How exactly do IPT and CT work? Research into the underlying mechanisms of change

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The Great Debate on specific and non-specific (common) factors

Different forms of psychotherapy suggests that each form works in a specific way

However: the dodo bird verdict (1936) from Alice in Wonderland “All have won and must have prizes”

Persistent finding that most forms of psychotherapy produce similar results (Luborsky et al. 1975; Cuijpers et al. 2008, 2013)

What does that say about working mechanisms of psychotherapy?
Working mechanisms in Cognitive Therapy (Beck, 1964)

- situation
- automatic thoughts
  - physiology
  - emotion (mood)
  - behaviour
- underlying assumptions and core beliefs
- coping strategies
- early (adverse) life events
Working mechanisms in Interpersonal Psychotherapy

a) enhancing social support  
b) reducing interpersonal stress  
c) processing of emotions  
d) improving interpersonal skills
Conclusion (from reviewing a bunch of studies I don’t show)

After 40 years of research into psychotherapy for depression, we know surprisingly little about how it actually works, let alone how other psychotherapies such as interpersonal psychotherapy work.

Research into mechanisms and mediators of change often falls short by the lack of an appropriate methodological framework.
Methodology: how can we do a better job?

Most importantly:

**Repeated measurements of mediators and outcomes**, for example in every therapy session, so that a time line can be established and **temporal relations** can be investigated.

*temporal relations*: mutual or even reciprocal relations in time, what is preceding what?
Methodology: how can we do a better job?

But also:

- Studying more mediators at once: how are they associated, what is their contribution, how do they interact?
- More experimental studies in which putative mediators are manipulated, the royal route to knowledge on causality
- State-of-the art statistical techniques (mixed models and growth curve analysis)
Stepd study (Maastricht University 2007-2014)

Treatment study (RCT)

- 182 depressed patients receiving psychotherapy (CT or IPT) at Academic Mental Health Center Maastricht

Main research questions:
- Effectiveness CT/IPT for depression in acute phase?
- CT vs. IPT in the long term (relapse prevention)?
- Which mechanisms account for effects?
Clinical effectiveness of cognitive therapy v. interpersonal psychotherapy for depression: results of a randomized controlled trial

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How effective are CT and IPT?
Long-term effects: relapse after initial response

Figure 1. Cumulative proportion of treatment responders \(n = 85\) surviving without relapse on the BDI-II over the course of follow-up. Results stratified per condition. Note: \textit{time in months} starts the month after baseline.
Main outcome and process measures

<table>
<thead>
<tr>
<th>Test</th>
<th>Description</th>
<th>Domain</th>
</tr>
</thead>
<tbody>
<tr>
<td>BDI-II</td>
<td>Beck Depression Inventory II</td>
<td>Depression</td>
</tr>
<tr>
<td>DAS17</td>
<td>Dysfunctional Attitude Scale</td>
<td>Cognitions</td>
</tr>
<tr>
<td>ASQ</td>
<td>Attributional Style Questionnaire</td>
<td>Underlying Attitudes</td>
</tr>
<tr>
<td>Sc-IAT</td>
<td>Single-category Implicit Association Test</td>
<td>Schemas</td>
</tr>
<tr>
<td>LEIDS</td>
<td>Leiden Index of Depression Sensitivity</td>
<td>Cognitive Reactivity</td>
</tr>
<tr>
<td>RRS</td>
<td>Ruminative Response Scale</td>
<td>Rumination</td>
</tr>
<tr>
<td>IIP</td>
<td>Inventory of Interpersonal Problems</td>
<td>Interpersonal Problems</td>
</tr>
<tr>
<td>SLSC</td>
<td>Self-liking and Self-competence Scale</td>
<td>Self-esteem</td>
</tr>
<tr>
<td>WSAS</td>
<td>Work and Social Adjustment Scale</td>
<td>Work and Social Functioning</td>
</tr>
<tr>
<td>BHS</td>
<td>Beck Hopelessness Scale</td>
<td>Hopelessness</td>
</tr>
<tr>
<td>WAI</td>
<td>Working Alliance Inventory</td>
<td>Therapeutic alliance</td>
</tr>
</tbody>
</table>
Changes in Process and Outcome measures in the treatment phase (n = 151)

