanish. States using the survey have translated it into other languages, including Arabic, Cambodian, Croatian, Hmong, Laotian, simplified Chinese, Oromo, Russian, Somali, and Vietnamese. Current versions of the surveys and these translations are posted on the ECO Center website (http://www.fpg.unc.edu/~eco/pages/states_family_act.cfm).

Checking the Quality of the Data

Before FOS data can be analyzed, it is necessary to verify the quality of the data. If the survey is being sent to a sample of families, the sample plan must be defensible. Will the plan generate a sample from which reasonable conclusions about the population of interest can be drawn? A discussion of sampling plans is beyond the scope of this document, but programs using the survey that intend to sample are encouraged to develop a sampling plan in conjunction with a sampling statistician.

Once the surveys are returned, there is a need to examine the percentage of surveys returned and whether those surveys adequately represent all the families the state was trying to reach. One of the biggest threats to the quality of survey data is a low return rate or low return rates for critical segments of the population. For example, a state agency cannot draw conclusions for the entire state if most of the returned surveys were from the northern portion of the state or if only white families returned the survey. Prior to analyzing the FOS data, the state needs to examine the data to see which segments of the population returned the survey. If all key segments are well represented, then the state can be confident that the data generalize to the entire population. Again, states are encouraged to consult with a survey statistician to examine the representativeness of their FOS data.

We also recommend that states check the range and pattern of responses for each item. Out-of-range responses or other questionable patterns would raise concerns about the quality of the data. These issues need to be addressed before data can be analyzed.

Possible Analyses for Data Collected from the FOS

In this section, we present nine questions that can be addressed with FOS data and the analyses that would answer these questions.[3] We also present ways to graphically represent these analyses. The first three questions are addressed by examining data for the state as a whole. The next five questions are concerned with family outcomes for different subgroups and the final question addresses change over time.

Looking at Family Outcomes for All Families

1. How are families doing with regard to each of the 15 aspects of family outcomes and the OSEP indicators measured by the survey?

This question is addressed by looking at the data from each of the 18 items on the survey. There are several possible ways to look at these data:

- A frequency distribution for each item
- A mean score on each item
- The percentage of families who score above or below a cut-off point on each item

Frequency distribution for each item. We recommend using a table or graph to show the frequency distributions for each of the individual items, so the full range of responses can be examined. A graph allows a visual inspection *of* items to see how families are distributed across the response options, whereas a table summarizes number and percentage of families who selected each of the response options. Examples showing the frequency with which families selected each possible response for two items on the FOS are shown in Table 1 and Figure 1.

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[3] Our analyses thus far suggest that the FOS has reasonable measurement properties for use in research and program evaluation (for more information about the psychometric properties of the FOS, see Appendix A). Further work is needed to determine the validity of the instrument for the various ways that it could be used, and we are currently working with states on additional analyses to support the use of the survey.

Table 1.   Frequency distributions for FOS items 3 and 6

	Item 3 Understand child's progress		Item 6 Know rights	
Responses	N	%	N	%
1	13	1	102	8
2	18	1	88	7
3	63	5	320	26
4	37	3	142	11
5	325	26	376	30
6	175	14	114	9
7	591	47	73	6
Missing	28	2	35	3

Figure 1.   Frequency distribution for FOS items 3 and 6.
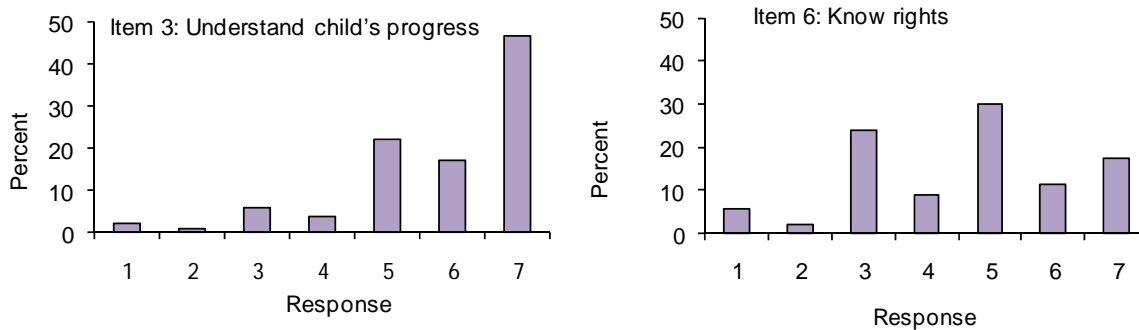
We encourage states to look at the frequency distribution for each item as part of the process of checking on the quality of the data. Carefully examining the frequency distribution will help to determine whether any of the items have an unusually large percentage of missing data, and to see if there are "out-of-range" values. Acceptable values for each item are 1 through 7; an 8 would be an out-of-range value.

Examining the individual item frequencies also can point to interesting patterns in the data across items, such as in items where families never selected a response lower than 3. In general, one would not use this kind of a presentation of the data to communicate findings for all of the items in a report or presentation because there is too much information, making it difficult to determine what the findings mean.

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Mean score on each item. Because each item has a range of 1 to 7, a mean score can be calculated for each item. Item means can be presented in a table (Table 2) or graph (Figure 2). Examining Figure 2, one can see that families reported higher levels of achievement for some outcomes than for others. Data such as these can provide a quick assessment of which items received the highest and lowest ratings. For example, in this state, the highest rated items are item 9 (help child practice new skills) and item 13 (access to medical care), whereas the lowest rated items are item 4 (knowledge of services) and 15 (child participation in community activities). The same information is presented in Table 2.

