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Change in Expressed Emotion and Treatment Outcome in Adolescent Anorexia Nervosa

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Abstract

Expressed emotion (EE) has been associated with poor outcomes in anorexia nervosa (AN); however, whether change in EE predicts superior treatment outcomes is unknown. The current study examined whether decreases in EE during an open trial of a novel family-based treatment for AN predicted symptoms at end-of-treatment. Forty-seven adolescents (12–18 years of age) with AN or sub-threshold AN and their parents (mothers: $n = 47$; fathers: $n = 39$) participated in 6-months of family treatment. Measures of AN symptomatology (Eating Disorder Examination completed by adolescent and end-of-treatment recovery status) and parental EE (Family Questionnaire completed by parents which measures two facets of EE: critical communication (CC) and emotional over-involvement (EOI) were collected at baseline and end-of-treatment. Parental EOI, but not CC, significantly decreased during the course of treatment. Change in mothers', but not fathers', EE accounted for additional variance in AN symptomatology at end-of-treatment above baseline EE and baseline AN symptom levels. Findings suggest a greater emphasis on parent support during treatment may improve outcomes.

Anorexia nervosa (AN) is a devastating illness with high rates of mortality relative to other psychiatric disorders and significant life impairment (Arcelus, Mitchell, Wales, & Nielsen, 2011; Wentz, Gillberg, Gillberg, & Rastam, 2001). Longer duration of illness prior to treatment initiation is associated with worse outcomes (Treasure & Russell, 2011), making early intervention essential. Family-based treatment (FBT) has the greatest empirical support for treating adolescent AN (Lock, 2015), but is not effective for all adolescents, with only 30–50% meeting full remission at the end-of-treatment (Le Grange, Lock, Loeb, & Nicholls, 2010). Many factors likely contribute to the limited effectiveness of current treatments,

including illness severity at the onset of treatment (Treasure & Russell, 2011), child obsessiveness and rigidity (Crane, Roberts, & Treasure, 2007), and the family dynamics that emerge in the context of severe illness (Ciao, Accurso, Fitzsimmons-Craft, Lock, & Le Grange, 2015; Duclos, Vibert, Mattar, & Godart, 2012). One dynamic feature that has been shown to be predictive of treatment outcomes is parental expressed emotion (EE) (Duclos et al., 2012).

EE is a multifaceted construct that reflects the transaction between the child's illness and the parent in the acute stages of illness management (Brown, Birley, & Wing, 1972; Simoneau, Miklowitz, & Saleem, 1998). Specific EE dimensions include critical communication (CC), hostility, emotional over-involvement (EOI), positive remarks and warmth (Brown et al., 1972). CC refers to patterns of communication indicative of disapproval or resentment. Hostility, which is correlated with CC (Brown et al., 1972), is the rejection of an individual or pervasive criticality. EOI is defined as attitudes or behaviors indicating marked concern about the individual (e.g., overprotection; self-sacrifice; heightened emotional reactivity). Positive remarks and warmth refer to positive statements and kindness along with empathy, concern and interest in the individual. Unhelpful patterns of interaction (e.g., CC, EOI) have been associated with illness severity and duration (Duclos et al., 2012) and may emerge as parents are trying to manage very severe symptoms with potentially limited resources. This includes limited information (about what to do when) as well as limited physical and emotional resources that can get depleted when caregiving a child with a serious psychiatric illness (Brown et al., 1972; Duclos et al., 2012; Kyriacou, Treasure, & Schmidt, 2008; Treasure et al., 2001).

The majority of the research on EE has focused on comparing treatment outcomes between families classified as "high" or "low" on EE. High EE reflects high levels of criticality, hostility, and/or emotional over-involvement. High EE has been associated with poor treatment outcomes in many psychiatric disorders, with particularly strong and consistent findings in schizophrenia and depression (Butzlaff & Hooley; Duclos et al., 2012). The literature examining EE in adolescent AN is relatively small. However, generally, higher baseline (or pre-treatment) EE has been found to predict higher levels of AN symptomatology and less weight recovery at end of treatment along with early treatment drop-out and relapse rates (Duclos et al., 2012). Further, a recent study by Rienecke and colleagues (2016) suggested that, at least for AN, the effect of pre-treatment levels of EE on outcomes may be dependent upon treatment context. More specifically, they found that high levels of maternal hostility at baseline were more likely to predict poor outcomes in FBT than adolescent-focused therapy. These findings are similar to Eisler et al. (2000), where adolescents in separated family therapy fared better when their parents were higher in EE. Combined, these findings might suggest the need for treatment matching with high EE families matched to either adolescent-focused therapy or separated family therapy, though the two have not been directly compared making treatment recommendations unclear (Rienecke, Accurso, Lock, & Le Grange, 2016; Eisler et al., 2000).

