

# Within-Persons Predictors of Change during Eating Disorders Treatment: An Examination of Self-Compassion, Self-Criticism, Shame, and Eating Disorder Symptoms

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## ABSTRACT

**Objective:** Attempts to identify the predictors of change during eating disorders treatment have focused almost exclusively on identifying between-persons factors (i.e., differences between patients). Research on within-person predictors of change (i.e., variations within patients over time) may provide novel and clinically useful information. To illustrate, we test the theory that within patients, self-compassion, self-criticism, shame, and eating disorder symptoms reciprocally influence one another over time.

**Method:** Seventy-eight patients with an eating disorder completed the Self-Compassion Scale, Experience of Shame Scale, and Eating Disorder Examination Questionnaire every three weeks across 12 weeks of treatment.

**Results:** Multilevel modeling revealed that following periods of increased shame, a patient's eating pathology was more severe than usual. Following periods of increased self-compassion or decreased eating pathology, a patient's level of shame was lower than usual. Between-person differences in the relationships among study variables also emerged.

**Discussion:** Results support the theory that shame and eating pathology influence one another cyclically within patients over time, and suggest that time-dependent increases in self-compassion may interrupt this cycle. If replicated, these results might suggest that assessing and intervening with increases in a patient's level of shame may help to reduce her eating pathology, and improving a patient's level of self-compassion or eating disorder symptomatology may lower her subsequent experiences of shame. Findings highlight the value of administering and examining repeatedly measured within-person predictors of change during eating disorders treatment, and suggest that it may be clinically important to attend to the changes that occur within a given patient over time. © 2016 Wiley Periodicals, Inc.

**Keywords:** within-persons; between-persons; multilevel modeling; treatment process; shame; self-compassion; self-criticism; bulimia nervosa; anorexia nervosa; eating disorders

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## Introduction

A great deal of treatment research in the eating disorders has focused on identifying the between-person predictors of treatment outcome. Between-

persons predictor variables are features that differentiate patients from one another – usually at intake or in the early weeks of treatment – and render certain individuals more or less likely to experience clinically significant improvements in their eating disorder symptoms. Although research of this nature is informative, the predictors studied generally provide limited guidance to clinicians about how to proceed with a given patient over time during treatment. For example, patients' baseline motivation for recovery is a robust between-persons predictor of treatment response.<sup>1</sup> However, without research showing that there is a within-person relationship between motivation to change and eating disorder symptoms (i.e., at times in treatment when a person's motivation has

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increased, her symptoms will be less severe than usual), and/or a relationship between these two variables over time (i.e., after a given person's motivation goes up in treatment, her symptoms go down), intervening with a patient's motivation to change over the course of treatment would be empirically unfounded.

Even research that has examined change in certain variables early in treatment as predictors or mediators of patient outcome offers limited explicit direction for clinical intervention. For example, treatment outcomes are better for patients who have faster early improvements in eating disorder symptoms.<sup>2-4</sup> How then should a clinician proceed with a patient who did not show these early gains? Is this patient a lost cause? Or is there something the clinician could be attending to in this individual during the course of her remaining treatment to help her get better? We suggest that research that examines within-person variance in, and predictors of, outcome may give a unique perspective on the processes by which some patients get better or worse, and thereby help clinicians more effectively assess and intervene with a given patient. In particular, it will be useful to examine whether certain processes that occur within a patient over time during treatment are related to change in the severity of that patient's eating disorder symptoms.<sup>a</sup>

An examination of within-person relationships between variables requires that multiple participants complete multiple repeated measures over time.<sup>5-8</sup> Such a design makes it possible to disaggregate within-person variance from between-person variance in study variables and to use multilevel modeling to examine the relationships between variables at both the between-persons level (i.e., level 2 of the model in which variance related to differences between individuals are estimated) and the within-person level (i.e., at level 1 of the model in which variance related to repeated measurements within individuals across time are estimated).<sup>7,9</sup> The overall aim of the present study was to highlight the value of exploring within-person predictors of eating disorder symptoms during treatment. We sought to do so by testing Goss and Gilbert's theory about the within-person relationships between shame, self-criticism, self-compassion, and eating pathology.<sup>10</sup>

