Distinct roles of state-like and trait-like patient–therapist alliance in psychotherapy

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Abstract | Hundreds of studies suggest that the patient–therapist alliance is the most consistent predictor of treatment outcome across patients, therapists, types of treatment and settings. Yet, the context-insensitive nature of this prediction makes it difficult to optimize alliance to benefit individual patients. To elucidate the potential roles of alliance in treatment, research published mainly in the past five years has distinguished between state-like strengthening of alliance throughout treatment from trait-like differences between individuals in alliance strength. In this Review, we synthesize the literature on state-like and trait-like alliance to shed light on for whom, when and why alliance predicts treatment outcome. Trait-like alliance is a product of patients' and therapists' intrapersonal and interpersonal characteristics, whereas state-like alliance reflects the therapeutic process evolving between them. Trait-like alliance mediates the effects of patient and therapist baseline characteristics on outcome, whereas state-like alliance is the mechanism by which alliance might drive therapeutic change. This synthesis reveals the importance of putting alliance into context for making progress toward personalized psychotherapy, in which the alliance is not merely a non-specific factor but an individual-specific mechanism of change.

Cognitive behavioural therapy
(CBT). A form of therapy aimed at modifying maladaptive thought processes and problematic behaviours through cognitive restructuring and behavioural techniques to achieve change.

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A century of theoretical and clinical writing and seven decades of empirical research have produced little consensus about the mechanisms that bring about therapeutic change, such as improved well-being and symptom reduction, in psychotherapy[1]. One of the few exceptions is the alliance formed during treatment between patients and their therapists[2–4]. The alliance is usually defined as the emotional bond between patients and their therapists, and the agreement between them on the goals of treatment and the tasks needed to achieve these goals[5,6]. Meta-analyses show that a stronger alliance is consistently and moderately associated with better treatment outcome across patient populations (that is, those with distinct diagnoses, presenting problems, or different socio-cultural backgrounds), settings (for example, naturalistic versus randomized controlled studies), and treatment modalities (such as psychodynamic and cognitive behavioural therapies)[7,8]. One of the common interpretations of this association is that the alliance is therapeutic in itself[3].

The broad scope and lack of specificity of the findings concerning the impact of alliance in treatment has made it easy for theorists, clinicians and researchers across theoretical orientations to agree that a stronger alliance between patient and therapist is associated with better treatment outcomes[3,4,6]. However, the same lack of specificity makes it difficult, if not impossible, to derive concrete guidelines about how to use the alliance to improve treatment efficacy and effectiveness[6]. This is a serious drawback given that decades of psychotherapy research has made little if any contribution to improving treatment efficacy[1]. Just as it was five decades ago, psychotherapy remains effective for only half of those seeking treatment[9].

To become instrumental and have an effect on clinical practice, alliance research, like all research on mechanisms of change, must distinguish between different components that have distinct roles in treatment[10,11]. Specifically, there are two distinct components of alliance[12]: trait-like alliance, which reflects individual differences in alliance strength, and state-like alliance, which reflects how alliance manifests and is strengthened or weakened within a specific treatment context. Yet, until the past decade, this distinction was rarely made, and empirical psychotherapy research used a contaminated raw measure that commingled the two alliance components and could not differentiate between them. Methodological research and simulation studies suggest that it is not possible to infer within-individual processes (alliance strengthening)

from between-individuals attributes (alliance strength) and vice versa[13,14]. Therefore, past research could not furnish accurate insights into either the strength or the strengthening of alliance, and consequently, on the role of alliance in treatment. Fortunately, a substantial amount of alliance research published mainly in the past five years has leveraged developments in study design, measurement (BOX 1) and statistical methods to disentangle the state-like and trait-like components of alliance.

In this Review, we first describe the trait-like and state-like components of alliance. Next, we focus on published peer-reviewed articles that adequately disentangle trait-like and state-like alliance to investigate whether these two components have distinct origins, differ in the manner in which they contribute to treatment outcomes, and how context (that is, the characteristics of patients, therapists, settings and type of treatment) determines the contribution of each component of alliance to treatment success. Mapping and synthesizing these findings moves beyond context-free questions about the role of alliance in general, to topics of clinical importance about the role of alliance for a given patient population, treated by certain therapists, using specific treatments, in a particular setting. This signals a new generation of psychotherapy research that focuses on the individual patient, closes the gap between what is of interest to clinicians and to researchers, and brings us closer to precision psychotherapy science.

Trait-like and state-like alliance

Many constructs in psychology and other disciplines include both trait-like and state-like components[15,16], which can be disentangled using statistical methods[14,17,18] (BOX 2) or procedural techniques (for example, different self-reporting questionnaire instructions to focus on an individual in general or in a given context)[19,20]. A trait is a person's characteristic, which remains relatively stable across time and situations; a state reflects a person's deviations from this trait under particular circumstances[17,21]. Like other constructs in psychotherapy and in psychology in general[22], each time researchers sample the alliance they are capturing, to varying degrees, both attributes of a person (patient, therapist, or both) and attributes of a person-in-a-situation. In other words, when patients are asked to report on the strength of the therapeutic alliance in the current session, the alliance observed at that moment reflects a mix of trait-like and state-like components (FIG. 1).

