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The misleading Dodo Bird verdict. How much of the outcome variance is explained by common and specific factors?☆

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ABSTRACT

The literature on psychotherapy research makes use of the so-called "Dodo Bird Verdict" to show that therapeutic change owes more to common factors than to specific techniques. According to the bulk of the empirical literature, common factors explain 30–70% of therapy outcome variance, while specific factors account for between 5% and 15%. This formulation is based on the assumption that common and specific factors are independent of each other. The present study uses a systematic review of the literature to empirically demonstrate that common and specific factors of change are actually correlated. In other words, the prevalent practice in the literature of using correlated common and specific factors as independent predictors in classical ANOVA models is both statistically unsound and conceptually distorted. We offer several alternative proposals for a sensible re-evaluation of the Dodo Bird verdict.

1. Introduction

Decades of meta-analytic research suggest that although psychotherapy is effective, no single approach is consistently more effective than another (Luborsky, Singer, & Luborsky, 1975; Wampold & Imel, 2015). Common factors research suggests that elements common to all psychotherapeutic approaches (and thus to a-specific ones), such as the therapeutic alliance and empathy, are more effective in promoting change than the specific features of different psychotherapeutic techniques, such as exposure in behavioural therapy or interpretation in psychodynamic approaches. Recently, a new model was presented to convey a theoretical basis for those common factors (Wampold, 2015). On the other hand, other authors give value to the specific "ingredients" of any psychotherapeutic technique (e.g. DeRubeis, Brotman, & Gibbons, 2005).

As a matter of fact, in the psychotherapy research domain, even the concepts of "common" and "specific" have been debated (Butler & Strupp, 1986; McAleavey & Castonguay, 2015; Mulder, Murray, & Rucklidge, 2017). Some authors have proposed an empirical taxonomy of both common and specific factors, and this has produced a shift from a clear-cut distinction of these factors to a more hazy view: "the variance of each common factor was significantly explained by its differential associations to specific techniques, thus, a common factor can be described and defined by the profile of techniques that contribute to this factor" (Tschacher, Junghan, & Pfammatter, 2014, p. 94).

A review of common factors research in 2008 suggested that between 30% and 70% of the variance in therapy outcome was due to common factors (Imel & Wampold, 2008). Therapeutic alliance accounted for roughly 30% of the variance in patient outcome, while therapy techniques, specific to each treatment, accounted for between 5% and 15% of the outcome variance (Lambert & Barley, 2001; Wampold, 2001). On the other hand, from a clinical standpoint, common and specific factors are normally considered intermingled and their relationship is often implicitly calculated by considering, for example, the timing of a comment made by the therapist: it is common for therapists to wait long enough until the patient is ready to accept it

☆ **Clinical or Methodological Significance of this Article:** In this work, the authors highlight a significant methodological criticality concerning the empirical differentiation between common and specific factors of psychotherapy. The paper rounds off outlining some proposals for a sensible re-evaluation of the Dodo Bird verdict.

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(alliance, common factor; interpretative comment, specific factor). Hence, the above figures concerning the empirical literature implicitly consider the efficacy more than the effectiveness of psychotherapy, and are at odds with everyday practice.

However, the empirical framework is further complicated when considering client contributions to the therapy process. According to Duncan (2014), as much as 86% of the psychotherapy outcome can be attributed to one of the client/life factors. Client/life factors include anything to do with the client and his or her life that aids recovery apart from actual participation in the therapy. Wampold's (2001) meta-analysis indicates that about 13% of total outcome variance is explained by treatment (alliance, therapist, model or technique, placebo and allegiance), leaving 87% of the variance attributed to client or extra-therapeutic factors as well as unexplained and error variance.

Methodologically, the research literature has typically addressed common and specific factors independently, usually by means of paradigms based on the analysis of variance (e.g. ANOVA, MANOVA, Hierarchical Linear Models, Multilevel Models). These statistical techniques assume the considered sources of variation (X variables) as mutually independent, so that their effect on the dependent variable (Y variable, the outcome) can be considered as simply additive. Only when this assumption is valid can we talk of "percentage of explained variation" by different factors. The potential presence of a significant "interaction effect" is, in any case, strictly dependent on the possibility of estimating the single contribution of each regressor in explaining a portion of variance of the dependent variable. Thus, the interaction effect suggests an impure additivity of the factor effects on outcome, not their initial interdependency.

From a clinical point of view, some authors have underlined that common and specific factors are not islands and cannot be disentangled (e.g. Sprenkle & Blow, 2004) since, for example, an alliance can only be actualised when the technique engages clients toward a common goal in therapy and when they believe that the therapeutic techniques are relevant (e.g. Davis & Piercy, 2007; Hatcher & Barends, 2006). On the other hand, the techniques may work because the clients trust the therapist (Bordin, 1979) and/or the therapist adapts treatment to match the clients' needs (Sprenkle, Davis, & Lebow, 2009).

