The Two-Generation Mutual Reinforcement Measurement Tool Appendix A: Subscales and Scoring

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Mutual reinforcement is a key concept in the two-generation field and is of interest to both researchers and practitioners. The Next Steps for Rigorous Research in Two-Generation Approaches (NS2G) project, sponsored by the Administration for Children and Families' Office of Planning, Research, and Evaluation (OPRE), developed a tool to measure mutual reinforcement in two-generation initiatives. We, the NS2G project team, described its development in The Two-Generation Mutual Reinforcement Measurement Tool: Development and Pilot Study Findings (Conroy et al. 2023). This technical appendix contains additional information on the Two-Generation Mutual Reinforcement Measurement Tool's subscales and scoring.

Tool Subscales and Scoring

In this section, we describe how we defined the measurement tool's four subscales, how we score the responses to the measurement tool's questions, and which questions require recoding of responses.

Defining the subscales

Table A.1 maps the items in the tool to each subscale.

Table A.1. Mutual reinforcement construct and subscale information

Subscale (# of items)	Definition	Item numbers	Sum range	Mean range
Partners (3)	The concept of mutual reinforcement relies on the idea that there are groups, systems, or multiple service providers working together.	1a, 1b, 1c	Not applicable	Not applicable
Principles (4)	The partner organizations within the two-generation initiative have discussed and agreed upon (1) a shared vision for change, (2) a common theory of change to positively affect both generations within a family, and (3) aligned mission statements related to positively affecting both generations within a family.	2d, 2e, 2g, 2h	0 – 20	0.00 – 5.00
Infrastructure (22)	The partner organizations within the two-generation initiative have discussed and agreed upon (1) common or compatible goals for serving whole families and (2) developing and using consistent, age-appropriate measures for both parents and children in the same family to assess and evaluate their goals.	2f, 4m, 6, 7, 8, 9, 10, 11a/12a*, 11b/12b*, 11c/12c*, 11d/12d*, 11e/12e*,11f/12f*, 11g/12g*, 13a, 13b, 13c, 13d, 14a, 14b, 14c, 14d	0 – 110	0.00 – 5.00
Service Delivery Strategies (26)	The partner organizations within the two-generation initiative have discussed and agreed upon (1) designing and/or offering services of comparable quality, duration, and intensity to caregivers and children in the same families, (2) aligning efforts and activities, (3) building upon existing efforts and activities, and (4) leveraging each service provider's area of strength or expertise by intentionally differentiating and coordinating efforts and activities.	2a, 2b, 2c, 2i, 2j, 2k, 3(a-e)*, 4a, 4b, 4c, 4d, 4e, 4f, 4g, 4h, 4i, 4j, 4k, 4l, 5a, 5b, 5c, 5d, 5e, 5f, 5g	0 – 130	0.00 – 5.00
Overall mutual reinforcement (55)			0 – 260	0.00 – 5.00

Note: The Partners subscale is for informational use only and is not used to calculate the overall score of mutual reinforcement.
* Each of these question pairs (or group, in the case of 3a–e) are summed for a subitem-level score. See the *Recoding* section for more information.

Scoring

When we created the Two-Generation Mutual Reinforcement Measurement Tool, we developed a preliminary scoring guide to begin to quantify an initiative's level of mutual reinforcement. However, due to the complex steps and time required to manually score the instrument and its preliminary nature, we supported staff and partners participating in the pilot study by calculating their results for them. After respondents from Waves 2 and 3 returned their completed measurement tools, we calculated each respondent's overall mutual reinforcement score and a score for each of three subscales.[1] Following the conclusion of the pilot study, we developed the electronic version of the tool so that two-generation initiative staff can complete their own measurement tool, score their responses independently, and track changes over time (the

[1] Wave 1 consisted of cognitive pre-tests only and, for the sake of time, did not include all of the Two-Generation Mutual Reinforcement Measurement Tool's questions.

electronic version is available in Appendix D at https://www.acf.hhs.gov/opre/report/two-generation-mutual-reinforcement-measurement-tool).