The trait-like component of alliance refers to the general ability of the patient to form satisfying interactions with others and the general ability of the therapist to form strong alliances with patients, reflecting individual differences between patients and between therapists in alliance strength. A therapist's trait-like alliance is relatively easy to estimate by assessing the alliance the therapist forms with various patients[23]. A patient's trait-like alliance is more difficult to estimate because patients are usually treated by one therapist at a time, and there is no way of knowing how strong an alliance the patient would form with different therapists[12]. Several approaches for estimating a patient's trait-like alliance have been proposed, including assessment of a patient's general ability to form a strong alliance with a specific therapist across treatment (estimated as the mean level of alliance across sessions), or the alliance at the first session, before any meaningful therapeutic changes can occur. Although trait-like alliance might include some dynamic characteristics (for example, an individual might be consistently slow to warm up across situations), it is by definition a consistent characteristic of the individual that is not intended to capture processes of change. To infer a causal relation, a correct temporal relationship must be established in which the cause must temporally precede the outcome[24]. Thus, no causality can be inferred regarding the association between trait-like alliance and changes in other constructs, unless shifts in traits are achieved experimentally (for example, through training).

Like many other constructs in psychology[25,26], alliance is never assessed in a situational vacuum. Consequently, alliance includes a state-like component that reflects the individual's alliance in a particular context. State-like

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Box 1 | How alliance is assessed and studied

For decades, most alliance research was based on the assumption that it takes several sessions for alliance to be formed, but once formed, it remains stable. Accordingly, alliance was usually measured at one point during treatment, with a questionnaire that patients completed at the end of sessions 3, 4 or 5 (REF.[7]). Although some studies suggested that alliance might not be static[176], they had little effect on the mainstream design of psychotherapy research[177]. Numerous questionnaires are available for assessing alliance, many with strong psychometric properties. One of the most widely used is the Working Alliance Inventory[178,179]. Less common is therapist-reported alliance at the end of one of the sessions or coding of alliance by a trained external observer who watches a video recording of a given session.

Historically, single-session assessment of alliance was used to test the alliance–outcome association, with outcome usually measured as the change from pre-treatment to post-treatment[180]. Single-session assessment blends together trait-like and state-like components of alliance such that it is not possible to differentiate between a patient with strong initial alliance and one who shows improvement in alliance over the course of treatment.

Psychotherapy research is now moving toward a conceptualization of alliance as a dynamic construct with potential to change over the entire course of treatment. In the past five years, state-of-the-art design of alliance research has been based on session-by-session measurement of alliance that aims to capture its dynamic nature[11]. This design enables the investigation of the temporal relationship between alliance and symptomatic change[30] to determine which is the predictor and which is the product[3]. Questionnaires are typically completed by both patients and therapists, enabling investigation of the agreement between patients and therapists on the alliance and the effects of such agreement on treatment outcome[181].

External coding systems have been used to generate insight on aspects of alliance that patients and therapists are not able or willing to report. However, coding is limited to what an external observer can detect. It is also time-consuming, which makes the coding of several sessions per individual expensive. Coding therefore tends to be used to shed light on within-session but not on between-sessions dynamics[138].

To complement existing measures, studies have started to use interdisciplinary methods to study the alliance or aspects of patient–therapist relations. Such measures can be automatically or semi-automatically coded from moment to moment to shed light on within-session and between-sessions dynamics of the alliance or therapist–patient relations in general. They include body motion[182,183], acoustic markers (such as vocal fundamental frequency span and jitter)[184], physiological measures (such as electrodermal activity and skin conductance)[185], hormonal synchrony[163], linguistic features[186,187], and vocal synchrony[188]. It has been suggested that these automatic measures, especially when combined into a multi-domain marker, could serve as automatic in-session feedback systems for therapists[189]. It remains to be determined which constructs these methods measure and how much they reflect alliance as it is usually understood and measured today.

To estimate state-like and trait-like components of alliance accurately, at least three observations across time are recommended[21,190]. There are several frequently used methods for disaggregating state-like from trait-like alliance[17,18,191,192].

Centring
Centring means subtracting the mean of the patient's observations at the various time points from each individual observation. The state-like alliance score obtained by removing the patient's mean (or the first session observation of alliance) represents within-patient change over time that is orthogonal to any stable differences between patients. The trait-like alliance score is the mean level of alliance (or the first session alliance). When using structural equation models, the centring procedure is part of the analytic model, with the random intercept as trait-like alliance, and the latent within-person deviation scores as state-like alliance.