Table 2.   Mean scores for each FOS item

Item	Description	N	Mean
1	Understand child's development	1,238	5.8
2	Understand child's special needs	1,229	5.8
3	Understand child's progress	1,234	6.0
4	Know about services	1,240	4.5
5	Comfortable participating in meetings	1,223	6.0
6	Know rights	1,197	5.1
7	Help child develop and learn	1,241	5.8
8	Help child behave	1,236	5.3
9	Practice new skills	1,231	6.1
10	Have support	1,226	5.6
11	Someone to call for help	1,224	5.1
12	Able to do things family enjoys	1,233	5.2
13	Access to medical care	1,240	6.1
14	Access to child care	876	5.6
15	Child participates in activities	1,129	4.5
16	Early intervention helped families know rights	1,218	5.7
17	Early intervention helped families communicate child's needs	1,212	6.0
18	Early intervention helped family help child develop and learn	1,225	6.2

**Figure 2. Distribution of mean FOS item scores for a state or program**
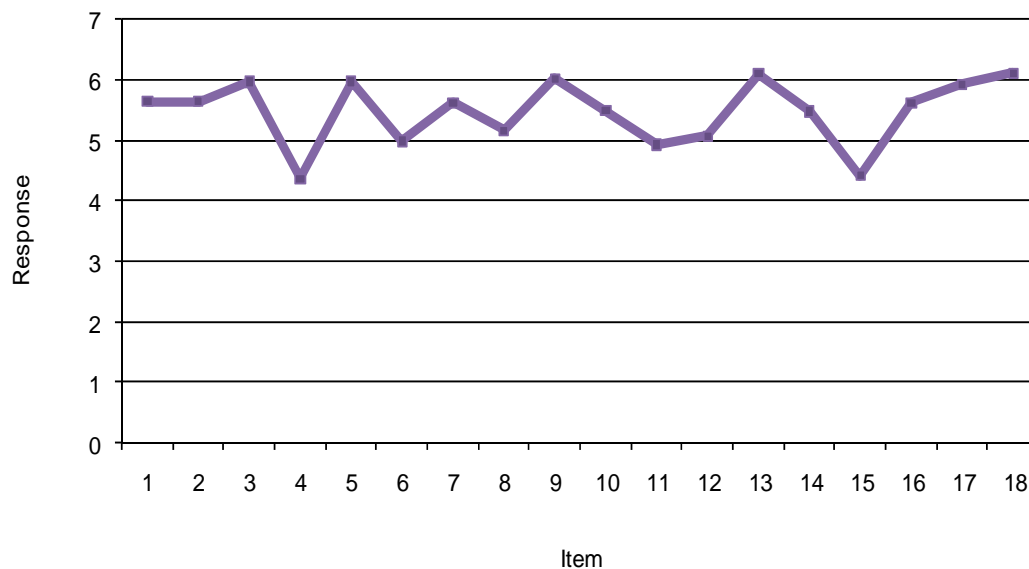
The percentage of families who score above or below a cut-off point on each item.
Another way to look at the FOS data is to use a cut-off point to identify the percentage of high- or low-reporting families on an item. We recommend defining "having achieved an outcome" as responding with a 5 or higher to the item. Although no formal cut-off score has been statistically determined for the FOS, a general rule might be that scores of 5 or greater are considered an acceptable indicator of outcome attainment; scores less than 5 suggest areas for needed improvement. To calculate the percentage of families who have achieved an outcome, add the number of families who scored a 5 or higher on the item and divide by the total number of families who completed the item. Alternately, one can add the percentage of families who responded 5, 6, or 7.

$$\text{Percentage of families who achieved an outcome} = \frac{\text{Number of families who responded a 5 or higher on the item}}{\text{Total number of families who completed}}$$

Figure 3 presents an example of the percentage of families who reported a 5 or higher for each of the 18 items.

**Figure 3.** Percentage of families responding 5 or higher on each item
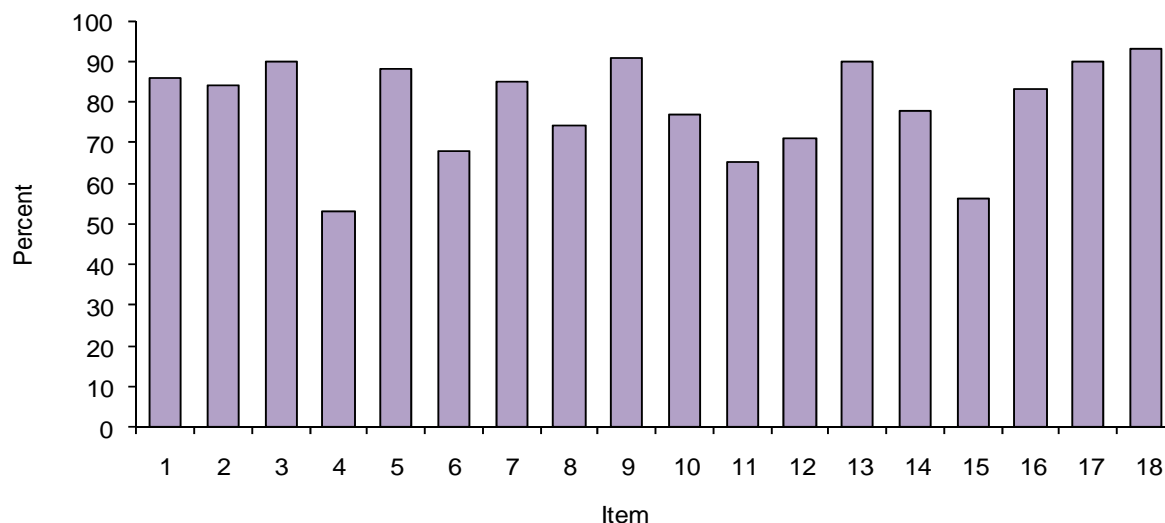
The last three items (items 16-18) on the Part C version of the FOS are used to assess families' perceptions of the helpfulness of early intervention. These are the items used for OSEP reporting: item 16 (early intervention helped family know rights), item 17 (early intervention helped family communicate child's needs), and item 18 (early intervention helped family help child develop and learn). We recommend using a cut-off score of 5 and calculating the percentage of families responding 5 or higher for each of these items to report data to OSEP for the family indicator for Part C as illustrated in Figure 3.

