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### Title

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### Permalink

<https://escholarship.org/uc/item/5f37j121>

### Journal

International Journal of Eating Disorders, 51(3)

### ISSN

0276-3478

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### Publication Date

2018-03-01

### DOI

10.1002/eat.22826

Peer reviewed



Published in final edited form as:

*Int J Eat Disord.* 2018 March ; 51(3): 275–280. doi:10.1002/eat.22826.

## Are Parental Self-Efficacy and Family Flexibility Mediators of Treatment for Anorexia Nervosa?

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### Abstract

**Objective**—Family-Based Treatment (FBT) for adolescent Anorexia Nervosa (AN) promotes faster weight restoration when compared to other treatments. However, the mechanisms through which this occurs are not clarified. This study explored the trajectories of parental self-efficacy and perceived family flexibility during FBT and Systemic Family Therapy (SyFT). We also explored whether parental self-efficacy mediates the effects of treatment on weight gain early in treatment.

**Method**—158 adolescents (12–18 years old; 89% girls) and their parents were randomized to FBT or SyFT. Parental self-efficacy as well as adolescents' and parental perceptions of the family's flexibility were collected at baseline and at sessions 2, 4, 6, and 8.

**Results**—Over time, only parents in FBT reported significantly greater self-efficacy. The change in maternal self-efficacy over the first 8 weeks of treatment was a significant mediator of session 10 weight gain. There were no significant group differences in perceived flexibility by session 8.

**Discussion**—Both parents in FBT and mothers in SyFT understand early the need to change their family's rules and roles. However, the specific strategies of FBT appear to mediate early weight gain in AN.

Anorexia Nervosa (AN) is a serious and potentially life threatening illness. Parents whose child has AN are advised to act promptly to minimize the risk of medical and psychosocial problems (Krug et al., 2013), making weight restoration a priority. Early weight gain also predicts a greater likelihood of recovery over time; the definition of “early” varies across existing studies, with some identifying weight gain by session 4 as a potential predictor of

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Trial registration: [clinicaltrials.gov](https://clinicaltrials.gov) identifier

outcome (Doyle, Le Grange, Loeb, Doyle, & Crosby, 2010; Le Grange, Accurso, Lock, Agras, & Bryson, 2014; Madden et al., 2015; Nazar et al., 2017). Thus, understanding the mechanisms which promote early weight gain is an important next step that could suggest how to refine the intervention and improve treatment response.

Different family interventions have been developed and manualized for adolescent AN. Family-Based Treatment (FBT) focuses on coaching parents in renourishing their child, while in Systemic Family Therapy (SyFT), uncovering and changing maladaptive relationships and communication patterns within the family system is the primary target of treatment (Lock & Le Grange, 2015; Pote, Stratton, Cottrell, Shapiro, & Boston, 2003). A recent randomized controlled trial (RCT) comparing FBT and SyFT for adolescent AN found at the end of the treatment, patients in both treatments reached an average ideal body weight greater than 91%, and there were no significant differences between the treatments (Agras et al., 2014). However, patients in FBT gained weight faster, and had fewer hospitalizations and a total of fewer days in the hospital than patients in SyFT (Lock et al., 2016).

One factor that has been proposed as a mechanism associated with change in family therapy is parental self-efficacy, i.e., the degree to which the parents believe that their parenting-related decisions and actions will attain desired outcomes (de Montigny & Lacharité, 2005). In FBT for adolescent AN, an improvement in parental self-efficacy has been associated with adolescents' reduced eating, anxiety, and depressive pathology (Robinson, Strahan, Girz, Wilson, & Boachie, 2013). When parental self-efficacy was compared between families of adolescents with AN receiving FBT or individual therapy (i.e., adolescent-focused therapy), increases in parental self-efficacy during FBT were associated with greater weight gain (Byrne, Accurso, Arnow, Lock, & Le Grange, 2015).

Families beginning treatment for adolescent AN are often pessimistic about their family's ability to focus on behaviors reducing AN symptoms (Dimitropoulos, Carter, Schachter, & Woodside, 2008). Elevated rigidity may impede a family's ability to shift roles (Rockwell, Boutelle, Trunko, Jacobs, & Kaye, 2011), however elevated flexibility may interfere with reinforcing the needed behavioral change (Rhodes, Baillie, Brown, & Madden, 2005); thus, understanding the degree of family flexibility associated with earlier weight restoration is important to informing treatment.