Detrending
Detrending means calculating a separate ordinary least-squares regression for the patient, with time of measurement (for example, session) entered as a predictor of the alliance. At each session, the state-like alliance is the discrepancy between the measured alliance score and the score implied by the model (model residual) for that session. The trait-like alliance score is given by the patient-specific intercepts obtained from these models. In structural equation modelling, detrending is applied by including a random slope in the model, in addition to the random intercept.

Growth-model approach
The intercept and time slope of the alliance for each patient is calculated using growth-model analysis. The state-like alliance score is the slope, representing change in alliance over time. The trait-like alliance score is the intercept, representing early or mid-treatment alliance (depending on how time is centred). It is more challenging to establish temporal relationships using this approach, and in contrast to the other approaches, state-like alliance is not estimated as a within-patient variance but rather as a between-patient variance.

Two additional methods may be used to calculate state-like alliance only.

Difference scores
The state-like alliance score is obtained by repeatedly calculating the difference in alliance scores observed at session T and session $T+1$ over the course of treatment.

Autoregression
The state-like alliance score is obtained by testing the effect of a given predictor on alliance at time T, controlling for the level of alliance at time $T-1$. This approach is relevant when alliance is used as the predicted variable.

alliance is usually estimated based on the patient's alliance as measured immediately after the end of a session, relative to the patient's trait-like alliance. In contrast to trait-like alliance, state-like alliance is estimated mostly at the within-patient level, and as such it has the advantage of ruling out at least some potential confounding variables. Because it is disentangled from trait-like alliance, state-like within-patient strengthening of alliance is orthogonal to any stable individual differences between patients[27], such as gender or level of education. State-like fluctuations in alliance represent variability or deviations from a relatively stable trait-like alliance level or alliance potential. Deviations can be situation-driven[28], for example, the anniversary of a patient's father's death, and psychotherapeutic process-driven, like the development of alliance over the course of treatment[29]. Psychotherapy researchers are generally interested in process-driven rather than situation-driven variability[30]. When they are not transient, process-driven state-like changes are expected to become enduring and to form the basis for a new trait-like characteristic[12]. Such positive changes are desirable and especially salient in successful treatments[31].

Strength is not the only critical characteristic of alliance; at least equally important are its state-like dynamic patterns[10,12] (BOX 3) because they represent the circumstances in which the strengthening of alliance acts as a mechanism of change in itself, activating a successful therapeutic process. Some patients arrive at treatment with poor trait-like potential for forming a strong alliance, which manifests as weak trait-like alliance early in treatment. However, over the course of a successful treatment, they might have the opportunity to experience a meaningful state-like strengthening of the alliance, referred to as earned security[32] or a corrective experience[33].

The literature on corrective experiences suggests that many patients seek treatment because of interpersonal problems, and start treatment with negative expectations about the willingness and ability of others to provide care and help in times of need[34]. Negative expectations and low motivation, combined with poor interpersonal skills, may result in poor trait-like alliance[12,35,36]. When working with these patients, therapists can explore these negative expectations and their effect on daily life, and also behave in ways that contradict the patient's expectations, for example, by being warm instead of judgmental[37–40]. Through such behaviour and by providing a new experience of negotiating interpersonal conflicts and needs[31], therapists can help patients overcome distorted interpersonal perceptions rooted in past experiences. This new experience enables patients to revise their internal sets of maladaptive schemas and representations of others, gain the ability to trust others, and devise new ways of relating to others that can be generalized to relationships outside of treatment[41–43]. The resulting state-like strengthening in alliance serves as a critical mechanism of change for individuals with poor trait-like alliance[42,44]. In these circumstances, the strength of trait-like alliance does not have a deterministic role. Instead, state-like alliance is therapeutic in and of itself, 'correcting'[45] and 'transforming'[36,46] the patient's poor trait-like alliance. This is in contrast to other therapeutic strategies where maladaptive interpersonal patterns are worked on outside the therapeutic relationship, for example, by challenging distorted cognitions and schemas and facilitating insight into maladaptive relationship patterns.

Thus, when trait-like alliance is strong, it can create a facilitative environment in which other therapeutic processes can occur. However, when trait-like alliance is poor, state-like alliance strengthening can become a mechanism of change in itself.