However, as in previous studies, Rienecke et al. and Eisler et al. focus on the relationship between *baseline* EE and treatment outcomes, instead of change in EE over the course of treatment. Rather than being static, EE may be conceptualized as a modifiable factor that if

successfully addressed in treatment may translate to better outcomes. There is preliminary evidence that improvements in EE occur during family treatment for AN (Duclos et al., 2012). However, whether the degree of change is important in determining outcomes is unknown. If changes in EE are important in determining treatment outcome (rather than just baseline EE levels as a characteristic of the family), this would suggest that treatment emphasize parent support to improve interactions during acute symptom management (e.g., psychoeducation, skill development, and/or parental self-care to replenish depleted resources). Additionally, if this were to occur, matching to adolescent-focused therapy based on pretreatment levels of parental EE may not be necessary. This would allow adolescents to remain in family treatment, which has demonstrated greater efficacy, including faster weight-restoration, than adolescent-focused therapy (Lock et al., 2010).

The current study tested whether *change* in parental EE, from baseline to end-of-treatment predicted AN symptom severity at end-of-treatment among adolescents with AN who participated in family treatment. We hypothesized that decreases in parental EE from baseline to end-of-treatment would predict lower levels of AN symptomatology and greater odds of recovery, after accounting for baseline levels of EE and AN symptoms.

Method

Participants

Participants were 47 adolescents meeting the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR) diagnostic criteria for AN or subthreshold AN and their parents (mothers: $n = 47$; fathers: $n = 39$) (American Psychiatric Association, 2000). Adolescents were between the ages of 12–18 ($M = 14.02$, $SD = 1.58$), mostly female (89%) and white (93%), with an average body mass index of 17.30 ± 1.43 at baseline.

Procedures

Current analyses used data collected in an open trial of a 6-month Acceptance-based Separated Family Treatment (ASFT) for adolescents with AN (see Timko, Zucker, Herbert, Rodriguez, & Merwin, 2015 for a detailed description of ASFT and study procedures). ASFT is a family treatment that incorporates key principles from FBT as manualized by Lock and le Grange (2012), including parental involvement in renourishment, but specifically infuses Acceptance and Commitment Therapy (ACT) to support parents in the task of mealtime management and broadly promote flexible, effective action in the parents and adolescents to improve adaptive functioning. The specific target of ASFT is increased psychological flexibility, or the capacity to openly experience difficult thoughts and feelings and engage in effective and value-guided behavior. For parents, this includes increasing willingness to have the painful experiences that accompany caring for a child with a life-threatening illness (e.g., fear, guilt, anger) so that they can take effective action in the service of their child's health and well-being even when it feels hardest to do so. Treatment incorporates behavioral management skills and has an emphasis on the importance of parental self-care. ASFT was delivered in 20 therapy sessions over a 6-month period. The majority of sessions occurred weekly and used a separated family treatment format (i.e., the same therapist met individually with the adolescent and the parents), with the final four

sessions occurring every other week and conjointly (i.e., therapist meeting with the adolescent and parent(s) at the same time.

Assessments were completed at baseline, end-of-treatment and two follow-up points. The current study utilized measures of eating disorder symptomatology (Eating Disorder Examination (EDE); Cooper & Fairburn, 1987) completed by adolescents and expressed emotion (Family Questionnaire (FQ); Wiedemann, Rayki, Feinstein, & Hahlweg, 2002) completed by parents at baseline and end-of-treatment. Adolescent recovery status (fully recovered vs. not recovered) at end-of-treatment was also coded as a primary outcome measure. All procedures were approved by the institutional review board and participation required informed consent.

