RESEARCH ARTICLE

Understanding Pamina’s recovery: An application of the hermeneutic single-case efficacy design

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Abstract
This article reports an effectiveness case study of the individual systemic therapy of a 22-year-old Portuguese woman with a diagnosis of paranoid personality disorder, conducted in a university-based clinic in Lisbon, Portugal. Data were analysed using the hermeneutic single-case efficacy design, a non-experimental interpretive approach that aims to determine whether change occurred, whether change was due to therapeutic strategies, and what in therapy caused the change. Results indicate that the treatment was effective and that de-pathologising Pamina’s condition and genogram-based exploration techniques played a crucial role in her recovery.

Keywords: Hermeneutics, individual systemic therapy, qualitative change process research, naturalistic research, single case design

Can we therapists research our own practice? Psychotherapy research is changing. Over the last 50 years, experimental methodology has dominated as the ‘gold standard’ approach for the scientific establishment of psychotherapy efficacy and effectiveness. However, with this methodology, which requires rigorous control of variables, protocolised treatments, and strict inclusion criteria for participation in analogue studies or clinical trials, psychotherapy research became separated from ‘real therapy’: therapy as performed by clinicians in routine practice was rarely studied. The complexity of experimental research protocols and the lack of methods for rigorous non-experimental studies hinder therapists’ active involvement in the production of science (Pinsof & Wynne, 2000; Sales, submitted). In this paper we present an effectiveness study, using a qualitative single-case design that has been developed as a non-experimental alternative for establishing treatment efficacy and effectiveness research: the hermeneutic single-case efficacy design (HSCED; Elliott, 2002).

The hermeneutic single-case efficacy design
The HSCED is an interpretive approach to evaluating treatment in naturalistic clinical contexts. It uses a mixture of quantitative and qualitative methods to create a network of evidence that first identifies causal links between therapy process and outcome, and then evaluates plausible non-therapy explanations for the apparent change. From a theoretical point of view, HSCED follows a change paradigm (Greenberg & Pinsof, 1986), using individualised change measures, identification of significant events in therapy, and the establishment of systematic connections between events occurring in sessions and the outcomes reached by the client. Ultimately HSCED allows a rigorous analysis of sessions based on client and therapist experiences.

An HSCED analysis proceeds as follows. First, a rich case record is compiled, containing comprehensive information on the therapy process and outcome, using multiple sources and types of data. This case record should contain evidence both in favour of and against the influence of therapy in the observed changes. Second, an analysis is undertaken to determine whether the client changed during therapy – an analysis that integrates quantitative and qualitative information. Third, after determining the existence of change, the next step is to examine whether the change is due to therapy, by compiling a systematic list of evidence that supports the influence of therapy and a systematic list of evidence that indicates the influence of non-therapeutic events in the observed changes. This critical balancing of the effects of therapy and alternative causes of change suggests the degree of therapeutic influence, and provides
such comprehensive analysis. The rationale for analysing Pamina’s case

Our goal was to apply the HSCED to help deepen our understanding of a case conducted in our service. The case was unusual in that the client refused to bring her family to the sessions. Although we always work with the nuclear family, we decided to proceed with individual systemic therapy. Such a shift from the family group to the individual format had previously been discussed in our team: could we conduct systemic therapy with an individual? To what extent would systemic principles for working with families be applicable to and effective for an individual?

Our practice is guided by three major principles.

Using a systemic diagnosis

We base each treatment plan on a systemic diagnosis, having identified all the systems that are, or may be, involved in the maintenance or resolution of the presenting problem at different levels: the individual, the family, the professional system, and the social network. Even if presenting with similar symptoms, each case has a unique systemic configuration, and thus each requires a different psychotherapeutic intervention. Following an integrative approach (Pinsof, 1995), we tailor treatments to individual cases, challenging the conventional approach of matching treatments to disorders.

Amplifying strengths and resources

In line with solution-based brief therapy (Miller, Hubble, & Duncan, 1996), we focus on the exploration of functional areas and highlight exceptions to symptoms. The aim is to empower clients and families to use their personal and relational resources to find solutions to their problems.

De-pathologising the client’s condition

We believe that diagnoses determined by mental disorder classification systems provide only a limited view of individuals’ capacities for change (Pina Prata, 2006, 2008), and are particularly concerned with the negative effects of labelling. We reframe problems in order to de-pathologise their nature.

