The Role of Emotion Regulation in the Presence, Maintenance, and Treatment of Borderline Personality and Self-injury

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Outline

- Definition of emotion dysregulation
- Role of emotion dysregulation in borderline personality disorder (BPD)
- Role of emotion dysregulation in BPD-relevant risky behaviors
  - Deliberate self-harm
  - Suicidality
- Treatment outcome and dissemination research
  - Acceptance-based emotion regulation group therapy
Definition of Emotion Regulation
Conceptualizing Emotion Regulation

Two primary areas of disagreement regarding the definition of emotion regulation

- Control of negative emotions vs. control of behaviors when experiencing negative emotions
- Relationship between emotion regulation and temperamental emotional vulnerability
Control of Emotions vs. Control of Behaviors when Experiencing Emotions

One approach equates emotion regulation with the control and reduction of negative emotions

- But, research indicates that efforts to control, suppress, or avoid unwanted emotions may have paradoxical effects

- Equating regulation with control or avoidance of emotions confounds processes that undermine regulation with those that promote regulation
Another approach views adaptive emotion regulation as the ability to control one’s behaviors when experiencing negative emotions.

- Although adaptive regulation may involve modulating the intensity or duration of an emotion, this is done to reduce the urgency associated with the emotion in order to control one’s behavior.

- Suggests utility of efforts to self-soothe when distressed, provided the person is not attempting to get rid of the emotion or escape it.
Relationship between Emotion Regulation and Emotional Vulnerability

Some researchers equate emotion regulation with low emotional intensity/reactivity

- Implies that intense/reactive emotional responses are inherently dysregulated

- But, research indicates that emotional intensity/reactivity in and of itself is not associated with negative psychological outcomes

- Temperament in general is not inherently adaptive or maladaptive
Other researchers define emotion regulation as separate from the quality of the emotional response

- Difference between emotion regulation and emotional temperament
- Emotional intensity/reactivity does not preclude adaptive regulation
- Emotion regulation defined as adaptive ways of responding to emotions, regardless of their intensity or reactivity (distinguishing responses to emotions from the quality of emotions)
A Clinically-Useful Conceptualization of Emotion Regulation (Gratz & Roemer, 2004)

Focuses on adaptive ways of responding to distress, rather than the control of emotions or dampening of emotional arousal, and includes:

- Awareness, understanding, and acceptance of emotions
- Ability to engage in goal-directed behaviors, and inhibit impulsive behaviors, when experiencing negative emotions
- Flexible use of strategies to modulate the intensity/duration of emotional responses, rather than to eliminate emotions entirely
- Willingness to experience negative emotions as part of pursuing meaningful activities in life
Emotion Dysregulation in BPD
Borderline Personality Disorder

**Diagnostic Criteria:**

- Frantic efforts to avoid real or imagined abandonment
- A pattern of unstable and/or intense interpersonal relationships
- Persistent and markedly unstable self-image or sense of self
- Impulsivity in at least two potentially self-damaging areas
- Recurrent self-harming or suicidal behaviors or communications
- Intense, usually brief, mood swings
- Chronic feelings of emptiness
- Inappropriate, intense anger
- Transient, stress-related paranoid ideation or severe dissociation

[To meet criteria for BPD, must meet 5+ criteria]
Borderline Personality Disorder

Serious mental health problem associated with a range of negative outcomes

- Severe functional impairment
- Substantial mental and physical disability (especially in women)
- High rates of co-occurring psychiatric disorders
- Elevated risk for a variety of self-destructive and health-compromising behaviors

Gunderson, 2001; Linehan, 1993; Skodol et al., 2002; Zanarini et al., 1998
Theories emphasize the centrality of emotion dysregulation to BPD

- Theorized to underlie many of the symptoms and associated difficulties of BPD
- Related to emotional, behavioral, and interpersonal problems of BPD

Dixon-Gordon et al., 2013; Gratz, 2007; Gratz et al., 2006, 2010, 2016; Herr et al., 2013; Kiel et al., 2015; Koenigsberg et al., 2001; Linehan, 1993; Scott et al., 2014
Growing evidence for the role of emotion dysregulation in BPD

- Lower emotional awareness and clarity
- Greater nonacceptance and avoidance of emotions
- Greater unwillingness to experience emotional distress in order to pursue goal-directed behavior
- Greater difficulty controlling behaviors in the context of distress
- Lower HRV/RSA (biological marker of poor ER capacity)
- Greater emotion dysregulation in general

Austin et al., 2007; Bornovalova, Gratz et al., 2008; Chapman et al., 2010; Gratz et al., 2006, 2013, 2016; Gratz, Tull, Baruch et al., 2008; Gratz, Tull, & Gunderson, 2008; Kiel, Viana, Tull, & Gratz, 2017; Kuo & Linehan, 2009
Following several minutes of exposure to a distressing task (PASAT-C), participants given the opportunity to terminate the task at any time. However, participants were informed that:

- Performance on the PASAT-C would determine the amount of time they would receive to work on a subsequent task (anagrams).
- Performance on the anagrams would determine the amount of reimbursement (providing an incentive to perform well on the tasks).

Latency to task termination indexes willingness to experience emotional distress in order to pursue goal directed behavior.