Measures

Eating Disorder Examination (EDE; Cooper & Fairburn, 1987)—The EDE is a widely used and validated semi-structured diagnostic interview that measures eating disorder attitudes and behaviors over the past 28 days (Cooper, Cooper, & Fairburn, 1989; Cooper & Fairburn, 1987). Adolescents completed the EDE at baseline and end-of treatment. The EDE global score was used in current analyses.

Recovery Status—Recovery status was coded dichotomously (fully recovered vs. not recovered) at end-of-treatment. Per previous recommendations, full recovery was defined as weight restoration of at least 95% of expected body weight and EDE scores within one standard deviation of population norms (Couturier & Lock, 2006).

Family Questionnaire (FQ; Wiedemann, Rayki, Feinstein, & Hahlweg, 2002)—The FQ is a 20-item self-report measure of EE. Caregivers are asked to indicate how frequently they have reacted to problems with their child in ways reflecting CC or EOI. Scores of 23 for CC and 27 for EOI have been recommended as cutoff points for high EE (Wiedemann et al., 2002). The FQ has been shown to correlate with standardized clinical interviews conventionally used to assess EE both in dimensional scores of CC and EOI and in overall classification of families as high or low on EE (Wiedemann et al., 2002). Good construct validity and subscale internal consistency have been demonstrated (Wiedemann et al., 2002).

Data Analysis Plan

We examined the subscales of the EE individually to maximize the interpretability of the findings. Paired samples t-tests were first conducted to examine if maternal and paternal CC and EOI significantly decreased pre-to-post treatment. CC and EOI change scores were then computed for mothers and fathers by subtracting baseline EE score from end-of-treatment EE score. Hierarchical regressions were run to determine if changes in parental EE from baseline to end-of-treatment predicted end-of-treatment child AN symptomatology (EDE global score) above and beyond that accounted for by baseline levels of parental EE and AN symptomatology. Separate models were run for mothers and fathers to determine if effects differed between parents. For all models, baseline EDE global scores and parental EE scores

were entered at step 1 and change in parental EE from baseline to end-of-treatment entered at step 2.

Binary logistical regressions were run to determine if changes in parental EE from baseline to end-of-treatment predicted child odds of recovery from AN (binary: fully recovered vs. not recovered). For all models, baseline levels of EE were entered in block one and parental EE change score in block two.

Results

See Table 1 for descriptive data on parental EE. See Table 2 for results of all hierarchical regression models.

Pre-to-post Treatment Change in Parental EE

Maternal EE—The paired samples t-test comparing maternal CC at baseline ($M = 21.36$, $SD = 5.45$; 40% high CC) and end-of-treatment ($M = 22.26$, $SD = 6.50$; 41% high CC) was not significant, $t(26) = 0.36$, $p = .719$, 95% CI $[-1.38, 1.97]$, $d = 0.08$. The paired samples t-test comparing maternal EOI at baseline ($M = 27.13$, $SD = 5.25$; 59% high EOI) and end-of-treatment ($M = 24.67$, $SD = 5.34$; 44% high EOI) was significant, $t(25) = 2.54$, $p = .018$, 95% CI $[0.40, 3.90]$, $d = 0.50$, indicating that maternal EOI significantly decreased during the course of treatment.

Paternal EE—The paired samples t-test comparing paternal CC at baseline ($M = 21.16$, $SD = 5.47$; 32% high CC) and end-of-treatment ($M = 19.30$, $SD = 6.72$; 30% high CC) was not significant, $t(21) = 1.71$, $p = .102$, 95% CI $[-0.35, 3.63]$, $d = 0.34$. The paired samples t-test comparing paternal EOI at baseline ($M = 26.37$, $SD = 4.55$; 45% high EOI) and end-of-treatment ($M = 22.23$, $SD = 6.07$; 23% high EOI) was significant, $t(20) = 4.28$, $p < .001$, CI: $[2.42 - 7.01]$, $d = 0.96$ indicating that paternal EOI significantly decreased during the course of treatment.