In agreeing to offer Pamina individual systemic therapy, we were interested in a comprehensive evaluation of how these principles would apply, and gaining a deeper understanding of the therapeutic process and its outcome. HSCED was chosen to guide such comprehensive analysis.

Method

Participants and ethical considerations

The client, Pamina, was a 22-year-old Portuguese woman who met the diagnostic criteria for paranoid personality disorder. She was offered systemic oriented individual therapy at CIAF (Centre for Research and Family Support) in Lisbon. CIAF is a university-based clinic, offering low cost couple and family systemic therapy, for training therapists from the Portuguese Association of Family and Community Therapy.

Pamina agreed to participate in our researched-practice protocol, and gave informed consent. All personal and geographic data have been modified in order to preserve anonymity. The therapy was provided by two female therapists – psychologists with postgraduate training in systemic family therapy, aged 26 and 29, who worked together in all the sessions as co-therapists. A team of senior family therapists, led by a supervisor, discussed and prepared the case with the therapists immediately before every session.

Instruments

The Simplified Personal Questionnaire (PQ; Elliott, Mack, & Shapiro, 1999) is an individualised change measure, listing approximately 10 problems that the client has decided he/she would like to work on in therapy. A multi-therapeutic format version (i.e., suitable for individual, family, or group therapy) has recently been developed (Sales, Goncalves, Silva, et al., 2007). The list is constructed initially in a semi-structured 45-minute interview. Client statements are placed on individual note cards, rank ordered, and typed onto a standard form. Once the list has been constructed, it is used at the start of each subsequent session. The client is asked to rate each problem on the list ‘according to how much it has bothered you during the past seven days, including today’ using a seven-point scale (where 1 = not at all, and 7 = maximum possible). Over the course of treatment, clients are allowed to change the PQ form by entering new problems or deleting previous items if they wish.

Helpful Aspects of Therapy (HAT; Llewelyn, 1988) is an open-ended semi-structured self-report measure that asks clients for their perceptions of key change processes in therapy. In addition to the original English version, there is a Spanish version for family therapy adapted for psychiatric settings (Sales, 2005; Sales, Fragoeiro, Noronha, Faisca, & Ortega Beviá, 2003), and a Portuguese version for individual therapy (Sales, Goncalves, Silva, et al., 2007). Clients are asked to identify and describe, in their own words, the most helpful event in the session, and to rate how helpful it was. They are also asked about other helpful or hindering events in the session. The HAT form is usually administered immediately after each session, and sometimes after the intersession period: that is, immediately before the next session (Elliot, Slatick, & Urman, 2001).
The Change Interview (Elliott, 1996) is a semi-structured interview, designed to obtain a rich qualitative account of the client's understanding of what has changed and how those changes have come about. It includes questions about what the client believes has changed over the course of therapy, what those changes are attributed to, and helpful and hindering aspects of therapy. The original Change Interview is intended for administration at the end of the therapy. A Portuguese version modified for follow-up administration (Sales, Goncalves, Silva, et al., 2007) was used here. Modifications consist essentially of rewording some questions in order to explore changes that might have occurred after discharge.

Procedure

Pamina came for an evaluation session consisting of the PQ construction interview, and a first PQ evaluation. This initial evaluation was undertaken by the team supervisor. The PQ form was subsequently self-administered before each session. Two HAT forms were filled out for each therapy session: immediately at the end and after the intersession period. One of the co-therapists gave Pamina the PQ and HAT forms, and collected them afterwards. Six months after discharge, Pamina came for a follow-up session in which the Change Interview and PQ where administered. Elliott (2002) suggests that validity of data is enhanced when the Change Interview is conducted by a person other than the therapist; thus, the Change Interview was conducted by the team supervisor, who also administered the PQ form at follow-up.

Results

Rich case record

The client and her relational context. Pamina was 22 years old at the time she was referred to CIAF by a psychologist trained in family therapy, with whom she had a professional relationship. Pamina identified several fears that prompted her to attend for therapy. These were: fear of walking alone on the street at night; fear of anyone who doesn’t seem ‘normal’; fear of someone hurting her or her family; and, for her the most significant, fear that her father will hurt the rest of the family. Pamina was unable to identify a trigger for these fears, especially those regarding her father, since he had never been violent. These problems, which are detailed in Table I, are indicative of a paranoid personality disorder: with a persistent distrust and suspicion of others in a variety of contexts, and interpreting their motives as malevolent. Pamina met at least four of the seven diagnostic criteria.