Psychosocial Foundation Research Endowment Support Grant, Development of a Behavioral Measure of Emotion Regulation for Individuals with BPD, PI: Gratz
Distress tolerance measure shown to induce emotional distress in the form of self-reported anxiety, anger, frustration, and irritability

Numbers are sequentially flashed on a computer screen, and participants must sum the most recent number with the previous number
   - Requires participants to ignore the sum and instead remember the previously presented number

Incorrect answers and failures to respond prior to the presentation of the next number result in an "explosion" sound effect and no change in score

3 levels, with increasingly shorter latencies between number presentations
   - Level 1: 1 min with 3-second latency (i.e., low difficulty)
   - Level 2: 2 min with 2-second latency (i.e., medium difficulty)
   - Level 3: up to 8 min with 1-second latency (i.e., high difficulty)
   - Quit option provided following 1 min of Level 3
For the sequence:  2  5  13  6
Correct answers are:  7  18  19
For the sequence: 2 5 13 6
Correct answers are: 7 18 19
For the sequence: 2 5 13 6
Correct answers are: 7 18 19
For the sequence: 2 5 13 6
Correct answers are: 7 18 19
Hypothesis

Compared to outpatients without a personality disorder (non-PD), outpatients with BPD would exhibit:

- **Less willingness to tolerate emotional distress** in order to engage in goal directed behavior

Gratz et al. (2006), *Journal of Abnormal Psychology*
Results

Significant difference between BPD and non-PD outpatients in the willingness to experience distress in order to pursue goal-directed behavior

- BPD outpatients more likely to quit the task (24%) than non-PD outpatients (0%)
  - $\chi^2 = 4.78, p < .05$

- BPD outpatients persisted for less time on the laboratory task
  - $F(1, 34) = 5.15, p < .05$

Gratz et al. (2006), *Journal of Abnormal Psychology*
Results

Latency to terminate the laboratory task

$F(1,34) = 5.15^*$

*$p < .05$
Results

Construct Validity:

Among BPD participants, PASAT-C latency to termination scores were negatively correlated with:

- DERS scores \( (r = -.63, p < .01) \)
- Measure of experiential avoidance \( (r = -.76, p < .01) \)

Gratz et al. (2006), *Journal of Abnormal Psychology*
Emotion Dysregulation in BPD-Relevant Behaviors
Emotion Dysregulation in BPD-Related Behaviors

Our research provides growing evidence for the role of emotion dysregulation in numerous maladaptive behaviors common in BPD.

- **Overall impulsive/self-destructive behaviors** (Weiss, Tull, Viana, Anestis, & Gratz, 2012)
- **Deliberate self-harm** (Gratz et al., 2015, 2016; Gratz & Chapman, 2007; Gratz & Roemer, 2008; Gratz & Tull, 2010)
- **Substance use** (Tull, Kiel, McDermott, & Gratz, 2013)
- **Disordered eating behaviors** (Fulton, Lavender, Tull, Cain, Muehlenkamp, & Gratz, 2012; Lavender, Gratz, & Tull, 2011)
- **Risky sexual behavior** (Gratz et al., 2012; Tull & Gratz, 2013; Tull, Weiss, Adams, & Gratz, 2012)
Examined BPD, PTSD, and emotion dysregulation as prospective predictors of BPD-relevant risky behaviors in a representative community sample of young adult women from 4 sites in Midwestern and Southern US

- Recruitment methods included random sampling from the community, in addition to community advertisements
- 296 women (mean age = 22; 35% African-American; 61% White)
- BPD, PTSD, and emotion dysregulation assessed at Time 1
- Risky sexual behavior, drug use problems, and deliberate self-harm assessed 4 months later (Time 2)

Gratz, Bennett, Messman-Moore, & DiLillo (2012)
## Results: Correlations with T2 Risky Behaviors

<table>
<thead>
<tr>
<th></th>
<th>T2 Drug problems</th>
<th>T2 DSH frequency</th>
<th>T2 Risky sexual behavior</th>
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<tr>
<td><strong>T1 BPD status</strong></td>
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*Note.* *p* ≤ .05. **p* ≤ .01.
## Results: T2 Deliberate Self-Harm Frequency

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<tr>
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<th>Adjusted R²</th>
<th>ΔR²</th>
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*Note.* *p ≤ .05. **p ≤ .01.
## Results: T2 Drug Use Problems

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<tr>
<th>Step 1</th>
<th>$\beta$</th>
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*Note.* *$p \leq .05$. **$p \leq .01$.**
### Results: T2 Overall Risky Sexual Behaviors

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<th>Step</th>
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<td>Emotion dysregulation</td>
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*Note.* *p ≤ .05. **p ≤ .01.*
Emotion Dysregulation and Deliberate Self-Harm
Deliberate Self-harm

Clinically-important behavior common among patients with BPD

- Occurs among 70-75% of patients with BPD
- Implicated in high levels of health care utilization

Emotion dysregulation is considered central to DSH

- Theorized to be the central underlying mechanism of DSH
- Associated with DSH in clinical and nonclinical samples
- DSH theorized to serve an emotion regulating function

Brown et al., 2002; Chapman, Gratz, et al., 2006; Gratz, 2007; Gratz et al., 2010, 2011, 2015, 2016; Gratz & Roemer, 2008; Gratz & Tull, 2010; Gunderson, 2001; Linehan, 1993; Heath et al., 2008; Kleindienst et al., 2008; Zanarini, 2009
Emotion-Regulating Function of DSH

Theory and research underscore the role of negative reinforcement in the form of emotional relief in the maintenance of DSH

- DSH conceptualized as an emotion regulation strategy (i.e., an attempt to avoid, escape, or regulate emotional distress)
- One of the most commonly reported reasons for engaging in DSH is to obtain relief from aversive/unwanted emotions

Yet, most studies rely on self-report measures of the perceived motives for and emotional consequences of DSH

- People may not be aware of the factors that maintain or motivate their behavior