The data in Figure 3 for items 1 to 15 suggest that in this particular state, most families (more than 80%) feel that they understand their child's strengths, abilities, and special needs (items 1, 2, and 3). However, a number of families reported less confidence in knowing their rights and advocating for their children (items 4, 5, and 6), with approximately 50% of families rating themselves as a 4 or lower on item 4 (know about services). This finding might suggest the state is doing well in working with families and teaching them about ways to help their children, but also that it needs to target efforts to change the ways that families are given information about their rights and services and make this information more accessible to them.

Another way to use a cut-off score is to look at the percentage of families who score below certain point, for example, a 2 or lower (Figure 4). Looking for concentrations of families at the low end of the scale may be especially helpful in identifying areas for improvement.

Figure 4. Percentage of families responding with 3 or lower to each item
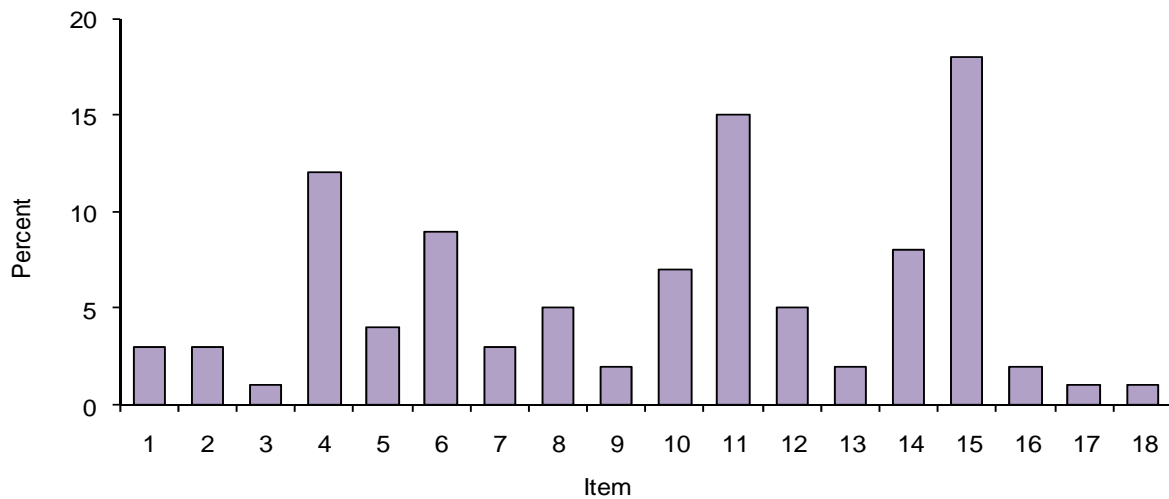
In Figure 4, we can see there are few families who are reporting low levels of family outcomes. There are three items that have more than 10% of families with a score of 2 or lower: item 4 (know about services), item 11 (someone to call for help), and item 15 (child participates in activities). Information presented in this way would be helpful for states or programs in identifying areas where families need extra help. Examining practices associated with achieving these outcomes would help states plan for program improvement.

2. How are families doing with regard to each of the five family outcomes?

To address this question, we present two ways to analyze the data:

- Using a mean score
- Using a cut-off score

Creating a mean score for each outcome. The next set of analyses are similar to those just presented, but in this set, we will examine the data for the five family outcomes identified by the ECO stakeholders that served as the basis for the development of the survey (see Appendix A). In this section, we only discuss items 1 through 15 (i.e., not the 3 OSEP indicators). The outcomes and their corresponding items are as follows:

- Understanding your child's strengths, abilities and special needs (items 1 through 3)
- Knowing your rights and advocating effectively (items 4 through 6)
- Helping your child develop and learn (items 7 through 9)

- Having support systems (items 10 through 12)
- Accessing desired services in the community (items 13 though 15)

To create a mean score for each outcome for each family, add the responses for the three items in an outcome area and then divide this sum by the number of items completed. We do not recommend computing an outcome score if only one item was completed within a given outcome.

$$\text{Mean score for outcome 1} = \frac{\text{(Response item 1) + (Response item 2) + (Response item 3)}}{\text{Total number of items completed (3)}}$$

Figure 5 shows the mean scores for each of the five family outcomes. Although all five outcomes have a mean over 5, we can see that two outcomes are slightly lower: outcome 2 (knowing rights) and outcome 4 (having supports).

Figure 5.   Mean scores on the five family outcomes
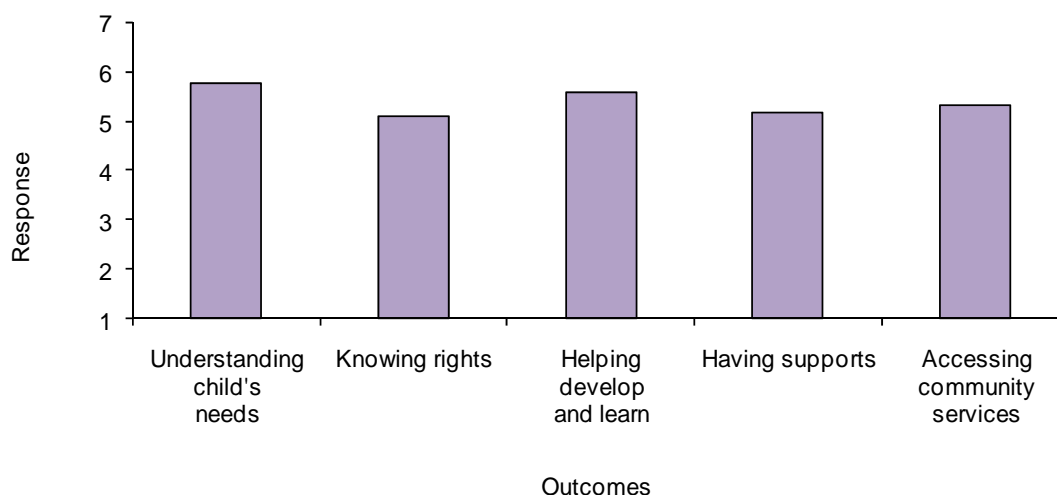
Creating a cut-score for each outcome. With this approach, a family is recorded as having attained an outcome if it responded to all of the items in an outcome with a 5 or higher. Figure 6 presents data for families using the cut-off of 5 or higher to define outcome attainment. An additional number which could supplement these analyses is the percentage of families who reported 5 or higher on *all* of the outcomes.