Pamina lived with her parents and her two brothers (see Pamina’s genogram in Figure 1), with whom she had a good relationship, but she did not want them to come to therapy with her because she felt uncomfortable. At the commencement of therapy, her younger brother (20 years old) was about to leave Portugal for several months to study. Pamina was worried about him leaving and felt that his leaving would be a loss to her. There were some conflicts between the older brother and the father, but Pamina didn’t consider them severe. She described fights between her parents. Pamina also had close relations in her extended family, although they lived several miles away.

Pamina worked at a children’s nursery and she was happy with her work, considering herself a competent professional. Pamina described her social life as uninteresting; she had some friends but felt that they didn’t always want to go out with her. She believed herself to be ‘too needy’. Pamina did not have a romantic relationship at the time therapy began. She became involved with a new boyfriend between the second and the fourth sessions. At the end of the pre-treatment initial PQ interview, two

<table>
<thead>
<tr>
<th>Complaints</th>
<th>Degree of bother*</th>
<th>Duration of complaints (years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Whenever there is a fight at home, I think my father is going to hurt us</td>
<td>7</td>
<td>1-3</td>
</tr>
<tr>
<td>I’m afraid someone might hit, kill, or hurt my family</td>
<td>7</td>
<td>1-3</td>
</tr>
<tr>
<td>I’m afraid of being hit, robbed, or hurt</td>
<td>5</td>
<td>3-5</td>
</tr>
<tr>
<td>I fear people who don’t seem normal</td>
<td>6</td>
<td>3-5</td>
</tr>
<tr>
<td>I can’t stop talking to people who treat me bad</td>
<td>4</td>
<td>&lt; 1 month</td>
</tr>
<tr>
<td>Sometimes I say things I shouldn’t. I can’t help myself</td>
<td>4</td>
<td>1-3</td>
</tr>
<tr>
<td>I feel too dependent, regarding my friends</td>
<td>3</td>
<td>1-3</td>
</tr>
<tr>
<td>I’m afraid of people who look like terrorists</td>
<td>5</td>
<td>–</td>
</tr>
<tr>
<td>I always believe that people who don’t like me are talking about me and laughing at me</td>
<td>6</td>
<td>–</td>
</tr>
</tbody>
</table>

*PQ ratings of how much bother each problem has caused to the client ‘during the past seven days, including today’, ranging from 1 (not at all) to 7 (maximum possible).
weeks before the first session, Pamina indicated several problems that she would like to see changed during therapy (see Table I). Items 8 and 9 were added immediately before the first session.

The treatment. Pamina was referred to CIAF and contacted us in November 2004. In that same month, she was seen for an evaluation interview, including PQ construction, and therapy began in December. Therapy continued until June 2005, with six sessions at regular monthly intervals. All the sessions were individual, given Pamina’s reluctance for her family to attend. However, she kept them informed of progress, and some therapeutic home tasks involved family participation. Six months after the discharge session, Pamina came to CIAF for a follow-up session.

Therapy focused on de-pathologising symptoms. The first session was devoted to empathic listening and to reframing Pamina’s major complaints – her fears. The second and third sessions focused on the indirect system of the nuclear and extended family, and used as a main technique genogram-based relational work. The fourth session focused on reinforcing Pamina’s social life/skills by means of social network map-based relational work. The last two sessions were oriented towards consolidation of the changes that were taking place, mainly by highlighting Pamina’s achievements and providing positive feedback.

Determining whether change occurred during the therapeutic process

Session-to-session mean PQ ratings (Figure 2) suggest decreasing intensity of complaints over the course of the treatment.

The reliable change index (RCI) \((p<0.05)\), which indicates whether the degree of change was of sufficient magnitude to exceed the margin of measurement error, was calculated to compare pre/post and post/follow-up PQ ratings.\(^1\) A cut-off point of 3.5 was used: items rated above 3.5 were considered as deterioration, and those rated below 3.5 were considered recovered.\(^2\) If a change occurred in the direction of normal functioning, but did not cross the cut-off point, the item was considered as improved (but not recovered) (Jacobson & Truax, 1991).