The purpose of this work is to understand if there is evidence in the literature of any empirical relation between common and specific factors in order to: a) understand the most appropriate methodological procedure for data modelling; b) assess the significance of the percentages of outcome variance explained by common and specific factors of change.

2. Hypothesis

While the empirical literature has always treated common and specific factors as independent by means of several different kinds of analysis of variance, the clinical literature has constantly emphasised their mutual relation. Even the potential presence of a significant "interaction effect", sometimes studied in the empirical literature by means of growth curves or multilevel models, just to mention some examples, is, in any case, strictly dependent on the possibility of estimating the single contribution of each regressor in explaining a portion of variance of the dependent variable. Thus, it is based on their initial independency.

The aim of the paper is to explore empirically the veracity of such an assumption. To that end, we have chosen to conduct a systematic literature review. We see this approach as superior to a meta-analysis in this context, because a meta-analytic design would ideally have been based on a comparison of the effects of two different treatments: the first group based on a "separated administration" of common and specific factors, and the second based on their "joint administration". Instead, we wish to focus attention on the potential inaccuracy of such a separation *ab initio*. Our systematic review will address the question of whether common and specific factors can in fact be considered independent. Finding an association in the empirical literature between common and specific factors would invalidate the widespread attribution of a relative weight to these variables. In so doing, our work intends to narrow the gap between controlled research studies and real-world practice by suggesting some ground rules to evaluate the relevance of different outcome modifiers in both real-world and research settings (Nathan, Stuart, & Dolan, 2000), expanding the lens of evidence-based practice in psychotherapy (Laska et al., 2014).

3. Systematic literature review

A systematic review was conducted until January 2016 with the keywords "Interpretation and Therapeutic Alliance" and "Exposure and Therapeutic Alliance". The search was bounded within the most prominent specific and common factor for the two most widespread psychotherapy approaches: the psychodynamic approach and the cognitive-behavioural one, respectively. The search engines included PubPsych, ProQuest, NCBI, Web of Science, Scopus, EBSCO. The papers were organised as follows: 43 on PubPsych (PubPsych), 109 on PubMed (NCBI), 22 on PsychArticles (EBSCO), 50 on ProQuest (ProQuest) and 226 on PsychInfo (EBSCO). Inclusion criteria were: a) considering papers relating only to psychotherapy; b) quantitatively assessing the possible correlation between common and specific factors; c) clearly identifying the two factors under comparison. The exclusion criteria were: a) papers relating to counselling; b) only a qualitative assessment made of the possible correlation between common and specific factors, c) an unclear identification of the two factors. The final number of papers included were 20: 16 for "Interpretation and Therapeutic Alliance" and 4 for "Exposure and Therapeutic Alliance". The results are shown below (Tables 1 and 2).

A simple look at the tables clarifies how the mutual independence between specific and common factors (the necessary pre-requisite for any estimation of the relative contribution of these two aspects in the determination of outcome) does not hold.

Sixteen papers showed the mutual dependency between a specific factor pertaining to psychodynamic psychotherapy and a common factor, and four papers demonstrated the same in the cognitive domain. Although the search was bounded within the most prominent specific and common factor for the two most widespread psychotherapy approaches, the results show the presence of a significant body of literature.

Specifically, in the column "correlation", concerning the psychodynamic domain, the literature shows evidence of a significant Pearson r ranging, in absolute value, from 0.23 (Ogrodniczuk & Piper 1999) to 0.70 (Eaton, Abeles & Gutfreund 1993). Other studies demonstrated the interaction between alliance and interpretation by means of regression models. In these cases, the significance of the model is reported along with its moderators (Gerostathos et al., 2014; Høglend et al., 2011; Joyce & Piper 1996; Despland et al., 2001; Sahlia, de Roten, Despland 2015). Two more studies (Hersoug, Høglend & Bøgwald 2004; Petraglia et al., 2015) highlighted the same finding by applying repeated measures ANOVA and the Wilcoxon Matched Pairs Sign Test, respectively. The former was applied to the "adjustment ratio" of a given interpretation in relation to the patient's defensive functioning in cases of decrease or increase of working alliance, while the latter to examine the mean depth of defense interpretation in low-alliance and high-alliance sessions.

On the other hand, in the cognitive domain, that is, comparing exposure and alliance, the literature shows a significant Pearson r ranging from 0.32 (Keller, Zoellner & Feeny 2010) to 0.60 (Cloitre, Koenen, Cohen & Han 2002). Therefore, the mutual dependency between common and specific factors is well documented even from the empirical perspective. From both the clinical (e.g. Davis & Piercy, 2007; Hatcher & Barends, 2006; Sprenkle & Blow, 2004) and empirical literature, it is evident that common and specific factors cannot be factorised and considered as independent.