Origins of each alliance component
The two components of alliance are conceptualized as originating from different sources: trait-like alliance from the patients' and therapists' intrapersonal and interpersonal characteristics, and state-like alliance from the therapeutic processes[12]. Given the distinct origins of the two components, conflating the two in a general measure of 'alliance' is likely to produce mixed results. Indeed, a review of the literature suggests that raw scores of alliance that combine trait-like and state-like components show mixed associations with pre-treatment symptom severity[47]: some studies report that more severe symptoms are associated with a weaker alliance[48,49], whereas others
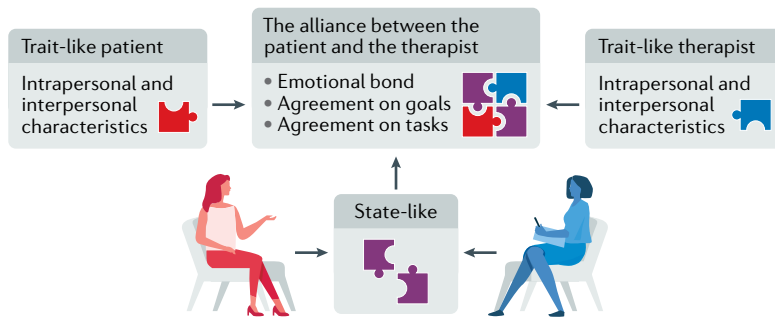
Fig. 1 | **The trait-like and state-like components of alliance and their origins.** The alliance between the patient and therapist as a product of the patient's trait-like alliance, the therapist's trait-like alliance, and the state-like strengthening in alliance. The trait-like alliance of the patient and the therapist is a product of their intrapersonal and interpersonal characteristics. The state-like alliance is a product of the dynamic processes occurring between the patient and therapist throughout the course of treatment.

show that more severe symptoms are associated with a stronger alliance[50,51] or no significant association[52–54]. Similarly, raw scores of alliance show mixed associations with the level of interpersonal problems[47]: again, some studies show that severe interpersonal problems are associated with a weaker alliance[55,56], and others show associations with a stronger alliance[57]. A richer picture of the origins of each component emerges from the disentangling of trait-like and state-like alliance.

The origin of trait-like alliance. The trait-like component of the alliance is conceptualized as the product of a network of interconnected factors, such as the individual's interpersonal skills, tendencies and problems, as well as motivations and expectations. Empirical findings support this conceptualization and suggest that trait-like alliance is the product of the patient's and the therapist's trait-like intrapersonal and interpersonal characteristics. For example, patients with less severe interpersonal problems[58–62] and less avoidant attachment orientation[63] show stronger trait-like alliance. Similarly, better intrapersonal trait-like characteristics, which are expected to furnish patients with a better ability to form satisfying relationships with others in general and with the therapist in particular, are also associated with better trait-like alliance. For example, higher self-esteem, stronger emotional expressivity[64], better emotion regulation skills[65], better reflective functioning[66], greater tolerance of affects, deeper insight and keener problem-solving abilities[61] are all associated with stronger trait-like alliance. Moreover, patients who started treatment with less severe symptoms[58,59,67,68] and more optimistic expectations that their treatment would result in favourable outcomes[69] also showed better trait-like alliance. Together, these studies suggest that the patient's trait-like intrapersonal and interpersonal characteristics contribute to trait-like alliance.

Moreover, alliance is not only a product of the patient's trait-like characteristics, but also of the therapist's trait-like characteristics. More positive interpersonal and intrapersonal therapist characteristics, which are expected to endow the therapist with a better ability to form satisfying helping relationships, are associated

with stronger trait-like alliance. For example, therapists with lower levels of cold and detached interpersonal style[70], greater empathy, less hostile feelings toward patients at the beginning of treatment[71,72], and who carry a lower personal burden[60] show stronger trait-like alliance.

In contrast to alliance-focused training[31], therapist training, supervision and experience conducting therapy that does not directly focus on the alliance, do not result in stronger trait-like or state-like alliance[73]. Indeed, the opposite is true: some studies suggest that in at least a portion of such training[70,74] and experience[64,74], more extensive training and experience is associated with poorer therapist trait-like alliance. These findings do not necessarily undermine the importance of therapists' experience and training in general, which might facilitate gains in mechanisms of change other than the alliance, and thus still result in higher levels of treatment efficacy and effectiveness than less extensive training and experience. Rather, these findings are specific to the alliance. Further research is needed to determine causal explanations for these results (for example, it might be that therapists who select training programmes that are not explicitly aimed at improving the alliance might also choose not to prioritize the alliance as a mechanism of change in treatment). The current literature suggesting no general positive effect of a therapist's experience on outcome[75] makes it especially important for future studies to focus on the effects of general versus dedicated training and experience.