The current study aimed to assess the role of parental self-efficacy and familial perceptions of flexibility in treatment. We predict that self-efficacy and flexibility will mediate the effect of treatment (FBT vs. SyFT) on early weight gain because these are early treatment targets of FBT, whereas communication patterns and general family functioning are the main treatment targets of SyFT early in treatment.

## **METHOD**

### **Participants**

Participants included 158 adolescents, ages 12–18 who met DSM-IV-TR criteria for AN with the exception of the amenorrhea requirement (APA, 2000) and their families. Full

information regarding recruitment and randomization appears in a separate report (Agras et al., 2014).

### Interventions

Families were randomized to receive either FBT or SyFT. Each of these manualized treatments consists of 16 sessions delivered over 9 months. FBT focuses on supporting parents in the re-nourishment of their adolescent to a healthy weight (Lock & Le Grange, 2015). SyFT focuses on family interactions that precipitate or maintain AN. In SyFT, the therapist focuses on identifying, reframing, and changing non-adaptive beliefs, attitudes, and behaviors that may reinforce AN, and concentrates on using the family's strengths to work toward recovery (Pote et al., 2003).

### Measures

Self-report measures were collected at baseline and sessions 2, 4, 6, and 8. Participants' weight was recorded at baseline and each treatment session.

Family Adaptability and Cohesion Evaluation Scale (FACES; Olson, 2011). This scale, assessing perceived level of family flexibility, ranging from rigidity to chaos, was separately rated by the adolescent and by each parent.

General Self-Efficacy Scale (GSE; Schwarzer & Jerusalem, 1995). A measure of the individual's sense of competency to cope with challenges was completed by each parent separately.

### Data analysis

Baseline differences between treatment groups at randomization were assessed using independent t-tests. Baseline differences between mothers and fathers in self-efficacy scores, and differences between adolescents, mothers, and fathers in flexibility were analyzed using a series of paired t-tests. To assess changes in self-efficacy and flexibility over the five time points, we used mixed effects models for each dependent variable and for each family member separately. In all models, the fixed explanatory variables were treatment arm and baseline values. The models also contained random effects for time. Mixed effects modeling was performed by intent-to-treat analysis using all participants whose data were available at each time point. Missing data points were treated as missing at random (Mallinckrodt, Clark, & David, 2001). Piecewise growth models with a change point at week 4 for flexibility provided the best fit for the flexibility data (Singer & Willett, 2003). Exploratory mediator analyses (MacArthur Approach) were conducted to test whether the changes in parental self-efficacy from baseline to session 8 mediated the effects of treatment type on weight gain by session 10 (Kraemer, Wilson, Fairburn, & Agras, 2002). According to this model, a variable in an RCT could be considered a mediator if (a) it was measured post-randomization; (b) it is significantly different between treatment arms; and (c) either a significant main effect of the mediator on the outcome and/or an interaction effect between treatment arm and the mediator are found (Kraemer, Kiernan, Essex, & Kupfer, 2008). We calculated the change scores of maternal and paternal self-efficacy from BL to session 8, and weight (in kgs) from BL to session 10. All analyses were conducted with SPSS, version 23.

## RESULTS

### Participant characteristics and baseline analyses

The average age of adolescent participants was 15.3 (SD=1.8) years, and 89.2% were female. 79.1% were White, 10.1% Hispanic and 5.1% Asian. No significant groups differences were found in any of the baseline or demographic variables. Full details of sample characteristics as well as enrollment and attrition can be found in the original report. (Agras et al., 2014)

### Baseline differences between family members in parental self-efficacy and balanced flexibility

At baseline, there were no significant differences between maternal and paternal self-efficacy ( $t=1.47, p=.14$ ) or flexibility ( $t=-.66, p=.51$ ). Although all family members evaluated their family's balanced flexibility within the low band of the "flexible" range, adolescents perceived their families as even less flexible than their mothers or fathers ( $t=-.29, p<.01$ , and  $t=-.78, p<.01$ , respectively).

### Parental Self-Efficacy over Time

Analyses showed that mothers and fathers receiving FBT reported significantly improved self-efficacy from baseline to session 8, while parents in SyFT did not report a significant change (see Table 1 as well as Figure 1).

### Family Members' Balanced Flexibility over Time

Table 2 presents piecewise linear growth curve models conducted for each family member separately, with a knot (i.e., change point) at week 4. Analyses showed a significant decline in perceived flexibility over the first four sessions of treatment, among mothers in the two treatment groups and fathers in FBT. However, all perceptions remained within the flexible range. There were no significant differences in flexibility at week 8 between adolescents, mothers, or fathers in FBT and their SyFT counterparts.

