Psychotherapy Research

ISSN: 1050-3307 (Print) 1468-4381 (Online) Journal homepage: http://www.tandfonline.com/loi/tpsr20

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To cite this article: Merton Krause (2018): Creating what is necessary for optimizing psychotherapy, Psychotherapy Research, DOI: 10.1080/10503307.2018.1534019

To link to this article: https://doi.org/10.1080/10503307.2018.1534019

Psychotherapy Research, 2018
https://doi.org/10.1080/10503307.2018.1534019

EMPIRICAL PAPER

Creating what is necessary for optimizing psychotherapy

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(Received 3 May 2018; revised 27 September 2018; accepted 1 October 2018)

Abstract
The dimensions of mental health status (MHS), all those that may influence MHS, and the measures to represent these dimensions must come to be agreed upon and all of them included in every study of psychotherapy effectiveness in order for these studies' results to be properly comparable, decisive, and cumulative. This is essential for eventually achieving a psychotherapy effectiveness research (PER) that is adequate for informing individual case psychotherapy practice rather than only reporting average case psychotherapy practice results. Cooperation among researchers and practitioners as well as between these is necessary in the form of their democratic central governance of programmatic PER, its coordination with practice, and its results' integration into individual case practice. This is the ideal that PER should strive for rather than continue in its present wastefully fragmented, least economically developed countries' mentally ill neglected, and practitioner experience underutilized manner.

Keywords: causal dimension inclusiveness; valid measure inclusiveness; representativeness of the mentally ill; phase space paths; central coordination of programmatic research

Clinical or Methodological Significance of this article:: The course of very individual case matters, so cross-sectional case sample averages are inadequate for psychotherapy effectiveness research. Only actual practice indicates psychotherapy's cost-effectiveness, so research and practice must be conjointly done. These are goals to strive for and some central governance of both jointly will be necessary to do so.

Progress toward optimizing humanity's mental health status (MHS) distribution depends first upon knowing the dimensions that define MHS and the dimensions causally influential on MHS, and upon having a valid standard measure for each of these dimensions. Because psychotherapy is most directly concerned with improving poor MHS and is provided by culturally and legally recognized professionals properly amenable to explicit standards of performance, whatever is securely learned about how to enhance poor MHS through psychotherapy can properly be required from psychotherapists. Therapists ongoing informal and scientists formal psychotherapy effectiveness research (PER) are the means by which this enhancing may be learned. Because optimizing PER's progress is a matter of great societal importance, PER should be a coordinated international public enterprise in order to progress as soundly and rapidly as possible.

PER progress must mean learning how to achieve greater MHS cost-effectiveness for clients, because poor MHS is certainly a widespread and important problem (see, e.g., Kessler et al., 1994; Leff, 1988; Whiteford et al., 2013). It affects other persons' MHS: the clients' families, co-workers, therapists, and the others these persons' MHS then affects. This "contagion" also may impact all these parties' physical health (e.g., Chiles, Lambert, & Hatch, 1999) and social welfare generally (e.g. crime, unemployment, poverty, parental neglect, etc.) which could be measured in terms of felt quality of life (Alexandrova, 2014; Diener, 2013) as well as in multiple other terms (see Sanders et al., 2016), all of which PER should be concerned about. How the

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solution of this problem of outcome coverage can best be conceived fits Kuhn's (1996) notion of scientific progress as a series of profound discontinuities in how a science is pursued that advances its progress. This paper proposes that such a PER methodology discontinuity is needed and so supplements the Magnavita and Anchin (2013) proposal of integrative psychotherapy theory.

So far PER has been pursued by many rather small competing research enterprises, each relying on its own notions of MHS and of what influences MHS and so with its own preferred cause and effect dimensions and measure for each. This competitive "little science" (Price, 1963) approach needs replacing by a cooperative "big science" approach to cost-effectively achieving an optimal path for every case of poor MHS, a path in a very multidimensional phase-space defined by time phases and ultimately by *all* the possibly very many relevant causal/input (***I***) and effect/outcome (***O***) dimensions. What these dimensions will be remains to be discovered in some very large candidate set of input (*I*: see, e.g., Hawkins & Meier, 2015) and outcome (*O*: see, e.g., Keyes, 2005; Krause, 2005; Leamy, Bird, Le Boutillier, Williams, & Slade, 2011; Williamson et al., 2012) dimensions. Such a comprehensive approach to PER research will require assembling all the initially plausible *I* and *O* dimensions, reaching researcher and practitioner agreement on a valid measure for each, achieving comprehensively inclusive case sampling, pursuing data analysis at the individual rather than average case level, and the programmatic pursuance of all this for optimizing the cost-effectiveness of PER research and clinical practice. This will certainly require some central governance to be achieved.