Figure 6. Percentage of families who achieved each outcome by scoring a 5 or higher on each item within an outcome area
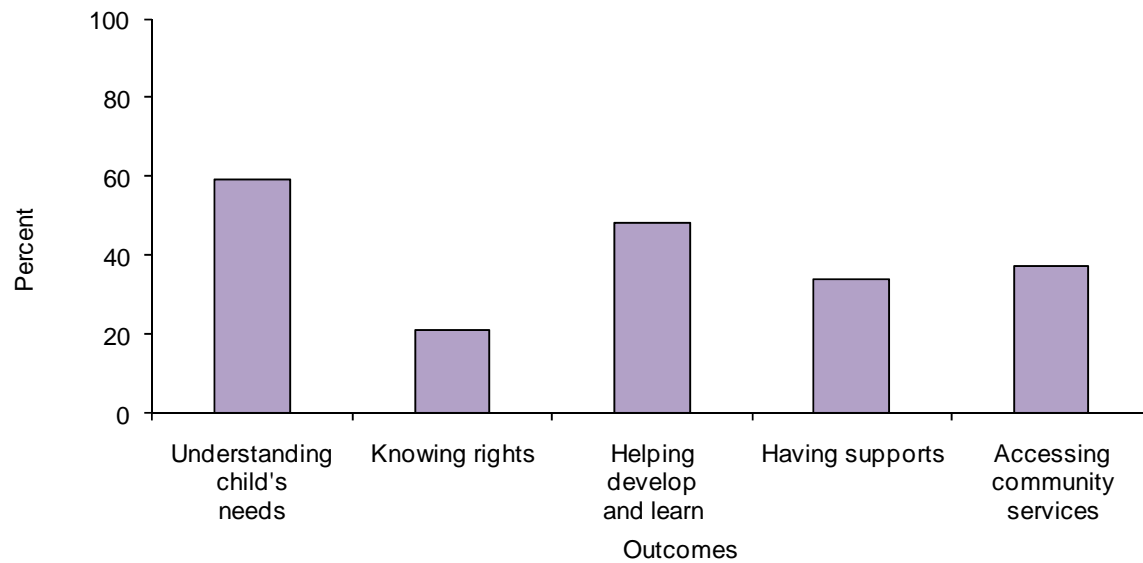
We recommend using a cut-off score to compute the percentage of families who report high attainment in an outcome area as illustrated in Figure 6. The percentage communicates how many families have achieved all items in a given outcome area. When compared to the mean scores for each outcome area in Figure 5, it provides a more accurate picture of how many families are reporting high attainment in the outcome areas.

Similarly, the cut-off score approach can be used to identify percentages of families who are unusually low in an outcome area. For this approach, the percentage of families who responded 3 or below to all the items in an outcome area is computed. This analysis is illustrated in Figure 7.

Figure 7. Percentage of families who reported low attainment (i.e., a score of 3 or lower on each item) for each outcome
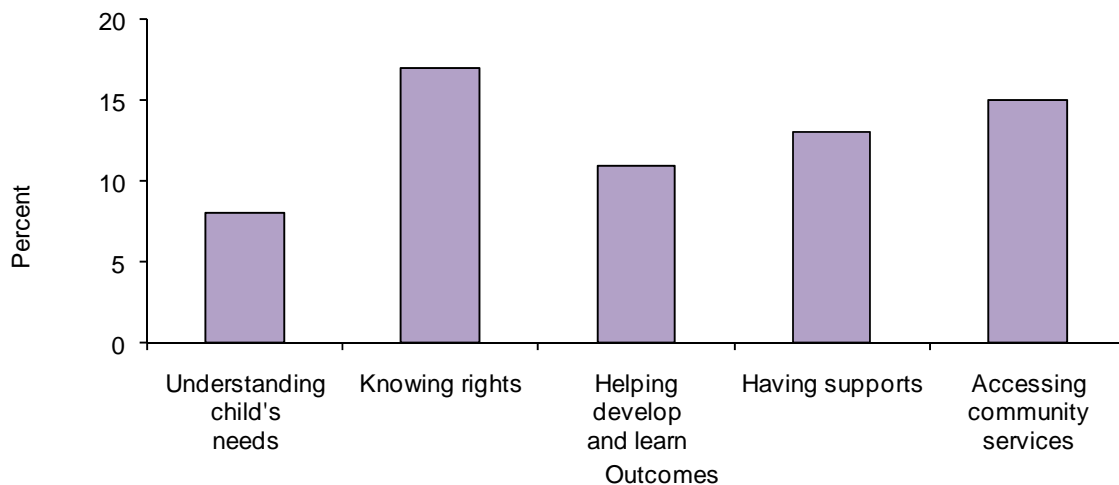
3. How are families doing overall with regard to achieving family outcomes?

The approaches examined thus far have looked at the data by 18 individual items or by the five family outcomes. The next approach summarizes the data across multiple items on the FOS into summary scores. These scores may be useful for general tracking of program status from year to year or even across regions or districts, but they provide limited information for program improvement because they do not reveal the specific family outcomes or subareas where the program is strong or weak. The two types of scores we discuss below are as follows:

- An overall mean score
- A cut-off summary score

Calculating an overall mean score. Much like one can compute a mean score for each outcome, one can compute an overall mean family outcome score for all 15 family outcome items.

$$\text{Overall mean score} = \frac{(\text{Score item 1}) + (\text{Score item 2}) + \dots (\text{Score item 15})}{\text{Total number of items completed}}$$

The calculation takes into account the possibility that a family does not complete all items in the survey. For example, if a family responded to 12 of the 15 items, the first step would be to add together the scores for each of the 12 items, then divide by 12.