The origin of state-like alliance. In contrast to trait-like alliance, state-like alliance is conceptualized as the product of processes occurring during the course of treatment. Such in-treatment processes can be assessed during treatment or anticipated with some degree of likelihood based on the patient's traits. In contrast to trait-like alliance, state-like alliance is expected to be positively associated with the severity of a patient's interpersonal problems[12]. For patients starting treatment with greater deficits in interpersonal relationships, there is a greater likelihood that alliance can become a mechanism of change in itself because these patients have more room to improve in their ability to form satisfying interpersonal relationships[34]. In theory, individuals who start treatment with lower expectations that others will act in helpful and benevolent ways are more likely to show state-like strengthening of alliance, possibly through a process of corrective relational experience[36]. These individuals generally hold negative working models and internal representations of others, but their state-like alliance can improve if they persevere in treatment and experience a corrective adaptive relationship with their therapists[34]. Indeed, individuals with poorer trait-like characteristics, such as more interpersonal problems[56,62,76,77], greater difficulties with intimacy[58], higher functional impairment[64], and more severe pre-treatment symptoms[61,64,78–80] tend to show more strengthening of state-like alliance during treatment. The opposite effects of various parameters on the state-like and trait alliance (for example, a negative association between trait-like alliance and interpersonal

problems, and a positive association between state-like alliance and interpersonal problems[58,59,61,62]) can explain the mixed results produced by studies that did not disentangle the two[47].

In addition to in-treatment processes anticipated based on a patient's traits, state-like alliance is expected to be associated with the processes of change inherent in treatment, that is, with the actions or experiences that occur during psychotherapy and are directly or indirectly responsible for patient improvement[30]. Strengthening of state-like alliance signals that a positive therapeutic process is taking place, and that alliance might be serving as a mechanism of change in treatment, either by itself or in interaction with other mechanisms. For example, sudden gains in symptom reduction[81,82], corrective relational experiences[34], gains in ability to cope with problems[83], deeper insight into repetitive interpersonal patterns[84], and improved emotional experiences[85] are all associated with a strengthening of state-like alliance.

Strengthening of state-like alliance is not associated with the therapist's trait-like characteristics[64,70,74] but rather with in-treatment processes related to the therapist. For example, the therapist's lower feelings of anxiety and less avoidance of therapeutic engagement during the session are related to greater strengthening of state-like alliance[71]. Additionally, a therapist's use of supportive techniques (such as warmth, empathy and active listening) is associated with strengthening of state-like alliance[86], whereas their use of other techniques (such as a mix of cognitive behavioural, dialectical-behavioural, and other techniques) is not[87]. Similarly, providing

therapists with continuous feedback on in-treatment processes, such as patients' self-reporting on alliance and outcomes in previous sessions, helps to strengthen state-like alliance[88–90]. Together, these findings further demonstrate that state-like alliance originates in the process of treatment.

In summary, trait-like and state-like alliance differ in their origins. Trait-like alliance originates in the relatively stable characteristics of patients and therapists, whereas state-like alliance is rooted in the processes occurring in the course of treatment.

Effect of alliance on treatment outcome

Meta-analyses repeatedly confirm that a strong alliance is associated with better treatment outcome[7,91–94]. One meta-analysis suggested that 1,000 studies showing null results would be needed to cast doubt on this finding[7]. However, most studies in these meta-analyses used non-specific estimates of alliance that combine trait-like and state-like components. Consequently, these findings do not provide information about the different roles of alliance, or the context needed to determine for whom and when the alliance fulfills each role. In other words, these studies are contextually neutral and do not indicate what roles the alliance might have in different contexts. Saying that a strong alliance is desirable is much like saying that good nutrition is desirable; it does not indicate what types of food are good for individual people.

The literature suggests that in the absence of context, both stronger trait-like alliance and greater state-like strengthening in the alliance are important for better treatment outcomes (TABLE 1). Although the studies differ in sample size, populations, setting, measures and statistical analysis methods, most show an effect of both trait-like and state-like alliance on outcome. Across 18 studies that disentangled state-like and trait-like alliance and investigated the association between trait-like alliance and treatment outcome, two-thirds reported that those who had stronger trait-like alliance also had significantly better treatment outcomes[58,95–105]. Similarly, of 41 studies that disentangled state-like and trait-like alliance and investigated the association between state-like alliance and subsequent treatment outcome, 80% showed a significant effect of state-like alliance on outcome. That is, an increase in alliance at one time point in treatment was associated with a reduction in symptoms and gains in quality of life and well-being at subsequent points[67,69,83,84,95–97,100–103,106–126].

The potentially important role of state-like alliance works in both directions: strengthening of the alliance results in greater improvement in outcome, and degrading the alliance harms treatment outcome. Twenty-two studies tested whether state-like alliance and outcome are interrelated. Of the 18 studies that found that alliance predicts outcome, 12 found that state-like strengthening of the alliance not only predicts better outcome but it is also predicted by previous levels or previous changes in outcome[27,95,108,110,113–116,119,121–123]; the rest found that state-like alliance predicted outcome, but not the other way around[67,100,101,112,120,124]. Of the four studies that found that alliance does not predict outcome, 75% found that symptoms predicted state-like alliance[58,63,127], and one did

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Box 3 | Dynamic patterns of state-like alliance

Here we describe the state-like alliance dynamics that have received the most theoretical and empirical attention.

Linear development
Defined as the tendency for alliance to consistently strengthen or weaken throughout treatment. A pattern of linear increase across sessions[177,193] is more frequently reported than an overall decrease[65,194]. Linear strengthening is associated with better treatment outcome in some studies[103,119,123], but not in others[195,196].