PER presently is not proceeding in this way for at least the following reasons: (1) No scientifically normative and so definitionally valid (Krause, 2012, 2018d) measure nor set of measures for PER's *O* dimensions (such as for MHS: e.g. destructively irrational felt distress, personality disintegration, behavioural dis-functionalities, thwarted individuation: Krause, 2005) is used in every PER empirical study (about which diversity see, e.g., Ogle, Lambert, & Masters, 1996). (2) No set of all the *I* dimensions possibly causally influential on MHS is represented in every PER study. (3) No single measure nor set of measures for any such *I* dimension is used in every PER study. (4) The case samples used in PER studies have been neither representative nor random samples of poor MHS cases (Krause, 2016, 2018a). All four of these reasons are best demonstrated in a singularly well detailed review of 50 years of PER studies (Orlinsky, Rønnestad, & Willutzki, 2004; see Wampold & Imel, 2015, for a quite different review).

Furthermore, a sufficiently cost-effective course of psychotherapy for each client, rather than on average for each kind of poor MHS (see, e.g., Roth & Fonagy, 2005), will always need to be discovered in the course of their therapy because each case is unique and so not adequately predictable by any average for some sample of cases (see, e.g., Krause, 2011, 2018b). How much assistance for discovering this for every individual client that PER has provided is the proper measure of PER's progress. Although what *on average* appears to have worked reasonably well for some therapists with their clients (e.g., empathy: Elliott, Bohart, Watson, & Greenberg, 2011) *may* be worthwhile for other therapists to try (Cooper, 2008), is the most that PER could so far fairly claim to have accomplished. So PER still has a long way to go and has to proceed quite differently than it so far has. *How* to do so is what this paper is about.

Some Obstacles to PER Progress

The necessity to keep publishing in order to progress as a recognized PER researcher, the relative scarcity of resources for doing PER research, and the kind of PER research that is presently most rewarded (i.e., the randomized clinical trial: RCT) jointly guarantee a great volume of brief, small dimension size (*d.*) and so measure size (*m*), and as small as practicable for statistical significance testing purposes case sample size (*n*) PER studies. One crucial result of this is the PER literature glut that is spread across so wide a range of publications and years that it is difficult (as any meticulous search on, e.g., Google Scholar or APA's Info Net can demonstrate) for practitioners and researchers to keep in adequate touch with and be well advised by (About such "information overload" problems see, e.g., Baez, Birukou, Casati, & Marchese, 2010; Bawden & Robinson, 2009; Safer & Tang, 2009; van Raan, 2000; Weick & Sutcliffe, 2008). For example, consider the numbers of PER papers found in Info Net in March 2017 with "psychotherapy effectiveness" in their title: for 1930–2017 there were 446 and with "psychotherapy outcome" in their title there were 1124, so 1570 altogether. This is surely too much for psychotherapists and PER researchers to adequately keep in mind and make good use of. The diversity of these studies as to dimensions included, measures used for each, opportunity samples of clients and therapists, durations of treatment and spacing of sessions, life situations of clients and therapists … makes their meta-analysis uninterpretable were it feasible (see Krause, 2018a).

Another contributor to psychotherapists and PER scientists being poorly informed about the state of PER is the fractionation of the psychotherapist and PER workforce and literature by both (a) profession

(Psychologist, Psychiatrist, Social worker, Counselor …) and (b) theory preference (Operant Conditioning, Psychoanalysis, Cognitive–Behavioural therapy, Client Centred therapy …), about which see, for example, Castonguay, Eubanks, Goldfried, Muran, and Lutz (2015), Henriques (2013), Magnavita and Anchin (2013), Mahoney (2008), Norcross and Goldfried (2005), Oddli, Nissen-Lie, and Halvorsen (2016). There should instead be one inclusive psychotherapy practice and research community and theory, this theory integrating all the various proposed input (*I*) and outcome (*O*) dimensions (see Orlinsky & Rønnestad, 2005, pp. 185–187), with each represented in every PER study and in each therapist's practice by the same valid measure (and also whatever others seem promising enough to these researchers or practitioners). Nothing less than such comprehensively mutual respect across professions and theory factions can reasonably hope to make the evolution of psychotherapy toward optimal cost-effectiveness likely. *This is because what I dimensions one does not take account of may confound the I dimensions one does take account of and what impact that the I dimensions one does take account have of on the O dimensions one does not take account of is left unknown*.