- Explicit Self-Esteem (SLSC)
- Attributional Style (ASQ)
- Therapeutic Alliance (WAI-O)*
- Implicit Self-Esteem (Sc-IAT)*
- Dysfunctional Attitudes (DAS17)
- Interpersonal Problems (IIP)
- Cognitive Reactivity (LEIDS)
- Hopelessness (BHS)
- Rumination (RRS)
- Impairment in Everyday Functioning (WSAS)
- Depression Severity (BDI-II)

* = change is n.s.
Figure 1. Theorized and Estimated models of direct and indirect effects of psychotherapy on depression severity through five potential mediators. Note: CT = Theorized Mechanism for Cognitive Therapy; IPT = Theorized Mechanism for Interpersonal Psychotherapy; CF = Common Factor.
Figure 2. Latent Difference Score (LDS) model to examine the various relations between treatment, process measure (in this example cognition assessed with DAS-A17), and outcome BDI-II in the acute phase of treatment (0-3-7 months). Note: The 1’s in the model are the necessary restrictions to obtain the latent difference scores (MacKinnon, 2008, p 215).
Sudden Gains and Outcome

BDI-II score

Time in months

- Sudden Gains (CT)
- Sudden Gains (IPT)
- No Sudden Gains (CT)
- No Sudden Gains (IPT)
The Personalized Advantage Index: Translating Research on Prediction into Individualized Treatment Recommendations. A Demonstration

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RESEARCH ARTICLE

Predicting Optimal Outcomes in Cognitive Therapy or Interpersonal Psychotherapy for Depressed Individuals Using the Personalized Advantage Index Approach

Marcus J. H. Huibers¹,²*, Zachary D. Cohen², Lotte H. J. M. Lemmens³, Arnoud Arntz⁴, Frenk P. M. L. Peeters⁵, Pim Cuijpers¹, Robert J. DeRubeis¹,²

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Selection of moderators (prescriptive indices)

<table>
<thead>
<tr>
<th>Predictors</th>
<th>β</th>
<th>t-statistic</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moderators</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BSI Somatic Complaints x Treatment</td>
<td>0.08</td>
<td>1.27</td>
<td>0.21</td>
</tr>
<tr>
<td>BSI Cognitive Problems x Treatment</td>
<td>-0.28</td>
<td>-3.86</td>
<td>0.00</td>
</tr>
<tr>
<td>BSI Paranoid Symptoms x Treatment</td>
<td>0.17</td>
<td>2.20</td>
<td>0.03</td>
</tr>
<tr>
<td>IIP Self-sacrificing x Treatment</td>
<td>0.10</td>
<td>1.94</td>
<td>0.05</td>
</tr>
<tr>
<td>ASQ Achievement x Treatment</td>
<td>0.40</td>
<td>1.88</td>
<td>0.06</td>
</tr>
<tr>
<td>Number of life events in past year x Treatment</td>
<td>0.43</td>
<td>2.21</td>
<td>0.03</td>
</tr>
</tbody>
</table>

doi:10.1371/journal.pone.0140771.t002
BUILDING A PREDICTION ALGORITHM FOR TREATMENT SELECTION

- The model:
  \[ BDI = k + Tx \text{ (CT or IPT)} + \text{prognostic (main)} + \text{prescriptive (Tx * main)} \]

- Predictive model with data from the other 133 patients, to predict the 134th patient.
- “Leave-one-out” is run 134 times (once for each patient).
- After model construction, “left out” patient’s values plugged in:
  - Once with the patient’s factual treatment value (CT = -0.5)
  - Again, for the same patient, plugging in the other (counterfactual) treatment value (IPT = 0.5)

  \[ PAI = \text{difference factual and counterfactual predicted end BDI} \]
# Observed end-BDI Scores