Computing a cut-off summary score. This computation is similar to the approach illustrated above for creating a cut-off score for each outcome. Two cut-off summary scores can be computed: one that identifies families who achieved all 15 items, and a second that identifies families who had difficulty with all 15 items.

The first cut-off summary score is the percentage of families who achieved all items on the survey. To calculate it, first determine the number of families who responded 5 or higher to all 15 items and then divide by the total number of families who completed the survey. The second cut-off summary score is the percentage of families who reported experiencing significant challenges on all items. This percentage is calculated by totaling the number of families who responded with a 3 or lower on all 12 items and divide by the total number of families who completed the survey.

The particular cut-off points are arbitrary and states may find other cut-off points or criteria (e.g., four items below 3) more useful for their purposes.

Looking at Family Outcomes for Subgroups

There are a number of ways to look at FOS data that might prove useful to a state. Possible subgroups of interest with implications for program improvement include the following:

- Local program/county/region
- Family characteristic
- Child characteristic
- Service characteristic

4. Are there differences in the achievement of family outcomes across local programs?

To answer this question, a state could use any of the analyses discussed above that produce findings by item, by outcome, or over all items. We recommend looking at the data by outcome areas because it allows an examination across the five areas without providing so much information as to be overwhelming. If the state identifies differences across programs, then we would recommend looking at the item-level data for programs showing low outcome attainment to identify which items are contributing to the finding, as illustrated below.

To look at data by program, we recommend programs use the cut-off score for each outcome as discussed previously. Figure 8 shows the percentage of families who achieved outcome 2 (knowing rights) for each of six local programs. Achieving an outcome is defined as the percentage of families who responded 5 or higher to items 4, 5, and 6, the three items that make up outcome 2.

Figure 8. Percentage of families who achieved outcome 2 (know rights) by local program
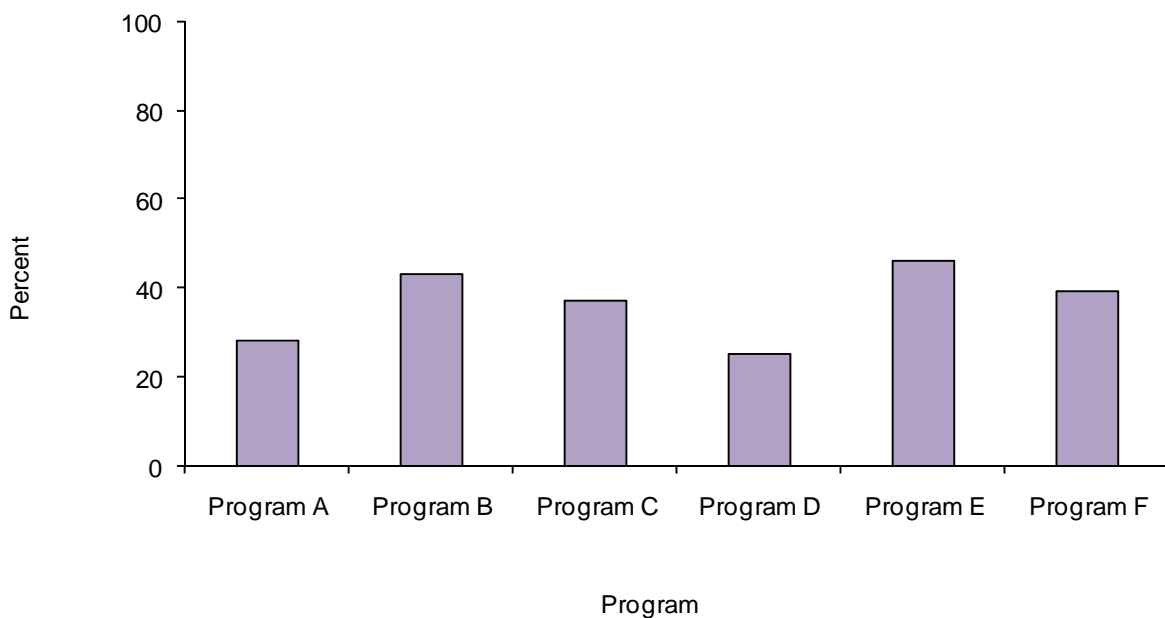
Variations that exist across the programs can be analyzed to determine whether changes need to be made to existing practices in one or more local programs to improve family outcomes. As shown in Figure 8, Programs A and D had fewer families reporting attainment on this outcome than the other four programs. When we look at the percentages of families who achieved the items within the outcome (i.e., scored a 5 or higher) in Figure 3, we see that item 4 (know about services) and item 6 (know rights) had the lowest percentages. Based on this information, Programs A and D might want to provide additional information to families about their rights and available services in the area and provide an opportunity to review the information during the child's Individualized Family Service Plan (IFSP) meeting. Programs A and D could also approach the other four programs to determine ways they are providing this information to families.
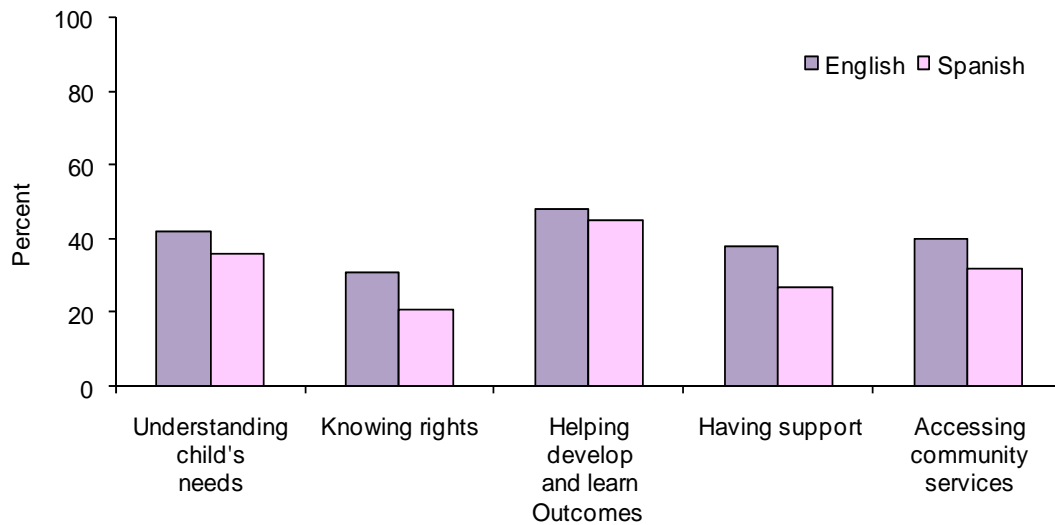
5. Are there differences in attainment of family outcomes for different kinds of families?