Results are displayed in Table II. Pamina presented with clinically significant changes \((p<0.05)\) in all items, with most of them placed below the cut-off point. This suggested there was clinical recovery in her problem areas at the end of therapy. Six months after discharge, five items maintained the recovery pattern, while two deteriorated (PQ6: ‘Sometimes I say things I shouldn’t. I can’t help myself’; and PQ9: ‘I always believe that people who don’t like me are talking about me and laughing at me’) and two others improved (PQ2: ‘I’m afraid someone might hit, kill or hurt my family’; and PQ4: ‘I fear people who don’t seem normal’).

Conclusion. Quantitative data indicated that Pamina significantly \((p < 0.05)\) recovered in all her problem areas that were indicative of a paranoid personality disorder. In general, she maintained these clinical gains six months after discharge.

Is therapy responsible for the change?

It was important to try to establish whether the observed improvements in Pamina’s presentation

<table>
<thead>
<tr>
<th>PQ items</th>
<th>Pre-treatment PQ rating</th>
<th>Post-treatment PQ rating</th>
<th>Six-month follow-up PQ rating</th>
<th>Pre-post RCI</th>
<th>Post-follow-up RCI</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>7</td>
<td>2</td>
<td>2</td>
<td>-6.339*</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>7</td>
<td>4</td>
<td>1</td>
<td>-3.803*</td>
<td>-3.803*</td>
</tr>
<tr>
<td>3</td>
<td>5</td>
<td>3</td>
<td>2</td>
<td>-2.535*</td>
<td>-1.268</td>
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<td>4</td>
<td>6</td>
<td>4</td>
<td>2</td>
<td>-2.535*</td>
<td>-2.535*</td>
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<td>1</td>
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<td>9</td>
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<td>3</td>
<td>5</td>
<td>-3.803*</td>
<td>2.535*</td>
</tr>
</tbody>
</table>

*\(p<0.05\); RCI > 1.96 indicates significant change.
were a consequence of therapy, or were instead due to other factors outside therapy. Positive arguments that indicated the changes were due to therapy, and negative arguments that held the possibility of other explanations for the observed changes, were analysed to try to determine this.

Positive arguments

First, we looked at Pamina’s retrospective attribution (i.e., does the client attribute change to therapy?). At follow-up during the Change Interview, Pamina indicated several changes that, from her point of view, had taken place because of therapy. These included the following:

- Pamina considered change in her fear of walking alone in the street to be due to therapy. She clearly indicated that her fear has decreased significantly due to therapy as she was able to identify strategies for coping with her fear.
- Pamina considered that the therapy ‘may have helped’ her independence from her friends.
- Pamina believed that therapy may have facilitated a positive change in relation to her fear of her father hurting or killing someone in the family.

Then, we turned to process-outcome mapping, to determine whether the content of the client’s reported change (or significant events that facilitate change) corresponds to in-session work. Significant events identified by Pamina in the HAT, as well as retrospective changes pointed out in the Change Interview, can be related to in-session therapeutic interventions:

- In session 1 the fear of walking alone on the street was the primary focus. The therapist reframed fear to some extent as a rational feeling, and thus helped Pamina to identify coping strategies for dealing with her fear and then to control it successfully. Fear was reframed as an already solved problem because Pamina was able to cope and, in doing so, was able to maintain her everyday activities (including walking on the streets late in the afternoon, after work). After the intersession period, Pamina stated in the HAT: ‘After what was said in the session, I believe I’m not as afraid; in that same day I walked alone and it was already dawn.’ In the Change Interview Pamina referred to this change once again: ‘I’m not afraid of walking alone on the streets anymore.’
- Additionally, during the first session the therapist addressed Pamina’s fear of her father being aggressive. In the HAT she referred to that event as being significant, although painful: ‘[One of the most painful aspects of this session was] discussing the fear of my father.’ During the Change Interview Pamina returned to this aspect of therapy: ‘I’ve stopped being afraid of my father killing everyone, when he fights with my mother.’
- In the second session, the therapeutic strategy involved construction of the family genogram in order to explore family dynamics and to enhance Pamina’s perception of the family as supportive. The same content was referred to by her in the HAT: ‘It helped me understand that I have a very large family, I’d never realised that; ‘I thought it [the genogram] very interesting and they [in the family] all thought so because the papers went through everybody’s hands and now my cousin is pregnant and there’s one more person to add to it and now I’ll always have that sense’; and ‘People pass away, but they remain there [in the genogram].’
- In the fourth session the therapeutic work was focused on the construction of Pamina’s social network map. Pamina referred to this in the HAT: ‘It made me understand that I have many important people in my life, although I feel I’m less important to them than they are to me.’ In the Change Interview, Pamina stated: ‘Regarding my friends, I used to think that I depended on them, but not anymore;’ ‘I feel more independent from my friends and I’m more proactive in inviting my friends out’; and ‘Our network is always changing, it’s always hard.’