Further progress on psychotherapy's cost-effectiveness is obviously necessary but it depends upon several logically prior matters, at least the following six. (A) Making the methodology of PER studies, their design, data analysis, and coordination more cost-effective. (B) Making their contribution to the ordinary practice that PER is meant to inform more cost-effective. (C) Making the publication of PER studies more nearly optimal for co-evolving PER and psychotherapy practice. (D) Making the necessarily always unique and emergent interpersonal process that psychotherapy necessarily is better accommodate PER research. (E) Making PER centrally coordinated enough to sufficiently facilitate achieving the preceding four requirements. (F) Making the information base of PER and of ordinary psychotherapy practice sufficiently automated to optimally facilitate the cost-effectiveness of PER, psychotherapy practice, and their mutually beneficial coordination. These are aspects of the "big picture" of PER that need attending to, so they will be addressed here in this order.

The Necessity for PER to Adopt an Appropriate Research Methodology

First, it is important to realize that RCT are inappropriate for discovering how to successfully treat any *individual* client because the random assignment in RCT cannot guarantee the actual equating of outcome-influential *unmeasured* dimensions' influence on all individual client outcomes across the comparison groups. Instead, random assignment guarantees only a stochastic approach to equating the comparison groups' statistical expectation of *mean* outcome as sample size approaches population size (Krause & Howard, 2003; Krause & Lutz, 2006). Therefore, the mean difference between the likely overlapping distributions of outcomes of an RCT's comparison groups cannot indicate which treatment will be the more effective for any subsequent *individual* client (Krause, 2011, 2018b; Krause, Lutz, & Bőhnke, 2011).

Second, measurements proposed to be on a dimension that are not explicitly justified by this dimension's *normative* scientific definition are not valid regardless of how they correlate with other measurements proposed to represent this dimension (Krause, 2012). Therefore the first principal component or the heaviest loaded factor of any set of such proposed but imperfectly inter-correlated different series of measurements (including the ingenious proposal of Kossakowski et al., 2016) claimed to be on the same dimension cannot logically be considered the valid measure for this dimension (Krause, 2012; and see Raykov, Marcoulides, & Li, 2016) without further justification. Perhaps such justification could be that (a) the loadings of each of these measures on this factor vary only *randomly* across replicate factor analyses on different samples of cases *randomly drawn* from the same case population and that (b) this factor correlates *stably enough* across these samples with valid measurements on certain other dimensions (read Laska & Wampold, 2014, in this light). However, (a1) PER still lacks the means to randomly sample from the populations to which it properly needs to generalize, and (a2) having drawn one random sample from a population another such cannot be drawn from *it* because *it* no longer is the identical population. (b1) The logically proper criterion for identifying "*stable enough* imperfect correlation" is unsettled but perhaps could simply be that for "statistically insignificantly different correlations" were statistical significance testing an indisputably logically sound rather than a merely now customary procedure (see Nickerson, 2000, for many of the still unsettled issues) and (b2) what is an insignificantly different correlation always depends on sample size being small enough (and see Krause, 2011).

Furthermore, correlational validity cannot replace definitional validity because, first, it is always dependent on definitional validity for assembling the measures to be factor analyzed or otherwise correlationally compared for construct validity. So if sufficient agreement cannot be reached on some definition of a dimension it cannot properly be

reached on what set of measures should be included in a factor analysis of candidate measures' measurements. Second, construct validity is always dependent on agreement about what constitutes a stable enough pattern of *sample* correlations among the given dimensions. Sufficient stability depends on taking population representative or (large enough) random samples, both of which are still infeasible for PER (Krause, 2016).

Third, the causal influences on any person's MHS are likely numerous and interactive. Therefore, given a set of possibly MHS influential dimensions' valid measurements, the proper way to initially study them is as all their highest order ANOVA interactions with no main effects or lower order interactions partialled out (i.e., as maximally complex sufficient condition causes: Krause, 2010, 2018c). This is in effect the way psychotherapists most sensitively and properly deal with their clients: making interventions that seem suitable at that moment for that unique client. So PER should initially present its data at this most disaggregated level if it is to be in principle most useful to psychotherapists. The usual co-variation statistics so far relied on by PER (i.e., *t, r, R*) dismiss as "random error" whatever dependent variable variation they do not account for (see Krause, 2013a), which ignores clients' individuality by dealing only in these *t, r, R* statistical parameters of opportunity-sample aggregations of clients (Krause, 2016, 2018a, 2018b). Laurenceau, Hayes, and Feldman (2007), for example, do deal with MHS temporal paths but only with average paths.