Table 1
Results from the search: Interpretation and Therapeutic Alliance. The column "correlation" corresponds to the quantitative assessment of the interaction between the specific and common factor: the + sign represents a Pearson's coefficient > 0 the - sign represents a Pearson's coefficient < 0. The ± sign represents a relation dependent on a third factor of moderation written in brackets. The column "Methodology in Case of Process-Outcome Comparison" underlines the specific kind of analysis of variance the authors performed in case of process-outcome comparison.

Reference	Specific Factor	Common Factor	Correlation	Methodology in Case of Process-Outcome Comparison
1) Marmar, C.R., Weiss, D.S. & Gaston, L. (1989).	Defense Interpretation	Alliance	$r = 0.30$ ($p < .05$)	Partial Correlations
	Transference Interpretation	Alliance	$r = 0.50$ ($p < .001$)	
2) Eaton, T.T., Abeles, N. & Gutfreund, M.J. (1993).	Interpretation	Alliance	$0.50 < r < 0.70$ ($.001 < p < .05$)	Pearson Coefficients
3) Piper, W.E., Azim, H.F.A., Joyce, A.S. & McCallum, M. (1991).	Transference Interpretation	Alliance	$-0.50 < r < -0.30$ ($.01 < p < .05$)	Multiple Regressions
4) Piper, W.E., McCallum, M., Azim, H.F.A. & Joyce, A.S. (1993).	Transference Interpretation	Alliance	$-0.48 < r < -0.28$ ($.01 < p < .05$) (moderator: Quality of Object Relations)	Multiple Regressions
5) Ogrodniczuk, J.S., Piper, W.E., Joyce, A.S. & McCallum, M. (1999).	Transference Interpretation	Alliance	$-0.40 < r < 0.40$ ($p < .05$) (moderator: Quality of Object Relations)	Hierarchical Linear Regression Analyses and Pearson Coefficients
6) Allen, J., Coyne, L., Colson, D., Horwitz, L., Gabbard, G., Frieswyk, S. & Newson, G. (1996).	Interpretation	Alliance	$0.35 < r < 0.45$ ($.01 < p < .05$)	
7) Crits-Christoph, P., Barber, J. & Kurcias, J. (1993).	Accuracy of Interpretation	Alliance	$r = 0.50$ ($p < .005$)	Partial Correlations
8) Gerostathos, A., de Roten, Y., Berney, S., Despland, J. & Ambresin, G. (2014).	Defense Interpretation	Alliance	−/+ ($.01 < p < .05$) (moderator: Rupture or Resolution Sessions) (Results derived from General Linear Models)	
9) Hersoug, A.G., Høglend, P. & Bøgwald, K. (2004).	Defense Interpretation	Alliance	−/+ ($p < .05$) (moderator: Patient's Defense Functioning) (Results derived from Repeated Measures ANOVA)	ANOVA
	Transference Interpretation	Alliance	−/+ ($p < .05$) (moderator: Patient's Defense Functioning) (Results derived from Repeated Measures ANOVA)	ANOVA
10) Høglend, P., Hersoug, A.G., Kjell-Petter, B., Amlo, S., Marble, A., Sørbye, Ø., Ivar Røssberg, J., Ulberg, R., Gabbard, G. & Crits-Christoph, P. (2011).	Transference Interpretation	Alliance	−/+ ($p < .05$, Cohen's $d = .49$) (moderator: Quality of Object Relations) (Results derived from Linear Mixed Models)	Linear Mixed Models
11) Joyce, A.S. & Piper, W.E. (1996).	Transference Interpretation	Working Involvement	−/+ ($.002 < p < .05$) (moderator: Quality of Object Relations) (Results derived from Hierarchical Linear Model)	Hierarchical Linear Model
12) Despland, J., de Roten, Y., Despars, J., Stigler, M. & Christopher Perry, J. (2001).	Defense Interpretation	Alliance	−/+ ($p < .05$) (moderator: Patient's Defense Functioning) (Results derived from Linear Regressions)	Linear Regressions
13) Petraglia, J., Bhatia, M., de Roten, Y., Despland, J.N. & Drapeau, M. (2015).	Interpretation Depth	Alliance	− ($p < .05$) (moderator: Patient's Defense Functioning) (Results derived from Wilcoxon Matched Pairs Sign Test)	
14) Sahlia, C., de Roten, Y., Despland, J. (2015).	Accuracy of Interpretation	Alliance	+ ($p < .001$) (Results derived from Generalised Linear Models)	Generalised Linear Models and Partial Correlations
15) Marziali, E. (1984).	Transference Interpretation	Intimacy	$r = 0.33$ ($p < .05$)	
16) Ogrodniczuk, J. & Piper, W. (1999)	Interpretation	Alliance	$0.23 < r < 0.36$ ($.01 < p < .05$)	Multiple Regressions

Table 2
Results from the search: Exposure and Therapeutic Alliance. The column "correlation" corresponds to the quantitative assessment of the interaction between the specific and common factor: the + sign represents a Pearson's coefficient > 0 the - sign represents a Pearson's coefficient < 0. The ± sign represents a relation dependent on a third factor of moderation written in brackets. The column "Methodology in Case of Process-Outcome Comparison" underlines the specific kind of analysis of variance the authors performed in case of process-outcome comparison.