High–low–high (U-shaped) pattern
Defined as the tendency for alliance to be strong early in treatment, weaker in the middle, and strong again at the end of treatment. This pattern was identified for at least some patients in some studies[102,197–199] but not in others[193,195,200], and there is only weak evidence that alliance strength typically follows a U-shaped pattern over the course of therapy[177]. Some of the studies that identified a quadratic pattern also found that the quadratic pattern was associated with better outcome[197].

Rupture and repair (V-shaped) pattern
Defined as the tendency for alliance to deteriorate, then strengthen again. In contrast to the U-shaped pattern, the periods of weak alliance are much briefer, lasting only one or two sessions, or even a few seconds within a session[201]. Researchers generally identify ruptures and repairs on the basis of fluctuation in alliance scores from session to session or within a session[202], or via dedicated coding systems for identifying markers of ruptures and repairs[203]. This pattern was identified for at least some patients[202], and is associated with better treatment outcome[132,201,202].

Sudden gains
Adapted from the original conceptualizations of sudden gains in symptom reduction[204], sudden gains in alliance are defined as the tendency for alliance to demonstrate large and lasting improvements that occur over a short period of time. In the few studies exploring sudden gains in alliance, this pattern was identified for at least some patients[205]. Sudden gains were associated with better treatment outcome in some treatments and studies[145], but not in others[128,145,205].

Table 1 | **Studies of the association between state-like and trait-like alliance and treatment outcome**

Study	Trait-like estimation	State-like estimation	Sample size	Rater	Time of measurement	Diagnosis	Treatment
Accurso et al. (2015)[58]	$b=-0.10$**	$b=-0.044$	80	Patient	Every session (symptoms), sessions 2, 8, 14 and post-treatment (alliance)	Eating disorder	ICAT or CBT-E
Ahn & Kivlighan (2021)[106]	n/a	$\beta=3.24$**	47	Therapist	Every session	Various	PDT
Constantino et al. (2020)[69]	n/a	$b_{patient}=-0.35$* $b_{therapist}=-0.45$*	85	Patient and therapist	Every session	GAD	CBT
Coyne et al. (2019)[107]	n/a	$\beta=-0.23$*	85	Patient	Every session	GAD	CBT
Crits-Christoph et al. (2011)[95]	$r=-0.32$ to $r=-0.41$*	$\beta=-0.41$, $r=-0.45$**	45	Patient	Every session	MDD	PDT
Falkenström et al. (2013)[108]	n/a	$\beta=0.05$**	645	Patient	Every session	Various	Various
Falkenström et al. (2016)[27]	n/a	$\beta_{patient}=-0.32$ $\beta_{therapist}=-0.32$**	96	Patient and therapist	Every session	MDD	CBT vs IPT
Falkenström et al. (2019)[109]	n/a	$\beta=-0.16$ to -0.21*	345	Patient	Every session	Various	Various
Fisher et al. (2016)[85]	n/a	$b=0.02$, $R^2=0.003$	101	Patient	Every session	Various	PDT
Flückiger et al. (2019)[98]	$R^2=$ up to 0.15*	n/a	430	Patient	Sessions 1–6	Various	CBT
Flückiger et al. (2021)[110]	n/a	$\beta=-0.23$	Sample $a=57$ Sample $b=80$	Patient	Every session	GAD	CBT
Gidhagen et al. (2021)[63]	$r_{patient}=0.03$ $r_{therapist}=0.02$	$b_{paient}=-0.03$, $b_{therapist}=-0.02$	99	Patient and therapist	Every session	Substance use disorder	Various
Gómez Penedo et al. (2020)[111]	n/a	$b=0.57$**	141	Patient	Every session	MDD	CBT
Gómez Penedo et al. (2021)[84]	n/a	$\beta=-0.10$**	621	Patient	Every session	MDD	CBT
Harrington et al. (2021)[99]	$\beta=-0.42$, $R^2=0.320$*	n/a	42	Patient	Sessions 7–11	Childhood maltreatment	Emotion-focused therapy
Hoffart et al. (2013)[100]	Task: $\beta=0.272$* Bond: $\beta=0.337$*	Task: $\beta=0.04$* Goal: $\beta=0.02$ Bond: $\beta=0.03$	65	Patient	Every session	PTSD	CBT
Huber et al. (2021)[112]	n/a	$\beta=-0.051$*	386	Patient	Sessions: 1, 5, 10, 15, 20	Various	PDT
Kivity et al. (2020)[127]	n/a	MOTR+GPMBV: $b_{patient}=-0.01$, $d=0.44$ $b_{therapist}=-0.47$, GPM-BV: $b_{patient}=0.02$, $d=0.02$, $b_{therapist}=0.02$	60	Patient and therapist	Sessions 1, 5, 10 (symptoms); every session (alliance)	Borderline personality disorder	GPM-BV or MOTR+GPMBV
Kivity et al. (2021)[101]	$b=-0.38$**	$b=-0.13$*, $r=0.06$	29	Patient	(Before) every session	Borderline personality disorder	CBT vs attention bias modification
Lange et al. (2021)[113]	n/a	$b=-6.58$**	49	Patient	Sessions 1, 4, 8, 12 and at follow-up	Panic disorder	CBT
Maisto et al. (2020)[102]	$b=0.208$**	$b=0.038$*	155	Patient	Every session	Alcohol use disorder	CBT
Mander et al. (2019)[103]	$b=-0.25$**	$b=-0.48$*	162	Patient	Sessions 5, 15, 25	Depression and anxiety	Treatment-as-usual + mindfulness