Eventually PER must develop a jointly cause and effect hyperspace of enough validly measured on dimensions and then study an extensive enough temporal span for representing every client in terms of all the dimensions of MHS, of those that causally influence MHS, and of all the other important dimensions that either of these causally influence: ***IO***. Until this ***IO*** temporal phase space is fully defined and adequately populated with cases PER publication should be *only* for informing the following audiences: (1) PER research coordinators about unoccupied locations in PER's current candidate phase space (*IO*) and about *I* locations that map to *O* locations one-to-many because this indicates that *I* is dimensionally underspecified (Krause, 2010). (2) Therapists about possibilities that might be worth their exploring (locations in *I* that so far have mapped for other therapists one-to-one to favourable locations in *O*) or worth their avoiding (because these have mapped to unfavourable locations in *O*). (3) Public health policy makers about *I* to *O* mappings relevant to their urgent purposes for which no better information is available (Krause, 2016). This limitation on publishing is to prevent the publication of premature PER knowledge claims, something that is now rampant and contributes to the PER literature glut.

Statistical significance testing of RCT has served to prevent publication of studies that have too small *n* for their amount of residual dependent-variable variance, and so has served to inflate the mean effect size in meta-analyses (on this see, e.g., Franco, Malhotra, & Simonovits, 2014; Schmidt & Hunter, 2005, pp. 51–56). This together with PER's present tolerance for *I* under-specification and for unsettled dimension definitions (and so measurement invalidity) means that PER has so far produced only a collection of many incomparable pilot studies. Henceforth PER needs to proceed in a more cost-effective manner than producing the congeries of studies that so far characterize its information base, which manner must satisfy at least the following five requirements:

(1) Propose nothing about treating any client simply on the basis of any treatment form's statistically significant mean superiority (i.e., *t*) over any other treatment or control condition. Instead, propose that on the basis of professional training and experience treat as then seems necessary, borrowing from whatever treatment forms seem to one promising, and when necessary improvising. Therapists documenting for PER how such improvising was done, why, and with what result would benefit PER and would aid the quality control of psychotherapy. Therefore the best that PER can provide practitioners, until its ***IO*** phase space is settled and sufficiently widely and densely populated with cases, is sensitization to some of what might need attending to. Every move a therapist makes is still an experiment with no way to be certain about what effect it will have. This is because until ***IO*** is settled every client is unique, somewhat unpredictable, and probably insufficiently understood (e.g., Lampropoulos, 2000, may best be read in this light).

(2) Reach a researcher and practitioner consensus on how MHS is always (but not necessarily only) to be measured no matter how difficult this will be, because otherwise PER will continue to produce logically unintegrateable studies and conflicting practice guidance because different MHS measures were employed (visit www.comet-initiative.org regarding this). This must take account of and avoid the danger that client, therapist, and researcher personal interests and

preferences can be to valid measurement (see Krause, 2018d).

(3) Always include *all* the various psychotherapy theories' and so PER factions' *IO* dimensions and so the normative measure for each in every PER study, because otherwise PER will continue to produce studies different *O* differently undetectably *I* confounded by the dimensions excluded that are causally influential on MHS (see, e.g., Hoffart & Johnson, 2017; Krause, Lutz, & Saunders, 2007). These are logically unintegrateable studies.

(4) Detail all the highest order ANOVA interaction *I* interventions (with nothing of lower order partialled out: Krause, 2018c) and all the important sequels of each in every PER study. Only this can make a study's findings actually relevant for guiding practitioners and most informative about psychotherapy's effects.

(5) Do extensive prior biographical and very temporally extended post-treatment data collection on all cases presenting at each *I* space location in order to try to more fully understand what may influence MHS and what it and psychotherapy influence. Until ***IO*** is fully defined every case properly is a PER research case and so ought to be included in PER's information base.

The Naturalness, Importance, and Effects of Research in and on Ordinary Practice

Every psychotherapist should be sensitive to whatever could be influencing each client's MHS. Lack of time for or of interest in adequately noticing and recording all this distinguishes the therapists unwilling from those willing to contribute to PER. There surely must be many of the latter who remain untapped for information about the complex time-serial individualizing of practice that PER most needs to learn how to help optimize (see Lucock et al., 2017). Highly detailed case-studies (see e.g. Edwards, Dattilio, & Bromley, 2004; Flyvbjerg, 2006; Iwakabe & Gazzola, 2009; McLeod, 2010; Norcross & Wampold, 2011; Stiles, 2009) are the most informative and natural, as well as the most expensive and demanding, form of PER data.