### Mediation analysis

Both maternal and paternal change in reported self-efficacy from BL to session 10 met the two preliminary requirements for testing mediation, per the MacArthur framework, i.e., they were both measured post-randomization and were significantly different between FBT and SyFT groups. These prerequisites were not met for flexibility perceptions. The change in maternal self-efficacy from baseline to session 8 mediated the treatment effect on weight gain from baseline to session 10. A regression analysis with weight gain by session 10 as the outcome variable – illustrated in Figure 2 - indicated that both treatment group and change in maternal self-efficacy had a specific main effect on weight gain ( $B=1.96, CI=.52,3.41, p=.008$  and  $B=1.45, CI=.47,2.43, p=.004$ , respectively). However, there was no significant interaction term ( $B=.82, CI=-1.14,2.78, p=.83$ ). The change in paternal self-efficacy from BL to session 8 was not a mediator of weight gain from BL to session 10. Neither treatment group nor paternal self-efficacy change had significant main effects ( $B=1.60, CI=-.059, 3.25, p=.058$  and  $B=-.60, CI=-1.35,1.23, p=.93$ , respectively). The interaction term of

treatment group and paternal self-efficacy, however, was significant ( $B=3.21$ ,  $CI= .62,5.79$ ,  $p=.02$ ), but this was not sufficient to determine mediation.

## DISCUSSION

This study explored self-efficacy and perceived flexibility as possible mechanisms of early weight gain in family therapy. On average, parents receiving FBT reported significantly greater increase in self-efficacy during early treatment than parents treated with SyFT which supported our primary hypothesis. Improvement in maternal self-efficacy by session 8 mediated the effect of treatment on short-term weight gain. The interaction of treatment type and change in paternal self-efficacy also predicted early weight gain. Perceived changes in family flexibility were not related to early weight gain.

The relationship between improvement in self-efficacy and behavioral change is based in theory and research (Bandura, 1977; Gallagher et al., 2013). The finding that parents in FBT reported greater increases in self-efficacy fits well with the proposed model of FBT which is designed to help parents learn to increase their confidence in changing the maintaining behaviors associated with weight loss (i.e., dieting and over-exercise) in AN. Empowering parents to make these changes is a key tenet of the approach. In contrast, SyFT targets maladaptive communication and family processes and therefore may at least early on lead to questioning of current family roles such that parents might actually feel less empowered initially. While the current mediator analysis is exploratory, it provides preliminary support that changes in self-efficacy early in treatment are a possible mechanism for why adolescents gain weight. This study's findings that perceived family flexibility decrease early in treatment may be line with the finding of increased parental self-efficacy in FBT. As parents feel more empowered, they may employ their behavioral management strategies more consistently, and not try to placate their child's wishes to diet and/or over-exercise. Thus, decreased flexibility may be a positive outcome early in FBT. Interestingly, mothers in SyFT also reported decreased flexibility. It is possible that since mothers are more involved in the treatment of their children (Martín et al., 2013; Whitney et al.), mothers who received SyFT adopted have adopted techniques to affect their child's eating earlier than their spouses did.

This study has important limitations which must be considered in evaluating our data and conclusions. Considering that the data are self-report, it is unclear if family members' ratings of flexibility and self-efficacy translate into observable behaviors. Since self-reports were administered following the weighing, parental self-efficacy may have increased when the adolescent gained weight, and parents perceived their behaviors as effective. Further, the FACES may not show sufficient sensitivity to detect changes in this population, a finding congruent with previous data (Rhodes et al., 2005). Sibling perspectives on family functioning would have provided additional context but were not measured. Additionally, this study did not explore weight gain by session 4, which has been found as predictive of remission. Finally, this study did not assess other aspects of family functioning that have been examined in other studies, such as clarity of communication and rules, proactive problem solving, and affective responding.

While both FBT and SyFT provide a framework to combat AN, this analysis supports the view that changes in parental self-efficacy may be a mechanism through which FBT may help adolescents achieve faster weight gain which may in turn lead to faster recovery rates at lower costs (Agras et al., 2014; Lock et al., 2016). The current study is a secondary, exploratory analysis and testing to confirm these preliminary findings in an adequately powered RCT is needed before definitive conclusions about the role of parental self-efficacy and flexibility can be reached.