Looking at family outcomes by family characteristics addresses the question of whether all types of families being served by the program are equally likely to achieve the five outcomes. A state's ability to look at family outcomes by family, child, or service characteristics will depend on the specific set of variables that are linked to the state's FOS data. Potentially important family characteristics a state might want to examine include the following:

- Race/ethnicity of family
- Family income or poverty status
- Educational level of family
- Family structure (two parents, single parent)
- Whether English is spoken in the home

For example, states could look at differences in outcomes between Spanish- and English-speaking families. Spanish-speaking families may have a harder time accessing the services they need and therefore may have lower family outcomes. Figure 9 shows, for each outcome, the percentage of English- and Spanish-speaking families who achieved that outcome (i.e., report a score of 5 or higher for each item within the outcome). The data show that a higher percentage of English-speaking families report achieving each of the five outcomes than Spanish-speaking families, although this difference is most noticeable for outcomes 2 (knowing rights), 4 (having support), and 5 (accessing community services). Examining the differences for each of the items within each outcome will provide additional information that could be useful for program improvement.

Figure 9.   Percentage of English- and Spanish-speaking families who achieved each outcome


6. Are there differences in which families are achieving family outcomes that are related to a characteristic of their child?

Looking at FOS data by child characteristic also answers the question of whether all kinds of families the program serves are equally successful in achieving family outcomes. Potentially important child characteristics to consider include the following:

- Race/ethnicity
- Gender
- Disability
    - For example: Do families of children with speech-only delays have different patterns of family outcomes from families of children with developmental delays?
- Health status
- Age

Figure 10 shows the percentage of families who attained each outcome (i.e., scored 5 or higher on all items) across different racial and ethnic categories. For four of the outcomes, families of white children rated themselves higher than families of children from other racial and ethnic categories. Families of Hispanic children reported the lowest level of outcome attainment, with the exception of outcome 4 (having support). Examining the scores of each of the items within the outcomes would provide additional information for states or programs which could be used to plan for program improvement.

Figure 10. Percentage of families who achieved each outcome across 4 racial/ethnic categories
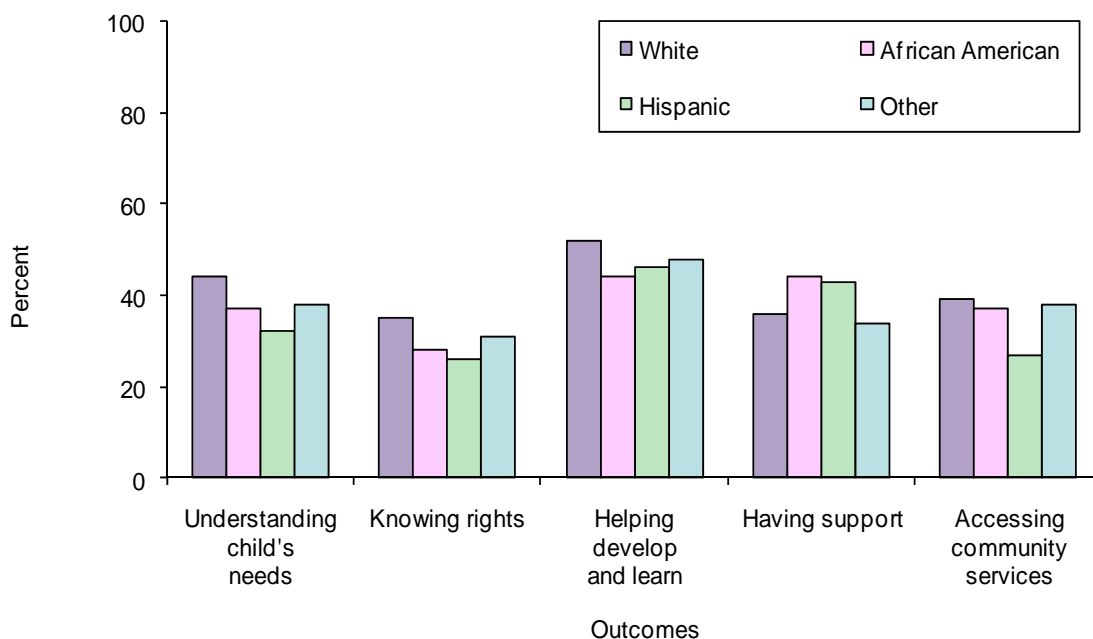

7. Do families who receive different kinds of services report different levels of attainment of family outcomes?

Looking at FOS data by service characteristics addresses the question of whether certain service or program characteristics are associated with families achieving or not achieving family outcomes. This question is especially important for program improvement because program characteristics can be changed. Potentially interesting program characteristics include the following:

- The type of service the child received
- The type of service the family received
  - For example: Are models of service delivery associated with different types of family outcomes?
- The intensity of services (i.e., hours per month, total hours)
  - For example: Do families of children who receive a higher number and frequency of services have different patterns of family outcomes than families of children who receive fewer services?
- The number of providers with whom the family worked
- The type of setting where services were provided
  - For example: Are families of children who receive services in the home more likely to have better family outcomes than families of children who receive services in other settings?
- The length of time (number of months) for which services were received

For example, as seen in Figure 11, programs could examine family outcomes by the average number of hours of service the child receives each week. For two of the outcomes, outcome 1 (understanding needs) and outcome 4 (having support), it appears that families whose children receive between 1 and 2 hours of services each week reported the highest level of attainment. For outcome 2 (knowing rights) and outcome 5 (accessing community services), families who received more hours of services each week, between 2 and 3 hours total, reported the highest percentage of attainment. This information can help local programs understand the link between service characteristics and family outcomes.