Such case-studies need not be limited to narrative format because this always implicitly is itself multidimensional phase-space data. This is so because all adjectives and some adverbs name dimensions and when suitably adverbially qualified (e.g., how angry, how evasive) designate specific ordered-category gradations (Krause, 2013b) on dimensions. Each instantiable location in ***O*** would have one or more instantiable locations in ***I*** that map only to it (Krause, 2010). Adequate comparison of the unique courses of client lives requires their portrayal as paths in the ***IO*** phase-space, rather than simply the traditional RCT *t* test or any other comparison of averages in aggregations of cases (Krause, 2018b). Once adequate portrayal of time-course paths in ***IO*** is achieved with computer assistance, the treatment of every individual case can be tentatively guided somewhat by prior PER findings. What enhances whose MHS how much under what circumstances for how long and at what costs to whom *might* prove to be similar enough to justify generalizations about some classes of cases, and this needs to subsequently be looked into. Such meticulous disaggregation of PER study results needs to be done instead of simply publishing averages with narrow "enough" confidence bounds or statistically significant "enough" mean differences or correlations,

The industry of psychotherapy practice operates in a vast phase-space that PER must strive to fully dimensionally define and widely explore (see, e.g., Westen, 2007), a phase-space in which practice must eventually come to be adequately cost-effective, which is the proper purpose of PER. Only were all the dimensions necessary to define ***IO*** and a valid measure for each of these dimensions widely agreed upon and universally employed by PER researchers *and* psychotherapists could finding an optimally cost-effective path in it (i.e., what best to do when) for every presenting client be possible (see Lampropoulos et al., 2002; Tasca et al., 2015).

The Roles of Paper and Proposal Reviewing

"Publish or perish" is the sciences' version of "profit or fail" that encourages competition for journal space, for others' citation of and reliance on one's publications, and for research funding and staffing. Hard logical challenging of project proposals and publication submissions favours the adoption and application of sound ideas, the production and accessibility of valid data, and the incorporation of exclusively both in PER's information base. A close balance between the volume of worthy submissions and the available journal pages and funding favours the optimization of research publication and funding cost-effectiveness: the funding and publishing all and only the most PER promoting papers and projects. Adequate reviewing of publication submissions and funding proposals, however, is certainly not presently assured (see, e.g., Coburn & Vevea, 2015; Cooper, 2009; D'Andrea & O'Dwyer, 2017;

Langfeldt, 2006; Li & Agha, 2015; Mahoney, 1977; Maner, 2014; Nosek & Bar-Anan, 2012; Suls & Martin, 2009). Nor is an optimal worthy-papers and available-pages or worthy-proposals and available-funds balance assured (about which I've yet to encounter any paper).

Poor reviewing of PER funding and publication proposals must be due in part to the unavailability of a thorough registry of properly methodologically sophisticated reviewers and in part to the disincentives and lack of compensating incentives for adequate reviewing (for a start see Kovanis, Porcher, Ravaud, & Trinquart, 2016). It also must be due in part to the excessive quantity of proposal and publication submissions and to reviewers' inadequate encouragement of and assistance on inadequate but programmatically promising research proposals and papers. Reviewers ought to be friendly consultants more than opinionated judges. Poor reviewing impedes PER's progress, although how much so remains unknown because detailed author, editor, and funder feedback on the reviewing of papers (on which APA has made a small start) and proposals is not yet required. This and some central oversight and coordination of the reviewing and inviting of PER *programme* proposals and of completed *programme* (rather than single efficacy or effectiveness study) publications is needed. A proper PER programme is a huge and long enduring effort to explain whose MHS is most cost-effectively enhanced most enduringly by what course of treatment for what variety of clients.

The criteria for accrediting, assigning, monitoring, and recompensing PER's publication and proposal reviewers should be designed to enhance PER's progress by requiring that who reviews what of whose be transparent and that the compensation and support provided for reviewing be sufficient for this purpose. The above proposed limitations on publication to reports about successfully concluded research *programmes* should help make this feasible. However, to ensure all this some recurrent reviewing of *proposal and publication reviewing* themselves would also be necessary. Communication of ideas and of small-scale findings ought not be by hard copy publication but by a quite different means which will be discussed later below.

Author and reviewer anonymity has no obviously lesser but simply different problems than author and reviewer transparency which is necessary for author and reviewer alliance to be personal enough for perfecting each research *programme's* proposal and final report in order to most benefit PER and psychotherapy practice. Because this would further burden both reviewers and authors, it would require their greater compensation and support, improved funding and publication prospects for authors of *programme* proposals and final reports, co-authorship and material compensation for reviewers, and easy access to information about relevant prior, active, and planned research programmes for both (something else to be further discussed later below).

The competition for PER funding and publication should occur in a market regulated to favour PER and clinical practice progress. Now neither is favoured because PER studies are variously dimensionally underspecified with each dimension variously disputably-validly represented and the studies imperfectly comparable as to treatment integrity (Perepletchikova, Treat, & Kazdin, 2007); control treatments (Krause & Lutz, 2009a); case and therapist and treatment-setting sampling (Krause, 2016); and follow up intervals (e.g., Klein, Shankman, & Rose, 2006). These studies are now increasingly summarized in meta-analyses despite the studies incomparability that cannot reasonably be assumed to be random (Krause, 2018a).