Change in Parental EE as a Predictor of AN Symptomatology

Maternal EE—The regression model for maternal CC predicting end-of-treatment EDE global score remained significant at step 2, $F(3, 25) = 6.11$, $p = 0.003$. Change in maternal CC from baseline to end-of-treatment accounted for an additional 13% variance above and beyond that contributed by baseline EDE global and CC scores ($R^2 = .13$, $F(1, 22) = 5.24$, $p = .032$). In this model, greater improvements in maternal CC during the course of treatment were associated with lower EDE global scores at end-of-treatment ($B = 0.132$, $SEB = .06$, $\beta = .426$, $p = .032$, CI: $[0.01, 0.25]$).

The regression model for maternal EOI predicting end-of-treatment EDE global score remained significant at step 2, $F(3, 24) = 5.96$, $p = 0.004$. Change in maternal EOI from baseline to end-of-treatment accounted for an additional 14% variance above and beyond that contributed by baseline EDE global and EOI scores ($R^2 = .14$, $F(1, 21) = 5.41$, $p = .030$). In this model, greater improvements in maternal EOI during the course of treatment was associated with lower EDE global scores at end-of-treatment ($B = 0.136$, $SEB = .06$, $\beta = .453$, $p = .030$, CI: $[0.014, 0.26]$).

Paternal EE—The regression model for paternal CC predicting end-of-treatment EDE global score remained significant at step 2, $F(3, 20)=3.46$, $p=0.04$. However, change in paternal CC from baseline to end-of-treatment did not account for additional variance above and beyond that contributed by baseline EDE global and CC scores ($R^2=.011$, $F(1,17)=3.13$, $p=.583$).

The regression model for paternal EOI predicting end-of-treatment EDE global score remained significant at step 2, $F(3, 19)=3.64$, $p=0.04$. However, change in paternal EOI from baseline to end-of-treatment did not account for additional variance above and beyond that contributed by baseline EDE global and EOI scores ($R^2<.001$, $F(1,16)=.001$, $p=.923$).

Change in Parental EE as a Predictor of Child Odds of Recovery

Maternal EE—The logistic regression model for maternal CC was statistically significant only when CC change score was included in the model, $\chi^2(2, n=27)=6.57$, $p=0.04$. The model explained 29.5% of the variance of odds of recovery. Decreases in CC was associated with greater odds of recovery (OR: 0.751, $p=0.03$). Baseline CC level was not a significant predictor (OR=1.051, $p=0.60$).

The logistic regression model for maternal EOI was statistically significant when EOI change score was included in the model, $\chi^2(2, n=26)=6.109$, $p<0.05$ (there was a nonsignificant trend when only baseline EOI was included in the model, $\chi^2(2, n=26)=3.61$, $p=0.06$). This model explained 28.9% of the variance of odds of recovery. In this model, higher levels of baseline EOI was associated with lower odds of recovery (OR=0.790, $p=0.04$). EOI change score was not a significant predictor (OR=0.828, $p=0.13$).

Paternal EE—The logistic regression models for paternal EE were not significant, indicating neither baseline nor change in paternal CC or EOI predicted odds of recovery (χ^2 s: 0.001–0.112, $n=21$ –22, $ps>.70$).

Discussion

The purpose of the current study was to examine whether change in parental EE from baseline to end-of-treatment predicted AN symptom severity at end-of-treatment among adolescents with AN participating in ASFT. Findings suggest that decreases in maternal CC and EOI during the course of treatment account for additional variance in end-of-treatment outcomes above and beyond that already accounted for by baseline levels of EE or AN symptomatology. While additional research is needed to understand the factors that increase risk of these negative transactions and elucidate the specific process by which family intervention decreases parental EE, specifically EOI; the current study supports recent efforts to provide parents with additional support during family treatment. This includes skills and self-care to help parents cope with the presence of severe, life threatening symptoms in their child who, in the depths of illness, might display significant rigidity and opposition to improved nutrition.

Only mothers' change in EE significantly impacted treatment outcomes in the current study, whereas other studies have found a significant relationship between paternal EE and treatment outcomes (e.g., Rienecke et al., 2016). This may indicate that mothers in our study took a more primary role in the renourishment and recovery process than fathers. It may also be that our sample size was too small to detect the impact of paternal EE on treatment outcomes. Additional research is needed to understand parent roles in their child's recovery and how best to support each parent.