We designed the survey so that theoretically a higher score suggests stronger mutual reinforcement than a lower score. This applies to the overall score and the scores in the individual subscales. Note: The Partners subscale is not used to calculate the overall score of Mutual Reinforcement because it is not numerical. Rather, the goal of this subscale is to prompt respondents to reflect on who their two-generation initiative partners are as they begin completing the tool. Then, they are well-positioned to consider these partners while responding to questions in the remainder of the survey. The scores on the remaining three numerical subscale scores (Principles, Infrastructure, and Service Delivery Strategies) contribute to the overall mutual reinforcement score.

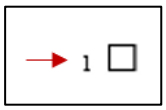
The range is based on a mean of the unique scales used for different questions in the tool. We calculated the score for each of the three numerical subscales (Principles, Infrastructure, and Service Delivery Strategies) by summing the associated data point value for each question in the subscale and then dividing that sum by the number of questions in that subscale to calculate the mean. Before calculating this mean, we took additional steps to recode some questions (the Recoding section provides more information). Table A.1 shows the list and total number of questions for each. Each subscale and the overall mutual reinforcement construct scores have the same range of possible scores, 0.00 to 5.00 (Table A.1). The electronic version of the tool calculates an initiative's overall score and its score on each subscale.

Recoding

Although the electronic version of the tool automatically calculates an initiative's scores, here we describe the individual steps of scoring for transparency and to enable those who would like to calculate their scores manually. To ensure the three numerical subscales (Principles, Infrastructure, and Service Delivery Strategies) used to calculate the overall construct are on the same 0.00 to 5.00 range of possible scores, we recoded select answer options and questions. *Recode* means the process of changing the values of a variable. This tool required two levels of recoding: (1) answer options and (2) whole question.

Step 1: Recoding answer options

Figure A.1. Data point value



All answer options have an associated data point value. The PDF version of the tool displays this data point value to the left of the answer option check box or circle (Figure A.1. provides an example). We use this data point value to calculate the subscale scores. However, some questions and responses require recoding before scoring, including those that:

- Do not follow our logic of a higher score suggesting stronger mutual reinforcement than a lower score, but are necessarily written in the reverse to make sense in plain language

- Contain Blank/Missing, Not Applicable (n.a.), and Don't Know (d) responses
- Have an initial data point value range outside of 0.00 to 5.00. Put another way, these questions have fewer or more than six response options.[2]

The scoring key in Table A.2 indicates which questions need recoding and to what value. If a question or subquestion is not listed in Table A.2, it does not require recoding at the answer option level. The electronic version of the tool recodes responses for respondents according to this scheme.

Table A.2. Recoding data point value key

Question number(s)	Original data point value	Recode to a value of
For all questions	Blank/Missing →	0
	Logical skip* →	0
3a–e	0 →	0
	1 or more →	1
4a–m, 5a–g	Don't know →	0
6, 7	0 →	1
	1 →	2
	2 →	3
	3 →	4
	4 →	5
8	0 →	1
	1 →	3
	2 →	3
	3 →	5
9	1 →	5
	2 →	5
	3 →	4
	4 →	3
	5 →	2
	6 →	1
10	0 →	1
	1 →	5
	2 →	3
11a–g	2 →	3

* A logical skip is when the tool instructs you to skip a question based on your answer. In this tool, these instructions look like this "→ GO TO". For scoring, the recode value of 0 would apply only to questions skipped due to this logic, not the question that preceded the skip.

[2] Each subscale consists of a different number of items (Table A.1) and unique response scales (for example, a 5-point scale such as *Never/Seldom/About Half the Time/Usually/Always* or a 2-point scale such as *No, Data Are Not Linked/Yes, Data Are Linked*). This creates differences in the associated data point value ranges for each question. Left alone, these differences would result in inconsistent scoring ranges between the three subscales and unequally weight them in the overall construct. To account for this, we rescaled the measurement tool so the data point value range is 0.00 to 5.00 for each question or subquestion.