Another area examined was event-shift sequences: are therapy sessions followed by immediate clinical significant clinical changes? After the first two sessions, PQ ratings highlighted six (66.7%) significant clinical recoveries (p <0.05) and two (22.2%) significant clinical improvements (see Figure 3). The following might suggest that these changes are directly linked to the main therapeutic strategies used in session 1 (de-pathologising Pamina’s fears), and session 2 (reinforcing Pamina’ relational network within the family):

- As already discussed, the first session focused on Pamina’s fear of walking the streets alone. An immediate qualitative effect was reported in the HAT after the intersession period, accompanied by clinically significant recoveries in PQ3 (‘I’m afraid of being hit, robbed or hurt’) and PQ4 (‘I fear people who don’t seem normal’) in the next application (before session 3).
At the end of the first session, Pamina was asked to collect information about her extended family to help in creating her genogram. In the second session, clinical work focused on the construction of Pamina’s genogram, and looking at her relationships with family members. This was accompanied by an immediate recovery in one item regarding the tensions in the family (PQ1: ‘Whenever there is a fight at home, I think my father is going to hurt us’).

Figure 3 suggests that there was deterioration in some items between the third and fourth sessions, although these changes are not clinically significant ($p < 0.05$). Pamina mentioned in the fourth session that she had been having some problems with her boyfriend. The subject was discussed in-session, focusing on Pamina’s ability to make the best decisions and choices regarding her relationships with him. She left the session with a sense of reassurance, which may have played a part in the improvement observed at the beginning of session 5.

In the fourth session therapeutic strategies focused on empowering Pamina’s social life, using techniques based on social network map exploration. As an immediate effect, one item concerning relations with friends significantly recovered (PQ5: ‘I can’t stop talking to people who treat me badly’).

Thus, in terms of event-shift sequences, it can be concluded that sessions 1, 2, and 4 were followed by immediate significant clinical change ($p < 0.05$).

Finally, we addressed the issue of change stable problems – did therapy coincide with changes in chronic stable problems? The observed changes occurred in problem areas Pamina considered to be relatively stable (the symptoms had been present for more than one year), particularly her fear of being hurt and walking alone (PQ3, present for three to five years). This indicates that the change was due to therapy, given that the probability of spontaneous recovery from stable problems is extremely low.

**Negative arguments**

Pamina reported several fears and irrational beliefs. However, she maintained functional behaviour in the basic areas of her life (work, family, friends, romantic life). Therefore, PQ complaints do not reflect real difficulties in Pamina’s life and PQ is not reliable as an outcome measure.

We need to ask whether change was due to natural maturation processes already happening before the therapy. Indeed, on several occasions prior to therapy, Pamina had tried to control her temper and emotions. For instance, in the first session she commented: ‘I have apologised to a colleague with whom I was angry.’ Her efforts to improve the way she related with friends and colleagues had started before therapy, as a natural process of self-maturation. Therefore, changes in PQ6 (‘Sometimes I say things I shouldn’t. I can’t help myself’) cannot be attributed to the therapy. Further evidence of a self-correction process was offered by Pamina when she reported a decrease in the tension between her parents, with fewer fights at home, before therapy began. Therefore, the clinical recovery in the first PQ item (‘Whenever there is a fight at home, I think my father is going to hurt us’) was probably not caused by therapy.