## Acknowledgments

### FUNDING INFORMATION

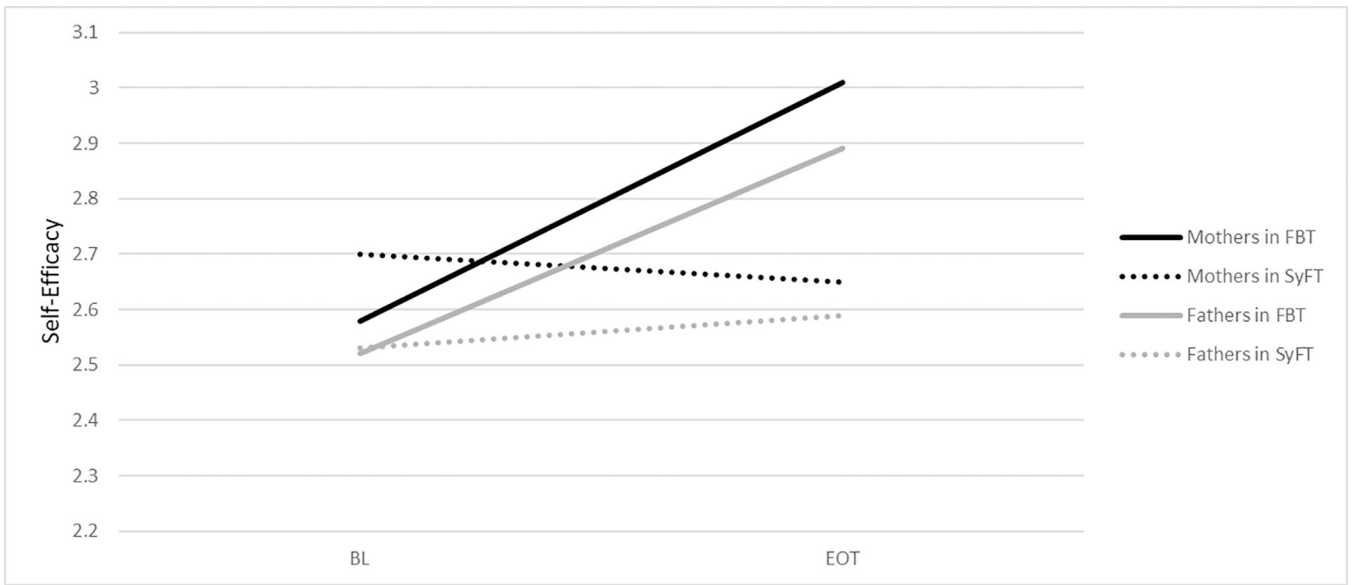
This study was funded by the National Institute of Mental Health. Grant Numbers: 1U01 MH076290, MH 076254, MH 076251, MH 076255, MH 076252

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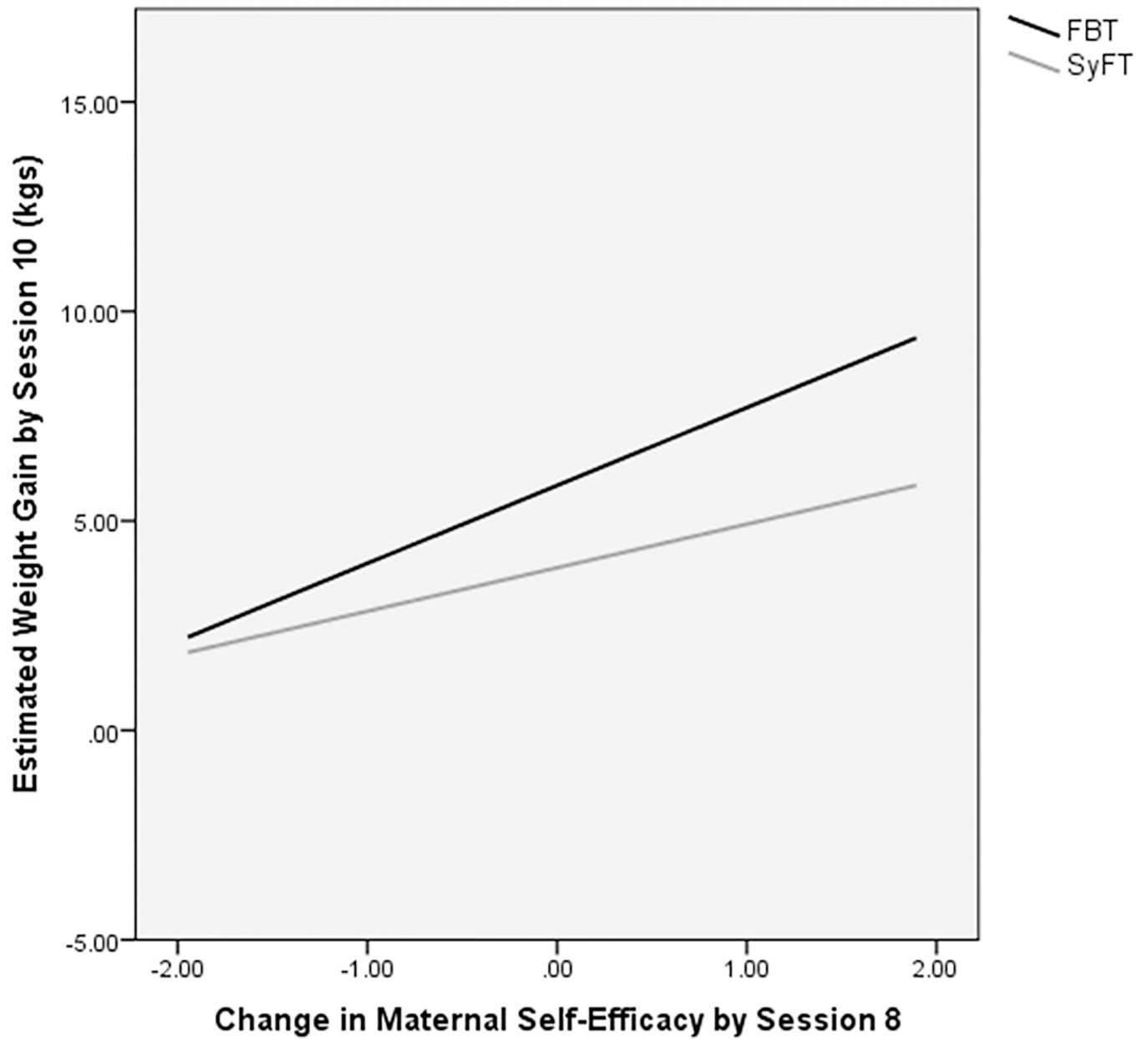
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**Figure 1:**  
Parental Self-Efficacy over Time