Table 1 (cont.) | **Studies of the association between state-like and trait-like alliance and treatment outcome**

Study	Trait-like estimation	State-like estimation	Sample size	Rater	Time of measurement	Diagnosis	Treatment
Marker et al. (2013)[114]	n/a	$\beta_{therapist}=0.32$* $\beta_{child}=0.059$	86	Patient, therapist and parents	Every session	Anxiety disorder	Manual-based treatment for child anxiety disorders
Norwood et al. (2021)[115]	n/a	$b=0.58$***, pseudo-$R^2=0.06$	46	Patient	Every session	Not mentioned	CBT
Rubel et al. (2019)[83]	n/a	$\beta=-0.13$*	55	Patient	Every session	GAD	CBT
Sasso et al. (2016)[172]	$b=0.05$	$b=-0.19$	60	Patient	Sessions 1–4	MDD	CBT
Schwartz et al. (2018)[118]	n/a	$b=0.65$**	193	Patient	Every session	MDD	CBT
Sijercic et al. (2021)[104]	$\beta=-0.78$*	$\beta=7.47$	169	Observer	Every session	PTSD	Cognitive processing therapy
Strauss et al. (2018)[146]	$b_{patient}=-0.01$, $b_{therapist}=-0.01$	EX/RP: $b_{patient}=0.09$, $b_{therapist}=0.08$; SMT: $b_{patient}=-0.27$, $b_{therapist}=-0.28$	108	Patient and therapist	Weeks 0, 4, 8 (symptoms); weeks 1, 2, 10, 17 (alliance)	OCD	CBT
Sun et al. (2021)[116]	n/a	$\beta=0.07$ to 0.20**	153	Patient	Every session	Not available	Various
Sun et al. (2021)[117]	n/a	Primary care sample: $b=-0.66$**, University sample: $b=0.19$**	Primary care = 1,096 University = 292	Therapist (primary care sample), patient (university sample)	Every session	Various	Various
Tasca et al. (2012)[119]	$r=.01$	$b=0.93$*, $d=0.36$	238	Patient	Every session	Eating disorder	Group
Tasca et al. (2016)[120]	n/a	$b=-0.09$**	118	Patient	Every session	Eating disorder	Emotionally focused group therapy
Tschuschke et al. (2020)[105]	$b_{patient}=11.08$** $b_{therapist}=6.44$	n/a	237	Patient and therapist	Every 5th session	Various	Various
Volz et al. (2021)[121]	n/a	$\beta=-0.06$**	650	Patient	Every 5th session	Various	PDT
Vrabel et al. (2015)[67]	n/a	$b=-0.11$**	91	Patient	Every session	Eating disorder	CBT
Weiss et al. (2014)[128]	$b=-0.05$, $R^2=0.14$	$b=0.02$, $R^2=0.47$	19	Patient	Every session	Panic disorder	CBT
Whelen et al. (2021)[122]	n/a	$\beta=-0.28$ to -0.34**	191	Patient	First 4 sessions	MDD	CBT
Xu et al. (2015)[123]	n/a	$\beta=-0.18$ to -0.23 $\beta=-0.36$*	638	Patient	(Before) every session	Various	Various
Zilcha-Mano & Errázuriz (2015)[96]	$b=-0.26$**	$b=-0.33$**	547	Patient	Every session	Various	Various
Zilcha-Mano et al. (2015)[124]	$b=-0.16$	$b=-0.69$**	149	Therapist	Every session	MDD	PDT vs medication with clinical management vs placebo with clinical management
Zilcha-Mano et al. (2016)[97]	$b_{patient}=0.99$** $b_{therapist}=0.07$	$b_{patient}=0.16$** $b_{therapist}=0.27$**	241	Patient and therapist	Every session	Various	CBT vs alliance-focused therapy

Table 1 (cont.) | **Studies of the association between state-like and trait-like alliance and treatment outcome**