<table>
<thead>
<tr>
<th>CT-Optimal</th>
<th>IPT-Optimal</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Assigned to CT (Optimal) [n=29]</strong></td>
<td><strong>Assigned to CT (Non-Optimal) [n=40]</strong></td>
</tr>
<tr>
<td><strong>9.8 (10.6)</strong></td>
<td><strong>16.5 (10.1)</strong></td>
</tr>
<tr>
<td><strong>Assigned to IPT (Non-Optimal) [n=35]</strong></td>
<td><strong>11.7 (11.4)</strong></td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>Model</th>
<th>Optimal</th>
<th>Non-optimal</th>
<th>Cohen’s D</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BASIC</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Demographics, DAS, IIP</td>
<td>12.9</td>
<td>16.6</td>
<td><strong>0.31</strong></td>
</tr>
<tr>
<td></td>
<td>(11.4)</td>
<td>(12.7)</td>
<td>p = 0.07</td>
</tr>
<tr>
<td><strong>FULL</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>all predictors retained at $p &lt; 0.05$</td>
<td>11.8</td>
<td>17.8</td>
<td><strong>0.51</strong></td>
</tr>
<tr>
<td></td>
<td>(11.5)</td>
<td>(12.1)</td>
<td>p = 0.003</td>
</tr>
<tr>
<td><strong>FULL</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>all predictors retained at $p &lt; 0.10$</td>
<td>10.7</td>
<td>18.0</td>
<td><strong>0.62</strong></td>
</tr>
<tr>
<td></td>
<td>(11.0)</td>
<td>(12.1)</td>
<td>p &lt; 0.001</td>
</tr>
<tr>
<td><strong>FULL (PAI &gt; 5)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>all predictors retained at $p &lt; 0.10$</td>
<td>12.7</td>
<td>20.0</td>
<td><strong>0.59</strong></td>
</tr>
<tr>
<td></td>
<td>(12.1)</td>
<td>(12.6)</td>
<td>p = 0.009</td>
</tr>
</tbody>
</table>
Review

How much psychotherapy is needed to treat depression? A metaregression analysis

Pim Cuijpers\textsuperscript{a,b,c,*}, Marcus Huibers\textsuperscript{a,b}, David Daniel Ebert\textsuperscript{c,d}, Sander L. Koole\textsuperscript{a,b}, Gerhard Andersson\textsuperscript{e,f}

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\textsuperscript{d} Department of Clinical Psychology, Philipps-University Marburg, Germany
\textsuperscript{e} Department of Behavioral Sciences and Learning, Swedish Institute for Disability Research, Linköping University, Sweden
\textsuperscript{f} Department of Clinical Neuroscience, Psychiatry Section, Karolinska Institutet, Stockholm, Sweden
Frequency and change mechanisms of psychotherapy among depressed patients: study protocol for a multicenter randomized trial comparing twice-weekly versus once-weekly sessions of CBT and IPT

Sanne J. E. Bruijniks¹, Judith Bosmans², Frenk P. M. L. Peeters³, Steven D. Hollon⁴, Patricia van Oppen⁵, Michael van den Boogaard⁶, Pieter Dingemanse⁷, Pim Cuijpers¹, Arnoud Amtz⁸, Gerdien Franx⁹ and Marcus J. H. Huibers¹
Figure 1 Hypothesized pathways of change in psychotherapy for depression
Take Home Message

We know surprisingly little about how IPT, CT or other forms of psychotherapy actually works

Research into mechanisms is highly complex, and an appropriate methodological framework is missing

Insight into the working mechanisms of psychotherapy is desperately needed to increase the effectiveness of psychotherapy and advance the field (personalized medicine)

Evidence-based explanation (Kazdin 2009)