Shame is a painful self-conscious emotion in which one experiences the self as flawed, bad, and defective.<sup>11,12</sup> Goss and Gilbert (2002) proposed

that individuals with an eating disorder use symptoms such as restrictive eating and binge/purge behaviors to experience temporary relief from feelings of shame; however, the secretive and isolating nature of these behaviors typically intensifies and perpetuates shame. This is in part because of the self-criticism and inner-hostility that these behaviors tend to elicit and propagate in clients.<sup>13</sup> Because care and affiliation with others are the optimal regulators of the brain's threat system, which underpins shame and self-criticism,<sup>14,15</sup> Gilbert proposed that cultivating self-compassion, a form of self-directed care, can be instrumental in interrupting these shame-symptom cycles.<sup>16,17</sup> Self-compassion involves responding to personal distress with sensitivity, kindness, and a desire to alleviate suffering.<sup>16,18</sup> At the between-persons level, individuals who have higher levels of self-criticism experience higher levels of shame and eating pathology,<sup>19-21</sup> and those who are higher in self-compassion experience less shame and eating pathology, and respond better to eating disorders treatment.<sup>22,23</sup>

We sought to perform a stronger test of Goss and Gilbert's (2002) theory by exploring the within-person relationships between self-criticism, self-compassion, shame, and eating disorder pathology during eating disorders treatment. We did this using a data set that contained eating disorder patients' responses to self-report questionnaires at five occasions during treatment.<sup>b</sup> Our hypotheses were that: (1a) following a period of increased shame or self-criticism, a patient's eating disorder symptoms will be more severe than usual; (1b) following a period of increased self-compassion, a patient's eating disorder symptoms will be less severe than usual; and (2) a patient's feelings of shame will be lower following a period of (2a) increased self-compassion, (2b) decreased self-criticism, or (2c) decreased eating pathology.

## Method

### Participants

Participants were 78 patients with a DSM-IV-TR eating disorder admitted to the Toronto General Hospital's day hospital (72.2%) or inpatient (27.8%) treatment

<sup>a</sup>It should be noted that the within-person changes patients experience are often related to between-persons baseline levels, but this was not the focus of the current paper.

<sup>b</sup>Previously, we used this data set to examine static, between-persons predictors of outcome, including patients' eating disorder diagnosis [31], baseline levels of self-compassion and fear of self-compassion [23], and early improvements in shame and self-compassion [37]. The present paper asked a different set of questions focused on within-person processes.

program.<sup>c</sup> Among them 27.2% had anorexia nervosa restrictive subtype (AN-R), 18.5% had anorexia nervosa binge-purge subtype (AN-BP), 29.6% had bulimia nervosa (BN), and 24.7% had an eating disorder not otherwise specified (EDNOS). Participants were mostly (97%) female and Caucasian (79.2%), with 10.8% of participants identifying as Latin-American, 4.5% as East Asian, 2.8% as African-Canadian, 1.5% as mixed race, and 1.4% as South Asian. The mean age was 28 years (SD = 9.6).

Both the day hospital and inpatient treatment programs from which we recruited are rooted primarily in cognitive-behavior therapy (CBT) and involve group therapy interspersed with supervised meals and snacks. Multidisciplinary teams, made up of psychologists, psychiatrists, nurses, dieticians, social workers, and occupational therapists, run the programs. Patients are admitted on a rolling basis to one of the two programs. Treatment goals in each include any combination of medical stabilization, weight restoration in the case of underweight patients, normalized eating, and elimination of eating disorder symptoms.<sup>26</sup> Groups in both programs include CBT, dialectical behavior therapy, psychoeducation, relationships and sexuality, and anxiety management.