Baseline levels of parental EE were not associated with treatment outcomes, with the exception of higher levels of maternal EOI predicting lower odds of recovery. This adds to a growing literature showing that EE at the onset of treatment, particularly CC, is not always related to AN symptomatology following completion of family therapy (Le Grange, Hoste, Lock, & Bryson, 2011; Rienecke et al., 2016). It may be that the impact of pretreatment levels of EE on end-of-treatment outcomes is dependent upon the severity of EE at baseline. Following this, it is possible that baseline levels of EE in our sample, and CC in particular, were not significant enough to have a direct impact on treatment outcomes.

Parental EOI but not CC significantly decreased pre to post-treatment. This is in contrast to Eisler and colleagues (2000) who observed a significant decrease in parental CC in both conjoint and separated family therapy. It may be that intervention components that targeted CC in Eisler et al. (2000) were not included in ASFT. Inconsistent findings may also be due to differences in EE measurement. For example, Eisler et al. used the Standardized Clinical Family Interview (Kinston & Loader, 1984) whereas the current study used a self-report measure which may have different demand characteristics or other differences. Additionally, behavioral change may precede the attitudinal and self-perceived changes in EE measured by the FQ. That is, behavioral decreases in CC observable by others (including the adolescent patient) may have occurred and impacted outcomes in the current study, even though attitudinal and self-perceived CC did not. Importantly, while CC did not change significantly pre to post-treatment in ASFT, decreases in CC did occur within families. Change in maternal CC predicted eating disorder symptomatology and recovery status at the end-of-treatment. This may suggest that even small reductions in CC have a positive effect on treatment outcomes.

The mechanism by which ASFT reduced EOI has not been tested. It might be that the ability to accept difficult thoughts and feelings increases parents' capacity to engage in behaviors supporting adolescent recovery (rather than those encompassing EOI). For example, greater willingness to experience feelings of anxiety (an emotion that has been associated with EOI, Kyriacou et al., 2008), may allow caregivers to refrain from overprotection and persist in food exposure. Other aspects of ASFT may also have contributed to reductions in EOI such as the emphasis on self-care or the separated treatment format in itself, which potentially allows for more direct intervention on parental barriers to renourishment (e.g., fear, guilt, anger). Future research is needed to parse the source of the effects and determine if findings generalize to conjoint family treatments including traditional FBT. Interestingly, while EOI significantly decreased from pre to post-treatment and change in EOI impacted treatment outcomes, 44% of mothers and 23% were still classified as high EOI at end-of-treatment. As with CC, this may suggest that even small reductions in EOI have a positive effect on

treatment outcomes and may be less important than decreasing EOI below a specific cut-off point.

In the case of weight restoration, baseline maternal EOI was a better predictor than change in EOI. Future research is needed to identify when baseline level is more important than change in EE, which may have implications for treatment matching. For example, there may be particular patterns of baseline EE (e.g., high levels of CC and low warmth) that are resistant to change in the context of family therapy, making adolescent-focused therapy the recommended intervention.

The study had important limitations. The sample size was modest, which may have reduced our capacity to detect effects. The study also utilized self-reported levels of EE, which although increasingly common, may not be consistent with actual behaviors or behavior change encompassing EE. Additionally, neither hostility nor warmth, both understudied components of EE, were assessed. Including these important facets of EE in future research may be particularly important as they have been shown to be associated with treatment outcomes in AN (Le Grange et al., 2011; Rienecke et al., 2016).

Having a child with AN is a painful experience and parents often struggle with this pain and how best to help their child. The current study provides preliminary support that decreasing unhelpful interactions in families in the acute stages of illness (particularly EOI among mothers) is valuable in the context of ASFT. Future research is needed to determine how to reduce CC and EOI most effectively and efficiently which may lead to specific treatment augmentations that improve outcomes in adolescent AN.