Note: Parental Self-Efficacy was measured by GSE, at baseline, and 2-, 4-, 6-, and 8- sessions.



**Figure 2:**  
The Mediating Role of Maternal Self-Efficacy on the Effect of Treatment Type on Weight Gain  
Note: FBT, Family-Based Treatment. SyFT, Systemic Family Therapy.

**Table 1.**

Differences in Self-Efficacy between Mothers and Fathers in FBT and SyFT over Time.

Variable	Parent	BL		EOT			Effect Size BL-Ses8	
		M (SD)	M (SD)	B	SE	t-value	p	
Maternal Self-Efficacy	FBT	2.58 (.71)	3.01 (.66)	.09	.02	4.27***	.000	.63
	SyFT	2.70 (.73)	2.65 (.72)	.03	.02	1.17	.243	.07
Paternal Self-Efficacy	FBT	2.52 (.68)	2.89 (.68)	.09	.02	3.60**	.000	.55
	SyFT	2.53 (.74)	2.59 (.75)	.03	.03	1.22	.225	.08

Note: FBT, Family-Based Treatment. SyFT, Systemic Family Therapy.

**Table 2.**

Differences in Family Flexibility Dimension between Adolescents, Mothers and Fathers in FBT and SyFT over Time.

Variable		BL		Session 4				Effect Size BL-Ses4	Session 8				Effect Size Ses4-Ses8	
		M (SD)	M (SD)	B	SE	t-value	p		M (SD)	B	SE	t-value		p
Adolescents	FBT	48.10 (15.69)	45.23 (13.45)	-1.42	1.05	-1.35	.178	.20	46.02 (13.8)	.05	2.01	.03	.980	.06
	SyFT	47.82 (15.53)	46.61 (12.59)	-.55	1.03	-.54	.592	.09	48.00 (16.64)	.47	2.01	.24	.814	.09
Mothers	FBT	52.46 (11.19)	48.13 (11.68)	-1.79	.85	-2.12	.034	.38	51.19 (12.65)	1.14	1.58	.72	.470	.25
	SyFT	51.56 (12.05)	46.86 (10.69)	-2.60	.84	-3.09	.002	.42	46.84 (10.24)	-.15	1.59	-.10	.923	0
Fathers	FBT	51.28 (10.72)	48.27 (10.91)	-2.90	.98	-2.98	.003	.28	52.0 (9.0)	.012	1.67	.01	.994	.38
	SyFT	54.98 (10.53)	50.40 (10.61)	-.38	1.00	-.38	.70	.44	51.56 (10.92)	.58	1.67	.35	.727	.11

Note: FBT, Family-Based Treatment. SyFT, Systemic Family Therapy.