The mean number of online assessments completed by each participant was 3.5/5 over 12 weeks with 65% of participants completing three or more full surveys. Of the remaining participants, 50% were active patients in the treatment who simply did not respond; 47% dropped out of treatment prematurely; and 3% successfully completed what the team considered to be a sufficient “dose” of treatment before the 12-week mark.

### Measures

**Self-Criticism and Self-Compassion.** The Self-Compassion Scale-Short Form (SCS-SF) was used to assess patients’ levels of self-criticism and self-compassion.<sup>27</sup> The SCS-SF is a 12-item version of the full 26-item SCS which was developed to assess the extent to which individuals relate to themselves compassionately at times of distress and disappointment.<sup>18</sup> The SCS-SF consists of six positively- and six negatively-worded items, which are rated from 1 to 5. Recent studies indicate that a two-factor non-hierarchical structure best fits

the SCS and SCS-SF, with the positive and negative items representing the distinct constructs of self-compassion and self-criticism.<sup>27–29</sup> We therefore treated the negative SCS-SF factor as an indicator of self-criticism and its positive factor as an indicator of self-compassion. In the present study, the Cronbach’s alphas at baseline were adequate, at .83 for self-compassion and .79 for self-criticism.

**Shame.** The Experiences of Shame Scale (ESS) is a 25-item measure that assesses the extent to which individuals experience shame related to their body, character, and behaviour; and a mean of all items represents global shame.<sup>30</sup> The ESS has good discriminant and construct validity, and had a strong Cronbach’s alpha in the current sample of .95 at baseline.

**Eating Disorder Symptoms.** The Eating Disorder Examination Questionnaire (EDE-Q) is a 36-item measure that assesses patients’ eating disorder symptoms.<sup>31</sup> It yields scores on the subscales of dietary restraint, weight concern, shape concern, and eating concern, as well as a global scale score, which was the focus of the present paper. The EDE-Q demonstrated strong internal consistency in the present sample with a Cronbach’s alpha of 0.95 for the Global score at baseline.

### Analytic Strategy

Primary analyses were conducted using multilevel modeling with SAS Proc Mixed, maximum likelihood estimation, and between-within degrees of freedom. Because scores on shame, self-criticism, self-compassion, and eating pathology changed linearly over time in our data set,<sup>24</sup> we could not use the traditional centering approach for disaggregating between- and within-persons variance.<sup>32</sup> Instead, we followed Curran and Bauer’s recommendations and produced *detrended* within-persons scores, which essentially removed the effect of time from each predictor.<sup>6</sup> To do this, we first computed the grand mean of time, which was 5.44, and then rescaled time by subtracting this grand mean. Second, we conducted ordinary least squares regressions for each participant, predicting shame, self-criticism, self-compassion, and EDE-Q Global from time. We then grand-mean centered the intercepts from these regressions, which provided us with between-persons scores for each participant on self-compassion, self-criticism, shame, and EDE-Q Global. These intercepts served as between-persons (level-2) predictors in multilevel models, and represented the predicted level of the predictor for each person at 5.44 weeks. Table 1 presents the mean intercept values for each predictor. We refer to these intercepts as “average” levels because they are based on a predicted score at the mean of time. Third, the residuals at each participant’s available assessment points were retained and used to create detrended within-

<sup>c</sup>The initial study sample consisted of 97 patients with a DSM-IV-TR eating disorder admitted to the Toronto General Hospital’s eating disorders treatment program. Participants were asked to complete online questionnaires at the time of their admission, and after 3, 6, 9, and 12 weeks. The EDE-Q was administered separately from other questionnaires; as a result, there were 19 participants who only completed a portion of measures at each assessment point. Because multilevel modeling software only considers data from time points at which observations are present for both the dependent variable and the time-varying covariates (i.e., within-person predictor variables), data from 78 participants were retained in the final analyses.