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Table 1

Parent EE at Baseline and End-of-Treatment

Variable	Baseline <i>M (SD)</i>	EOT <i>M (SD)</i>	Baseline % High EE (<i>n</i>)	EOT % High EE (<i>n</i>)	Correlation(<i>r</i>) Baseline/EOT
Mother CC	21.36 (5.45) ^a	22.26 (6.50) ^a	40% (<i>n</i> = 47)	41% (<i>n</i> = 27)	.760 ^{***}
Mother EOI	27.13 (5.25) ^a	24.67 (5.34) ^{b*}	59% (<i>n</i> = 46)	44% (<i>n</i> = 27)	.701 ^{***}
Father CC	21.16 (5.47) ^a	19.30 (6.72) ^a	32% (<i>n</i> = 38)	30% (<i>n</i> = 23)	.751 ^{***}
Father EOI	26.37 (4.55) ^a	22.23 (6.07) ^{b***}	45% (<i>n</i> = 38)	23% (<i>n</i> = 22)	.569 ^{**}

Note: EE = Expressed Emotion. CC = Critical Communication. EOI = Emotional Over-involvement. EOT = End-of-Treatment.

Alphabetical superscripts that differ across columns indicate a significant difference between baseline and EOT level of EE as determined by a paired samples t-test. Percent high EE determined using recommended cutoff of 23 for CC and 27 for EOI (higher scores reflect higher levels of EE; Wiedemann et al., 2002). *r* = Pearson correlation between baseline and end-of-treatment levels of EE variable.

* $p < .05$,

** $p < .01$,

*** $p < .001$.

Table 2

Change in Parent EE as a Predictor of Adolescent End-Of-Treatment Global EDE Score

Mother CC												
Model	Predictors	B (SE)	Beta	t	p	95% CI	R	F	p	R ²	R ²	F p
1	EDE Global _B	.506 (.152)	.575	3.323	.003**	.191 – .822	.570	5.528	.011*	.325		
	Mother CC _B	.017 (.050)	.057	.332	.743	–.087, .120						
2	EDE Global _B	.305 (.165)	.346	1.840	.079	–.039, .648	.674	6.110	.003**	.454	.130	5.236 .032*
	Mother CC _B	.003 (.046)	.010	.063	.950	–.093, .099						
	Mother CC	.132 (.057)	.426	2.288	.032*	.012, .251						
Mother EOI												
Model	Predictors	B (SE)	Beta	t	p	95% CI	R	F	p	R ²	R ²	F p
1	EDE Global _B	.449 (.163)	.503	2.758	.011*	.111, .786	.567	5.199	.014*	.321		
	Mother EOI _B	.038 (.043)	.160	.878	.390	–.052, .127						
2	EDE Global _B	.304 (.161)	.341	1.889	.073	–.031, .639	.678	5.964	.004**	.460	.139	5.411 .030*
	Mother EOI _B	.096 (.047)	.408	2.064	.052	–.001, .193						
	Mother EOI	.136 (.058)	.453	2.326	.030*							
Father CC												
Model	Predictors	B (SE)	Beta	t	p	95% CI	R	F	p	R ²	R ²	F p
1	EDE Global _B	.502 (.160)	.599	3.146	.006**	.167, .837	.606	5.225	.016*	.367		
	Father CC _B	–.054 (.043)	–.243	–1.276	.218	.144, .035						
2	EDE Global _B	.508 (.163)	.606	3.116	.006**	.164, .852	.615	3.455	.040*	.379	.011	.313 .583
	Father CC _B	–.051 (.044)	–.230	–1.177	.256	–.144, .041						
	Father CC	.031 (.055)	.108	.559	.583	–.086, .147						
Father EOI												
Model	Predictors	B (SE)	Beta	t	p	95% CI	R	F	p	R ²	R ²	F p
1	EDE Global _B	.549 (.167)	.641	3.282	.004**	.196, .902	.637	5.792	.012*	.405		

2	Father EO _{Ig}	-.098 (.054)	-.354	-1.813	.088	-.212, .016						
	EDE Global _{Ig}	.550 (.173)	.642	3.186	.006**	.184, .916	.637	3.64	.036*	.406	<.001	.010 .923
	Father EO _{Ig}	-.096 (.057)	-.349	-1.679	.112	-.218, .025						
	Father EO _I	.005 (.051)	.020	.098	.923	-.102, .112						

Note: Baseline levels of eating disorder symptomatology and expressed emotion included as control variables. B = Baseline Score. = Change Score (Value at end-of-treatment – Value at baseline), CC = Critical Communication. EO_I = Emotional Over-involvement. EDE = Eating Disorder Examination Global Score.

* $p < .05$,

** $p < .01$,

*** $p < .001$.