Reference	Specific Factor	Common Factor	Correlation	Methodology in Case of Process-Outcome Comparison
1) Cloitre, M., Koenen, K.C., Cohen, L.R. & Han, H. (2002).	Prolonged Exposure	Alliance	r = 0.60 (p < .05)	MANOVA
2) Keller, S.M., Zoellner, L.A. & Feeny, N.C. (2010).	Prolonged Exposure	Alliance	r = 0.32 (p < .05)	ANOVA and Pearson Coefficients
3) McLaughlin, A.A., Keller, S.M., Feeny, N.C., Youngstrom, E.A. & Zoellner, L.A. (2014).	Prolonged Exposure	Alliance	r = 0.37 (p < .001)	Regression Analyses
4) Cloitre, M., Stovall-McClough, K.C., Miranda, R. & Chemtob, C.M. (2004).	Exposure	Alliance	r = 0.46 (p < .01) (moderator: Negative Mood Regulation)	Hierarchical Regression Analyses

Hence, talking in terms of relative percentages of the outcome variance explained by common and specific factors makes no sense; assuming the independence of variables, the analysis of variance used for identifying their relative contributions to the psychotherapeutic outcome turns out to be dysfunctional. On the other hand, we need to seriously take the interaction of specific and common factors into account, understand their relationship with the outcome, and model their evolution over time.

4. Discussion and conclusion

The demonstrated lack of independence between the so-called common and specific factors implies that a different perspective should be adopted in order to address the problem of how psychotherapy works, especially with regard to the current paradigm on which psychotherapy research is based: process-outcome research investigates the connection between the variables pertaining to the process of psychotherapy and its outcome.

The main limitation of the ANOVA-based models concerns the independence of variables. We suggest shifting from models which we can call "additive" to "multiplicative models" (e.g. $y = \times 1^* \times 2^* \times 3 \ldots$), which consider not only the interactions between variables, but also how they evolve over time (e.g. Malkina-Pykh, 2018).

One further possibility is to explore the feasibility of creating a composite "multiplicative" index, e.g., quantifying the combined joint action of common and specific factors in a manner analogous to the definition of "work" in physics: i.e. "force multiplied by displacement". The analysis of the correlation between outcome and such a composite "work-like" index could be useful. An example can be found in Joyce & Piper, 1996, where hierarchical linear models (i.e. a type of analysis of variance for nested data) were used to measure the patterns of therapist interpretations and patient relational responses, avoiding the focus on therapist technique in isolation. In fact, from a clinical standpoint, the relationship between common and specific factors is often implicitly taken into account, thereby avoiding any interpretative comment made before we perceive that the patient is ready to accept it or after the core theme is no longer dominant in the patient's internal world.

Furthermore, the ANOVA-based models rely on linear causality – an aspect challenged by a substantial body of literature (e.g. Ilardi & Craighead, 1994; Tang & DeRubeis, 1999; Hayes et al., 2007; Gumz, Bauer, & Brähler, 2012; Schiepek et al., 1997; for a review see; de Felice & Andreassi, 2015). This represents a heavy limitation because it does not take the complexity of clinical practice into account, where the meaning of any given variable derives from its relations with the others. The same comment, even if it conveys the same meaning, will be introjected by the patient in different ways according to the atmosphere of the therapeutic relationship (note the mutual dependency between a common factor, the therapeutic atmosphere, and a specific factor, the interpretative comment).

Therefore, it would be more appropriate to study the interactions between variables and their evolution over time by means of methods that take the causality as a phenomenon stemming from self-organisation processes between those variables and their patterns of change (e.g. Tschacher, Schiepek, & Brunner, 1992; Orsucci et al., 2016a,b; Schiepek et al., 2017; Schöller et al., 2018).

An example is Symbolic Dynamics, a mathematical procedure in which clusterisation methods are used to highlight recurrent patterns throughout the therapeutic process (e.g. Halfon et al., 2016; Orsucci et al., 2016a,b; Rapp, Cellucci, Gilpin, Jiménez-Montaño, & Korslund, 2011). Symbolic Dynamics is based on the shift from a continuous to a discrete approach, in which data-driven clusters correspond to specific patterns of the variables considered, avoiding the focus on any one of them in isolation. Clusters are located in a multidimensional space composed of a number of axes corresponding to all the modulators and outcome variables. The trajectories across these clusters, computed for each patient or for a group of similar patients (e.g. Halfon et al., 2016),

take the form of a Markov Matrix, and can be easily correlated to any global index of effectiveness of the therapeutic process. This approach is completely devoid of any collinearity constraint and of the need to assume the independency of the variables considered.