Figure 11. Percentage of families who achieved each outcome for different levels of service intensity each week
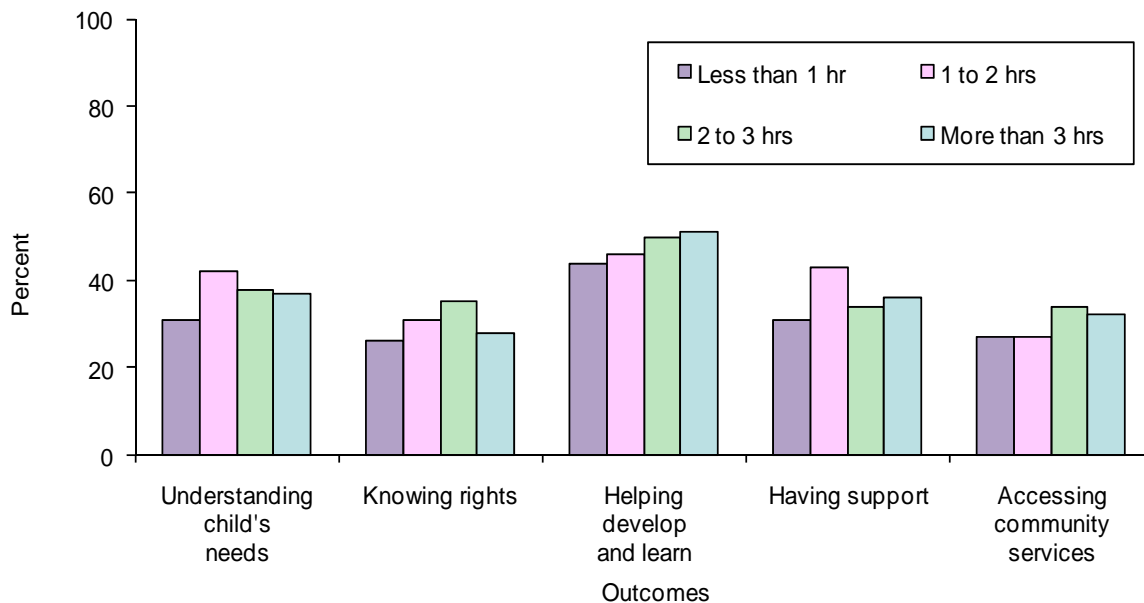
8. Are family outcomes related to child outcomes?

In addition to the five family outcomes, the ECO stakeholder groups identified three child outcomes:

- Children have positive social relationships.
- Children acquire and use knowledge and skills.
- Children take appropriate action to meet their needs.

A critical assumption related to the child and family outcomes is that achievement of the child and family outcomes are intertwined: children will not achieve the good outcomes we want for them

if families are not able to help their children develop and learn, have support systems, and so on. For some families, such as those with children with severe disabilities and challenges, programs may play an especially important role in providing the supports and services these families need to attain the five family outcomes. The interplay between the child and family outcomes is illustrated in Figure 12.

Figure 12. Early intervention and preschool inputs, processes, and outcomes
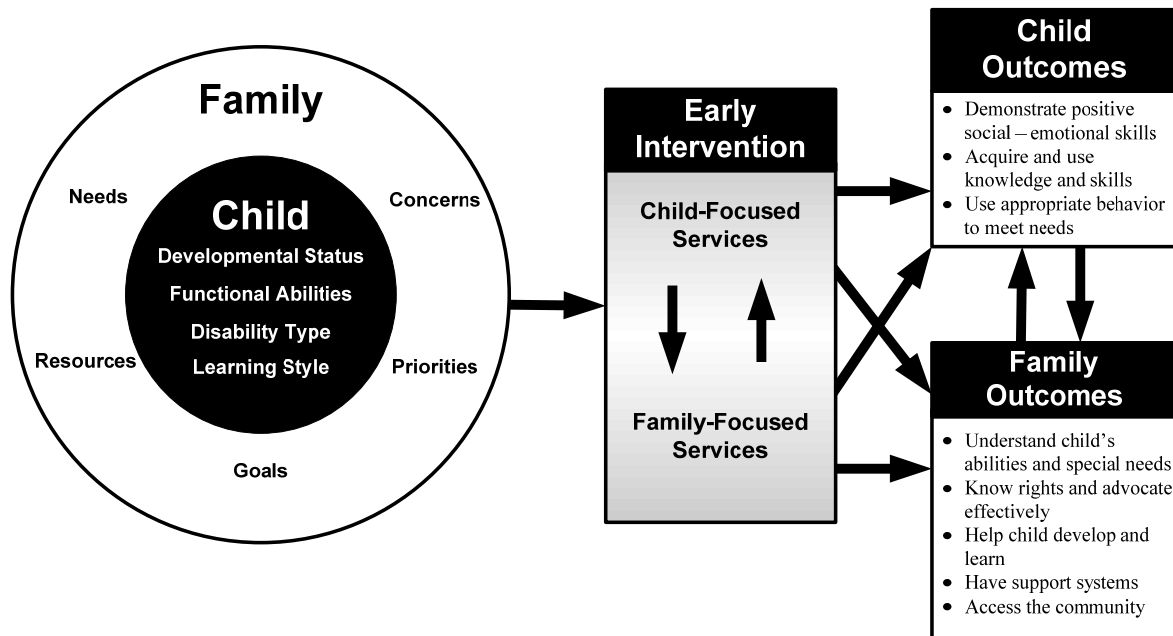
Creating analyses that relate family outcomes to child outcomes can be complicated analytically, and the findings need to be interpreted carefully because multiple and competing interpretations of the relationships may be equally plausible. To be able to examine the relationship between family outcomes and child outcomes, a state needs to have identifiers on the FOS data that can be linked to the child outcomes data. Also, depending on the point at which in a family's program experience the FOS data are collected, different interpretations can be drawn. For instance, if the FOS data are collected after families receive 1 year of service, it will be challenging to try to understand how these relate to the child outcome data at exit from the program. It would be even more difficult if the family outcomes data for some families represents outcome status after 6 months, after 12 months for other families, or after 20 months for others. The most straightforward analysis to interpret would be the collection of child and family outcome data at the same time point relative to services. Since the child outcome data are based on progress at exit, for this discussion, we will assume the state is collecting family outcome data at exit from the program as well. Also, because there are three