**TABLE 1. Between-persons zero order correlations, mean intercept values, and intraclass correlations for study variables**

	Self-Compassion	Self-Criticism	Shame	EDE-Q Global	Mean Intercept	ICC
Self-compassion	—	-.59***	-.54***	-.54***	2.22	.549
Self-criticism		—	.80***	.68***	3.97	.642
Shame			—	.79***	2.85	.743
EDE-Q Global				—	3.24	.687

Abbreviations: EDE-Q, eating disorder examination questionnaire; ICC, intraclass correlations. Between-persons zero-order correlations were based on 76 participants.  
 \* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ .

**TABLE 2. Within-persons correlations between variable scores at time  $t$  and variable difference scores between time  $t$  and  $t - 1$ .**

	Self-Compassion	Self-Criticism	Shame	EDE-Q Global
Self-compassion	—	-.26*	-.48***	-.01
Self-criticism	.09	—	-.18	-.16
Shame	-.59 ***	.02	—	.48 ***
EDE-Q Global	-.33 **	-.21	.47***	—

Abbreviations: EDE-Q = Eating Disorder Examination Questionnaire; ICC = intraclass correlations. Zero-order correlations were based on 76 participants. Pearson  $r$  correlations above the diagonal represent within-person correlations between detrended scores at time  $t$ ; those presented below the diagonal reflect within-person correlations between the differences in scores on the given variables between  $t$  and  $t - 1$ .

person (level-1) variables at time  $t$ . The LAG function in SAS was then used to create lagged variables, representing the level of each variable at  $t - 1$ . The DIF function was used to create variables representing the difference in a patient’s score on a given variable between  $t$  and  $t - 1$ .

Our primary dependent variable was patients’ raw EDE-Q Global score across all available assessment points. Multilevel models included a random and fixed effects portion. Our base models contained a random intercept, and when a fixed effect of time was added, model fit improved according to the AIC and BIC criteria. Fit improved further when time was added as a random effect, and again when eating disorder subtype was added as a fixed effect. We therefore retained these effects. Fit did not improve when Treatment Program (i.e., day hospital versus inpatient) was added as a group-level fixed effect and its contribution to eating pathology and shame was not significant. We therefore removed Treatment Program from final models presented below.

Additional within-persons fixed effects were within-person difference scores between  $t$  and  $t - 1$  for self-compassion, self-criticism, and shame. These were our primary predictors and represented the change a patient experienced in a given variable over the preceding assessment time period. We also included lagged EDE-Q as a covariate to control for a patient’s preceding level of eating pathology when predicting their subsequent level. Self-criticism, self-compassion, and shame were included as between-persons fixed effects in all models. When shame was our dependent variable, shame and eating pathology variables were interchanged in the

model. For all significant effects, Cohen’s  $d$  effect sizes were calculated, where 0.2–0.5, 0.5–0.8, and  $> 0.8$  represented small, medium, and large effects respectively.<sup>33</sup>

## Results

Intraclass correlations (ICCs) were calculated for all variables using raw scores at available assessment points. Higher ICCs indicate that scores varied between participants to a greater degree than their variation within-persons over time (i.e., over the course of treatment).<sup>34</sup> As seen in **Table 1**, two-thirds to three-quarters of the variance in self-criticism, shame, and global eating pathology was at the between-persons level. Self-compassion had just over half of its variance at the between-persons level.

**Table 1** presents Pearson  $r$  zero-order correlations between study variables at the between-persons level. Self-compassion showed a strong negative relationship with self-criticism, shame, and eating pathology. These latter three variables also had strong positive relationships with one another. **Table 2** presents two sets of within-person correlations. Correlations between detrended variables at time  $t$  revealed that self-compassion had a moderate negative correlation with self-criticism, was unrelated to eating pathology, and had a large negative correlation with shame. Shame and eating pathology were also strongly positively related, but both were unrelated to self-criticism. We also found that changes in levels of eating pathology