Another alternative approach consists of using coarse-grained descriptors by organising the various microscopic variables of the psychotherapy process into a few general dimensions usually related to correlation robustness, variability and complexity of the system (i.e. what we have called a Statistical Mechanics approach to psychotherapy research; see, for example, de Felice et al., 2019; Schiepek, 2009). This approach, mirroring the rationale of Statistical Mechanics, shifts the focus from the description of specific features of the system at hand to its general organising properties, such as the degree of order and variability, which are well-known universal markers of phase transition (i.e. state change; e.g. Gorban, Smirnova, & Tyukina, 2010). Network approaches are an example of this paradigm (Sporns & Betzel, 2016).

Finally, another promising research avenue could be latent factors analysis (LCA), a bottom-up approach employed to find groups or subtypes of cases in multivariate categorical data, or, generally, in the use of unsupervised methods that model observed high-dimensional data by orthogonal constructions (e.g. Mannarini, Balottin, Toldo, & Gatta, 2016).

It seems to us that the Dodo Bird verdict "Everyone has won, and all must have prizes" (Carroll, 1971; Rosenzweig, 1936) has led our main research efforts to protect the effectiveness of our own different psychotherapy schools more than being a creative impulse to understand how effectively the process of psychotherapy works. This is also confirmed by all the data stressing the importance of allegiance as one of the most prominent variables in predicting the outcome of many studies (Dragioti, Dimoliatis, Fountoulakis, & Evangelou, 2015).

The methods on which we have traditionally relied (i.e. based on the analysis of variance) in order to study and support the effectiveness of our respective psychotherapeutic approach, have generated a misleading split between common and specific factors in the understanding of how psychotherapy works. Such a clinical picture within the psychological literature would be called "baF" or "basic assumption of fight-flight" (Bion, W. R. 1961). The "basic-assumption mentality" describes the status of a group as all wrapped up in its own emotions: in this case, probably characterised by an anxiety to protect the identity of our own psychotherapy approach or our professional identity; the outcome, in the case of a prevalence of this kind of mentality, consists of losing sight of the aim for which the group has come together, collapsing into a collusive process of "stagnation" (Bion, 1961, p. 128). Curiously, a period of strong stagnation of our research results and novelties has really occurred in our research community: our methods have become more suited to protecting our own professional identity than to adequately studying the complexity of the interactions between variables pertaining to the psychotherapeutic process.

Given that the literature has for many years clarified that the talking-cure is effective, a promising area of research is based on the attempt to rank the different approaches in terms of a differential efficacy for specific psychopathological conditions: something which goes under the statement "what works for whom" in the literature (Roth and Fonagy, 2013; Leichsenring et al., 2018). In the case of purely organic diseases, the different therapeutic interventions are ranked in the context of a specific disease. Meta-analysis or comparative trials for leukaemia involve the comparison of different drugs acting on that specific disease; nobody puts together an anti-proliferative agent with an anti-arrhythmic drug in a clinical trial mixing leukaemia and atrial fibrillation patients.

Although a significant degree of comorbidity is the rule more than the exception in our field, in the long run we expect the Dodo verdict to be confuted by assigning the most promising therapy or therapeutic attitude for a given clinical condition, that is, a personalised psychotherapy grounded on the use of a detailed case formulation and an ongoing process monitoring (e.g. Schiepek et al., 2015). The existence of different efficacy rankings for different clinical conditions or case formulations will immediately solve the conundrum: the existence of that context-dependency will indirectly speak in favour of some relevant peculiarities of the different approaches. Thus, it is perfectly reasonable that model A will be better than model B for dealing with the clinical condition K, while the contrary will hold for pathology J. From a clinical standpoint, this is the same procedure used any time a psychodynamic psychotherapist chooses to carry out a treatment either *vis-à-vis* or on the couch with a new patient. On the other hand, in the same way as there are wide-spectrum antibiotics acting on many bacterial species, we should expect to observe emerging "wide-spectrum" therapies or therapeutic attitudes (probably based on a meta-theoretical framework) or very specific ones (e.g. therapy or therapeutic attitude C is the first choice for clinical condition Z, while it is completely useless in other cases).

While the concept that any approach or therapeutic attitude must be checked for its efficacy in the realm of a specific clinical condition is largely obvious, we are convinced that such an effort could promote the creation of a "shared ontology" across different psychotherapy schools by identifying "wide-spectrum" strategies of change based on a meta-theoretical framework. Hopefully, the Dodo Bird verdict will be used to foster such a necessary systematisation, thereby allowing a psychotherapist to tailor his/her therapeutic interventions to that specific patient. In short, a proper shift of research paradigm is proposed here:

a) From additive models to multiplicative models
b) From linear causality to self-organisation
c) From independent variables to patterns of change.