The Process of Psychotherapy

Because no psychotherapist can yet assuredly know the best way to treat any given client, some joint evolving by therapist and client of how they work together is always necessary (see Krause & Lutz, 2009b; Rihacek & Roubal, 2017). It is from many of these that general principles may emerge, likely very situation conditional principles that depend upon the parties emergent working relationship, relevant skills and vulnerabilities, life circumstances, and treatment goals. Therefor relying on RCT comparison group outcome averages rather than studying highly multi-dimensional phase-space individual-case paths has robbed PER of the advantage of documenting this crucially important process of evolving (Krause & Lutz, 2009b).

This means that PER should study and foster the development of a pan-theoretical evolutionary treatment process (as e.g. Finnerty, 2014, has) rather than profession- or theory-factional treatment forms. Because somewhat different processes may be best for different client-therapist-occasion conjunctions, PER should try to discover how to train and supervise therapists to better evolve their treatments coordinately with what their clients currently can most constructively use. This radically differs from training and supervising therapists in any fixed form of treatment and as if it were free of all elements of other forms, which is impossible (Krause et al., 2007). It is impossible because all the *dimensions* of interpersonal interaction are necessarily involved at every moment over the whole course of every client-

therapist relationship. So, for example, an attempted reinforcement of a client's response in some problematic situation cannot assuredly be exclusively that but may affect this client also or instead as a favourable or unfavourable judgment on what she is doing, an implicit interpretation that she is reacting ego-dystonically to the situation, an empathic expression of unconditional positive regard, etc. In other words, what the therapist intends to communicate cannot safely be assumed to be what or only what actually is communicated, which may be evident in how the client reacts but may also need the client's sophisticated cooperation to clarify. What is now happening here can be far more complicated than what one is presently disposed by profession or theory/school to recognize, so a trans-professional and pan-theoretical perspective is needed in every therapy session and so in every PER empirical study (see Tryon, 2016).

The Functions of Coordinative International Central Governance of PER

There is not a nearly large enough psychotherapy nor PER workforce worldwide. For example, there were in 2017 at least 7000 licensed psychiatrists, 106500 licensed psychologists, and 254000 licensed clinical social workers, so 367500 legally recognized psychotherapists, in the USA according to their respective professional organizations. Worldwide, however, there were on one estimate only 1.27 psychiatrists, 0.33 psychologists, and 0.24 clinical social workers per 100,000 population (Kakuma et al., 2011), which for a 2017 world population of 7.5 billion would mean 95,250 psychiatrists, 24,750 psychologists, and 18,000 clinical social workers worldwide. This must explain in part why poor MHS mostly goes untreated worldwide (see, e.g., Kessler et al., 2009), although it goes untreated even when psychotherapist density and accessibility are relatively high (e.g., Kazdin, 2017; Mack et al., 2014).

This suggests that PER should be most concerned with (1) the production of "barefoot" psychotherapists in the least economically developed countries (see e.g. Kazdin, 2017; Patel et al., 2016), (2) the promotion of widespread laity ability to recognize poor MHS, and (3) the promotion of motivation for treatment by those with poor MHS. PER should not bother so much with contrasting factional treatment forms in the most economically developed countries, but should instead contrast world-wide the pan-theoretically ***O*** depicted treated with the untreated. Nor should PER study only clients who already can access and afford psychotherapy and expect to be benefitted by it, but should also study world-wide how to recruit clients who need but do not know about or believe they can benefit from psychotherapy, provide them with it, and then show them and those who know them that it can be beneficial without being too costly (see Thornicroft & Patel, 2014.

Furthermore, PER scientists must be more scarce than psychotherapists in the least economically developed countries, probably in part because of their even more limited production there and of their migration more to than from the most economically developed countries. As for PER scientists world-wide, whatever this total is, the accumulation and present production of PER empirical research papers already exceeds in quantity what can be usefully and easily enough taken account of by the psychotherapy practice and research community. So a full ***IO*** phase-space and world population spanning programme of empirical study for the rest of their lives of persons with poor MHS who did and who did not receive psychotherapy is what PER needs to develop. This will require many PER scientists for its designing, siting, measuring, data quality control, ***IO*** path analysis, research programme evolution responsive to this analysis and to opportunities for wider spanning and denser saturating ***IO*** case sampling, negotiating for research resources, preparing a series of only completed PER *programmes' comprehensive summary reports*, planning what is needed next, drawing the clinical implications of the programmes' findings, translating these into performed clinical training and supervision and evaluating of both. Perhaps the present number of PER scientists would be enough to do all this if their present competition in terms of a glut of multiply inadequate RCT and meta-analyses of such were foregone and cooperation in rationally pursuing programmatic PER replaced it. Thus, PER should be pursued as a coherent international public enterprise rather than as a congeries of competing small-scale private enterprises.