Brown et al., 2002; Chapman & Dixon-Gordon, 2007; Gratz, 2007; Gratz & Roemer, 2008; Gratz & Tull, 2010; Heath et al., 2008; Kleindienst et al., 2008; Linehan, 1993; Rodham et al., 2004
Purpose of this Study

Extend extant research on the role of emotional relief in DSH by examining the strength of the association of DSH with emotional relief using a novel version of the Implicit Association Test (IAT)

- Assesses associations between DSH and relief at an implicit level
- Assesses learned emotional associations of DSH

Gratz et al. (2016), *Personality Disorders: Theory, Research, and Treatment*
Recruitment

Community sample of young adults

- 18 to 35 years of age
- Drawn from two sites in the United States and Canada

Recruited two groups: DSH (n=113) and non-DSH (n=135)

- DSH group: ≥10 lifetime episodes, ≥1 episode in past year
- Non-DSH group: No history of DSH
Self-report Measures

**Deliberate Self-Harm Inventory** (Gratz, 2001)
- Assesses lifetime history of DSH, including frequency, duration, and type of DSH, as well as time since last episode

**Questionnaire for Nonsuicidal Self-Injury** (Schmahl et al., 2008)
- Assesses perceived functions and motives of DSH

**Difficulties in Emotion Regulation Scale** (Gratz & Roemer, 2004)
- Assesses emotion dysregulation

**Acceptance and Action Questionnaire** (Hayes et al., 2004)
- Assesses experiential avoidance

**Personality Assessment Inventory – Borderline Scale** (Morey, 1991)
- Assesses BPD features
Implicit Association Test (IAT)

Computerized categorization task that indirectly assesses the relative strength of associations between concepts/constructs

- Requires respondents to sort stimulus items into target and attribute dimensions that share response options
- Reaction time used as a measure of the strength of the association between stimuli

This IAT required participants to sort stimuli into target categories of DSH and furniture and attribute categories of relief and disgust

- Assesses relative strength of association of DSH with relief vs. disgust

Gratz et al. (2016), *Personality Disorders: Theory, Research, and Treatment*
Implicit Association Test (IAT)

Includes two categories:

- Target categories: DSH vs. furniture images (6 each)
  - Self-harm images were personalized for participants (based on images identified as most representative of DSH)

- Attribute categories: Relief vs. Disgust words (6 each)
Seven trial blocks (consistent with Greenwald et al., 2003)

1) 24 trial attribute discrimination block (relief on left, disgust on right)
2) 24 trial target discrimination block (self-harm on left, furniture on right)
3) 24 trial “practice” congruent combination block (self-harm and relief on left, furniture and disgust on right)
4) 40 trial congruent combination block (same as #3)
5) 24 trial reversed attribute discrimination block (disgust on left, relief on right)
6) 24 trial “practice” incongruent combination block
7) 40 trial incongruent combination block (same as #6)
Blocks 3, 4, 6, and 7 used to calculate strength of association

1) 24 trial attribute discrimination block (*relief* on left, *disgust* on right)
2) 24 trial target discrimination block (*self-harm* on left, *furniture* on right)
3) 24 trial “practice” congruent combination block (*self-harm* and *relief* on left, *furniture* and *disgust* on right)
4) 40 trial congruent combination block (same as #3)
5) 24 trial reversed attribute discrimination block (*disgust* on left, *relief* on right)
6) 24 trial “practice” incongruent combination block
7) 40 trial incongruent combination block (same as #6)
Self-harm or I feel relief

Furniture or I feel disgust
Self-harm or I feel disgust

Furniture or I feel relief
DSH-relief IAT

IAT score (D score) calculated as a difference score between incongruent (DSH-disgust/furniture-relief) and congruent (DSH-relief/furniture-disgust) response times.

Higher D scores indicate lower response latencies for trials in which DSH images and relief words share a response key compared to trials where DSH and disgust share a response key.

Higher D scores indicate stronger association between DSH and relief (relative to disgust).
Group Differences in IAT D Scores

- DSH group exhibited stronger DSH-relief association than non-DSH group

- \( t = 4.13^{***} \)
- \( d = .53 \)
- \( ***p < .001 \)

Mean IAT D Scores

Non-DSH: -0.39 ± 0.32
DSH: -0.19 ± 0.43
Group Differences in IAT D Scores

DSH-relief association stronger for DSH participants with vs. without BPD

- DSH-No BPD: -0.24±0.38
- DSH-BPD: -0.07±0.49

$t = 1.99^*$
$d = .38$

*p < .05
Associations: All Participants

IAT D scores significantly correlated with:

- **Lifetime DSH frequency**: $r = .27, p < .001$
- **Lifetime DSH versatility**: $r = .31, p < .001$
- **BPD pathology on PAI-BOR**: $r = .26, p < .001$
- **Emotion dysregulation on DERS**: $r = .22, p < .01$
- **Experiential avoidance on AAQ**: $r = .15, p < .05$

IAT D scores prospectively predicted:

- **6-month DSH status (yes vs. no)**: $r = .27, p < .001$
- **6-month DSH frequency**: $r = .19, p < .01$
- **6-month DSH versatility**: $r = .25, p < .001$
IAT D scores significantly correlated with:

- Emotion relief motives for DSH, $r = .29, p < .01$
- Feeling generation motives for DSH, $r = .16, p < .10$
- Self punishment motives for DSH, $r = .21, p < .05$
- Lifetime DSH versatility, $r = .22, p < .05$
  - But not lifetime DSH frequency, $r = .10, p > .20$

IAT D scores were NOT significantly correlated with:

- Interpersonal motives for DSH, $r_s = -.03$ and $-.07, ps > .20$

IAT D scores marginally predicted:

- 6-month DSH versatility: $r = .18, p < .10$
- 6-month DSH status (present vs. absent): $r = .19, p < .10$
## Incremental Validity of IAT D Scores

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<th>DSH Frequency</th>
<th>DSH Versatility</th>
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<td><strong>Step 1</strong></td>
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<tr>
<td>Emotion relief motives</td>
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<td>Emotion relief motives</td>
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*p < .05
## Incremental Validity of IAT D Scores

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<td>0.19</td>
<td>1.93</td>
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*p < .05
Emotion Dysregulation and Suicidal Behavior
Role of Emotion Dysregulation in Suicidal Behavior

Relation of emotion dysregulation to suicidality is more complex

- Positively related to suicidal desire/ideation but negatively related to the capability for suicide/suicide attempts
- Indirectly related to suicide attempts through DSH (and other painful and provocative events) but not directly related
- DSH is positively related to capability for suicide and suicide attempts

Emotion dysregulation increases suicidal desire and may increase risk for suicide attempts only via its positive relation to DSH

Anestis et al., 2011; Anestis & Joiner, 2012; Anestis, Kleiman, Lavender, Tull, & Gratz, 2014; Anestis, Pennings, Lavender, Tull, & Gratz, 2013; Anestis, Tull, Lavender, & Gratz, 2014; Joiner et al., 2009; Klonsky et al., 2013; Tamas et al., 2007
Clinical Implications of Research on Emotion Dysregulation in BPD and DSH: Translating Research into Practice
Clinical Implications of Reviewed Research

Given evidence that:

- BPD is associated with emotion dysregulation
- Emotion dysregulation is associated with DSH
- DSH often functions to regulate or relieve emotions

Clinical utility of targeting emotion dysregulation to treat DSH within BPD

- If emotion dysregulation drives DSH, decreasing emotion dysregulation will decrease the need for DSH
Emotion Regulation Group Therapy for DSH in BPD

**Adjunctive 14-week group therapy for DSH among women with BPD**

- Designed to augment usual treatment in the community by directly targeting DSH and its proposed underlying mechanism
- Draws from DBT and ACT

**Targets each of the following dimensions of emotion dysregulation**

- Awareness, understanding, and acceptance of emotions
- Ability to control behaviors when experiencing negative emotions
- Flexible use of strategies to modulate the intensity/duration of emotional responses, rather than to eliminate emotions entirely
- Willingness to experience distress to pursue meaningful activities

Gratz, 2007; Gratz et al., 2015; Gratz & Gunderson, 2006; Gratz & Tull, 2011; Gratz & Roemer, 2004
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<td>Week 2</td>
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<td>Weeks 3-4</td>
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<td>Primary vs. secondary emotions</td>
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<td>Week 6</td>
<td>Clear vs. cloudy emotions</td>
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<td>Weeks 7-8</td>
<td>Emotional unwillingness vs. willingness</td>
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<td>Impulse control</td>
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<td>Weeks 11-12</td>
<td>Valued directions</td>
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<td>Weeks 13-14</td>
<td>Commitment to valued actions</td>
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Four trials support the utility of this ERGT in women with BPD

Initial RCT:
- Addition of ERGT to TAU had positive effects on DSH and emotion dysregulation (as well as BPD, depression, and anxiety)
- ERGT+TAU had significant changes over time on all measures

Open trial:
- Significant improvements from pre- to post-treatment in DSH and other self-destructive behaviors, emotion dysregulation, BPD, depression, anxiety, and social/vocational impairment

Gratz & Gunderson, 2006; Gratz & Tull, 2011
Mechanism of Change in ERGT

Examined mediating role of changes in emotion dysregulation in DSH improvement across two trials of ERGT

- Open Trial and Initial RCT

Path models examined if changes in emotion dysregulation mediated changes in DSH for Initial RCT and Open Trial treatment completers

- Use estimated latent intercept and slope factor scores
- Initial RCT controls serve as reference group
- Models estimated using maximum likelihood with robust standard errors in Mplus

Gratz, Levy, & Tull (2012), *Journal of Cognitive Psychotherapy*
Mechanism of Change in ERGT: Results

Results provide support for full mediation across both trials

- Standardized mediated effect for RCT: -0.45 ($SE = .21$), $p < .05$
- Standardized mediated effect for Open Trial: -0.31 ($SE = .15$), $p < .05$

Support emotion regulation as a mechanism of change in ERGT

- Changes in emotion dysregulation positively related to changes in DSH
- Indirect effect of ERGT on DSH improvement through changes in emotion dysregulation was significant

Gratz, Levy, & Tull (2012), *Journal of Cognitive Psychotherapy*
Larger-Scale RCT

- Extend findings of initial RCT
  - More socio-economically and ethnically diverse patients
  - Underserved setting (less intensive TAU)
  - Wider range of outcomes
    - Self-destructive behaviors beyond DSH
    - Adaptive functioning (interpersonal functioning, social/vocational impairment, quality of life)

Gratz, Tull, & Levy (2014), Psychological Medicine
Aims and Hypotheses

**Aims:** Examine the efficacy of this ERGT in a larger RCT and durability of treatment gains over a 9-month follow-up period

- Outpatients randomly assigned to receive this ERGT in addition to ongoing outpatient therapy (ERGT + TAU), or to continue with their current outpatient therapy alone for 14 weeks (TAU waitlist)

**Hypotheses:** Adding ERGT to usual outpatient therapy will have positive effects on DSH and self-destructive behaviors, emotion dysregulation/avoidance, psychiatric symptoms, adaptive functioning
Participant Screening

Inclusion criteria:

- Woman 18 to 60 years of age
- History of repeated DSH, including one episode in past 6 mos.
- Having individual therapist, psychiatrist, or case manager
- Threshold or subthreshold BPD (≥ 3 criteria for BPD on DIPD-IV)

Exclusion criteria:

- Primary psychotic disorder
- Bipolar I disorder
- Current (past month) substance dependence
## Demographics of Intent-to-Treat Sample (N = 61)

<table>
<thead>
<tr>
<th></th>
<th>ERGT+TAU (n=31)</th>
<th>TAU WL (n=30)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mean age:</strong></td>
<td>33 years</td>
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</tr>
<tr>
<td><strong>Race/ethnic minority:</strong></td>
<td>16.1%</td>
<td>26.7%</td>
</tr>
<tr>
<td><strong>Marital status:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td>51.7%</td>
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<tr>
<td>Married</td>
<td>25.8%</td>
<td>13.3%</td>
</tr>
<tr>
<td>Separated/divorced</td>
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<tr>
<td><strong>Education:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than high school</td>
<td>6.5%</td>
<td>6.7%</td>
</tr>
<tr>
<td>High school graduate</td>
<td>54.8%</td>
<td>73.3%</td>
</tr>
<tr>
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<tr>
<td><strong>Income:</strong></td>
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<tr>
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### Clinical Characteristics of Intent-to-Treat Sample (N=61)

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<tr>
<th></th>
<th>ERGT+TAU</th>
<th>TAU WL</th>
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<tbody>
<tr>
<td>Meets criteria for BPD:</td>
<td>90.3%</td>
<td>86.7%</td>
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<tr>
<td>Suicide attempt in lifetime:</td>
<td>58.1%</td>
<td>66.7%</td>
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<tr>
<td>Suicide attempt in past year:</td>
<td>16.1%</td>
<td>20.0%</td>
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<tr>
<td>DSH frequency past 3 months:</td>
<td>35.5 (SD=68.4)</td>
<td>28.4 (SD=39.4)</td>
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<tr>
<td>Past-yr inpatient hospitalization:</td>
<td>12.9%</td>
<td>26.7%</td>
</tr>
<tr>
<td>Total hrs/wk of ongoing therapy:</td>
<td>1.2 (SD=1.4)</td>
<td>2.5 (SD=2.6)</td>
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<td>Hrs/wk of individual therapy</td>
<td>0.7 (SD=0.4)</td>
<td>1.0 (SD=0.8)</td>
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<tr>
<td>Hrs/wk of group therapy</td>
<td>0.4 (SD=1.3)</td>
<td>0.6 (SD=1.8)</td>
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<tr>
<td>GAF score:</td>
<td>43.4 (SD=24.6)</td>
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</tr>
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<td></td>
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<tr>
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<td>42.9%</td>
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<td></td>
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<tr>
<td>Cluster A PD</td>
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Outcome Measures

**Deliberate Self-harm and Other Self-destructive Behaviors**

- Deliberate Self-Harm Inventory *(Gratz, 2001)*
  - Frequency of DSH over specified time periods

- Self-harm Inventory *(Sansone et al., 1998)*
  - Past-month frequency of self-destructive behaviors (e.g., drug and alcohol abuse, risky sex, disordered eating, suicidal behavior)

**Emotion Dysregulation/Avoidance**

- Difficulties in Emotion Regulation Scale *(Gratz & Roemer, 2004)*
  - Level of emotion dysregulation across 6 dimensions

- Acceptance and Action Questionnaire *(Hayes et al., 2004)*
  - Tendency to avoid unwanted internal experiences (e.g., emotions)
**Outcome Measures**

**Psychiatric Symptoms**

- Zanarini Rating Scale for Borderline Personality Disorder (Zanarini, 2003)
  - Clinician-administered instrument assessing change in BPD symptoms over time

- Borderline Evaluation of Severity over Time (Pfohl et al., 2009)
  - Past-month BPD symptom severity

- Beck Depression Inventory–II (Beck et al., 1996)
  - Current depression symptom severity

- Depression Anxiety Stress Scales (Lovibond & Lovibond, 1995)
  - Depression, anxiety, and stress symptom severity
Outcome Measures

**Adaptive Functioning**

BPD composite of Inventory of Interpersonal Problems (Lejuez et al., 2003)
  - Interpersonal problems relevant to BPD

Sheehan Disability Scale (Sheehan, 1983)
  - Social and vocational impairment due to psychological symptoms

Quality of Life Inventory (Frisch et al., 1992)
  - Life satisfaction in areas important to the individual

[All outcome measures administered pre- and post-treatment or –waitlist, and 3- and 9-months post-treatment]
Overall treatment dropout rate: 23.5%

No significant between-group differences on any demographic, clinical, or diagnostic variable, with the exception of hours/week of TAU

- Significantly higher among TAU WL vs. ERGT+TAU participants
  \[t = 2.34, \ p < .05\]

When including the 1.5 hours of treatment time associated with ERGT, no significant differences in overall therapy hours/week \[(t = .43, \ p > .10)\]

- ERGT + TAU = 2.7 hours
- TAU WL = 2.5 hours
Latent growth models for TX effects

- Linear growth structure modeled from pre- to post- values
- Condition status modeled as influencing latent intercept and slope
- Bayesian approach to growth modeling
- Models fit using Markov chain Monte Carlo routines in Mplus
- Multiple imputation strategy for missing data allows use of intent-to-treat sample
Results of RCT Analyses (N = 61)

Significant effects of ERGT (with medium to large effect sizes) on:

- DSH and other self-destructive behaviors
- Emotion dysregulation
- BPD symptoms on the ZAN-BPD
- Depression and stress symptoms on the DASS
- Quality of life