Perhaps it is not entirely fortuitous that the Complexity Science section has been established this year in the SPR (International Society for Psychotherapy Research) society. We resolutely think the scientific interaction between those two disciplines can nourish our research community by producing new and fertile advancements.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.newideapsych.2019.01.006.

References

Allen, J. G., Coyne, L., Colson, D. B., Horwitz, L., Gabbard, G. O., Frieswyk, S. H., et al. (1996). Pattern of therapist interventions associated with patient collaboration. *Psychotherapy: Theory, Research, Practice, Training, 33*(2), 254.
Bion, W. R. (1961). *Experiences in groups.* London: Tavistock.
Bordin, E. S. (1979). The generalizability of the psychoanalytic concept of the working alliance. *Psychotherapy Theory Research and Practice, 16*(3), 252.
Butler, S. F., & Strupp, H. H. (1986). Specific and nonspecific factors in psychotherapy: A problematic paradigm for psychotherapy research. *Psychotherapy: Theory, Research, Practice, Training, 23*(1), 30.
Carroll, L. (1971). *Alice in wonderland. 1865.* London: Oxford UP.
Cloitre, M., Koenen, K. C., Cohen, L. R., & Han, H. (2002). Skills training in affective and interpersonal regulation followed by exposure: A phase-based treatment for PTSD related to childhood abuse. *Journal of Consulting and Clinical Psychology, 70*(5), 1067.
Cloitre, M., Stovall-McClough, C. K., Miranda, R., & Chemtob, C. M. (2004). Therapeutic alliance, negative mood regulation, and treatment outcome in child abuse-related posttraumatic stress disorder. *Journal of Consulting and Clinical Psychology, 72*(3), 411–416.
Crits-Christoph, P., Barber, J., & Kurcias, J. (1993). The accuracy of therapists' interpretations and the development of the therapeutic alliance. *Psychotherapy Research, 3*(1), 25–35.
Davis, S. D., & Piercy, F. P. (2007). What clients of couple therapy model developers and their former students say about change, Part I: Model-dependent common factors across three models. *Journal of Marital and Family Therapy, 33*(3), 318–343.
DeRubeis, R. J., Brotman, M. A., & Gibbons, C. J. (2005). Conceptual and methodological analysis of the non specifics argument. *Clinical Psychology: Science and Practice, 12*, 174–183.
Despland, J. N., de Roten, Y., Despars, J., Stigler, M., & Perry, J. C. (2001). Contribution of patient defense mechanisms and therapist interventions to the development of early therapeutic alliance in a brief psychodynamic investigation. *The Journal of Psychotherapy Practice and Research, 10*(3), 155.
Dragioti, E., Dimoliatis, I., Fountoulakis, K. N., & Evangelou, E. (2015). A systematic