Much of what is required is effective communication among and between researchers and clinicians about individual cases in order to work toward defining ***IO*** and spanning and saturating it with cases (Krause, 2018b, 2018c; McWilliams, 2017). The most economically developed countries' practitioners probably have had some training in PER but do not perform it (nor welcome it: Baker, Mcfall, & Shoham, 2008), while many of those who do PER were trained to be practitioners and some still practice. Practitioners and scientists are both presently fractionated as to *IO* dimensions of interest, valid measures for these, and the PER literature they read and cite. Much of PER is done now by separate professionally and theoretically factional collegial groups of scientists (Feist & Gorman, 1998) that do not much, if at all, cite the work of other such groups

(as scanning PER papers' reference lists routinely indicates). Also, PER is presently done in mostly relatively small brief studies on opportunistically sampled cases, which is due in part to researchers' career development (see e.g. Bakker, van Dijk, & Wicherts, 2012) and available resource considerations. So the accumulated PER information base presently is fragmentary in *IO* and case sample terms, with each fragment subject to covert confounding by the *I* dimensions favoured by the others that it ignores (Krause et al., 2007), to different *O* dimensions, and to differently opportunistic case-population sampling bias (Krause, 2016). This information base is further fragmented due to differences in the measures used to represent dimensions that are shared (even those of MHS). Therefore some central governance is necessary to ensure that all published PER studies include the whole psychotherapy practice and research community's eventually compromised-on core *IO* in terms of this community's compromised-on measure for each *I* and *O* dimension. However, any *additional* dimensions and/or measures that are favoured by a study's scientists or practitioners may *also* be included. This means that keeping tolerable the burdens of measuring and of being measured on so many possible *IO* dimensions and preventing their biasing of its results will likely require serious research attention (see Krause, 2018d).

Only coordinative central governance of programmatic PER can solve the problems that impede PER progress were such governance to become feasible. This would require at least widespread agreement across the various practice and research sub-communities that *all* their various democratically favoured *IO* dimensions and measures for these deserve representation in every PER empirical study and consideration in every clinical case, with each always represented by at least the one measure its nominating sub-community has come to agree upon and all the other sub-communities have come to accept as adequately representative of this dimension. There obviously cannot be the sustained, effective, representative, coordinative central governance that PER requires without such politics. So compromises among and between the various practice and research sub-communities are essential for trying to optimize PER and psychotherapy. The practice of psychotherapy, however, must be left free to be fine-tuned by therapists and clients jointly, which tuning should also be recorded in the PER information base for further study. Practice and research need to be wedded if either is ever to become maximally cost-effective.

All of what has been proposed here will not be easily accomplished, but if we are not clear on what *ideally* is needed we cannot put into proper perspective where PER has so far gotten to and so needs to further go. PER obviously is some distance from where it needs to go in terms of the degree, duration, and reliability of MHS improvement and even of the maximum impact possible on MHS of the most minimal intervention, the placebo (see, e.g., Benedetti, Mayberg, Wager, Stohler, & Zubieta, 2005; Kirsch, Wampold, & Kelley, 2015; Krause & Lutz, 2009a, 2009b; Miller, Colloca, Crouch, & Kaptchuk, 2013) as possibly the key tool of all psychotherapists.

The Necessity of an Active Comprehensive Information Base

This is ultimately for optimally informing all PER scientists, psychotherapy practitioners and clients, paper and proposal reviewers, potential clients and potential therapists, and the public about what apparently is already securely known, further needs to be known, and presently is being or will be studied by PER. This Active Information Base (AIB), unlike the presently passive one (for a start on this see Michie & Johnston, 2017), must include knowledge about proposed and already measured on *IO* dimensions, the measures for these, the case occupancy of the present *IO* phase space, and the proximity of *IO* to ***IO*** in order to most cost-effectively (a) guide PER toward fully dimensionally defining ***IO*** and adequately populating it with uniformly validly measured case paths and (b) inform practitioners, clients, and others about what PER has so far adequately determined. It should replace the present glut of inadequate publications for keeping practitioners and researchers properly up to date.

Given a pan-theoretically dimensionally large *IO*, plural candidate measures for some of these dimensions, many cases already or being studied, many PER researchers, psychotherapists, current and former and potential clients, funding sources, publication outlets, public health policy officials, and some public interest, only an active/automated comprehensive PER information base, AIB, could most cost-effectively keep all these parties adequately informed about the current state of psychotherapy and PER. It must be automated to most usefully, promptly, safely (e.g., Schneier, 2000) and cost-effectively provide all the information relevant to PER's proper objective of fully dimensionally defining and case populating the ***IO*** space to everyone who qualifies to obtain information about psychotherapy with the least possible cost to and effort by them. This is possible because an AIB can be more cost-effective for optimizing the gathering and distributing of PER information than the present

overburdened publishing arrangements or any passive Information Base and informal system of personal contacts could be (see, e.g., Baez et al., 2010). It will be, however, only if it is properly constructed to be, so what does this require?