Effects on experiential avoidance and interpersonal functioning approached significance (ps < .10) and were medium-sized
RCT Analyses: Deliberate Self-Harm

Effect of Condition on Slope

95% CI = -0.70 – -0.15*

Effect size = -0.64

*p < .05
RCT Analyses: Self-Destructive Behaviors

Effect of Condition on Slope

95% CI = -53.01 – -14.97*

Effect size = -0.77

*p < .05
RCT Analyses: Emotion Dysregulation

Effect of Condition on 
Slope

95% CI = -23.18 – -2.91*

Effect size = -0.55

*p < .05
RCT Analyses: BPD Symptom Severity

Effect of Condition on Slope

95% CI = -11.80 – -6.12*

Effect size = -1.20

*p < .05
RCT Analyses: Depression Symptom Severity

Effect of Condition on Slope

95% CI = -11.40 – -0.26*

Effect size = -0.51

*p < .05
RCT Analyses: Stress Symptom Severity

Effect of Condition on Slope

95% CI = -11.27 – -2.52*

Effect size = -0.60

*p < .05
RCT Analyses: Quality of Life

Effect of Condition on Slope

95% CI = 0.14 – 2.10*

Effect size = 0.52

*p < .05
RCT Analyses: Experiential Avoidance

Effect of Condition on Slope

95% CI = -9.11 – 0.08

Effect size = -0.71

(= medium to large effect)

\[ \text{**}p < .10 \text{**} \]
RCT Analyses: BPD-Relevant Interpersonal Problems

Effect of Condition on Slope

95% CI = -0.71 – 0.01†

Effect size = -0.48 (medium effect)

†p < .10
RCT Analyses: BPD Symptom Severity

Effect of Condition on Slope

95% CI = -8.26 – 0.96

Effect size = -0.34
RCT Analyses: Depression Symptom Severity

Effect of Condition on Slope

95% CI = -7.36 – 2.33

Effect size = -0.19
RCT Analyses: Anxiety Symptom Severity

Effect of Condition on Slope

95% CI = -10.13 – 1.14

Effect size = -0.38
RCT Analyses: Social and Vocational Impairment

Effect of Condition on Slope

95% CI = -6.70–3.22

Effect size = -0.16
Analyses of Maintenance of Treatment Gains

Piecewise linear growth models used to model changes in outcomes across treatment and follow-up periods for all participants who began ERGT (n=51)

- Bayesian approach to growth modeling
- Due to unequal intervals between assessments, DSH frequencies scaled to be the frequency of DSH per 14 weeks
- Models capture linear change during treatment ($Slope_1$) and from post-treatment to 9-month follow-up ($Slope_2$)
Results: Maintenance of Treatment Gains (n = 51)

Across all participants who began ERGT, significant improvements from pre- to post-treatment on all outcome measures

All gains maintained or further improved upon at 9-month follow-up

- Additional significant improvements from post-treatment to 9-month follow-up for
  - DSH
  - Emotion dysregulation
  - Experiential avoidance
  - BPD symptoms on the BEST
  - Quality of life

- No significant changes from post-treatment through 9-month follow-up on any other measure
Results: Deliberate Self-Harm

Slope$_1$
95% CI = -0.05 – -0.02*
Effect size = -0.68

Slope$_2$
95% CI = -0.02 – -0.01*
Effect size = -1.36

*p < .05
Results: Deliberate Self-Harm (Observed Means)
Results: Emotion Dysregulation

**Slope_1**
- 95% CI = -1.40 – -0.67*
- Effect size = -0.67

**Slope_2**
- 95% CI = -0.46 – -0.08*
- Effect size = -1.15

*p < .05
Results: Experiential Avoidance

\[ \text{Slope}_1 \]
\[ 95\% \ CI = -0.47 \text{ – } -0.18^* \]
Effect size = -0.59

\[ \text{Slope}_2 \]
\[ 95\% \ CI = -0.14 \text{ – } -0.01^* \]
Effect size = -0.98