appraisal of allegiance effect in randomized controlled trials of psychotherapy. *Annals of General Psychiatry, 14*(1), 25.
Duncan, B. L. (2014). *On becoming a better therapist: Evidence based practice one client at a time* (2nd ed.). Washington, DC: American Psychological Association.
Eaton, T., Abeles, N., & Gutfreund, M. (1993). Negative indicators, therapeutic alliance, and therapy outcome. *Psychotherapy Research, 3*(2), 115–123.
de Felice, G., & Andreassi, S. (2015). How is the shape of change in the psychotherapeutic complex system? *Chaos and Complexity Letters, 8*, 109–120.
de Felice, G., Orsucci, F., Scozzari, A., Gelo, O., Serafini, G., Mergenthaler, E., et al. (2019). *What differentiates poor and good outcome psychotherapies? A statistical Mechanics approach to psychotherapy research.* (Manuscript submitted for publication).
Gerostathos, A., de Roten, Y., Berney, S., Despland, J. N., & Ambresin, G. (2014). How does addressing patient's defenses help to repair alliance ruptures in psychodynamic psychotherapy? An exploratory study. *The Journal of Nervous and Mental Disease, 202*(5), 419–424.
Gorban, A. N., Smirnova, E. V., & Tyukina, T. A. (2010). Correlations, risk and crisis: From physiology to finance. *Physica A: Statistical Mechanics and Its Applications, 389*(16), 3193–3217.
Gumz, A., Bauer, K., & Brähler, E. (2012). Corresponding instability of patient and therapist process ratings in psychodynamic psychotherapies. *Psychotherapy Research, 22*(1), 26–39.
Halfon, S., Çavdar, A., Orsucci, F., Schiepek, G. K., Andreassi, S., Giuliani, A., et al. (2016). The non-linear trajectory of change in play profiles of three children in psychodynamic play therapy. *Frontiers in Psychology, 7*, 1494.
Hatcher, R. L., & Barends, A. W. (2006). How a return to theory could help alliance research. *Psychotherapy: Theory, Research, Practice, Training, 43*(3), 292.
Hayes, A., Laurenceaue, J., Feldman, G., et al. (2007). Change is not always linear: The study of nonlinear and discontinuous patterns of change in psychotherapy. *Clinical Psychology Review, 27*, 715–723.
Hersoug, A. G., Høglend, P., & Bøgwald, K. P. (2004). Is there an optimal adjustment of interpretation to the patients' level of defensive functioning? *American Journal of Psychotherapy, 58*(3), 349.
Høglend, P., Hersoug, A. G., Bøgwald, K. P., Amlo, S., Marble, A., Sørbye, Ø., ... Crits-Christoph, P. (2011). Effects of transference work in the context of therapeutic alliance and quality of object relations. *Journal of Consulting and Clinical Psychology, 79*(5), 697.
Ilardi, S. S., & Craighead, W. E. (1994). The role of nonspecific factors in cognitive-behavior therapy for depression. *Clinical Psychology: Science and Practice, 1*(2), 138–155.
Imel, Z. E., & Wampold, B. E. (2008). The importance of treatment and the science of common factors in psychotherapy. *Handbook of counseling psychology, 4*, 249–266.
Joyce, A. S., & Piper, W. E. (1996). Interpretive work in short-term individual psychotherapy: An analysis using hierarchical linear modeling. *Journal of Consulting and Clinical Psychology, 64*(3), 505.
Keller, S. M., Zoellner, L. A., & Feeny, N. C. (2010). Understanding factors associated with early therapeutic alliance in PTSD treatment: Adherence, childhood sexual abuse history, and social support. *Journal of Consulting and Clinical Psychology, 78*(6), 974.
Lambert, M. J., & Barley, D. E. (2001). Research summary on the therapeutic relationship and psychotherapy outcome. *Psychotherapy: Theory, Research, Practice, Training, 38*(4), 357.
Laska, K. M., Gurman, A. S., & Wampold, B. E. (2014). Expanding the lens of evidence-based practice in psychotherapy: A common factors perspective. *Psychotherapy, 51*(4), 467.
Leichsenring, F., Abbass, A., Hilsenroth, J., Luyten, P., Munder, T., Rabung, S., et al. (2018). "Gold standards", plurality and monocultures: The need for diversity in psychotherapy. *Frontiers in Psychiatry, 9*, 159.
Luborsky, L., Singer, B., & Luborsky, L. (1975). Comparative studies of psychotherapies: Is it true that everyone has won and all must have prizes? *Archives of General Psychiatry, 32*(8), 995–1008.
Malkina-Pykh, I. (2018). Generalized multiplicative model for assessing outcome in psychotherapy: Subjective well-being. *Nonlinear Dynamics, Psychology, and Life Sciences, 22*(2), 191–224.
Mannarini, S., Balottin, L., Toldo, I., & Gatta, M. (2016). Alexithymia and psychosocial problems among Italian preadolescents. A latent class analysis approach. *Scandinavian Journal of Psychology, 57*(5), 473–481.
Marmar, C. R., Weiss, D. S., & Gaston, L. (1989). Toward the validation of the California therapeutic alliance rating system. *Psychological Assessment: Journal of Consulting and Clinical Psychology, 1*(1), 46.
Marziali, E. A. (1984). Prediction of outcome of brief psychotherapy from therapist interpretive interventions. *Archives of General Psychiatry, 41*(3), 301–304.
McAleavey, A. A., & Castonguay, L. G. (2015). The process of change in psychotherapy: Common and unique factors. *Psychotherapy research* (pp. 293–310). Vienna: Springer.