An AIB must on its own programmed initiative inform each of its proper audiences about all that each needs to know about prior, in process, and in planning contributions to defining and populating ***IO*** and about where and how these elements relate to one another. It should make most querying of AIB by members of its audiences unnecessary but not preclude their querying. For all this to be possible a prompt openness by all PER workforce members about their PER work, plans, expertise, and interests would be required so that PER's AIB is kept abreast of what these are in order for it to have a timely basis for selecting information to send them and any other qualified parties (see Nosek & Bar-Anan, 2012). Furthermore, all PER workforce members (many of whom are also working therapists) need to be open to AIB about their work-related information needs and what they have learned how about psychotherapy in the course of their work in order for it to most usefully select information to send to them and to others who might benefit from their experience. PER researchers and psychotherapists (and clients because they too have crucial information to contribute) should be a single AIB community, all informing and being informed by all.

The central governing council of PER *and* psychotherapy practice needs to know who is doing or planning what research and who is practicing how, as also must each PER research programme's and treatment-provision organization's management. This is necessary for maximizing the overall cost-effectiveness of PER and of psychotherapy practice, because an optimal balance between competing and cooperating needs to continually be sought but is not possible without fully enough informed and otherwise competent governance of research and practice. Thus, an AIB is essential for such governance.

Preparing one's research proposals and papers on an internet-connected computer and making AIB an artificial intelligence programme on an internet-connected super-computer with vast storage capacity would make communication between AIB and every PER scientist and psychotherapist feasible and easy. These scientists would need to send to AIB information about their research interests, proposals, progress, and paper drafts (all of which likely already exist on their computers) so that AIB has a basis for selecting from prior research publication and PER scientists' preliminary information what it sends to each PER scientist for whom these are relevant. Psychotherapists would need to send to AIB information about the nature of their practice and their PER interests so that AIB has a basis for selecting information relevant to these (see e.g. Fox, Bury, Humber, Rahmanzadeh, & Thomson, 2001). Thus The PER and practice governors, every PER scientist, and every psychotherapist always would automatically have at hand up-to-date information on all the others' relevant work and the option to better adjust what AIB sends. Data and how they were produced as well as ideas and what provoked them need to be sent to AIB so that their further analysis, development, or criticism by others is facilitated (see DeSoto, 2016).

It is vitally important for PER to avail itself of the immense repository of knowledge about psychotherapy that exists in the population of psychotherapists and clients, and to make this, as well as the products of PER research programmes, readily available to all psychotherapists and PER scientists. Balancing the supply of and demand for information by an AIB's intermediation and by coordinative central governance is crucial for PER to efficiently progress toward optimizing the cost-effectiveness of PER and thereby of psychotherapy.

Summary

Optimizing PER's progress first requires recognizing how it is being hampered. Certainly the factionalizing of the psychotherapy practice and research workforces into considerably separated profession-defined communities and these into distinct sub-communities on the basis of psychotherapy theory or measure preferences is hampering progress. It is because differently restricting the supposed causally influential/input (*I*) and effect/outcome (*O*) dimension sets or their measures to those that each of these sub-communities prefer allows the findings of each to be covertly confounded by the *I* dimensions of the others it does not employ and to be uninformative about the different *I* and *O* dimensions of these others. This progress-hampering *I* or *O* incomparability is compounded by differences in case and therapist sampling, by too brief and different case study durations, and by the glut of naïve meta-analysis-glossed incomparable outcome studies.

PER's failure to address this "big picture", practitioner disinterest in PER, and the dangers of relying on RCT statistics and their significance testing, on *IO* correlations rather than highest order interactions, on the most economically developed countries' opportunity samples of cases, on too small and varied *I* sets that then covertly confound each other, on too brief follow-up durations and too

narrow study of psychotherapy's effects … are all critical problems. No wonder that many practitioners find PER uninteresting. Much more concern with the long term social consequences of psychotherapy and for developing researcher and practitioner representative coordinative central governance of internationally programmatic PER is also necessary. Whatever is ideal needs first to be seen as such and agreed upon in order to be made feasible, rather than simply ignored or dismissed as presently unconventional or infeasible. How PER is performed is too much a matter of social convention that likely will not change anytime soon (see e.g. Centola, Becker, Brackbill, & Baronchelli, 2018) but sorely needs to.

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