**TABLE 3. Fixed Effect and Variance Estimates for Models Predicting EDE-Q Global.**

	B (SE)	F	Cohen's <i>d</i>
Fixed Effects			
Intercept	1.03 (.67)	—	—
Diagnosis		3.73	0.44
AN-R	-.83 (.27)**	—	—
AN-BP	-.61 (.29)*	—	—
BN	-.30 (.27)	—	—
EDNOS	0	—	—
Time	-.16 (.02)***	101.81	1.50
Lagged EDE-Q	-.21 (.10)*	4.23	0.30
Within-persons predictors			
Difference self-compassion	.05 (.09)	.04	0.03
Difference self-criticism	.00 (.08)	.02	0.02
Difference shame	.72 (.15)***	10.26	0.47
Between-persons predictors			
Self-compassion	-.08 (.15)	.27	0.12
Self-criticism	.30 (.15)*	3.97	0.46
Shame	.82 (.17)***	22.09	1.08
Variance components			
Within-person $\sigma^2$	.1876 (.02)***	—	—
Between-person $\tau^2$	.7284 (.15)***	—	—

"Difference" represents the difference in scores on a given variable between  $t$  and  $t - 1$ . Degrees of freedom for within-persons effects were 182 and for between-person effects were 76.

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ .

between  $t$  and  $t - 1$  were moderately related to concurrent changes in shame and self-compassion (negatively), and changes in these latter two variables were inversely related to a large degree. Changes in self-criticism were unrelated to changes in all other variables between  $t$  and  $t - 1$ .

### Central Analyses

**Eating Disorder Pathology.** At the within-persons level, preceding change in shame emerged as the only significant predictor of subsequent eating disorder symptoms, controlling for preceding levels of eating pathology. The effect size was medium (Table 3). Between-persons, there was a large effect of shame and a medium effect of self-criticism on eating pathology. Together, findings indicate that a patient's eating disorder symptoms were more severe than usual following periods of increased shame. In addition, patients who had higher average levels of shame or self-criticism than other patients generally had more severe eating disorder symptoms.

**Shame.** As presented in Table 4, preceding changes in self-compassion and eating pathology emerged as unique within-person predictors of subsequent shame levels, each exerting a small effect. Between-persons, significant predictors were self-criticism and eating pathology; each had a large effect. Therefore, after periods of increased self-compassion or decreased eating disorder symptoms during treatment, a patient's feelings of

**TABLE 4. Fixed Effect and Variance Estimates for Models Predicting Shame.**

	B (SE)	F	Cohen's <i>d</i>
Fixed Effects			
Intercept	1.33 (.35)***	—	—
Diagnosis		1.82	0.31
AN-R	-.17 (.14)	—	—
AN-BP	-.08 (.15)	—	—
BN	-.17 (.14)	—	—
EDNOS	0	—	—
Time	-.06 (.01)***	36.47	0.90
Lagged shame	-.38 (.10)***	12.97	0.53
Within-persons predictors			
Difference self-compassion	-.06 (.03)*	4.13	0.30
Difference self-criticism	.02 (.03)	.32	0.08
Difference EDE-Q	.09 (.03)*	6.72	0.38
Between-persons predictors			
Self-compassion	-.04 (.08)	.23	0.11
Self-criticism	.33 (.07)***	22.24	1.08
Shame	.21 (.05)***	20.82	1.05
Variance Components			
Within-person $\sigma^2$	.0568 (.01)***	—	—
Between-Person $\tau^2$	.2761 (.06)***	—	—

"Difference" represents the difference in scores on a given variable between  $t$  and  $t - 1$ . Degrees of freedom for within-persons effects were 181 and for between-person effects were 74.

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ .

shame were lower than usual. In addition, patients who had higher average levels of self-criticism or eating pathology compared with other patients also had higher average levels of shame.

## Discussion

The present paper sought to highlight the importance of exploring within-person predictors of patient change during eating disorders treatment. In support of Goss and Gilbert's transdiagnostic model,<sup>10</sup> findings indicated that following periods of increased shame, patients' eating disorder symptoms were more severe than usual. Feelings of shame, in turn, were lower than usual following periods of increased self-compassion or decreased eating pathology.