\*{\( p < .05 \)}
Results: BPD Symptom Severity

**Slope\textsubscript{1}**
95% CI = -0.56 – -0.21*
Effect size = -0.51

**Slope\textsubscript{2}**
95% CI = -0.22 – -0.03*
Effect size = -0.96

*p < .05
Results: Quality of Life

$Slope_1$
95% CI = 0.04 – 0.12*
Effect size = 0.44

$Slope_2$
95% CI = 0.00 – 0.04*
Effect size = 0.72

*p < .05
Results: Self-Destructive Behaviors

**Slope_1**
95% CI = -2.63 – -0.45*
Effect size = -0.34

**Slope_2**
95% CI = -0.21 – 0.28
Effect size = -0.31

\*p < .05
Results: BPD Symptom Severity

\[ \text{Slope}_1 \]
\[ 95\% \ CI = -0.66 - 0.40^* \]
Effect size = -0.99

\[ \text{Slope}_2 \]
\[ 95\% \ CI = -0.05 - 0.02 \]
Effect size = -1.08

\[ ^*p < .05 \]
Results: Depression Symptom Severity

**Slope**<sub>1</sub>
95% CI = -0.73 – -0.33*
Effect size = -0.58

**Slope**<sub>2</sub>
95% CI = -0.17 – 0.03
Effect size = -0.78

*<span>p < .05</span>
Results: Depression Symptom Severity

\( \text{Slope}_1 \)
95% CI = -0.68 – -0.33*
Effect size = -0.53

\( \text{Slope}_2 \)
95% CI = -0.11 – 0.06
Effect size = -0.61

\*p < .05
Results: Anxiety Symptom Severity

\[ \text{Slope}_1 \]
95% CI = -0.43 – -0.11*
Effect size = -0.29

\[ \text{Slope}_2 \]
95% CI = -0.11 – 0.05
Effect size = -0.38

*p < .05
Results: Stress Symptom Severity

Slope_1
95% CI = -0.58 – -0.27*
Effect size = -0.52

Slope_2
95% CI = -0.11 – 0.06
Effect size = -0.61

*p < .05
Results: BPD-Relevant Interpersonal Problems

\[ \text{Slope}_1 \]
95% CI = -0.04 – -0.01*
Effect size = -0.46

\[ \text{Slope}_2 \]
95% CI = -0.01 – 0.00
Effect size = -0.83

*\( p < .05 \)
Results: Social and Vocational Impairment

$\textit{Slope}_1$
95% CI = -0.42 – -0.06*
Effect size = -0.41

$\textit{Slope}_2$
95% CI = -0.13 – 0.04
Effect size = -0.62

*p < .05
Clinical Significance of Improvements in Completers

Examined across all treatment completers (n = 39)

**Criteria:** Participants must report a reliable improvement in symptoms and reach normative levels of functioning

Gratz, Tull, & Levy (2014), *Psychological Medicine*
<table>
<thead>
<tr>
<th>Outcome</th>
<th>Post-treatment</th>
<th>9-month Follow-up</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>% Reliable</td>
<td>% Normal Function</td>
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<tr>
<td><strong>Primary Outcome</strong></td>
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<tr>
<td>DSH</td>
<td>61.5</td>
<td>51.3</td>
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<td><strong>Proposed Mediators</strong></td>
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<tr>
<td>Emotion Dysregulation</td>
<td>33.3</td>
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<td><strong>Psychiatric Symptoms</strong></td>
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<tr>
<td>ZANBPD (BPD)</td>
<td>51.3</td>
<td>87.2</td>
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<tr>
<td>BDI-II Depression</td>
<td>28.2</td>
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<td><strong>Adaptive Functioning</strong></td>
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<td>Interpersonal function.</td>
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<td>35.9</td>
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<tr>
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<td>38.5</td>
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Examined change in emotion dysregulation as a mediator of the effects of ERGT on DSH and BPD symptoms in recent RCT

Results provide further support for emotion regulation as mechanism of change in ERGT

- Improvements in emotion dysregulation over the course of treatment:
  - Mediated reductions in BPD cognitive and affective symptoms during treatment
    - Significant indirect effects (a*b) of treatment on ΔBPD symptoms through ΔDERS (-.32 and -.21; CIs do not contain 0)
  - Predicted further improvements in DSH during follow-up

Gratz et al. (2015), *Behaviour Research and Therapy*
Predictors of Change in DSH During Follow-Up

ΔDERS (pre- to post-treatment)

ΔZAN-BPD-Cognitive (pre- to post-treatment)

ΔZAN-BPD-Affect (pre- to post-treatment)

ΔDSHI (pre- to post-treatment)

ΔDSHI (post-treatment to 9-month follow-up)
Predictors of Change in DSH During Follow-Up

- ΔDERS (pre- to post-treatment)
- ΔZAN-BPD-Cognitive (pre- to post-treatment)
- ΔZAN-BPD-Affect (pre- to post-treatment)
- ΔDSHI (pre- to post-treatment)

ΔDSHI (post-treatment to 9-month follow-up)

*p < .05

Correlations:
- ΔDERS: .32*
- ΔZAN-BPD-Cognitive: .10
- ΔZAN-BPD-Affect: .23
- ΔDSHI: -.11
Serial Mediation Model: Change in DSH Over Treatment

- ΔEmotion Dysreg
- ΔBPD Affective symptoms
- ΔBPD Cognitive symptoms
- ΔDSH

Condition

- ΔEmotion Dysreg
- ΔBPD Affective symptoms
- ΔBPD Cognitive symptoms
- ΔDSH

*p < .05, **p < .01, ***p < .001
Serial Mediation Model: Change in DSH Over Treatment

Significant indirect paths
Condition → ΔDERS → ΔBPD-Cognitive → ΔDSHI (b = -.12, SE=.07, CI= -.30,-.04)
Condition → ΔBPD-Cognitive → ΔDSHI (b = -.24, SE=.13, CI = -.57, -.08)
Conclusions

Findings support efficacy of this adjunctive ERGT for DSH in BPD

- Significant treatment effects on DSH and self-destructive behaviors, emotion dysregulation, BPD, depression, and stress, and quality of life

Findings support the durability of treatment gains

- All treatment gains maintained or improved upon at 9-month follow-up
- Continued improvements after treatment in main outcomes of interest

Suggests utility of adding this brief group to TAU in the community

- Does not require match to specific form of individual therapy
- Type and intensity of TAU did not influence treatment response
- Was the primary treatment for 43% of participants in this trial
Limitations/Future Directions

More rigorous examination of emotion regulation as mechanism of change is needed

- Mediators should be assessed often with tight intervals (Kraemer et al., 2002)

All studies conducted in the PI’s lab

- No evidence of transportability of treatment outside PI’s lab or efficacy trials
- Whether treatment can be disseminated to community clinicians remains unclear
Solution? Move outside the United States

Swedish National Self-harm Project (Nationella Självskadeprojektet)

- 2011 initiation of National Self-harm Project in Sweden
- Government initiative to reduce self-harm in Sweden
  - Government sponsored
  - Government funded

ERGT identified as efficacious and feasible treatment for DSH

- RCT results presented at the first annual conference
- Collaboration meetings to translate the manual into Swedish
Swedish Open Trial of ERGT