child outcomes and five family outcomes, there are 15 analyses to be conducted if each of the outcomes is considered separately. To reduce the number of analyses, we are going to use the cut-off summary score (i.e., reporting a 5 or higher for all 15 items on the FOS) for this analysis.

Table 3 shows the percentage of families reporting 5 or higher for all 15 outcome items for each of the five child OSEP outcome categories. The entry 36 in the first column means that 36 percent of families of children who did not improve functioning responded 5 or higher to all 15 items. Slightly more families of children who made the most progress reported overall outcome attainment on the FOS.

Table 3.   Samples showing percentage of families who reported 5 or higher on all items for OSEP child outcome progress categories for each child outcome

	Child Outcomes		
Child Outcome Progress Categories	1	2	3
Did not improve functioning	36	33	35
Improved functioning but not sufficiently to move nearer to same-aged peers	36	37	38
Improved functioning to a level nearer to same-aged peers but did not reach it	44	46	43
Improved functioning to reach a level comparable to same-aged peers	44	48	46
Maintained functioning at a level comparable to same-aged peers.	44	47	49

Change over Time

9. Are families reporting higher levels of family outcome attainment over time?

Change over time as used here refers to year-to-year change for the program. Table 4 illustrates one way to address this question for each of the five family outcomes. Outcome attainment is defined as responding 5 or higher to the three items within the outcome. These data show relatively high outcome attainment for all of the outcomes for all years, but they also show slightly lower attainment on outcomes 2 and 5 and increases over time for these outcomes and for outcome 4.

Table 4.   Percentage of families reporting outcome attainment for each outcome, 2009-2011

Family Outcome	Year		
	2009	2010	2011
	N = 12,652	N = 13,765	N = 13,876
Families understand their children's strengths, abilities, and special needs.	54	54	54
Families know their rights and advocate effectively for their children.	35	37	38
Families help their children develop and learn.	50	50	49
Families have support systems.	40	42	43
Families access desired services, programs, and activities in their communities.	36	39	44

Conclusion

In this document, we have presented some questions that states might want to address related to family outcomes along with suggested ways to look at the data from the Family Outcomes Survey to answer these questions. The suggested analyses and findings will provide states or local programs with information on how the families they serve are doing overall. If states or programs conduct subgroup analyses, the analyses will provide information for different types of families within the population. If areas of relative weakness are identified, the next step in improving family outcomes may involve additional analysis to further explore the discrepancies uncovered. Information also may be needed to understand what the current system of services and supports for families looks like in Program A or why it is that certain types of families are reporting lower levels of outcome attainment. Based on what is learned, program adjustments will need to be designed and implemented. Subsequent measurement of family outcomes will then address the question of whether family outcomes improve after the changes are implemented. Program improvement is a cycle and family outcome data are an essential tool in that cycle. Data from the Family Outcomes Survey can help states see how their families are doing, identify any areas in need of improvement, and then, after program adjustments, assess the impact of those changes—with the goal of moving to ever higher percentages of families reporting outcomes attained.

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Appendix A: Preliminary Data on the Psychometric Properties of the FOS

The 15 items on the FOS were designed to assess the five recommended family outcomes (Bailey et al., 2006). However, we wanted to determine the extent to which outcomes were interrelated and whether meaningful factors or clusters of outcomes were differentiated from each other. Preliminary analyses indicate that all five subscales (3 items for each of the five outcomes) are strongly correlated with the total score (items 1 through 15), with correlations ranging from 0.65 to 0.82. Three of the five subscales were highly correlated with each other: understanding your child's strengths, needs, and abilities; knowing your rights and advocating for services; and helping your child develop and learn. The remaining two subscales (having support systems and accessing your community) were positively related ($r = 0.51$), but less strongly associated with the other three subscales (ranging from $r = 0.33$ to $r = 0.47$).

To determine a measure of internal consistency among the items with each subscale and the total score, Cronbach's alpha was calculated. Results indicated moderate to high internal consistency: Strength and Ability subscale, $\alpha = 0.68$; Rights and Services subscale, $\alpha = 0.68$; Develop and Learn subscale, $\alpha = 0.77$; Social Support subscale, $\alpha = 0.74$; Community Access subscale, $\alpha = 0.56$; and Total score, $\alpha = 0.88$.

Finally, an exploratory factor analysis was performed to determine how many meaningful factors the FOS measures. Results indicated two factors: factor 1, which explained 38% of the variance, comprised items 1 through 9 and factor 2, which explained 10% of the variance, comprised of items 10 through 15. We labeled factor 1 "Family Knowledge and Ability" and factor 2 "Social Support and Community Access."

These data have recently been accepted for publication and a complete report of the findings will be posted on the ECO Center website when they are available.