Step 2: Recoding whole questions

Select questions require recoding at the question or subquestion level. To correctly score and adhere to our scoring logic (in which a higher score defines stronger mutual reinforcement), these questions require a second recoding step. The scoring key in Table A.3 indicates which questions need recoding at the question level and the associated scoring instructions. If Table A.3 does not list a question number, it does not require recoding at the question level. The electronic version of the tool automatically recodes responses for respondents according to this scheme.

Table A.3. Recoding question values key

Question number(s)	Scoring instructions
3a–e	Sum each subquestion's recoded data point value (that is, for each of a–e) for a total Question 3 score. Question 3a-e asks the respondent to list the number of services in a set of five categories: solely child-focused, child-focused with parent elements, whole family, parent-focused with child elements, and solely parent-focused. In Figure A.2 below, the example respondent indicated their initiative provides three services that are "whole family," two services that are "parent-focused with child elements," one service that is "child-focused," and one service that is "parent-focused." They did not indicate any services that are "child-focused with parent elements." We recode the two categories with a response greater than 1 to a value equal to 1 to indicate the presence of these services. A total of 4 categories now have a value of 1 so the summed value across all categories and the total Question 3 score is **4**.
11a, 12a 11b, 12b 11c, 12c 11d, 12d 11e, 12e 11f, 12d 11g, 12g	Sum each subquestion pair's recoded data point value. Each subquestion pair (for example, 11a and 12a) will have one score. Using the example provided in Figure A.3 below, the respondent reported in 11a that they have access to "child data only" for early care and education outcomes. This response is assigned a value of 2 in the measurement tool. We recoded this response to a value of 3 so that collecting data on a single generation (either "child data only" or "parent data only") receives the same value. The respondent reports in 12a that these data are linked to other data for other members of the same family, which is assigned a value of 1. We sum the recoded responses to 11a and 12a as follows: 3+1=4. This Question 11a/12a example would thus have a score of **4.**

Figure A.2. Recoding of example responses to subquestions 3a-e to create a summed question 3 score

	IF NONE, ENTER 0 NUMBER OF PROGRAMS/ SERVICES	Recoded value
a. Child-focused (e.g., early childhood education)	1	1
b. Child-focused with parent elements (e.g., parenting skills, family literacy)	0	0
c. Whole family (e.g., food, housing, transportation)	3	1
d. Parent-focused with child elements (e.g., child care, work supports)	2	1
e. Parent-focused (e.g., employment services)	1	1

Figure A.3. Recoding of example responses to subquestions 11a and 12a to create a summed question 11a/12a score

FOR EACH QUESTION, MARK ONLY ONE PER ROW

	Q11					Q12	
	n.a.	DON'T HAVE ACCESS TO THESE DATA	CHILD DATA ONLY	PARENT DATA ONLY	BOTH PARENT AND CHILD DATA	NO, DATA ARE NOT LINKED	YES, DATA ARE LINKED
a. Early care and education (e.g., Head Start, child care partnerships, Pre-K, home visiting)	0 ❍	1 ❍	2 ●	3 ❍	4 ❍	0 ❍	1 ●
Recoded value			3			1	

OPRE's Portfolio on Coordinated Services

The Next Steps for Rigorous Research in Two-Generation Approaches (NS2G) project is part of a portfolio of research focused on coordinated services to support children and families. Projects within this research portfolio address the intentional coordination of two or more services. These projects span OPRE's program-specific research portfolios, including child care, Head Start, home visiting, child welfare, and welfare and family self-sufficiency. More information about OPRE's Coordinated Services projects can be found at https://www.acf.hhs.gov/opre/coordinated-services-research-and-evaluation-portfolio.

References

Conroy, Kara, Sarah Brunskill, and Amanda Carrillo-Perez (2023). The Two-Generation Mutual Reinforcement Measurement Tool: Development and Pilot Study Findings, OPRE Report #2023-149, Washington, DC: Office of Planning, Research, and Evaluation, Administration for Children and Families, U.S. Department of Health and Human Services.

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