A number of non-therapy events occurred during the treatment period that may have contributed to the observed changes. First, Pamina’s younger brother left the country to study. By the time therapy began, Pamina was very anxious about him leaving. This might have exacerbated her anxiety symptoms, including her fears. Her brother leaving was probably a source of stress for the entire family. As her brother settled into his new life abroad, the overall tension in the family lowered; this may explain her apparent recovery in the problems identified. Additionally, Pamina’s new relationship with her boyfriend might have further enhanced outcome, as an additional source of support.

**Other factors**

The HSCED considers four other non-therapeutic areas that may explain client change (Elliott, 2002): relational artefacts (change as an attempt to please); reactive effects of research (altruism, relationship to research staff, etc.); client expectation or wishful thinking; and psychobiological factors (change due to medication or herbal remedies, or recovery from medical illness). There was no evidence in this study that these factors explained changes in Pamina’s outcome.

**Discussion**

Pamina changed over the course of the therapy. Her persistent distrust and suspicion of others, indicative of a paranoid personality disorder, reduced and reached functional levels. Figure 4 summarises the therapy process, emphasising the sessions in which change occurred. In light of the positive and negative arguments, it may be argued that, overall, therapy was effective. It is possible to differentiate areas where therapy facilitated change, as well as areas in which non-therapeutic factors may explain change.

The major change experienced by Pamina (i.e., in her fear of walking alone on the street) was due to therapy, and specifically the clinical interventions used during the first session. De-pathologising fears and exploring clients’ resources in order to identify and amplify existing skills and solutions are effective strategies.

As for the other changes, therapy seems to have had a partial influence. First, Pamina’s progress in developing social skills is attributed by her to the therapy. Indirectly, by working on the genogram, therapy may also have helped Pamina become more aware of many support elements in her own family, promoting her self-esteem and independence from...
her friends. Pinsof (1995) describes this strategy as an indirect involvement of systems, not present in sessions, in order to promote change. However, arguments in favour of the therapeutic effects of such strategies must take into consideration that Pamina was already trying to improve her social skills before starting therapy. In addition, a new romantic relationship was probably an important factor in that change.

The change in the intensity of Pamina’s fear of her father hurting someone in the family can be attributed simultaneously to therapy and to non-therapeutic factors – the latter being a natural decrease in the tension between her parents before the beginning of therapy. However, although it seems this change in her parents’ relationship had begun before therapy, it could be that simply knowing Pamina was starting therapy may have prompted her parents to change their own relationship positively. Also, she involved her parents, especially her mother, in the construction of the family genogram, which was a source of many conversations between them. This may have enabled a different pattern of communication and affection within the family. A systemic family perspective may be helpful when considering individual problems when a diagnosis of paranoid personality disorder is present. Interventions in the family system should be considered in treatment planning.

**Conclusion**

The HSCED was useful as a framework for the analysis of all the clinical data available for Pamina. It allowed for case outcome evaluation and provided evidence of treatment effectiveness. Additionally, it enabled the therapists to understand what in the therapy had promoted clinical change. Therefore, HSCED also revealed itself as a case discovery-oriented tool. These characteristics suggest that HSCED is suitable for naturalistic psychotherapy research undertaken by therapists.

HSCED requires session-by-session data collection procedures using PQ and HAT. A survey (Sales, Goncalves, Fragoeiro, Noronha, & Elliott, 2007) has revealed that therapists are open to working with these two instruments in this way because, among other advantages, they provide relevant data for clinical decision-making, and promote clients’ self-reflection. However, therapists also pointed out that such data collection is time-consuming, and thus potentially interferes with service organisation. As a consequence, even given its advantages, the question of HSCED suitability as a routine procedure should be addressed.

1. The following formula was used:

\[
\text{RCI} = \frac{(\text{PostTF} - \text{PreTF})}{\text{Sdiff}}
\]

where \( \text{Sdiff} = \sqrt{2SE^2} \), and \( SE = \frac{S1}{\sqrt{1 - rxx}} \).

Since there are no normative data for the dysfunctional population in PQ, S1 is given by the standard deviation of PQ ratings before therapy (baseline; \( S1 = 1.394 \)). The test–retest reliability \( rxx \) used was 0.84, according to the author recommendation (Robert Elliott, personal communication, June 2002).

2. Since the PQ is an individualised measure, Robert Elliott suggests that the midpoint of the scale be considered as the functional cutoff point (i.e., 3.5).

**Biographical notes**

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References