McLaughlin, A. A., Keller, S. M., Feeny, N. C., Youngstrom, E. A., & Zoellner, L. A. (2014). Patterns of therapeutic alliance: Rupture–repair episodes in prolonged exposure for posttraumatic stress disorder. *Journal of Consulting and Clinical Psychology, 82*(1), 112.
Mulder, R., Murray, G., & Rucklidge, J. (2017). Common versus specific factors in psychotherapy: Opening the black box. *The Lancet Psychiatry, 4*(12), 953–962.
Nathan, P. E., Stuart, S. P., & Dolan, S. L. (2000). Research on psychotherapy efficacy and effectiveness: Between Scylla and Charybdis? *Psychological Bulletin, 126*(6), 964.
Ogrodniczuk, J. S., & Piper, W. E. (1999). Measuring therapist technique in psychodynamic psychotherapies: Development and use of a new scale. *The Journal of Psychotherapy Practice and Research, 8*(2), 142.
Ogrodniczuk, J. S., Piper, W. E., Joyce, A. S., & McCallum, M. (1999). Transference interpretations in short-term dynamic psychotherapy. *The Journal of Nervous and Mental Disease, 187*(9), 571–578.
Orsucci, F., et al. (2016a). *Human Dynamics: A complexity science open handbook.* Nova Science Publishers.
Orsucci, F. F., Musmeci, N., Aas, B., Schiepek, G., Reda, M. A., Canestri, L., et al. (2016b). Synchronization analysis of language and physiology in human dyads. *Nonlinear Dynamics, Psychology, and Life Sciences, 20*(2), 167–191.
Petraglia, J., Bhatia, M., De Roten, Y., Despland, J. N., & Drapeau, M. (2015). An empirical investigation of defense interpretation depth, defensive functioning, and alliance strength in psychodynamic psychotherapy. *American Journal of Psychotherapy, 69*(1), 1–17.
Piper, W. E., Azim, H. F., Joyce, A. S., & McCallum, M. (1991). Transference interpretations, therapeutic alliance, and outcome in short-term individual psychotherapy. *Archives of General Psychiatry, 48*(10), 946–953.
Piper, W. E., Joyce, A. S., McCallum, M., & Azim, H. F. (1993). Concentration and correspondence of transference interpretations in short-term psychotherapy. *Journal of Consulting and Clinical Psychology, 61*(4), 586.
Rapp, P. E., Cellucci, C. J., Gilpin, A. M., Jiménez-Montaño, M. A., & Korslund, K. E. (2011). Communication patterns in a psychotherapy following traumatic brain injury: A quantitative case study based on symbolic dynamics. *BMC Psychiatry, 11*(1), 119.
Rosenzweig, S. (1936). Some implicit common factors in diverse methods of psychotherapy. *American Journal of Orthopsychiatry, 6*(3), 412.
Roth, A., & Fonagy, P. (2013). *What works for whom? A critical review of psychotherapy research.* Guilford Publications.
Sahlia, C., de Roten, Y., & Despland, J. N. (2015). Therapist interpretation, alliance rupture-resolution and outcome. *Swiss archives of neurology and psychiatry, 166*(6), 208–221.
Schiepek, G. (2009). Complexity and nonlinear dynamics in psychotherapy. *European Review, 17*(2), 331–356.
Schiepek, G., Eckert, H., Aas, B., Wallot, S., & Wallot, A. (2015). *Integrative psychotherapy: A feedback-driven dynamic systems approach.* Hogrefe Publishing.
Schiepek, G., Kowalik, Z., Schütz, A., Köhler, M., Richter, K., Strunk, G., ... Elbert, T. (1997). Psychotherapy as a chaotic process I. Coding the client-therapist interaction by means of sequential plan analysis and the search for chaos: A stationary approach. *Psychotherapy Research, 7*(2), 173–194.
Schiepek, G. K., Viol, K., Aichhorn, W., Hütt, M. T., Sungler, K., Pincus, D., et al. (2017). Psychotherapy is chaotic — (Not only) in a computational world. *Frontiers in Psychology, 8*, 379.
Schöller, H., Viol, K., Aichhorn, W., Hütt, M. T., & Schiepek, G. (2018). Personality development in psychotherapy: A synergetic model of state-trait dynamics. *Cognitive Neurodynamics, 12*(5), 441–459.
Sporns, O., & Betzel, R. F. (2016). Modular brain networks. *Annual Review of Psychology, 67*, 613–640.
Sprenkle, D. H., & Blow, A. J. (2004). Common factors are not islands—they work through models: A response to Sexton, Ridley, and Kleiner. *Journal of Marital and Family Therapy, 30*(2), 151–157.
Sprenkle, D. H., Davis, S. D., & Lebow, J. L. (2009). *Common factors in couple and family therapy: The overlooked foundation for effective practice.* Guilford Press.
Tang, T. Z., & DeRubeis, R. J. (1999). Sudden gains and critical sessions in cognitive-behavioral therapy for depression. *Journal of Consulting and Clinical Psychology, 67*(6), 894.
Tschacher, W., Junghan, U. M., & Pfammatter, M. (2014). Towards a taxonomy of common factors in psychotherapy—results of an expert survey. *Clinical Psychology & Psychotherapy, 21*(1), 82–96.
Tschacher, W., Schiepek, G., & Brunner, E. J. (Vol. Eds.), (1992). *Self-organization and clinical psychology: Empirical approaches to synergetics in psychology: Vol. 58*Springer Science & Business Media.
Wampold, B. E. (2001). *The great psychotherapy debate: Models, methods, and findings.* Mahwah, NJ: Lawrence Erlbaum Associates.
Wampold, B. E. (2015). How important are the common factors in psychotherapy? An update. *World Psychiatry, 14*(3), 270–277.
Wampold, B. E., & Imel, Z. E. (2015). *The great psychotherapy debate: The evidence for what makes psychotherapy work.* Routledge.