ICCs revealed that there were relatively stable differences between patients over the course of treatment with regards to their levels of eating pathology, shame, self-criticism, and self-compassion. Nevertheless, all variables displayed between 25% and 50% of within-person variance, revealing that within a given patient, scores on all study variables varied substantially across assessment points. Multilevel models further revealed instances of variables relating to each other differently at different levels of analysis. For instance, previous change in self-compassion predicted subsequent levels of shame within the average patient. However, differences between patients in their

average level of self-compassion during treatment were not related to differences between patients in average levels of shame. These findings underscore the importance of investigating both within- and between-persons predictors of change during eating disorders treatment.

Consistent with previous research,<sup>20–22</sup> we found between-persons relationships between shame and eating disorder pathology, but this is the first study to our knowledge that has uncovered these relationships occurring sequentially across multiple time points. At the within-persons level, we found that increased shame predicted subsequent levels of eating disorder pathology and increased eating pathology predicted subsequent levels of shame. These findings offer new and important support for Goss and colleagues' model, which postulates that within a given individual, shame and eating disorder symptoms perpetuate each other in a cyclical fashion over time.<sup>10,13</sup> If these results are replicated, they would suggest that independent of whether a patient experiences more or less shame or eating pathology compared to other patients, attending to and intervening with sudden increases in a patient's own relative levels of shame or eating pathology during treatment, is likely to be helpful. The finding that shame was lower in treatment after periods of increased self-compassion, if replicated, would suggest that compassion-focused therapy approaches, which help individuals develop more caring, sensitive attitude toward personal distress, may help to further interrupt the shame-symptom cycle.<sup>35,36</sup>

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## Limitations and Future Research

Our sample was heterogeneous in terms of diagnosis. Replicating this research in more diagnostically homogeneous samples will be important to assess the relationship(s) between changes in shame, self-compassion, and more subtype-specific eating disorder symptoms. Future research could also administer assessments on a more frequent basis than the three-week schedule of the current study. Given that clinicians often see patients on a weekly basis, it would be important to determine the magnitude of, and relationships between, within-person changes in shame, self-compassion, and eating pathology over shorter periods of time. Finally, there are likely other factors beyond change in shame that contribute to within-person changes in eating pathology during treatment. Future research might identify what those factors are.

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## Conclusions

Should our results be replicated with a larger sample and in diverse settings, such findings might indicate that administering psychometrically sound measures of both shame and eating pathology on a repeated basis during treatment, and within each patient, may be useful to identify sudden changes as targets for clinical interventions. An observed spike in either of the two variables for a particular individual would indicate the need for the therapist to intervene so as to interrupt the shame-symptom cycle. Our findings also suggest that in addition to targeting these two variables directly, helping the patient cultivate a higher level of self-compassion may be a helpful approach.

Although the between-person relationships we observed between study variables provide important predictive information about which patients are more versus less likely to struggle with severe eating disorder pathology and shame during treatment, our within-person findings provide more practical direction to clinicians. Our findings emphasize to clinicians the clinically relevant changes in a particular patient that occur over the weeks of treatment, and de-emphasize differences between patients at any one time point. The results also suggest that clinicians should encourage clients to focus on how they are progressing relative to their own problem levels rather than simply comparing their progress to fellow patients. That is, improvements in a patient's own experiences of self-compassion, shame, and symptoms over time are likely to be more meaningful than other patients' experiences. Of course, replication of our findings is necessary to strengthen confidence in these clinical conclusions.

We encourage researchers to develop and test their own hypotheses about within-person processes of change during eating disorders treatment. Studies designed to include multiple repeated assessments over time create the possibility of identifying within-person predictors of change, and disseminating specific, practical, empirically-based suggestions to clinicians about what to attend to and intervene with in a given patient.

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