Requirement for included therapists and clinics:
- Regulated profession with experience in
  - CBT/DBT/ACT
  - BPD
  - DSH
- Influx of patients with BPD and DSH
- Geographical distribution (nationwide)

Sahlin, Bjureberg, Gratz, et al. (2017)
Swedish Open Trial of ERGT

**Therapist/Clinics included:**
- 14 adult outpatient clinics; 28 therapists
  - 3-day training in ERGT
  - Video-recorded sessions
  - Weekly supervision by Swedish collaborators

Sahlin, Bjureberg, Gratz, et al. (2017)
Swedish Open Trial of ERGT

**Participant inclusion criteria:**
- Mainly same inclusion criteria as previous ERGT studies
  - Women aged 18-65
  - ≥ 3 criteria for BPD
  - ≥ 3 self-harm episodes past 6 months
  - Ongoing TAU
- Within-subjects design with baseline, pre-, post, and 6-month follow-up
- Weekly web-based self report measures
  - DSH frequency: *Deliberate Self-Harm Inventory Short Form*
  - Emotion dysregulation: *Short version of Difficulties in Emotion Regulation Scale*

Sahlin, Bjureberg, Gratz, et al. (2017)
Swedish Open Trial of ERGT

Participant Demographic and Clinical Characteristics (N = 96)

- Mean age = 25.4 (SD = 6.6)
- Marital/family status
  - 11.4% married
  - 16.7% have children
- Occupation
  - 37% on sick-leave (83% full-time sick-leave)
  - 40% students
- 82.3% had previous treatment
- Comorbidity
  - 69% BPD
  - 69.4% anxiety disorder
  - 54.6% depression

Sahlin, Bjureberg, Gratz, et al. (2017)
**Swedish Open Trial of ERGT: Results**

**Overall treatment dropout rate: 22%**

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Cohen’s d Pre-Post</th>
<th>Cohen’s d Post-6 mo FU</th>
</tr>
</thead>
<tbody>
<tr>
<td>DSH frequency</td>
<td>0.49***</td>
<td>0.39***</td>
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<tr>
<td>Emotion dysregulation (DERS)</td>
<td>0.70***</td>
<td>0.07</td>
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<td>Depression symptoms (DASS)</td>
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<tr>
<td>Stress symptoms (DASS)</td>
<td>0.28*</td>
<td>0.14</td>
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<tr>
<td>Anxiety symptoms (DASS)</td>
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<tr>
<td>BPD-relevant interpersonal difficulties (IIP)</td>
<td>0.11</td>
<td>0.18*</td>
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<tr>
<td>Social and vocational impairment (SDS)</td>
<td>-0.01</td>
<td>0.26*</td>
</tr>
</tbody>
</table>

*p < .05, **p < .01, ***p < .001*
Swedish ERGT Study: Results

Deliberate Self-harm

Frequency

InterQuartileRange

PRE: (9-63)
POST: (2.1-45)
FU6: (0-13)
Examined mediating role of change in ER in self-harm improvement

- Mediation analysis examined indirect effect of treatment on reductions in self-harm through change in emotion dysregulation

Further support for emotion regulation as mechanism of change in ERGT

- Indirect effect was significant (-0.041, 95% CI [-0.059, -0.025])
- 61.5% of the total effect of time in ERGT on reductions in self-harm frequency was mediated by change in emotion dysregulation
Reverse causal effect rejected

Test if…

- Emotion dysregulation (mediator) measured at any week, predicted subsequent change in DSH (outcome) in the following week

…while

- DSH (outcome) measured at any week, did not predict subsequent change in emotion dysregulation (mediator) in the following week
Conclusions

ERGT can be a feasible and effective treatment for DSH and emotion dysregulation

- Easily disseminated
  - Community clinicians
  - Brief training
  - No ongoing supervision by treatment developers
Next Steps

Examine the utility of ERGT in Swedish adolescents

- Just published open trial of ERGT-based individual therapy for adolescents (ERITA)
- Just completed open trial of a web-based version of ERITA
- About to begin RCT of the web-based version of ERITA

Examine the efficacy of ERGT for adolescents in New Zealand

- International collaborator on independent efficacy trial of ERGT
Collaborators

United States and Canada:
- Michael Anestis, Ph.D., University of Southern Mississippi
- Alexander Chapman, Ph.D., Simon Fraser University
- Katie Dixon-Gordon, Ph.D., University of Massachusetts Amherst
- John Gunderson, M.D., McLean Hospital/Harvard Medical School
- Carl Lejuez, Ph.D., University of Maryland
- Roy Levy, PhD, Arizona State University
- Lizabeth Roemer, Ph.D., University of Massachusetts Boston
- Matthew T. Tull, PhD, University of Toledo

Sweden:
- Hanna Sahlin, MSc, Karolinska Institutet
- Johan Bjureberg, MSc, Karolinska Institutet
- Brjánn Ljótsson, PhD, Karolinska Institutet
- Erik Hedman, PhD, Karolinska Institutet
- Clara Hellner Gumpert, MD, Karolinska Institutet
- Lars-Gunnar Lundh, PhD, Lund University
Funding

- National Institute of Mental Health R34 MH079248 (PI: Gratz)
- Swedish National Self-harm Project (Nationella Självskadeprojektet)
- Stockholm County Council Regional Research Grant #SLL20140428
- Psychosocial Foundation Research Endowment Support Grant, McLean Hospital/Harvard Medical School (PI: Gratz)
- Canadian Institutes of Health Research Operating Grant 222112 (PIs: Chapman & Gratz)
- Canadian Institutes of Health Research Operating Grant 343892 (PIs: Chapman & Gratz)
Comments and Questions