Study	Trait-like estimation	State-like estimation	Sample size	Rater	Time of measurement	Diagnosis	Treatment
Zilcha-Mano et al. (2018)[a,125]	n/a	$b = -0.07^*$	327	Patient	Every session	Various	Various
Zilcha-Mano et al. (2018)[b,126]	n/a	$\beta = 0.20^{**}$	185	Patient	Every session	Various	CBT

Studies were included if they appropriately disaggregated state-like and trait-like alliance (see BOX 2), established a correct temporal relationship between alliance and outcome (that is, alliance predicting subsequent outcome) for state-like alliance, and if they tested the association between trait-like alliance and changes in outcome (for example, by controlling for pre-treatment or previous session symptom severity) rather than with the mean level of outcome for trait-like alliance. When studies predicted both subsequent outcome and same time point outcome, only subsequent outcome results were reported. b is an unstandardized coefficient; β is a standardized coefficient; r is a partial correlation; d is Cohen's d; R^2 is the explained variance. Given that in multilevel models R^2 cannot be simply extracted from the available information in the papers, we include the standardized beta (β), when possible, and unstandardized beta (b) otherwise. When it was not possible to calculate beta, the parameters included in the table appear as they were reported in the papers. To calculate standardized β from b we used the within-person standard deviations (SD) of the included variables across all patients and sessions (that is, $\beta = \frac{b \times SD_{alliance}}{SD_{outcome}}$)[173]. Disorders: MDD, major depression disorder; PTSD, post-traumatic stress disorder; OCD, obsessive compulsive disorder; GAD, general anxiety disorder; BPD, borderline personality disorder. Treatment types: ICAT, integrative cognitive-affective therapy; CBT-E, cognitive-behavioural therapy-enhanced; CBT, cognitive behavioural therapy; PDT, psychodynamic therapy; GPM-BV, good psychiatric management; MOTR + GPMBV, good psychiatric management combined with motive-oriented therapeutic relationship techniques. EX/RP, exposure and response prevention. SMT, stress management training. [a]Same data as Zilcha-Mano & Errázuriz (2015)[96]. [b]Same data as Zilcha-Mano et al. (2016)[97]. $^*P < 0.05$; $^{**}P < 0.01$.

not find any significant association ($p = 0.31$) between the two[128].

Studies of the association between outcome and trait-like and state-like alliance individually (rather than a combined alliance score) suggest two important implications. First, most of the studies found that both trait-like and state-like alliance were significantly associated with outcome (TABLE 1). This suggests that it might be important to focus on both when deconstructing the different roles of alliance in treatment. Second, there is variability in the alliance–outcome association when trait-like and state-like alliance are disentangled, with some studies showing significant and meaningful effects of one but not the other, both or neither (TABLE 1). This variability cannot be explained by differences in the statistical methods used in each study, and instead hints at the potential importance of mapping the context in which significant effects emerged to explore for whom (the specific patient, therapist and dyad) and when (the concrete circumstances) each alliance component is associated with outcome. Although research on trait-like versus state-like alliance is still in its early stages, we can already identify several patterns, described in the following sections.

Patient characteristics. Patients with different characteristics might benefit from different roles of alliance. Patients suffering from disorders with underlying psychopathology involving interpersonal factors and those displaying more interpersonal deficits prior to treatment benefit more from alliance as a mechanism of change than do individuals with disorders with less clear interpersonal psychopathology and those displaying fewer interpersonal deficits[27,96,108,111]. Thus, for these patients, state-like strengthening of the alliance is more likely to be associated with gains in treatment outcome. For example, in major depressive disorder, which is typically understood to be related to interpersonal deficits[129–131], the effect of state-like alliance on outcome is larger and more consistent than in samples of patients with other diagnoses characterized by less definitive underlying interpersonal psychopathology, such as eating disorders, anxiety and mixed diagnoses (seven of eight studies on

major depressive disorder showed a significant state-like alliance–outcome association, whereas other disorders showed less consistent results and smaller effects; see TABLE 1). This pattern does not seem to be a byproduct of symptom severity. In four of the five studies that examined pretreatment symptom severity as a potential moderator, the association between state-like alliance and outcome was not mitigated by the patient's pretreatment symptom level[27,84,108,109].

Individuals with more severe interpersonal problems and greater interpersonal deficits not only show more state-like strengthening of alliance during treatment, but also benefit more from it as a mechanism of change, which predicts subsequent gains in treatment outcome. For example, the association between strengthening of state-like alliance and subsequent gain in treatment outcome was stronger in individuals who were more submissive pre-treatment[111], and had higher levels of avoidant and anxiety attachment orientations[63,113]. Other studies showed that greater interpersonal impairments were associated with larger effects of state-like strengthening in alliance on treatment outcome[27,108,111,113,126,132].

In addition to mapping the general trait-like patient characteristics that moderate the association between state-like alliance and outcome (that is, answering the question of who benefits most from strengthening of the alliance), it is also important to ask what the optimal timing for a given patient is, that is, when during treatment focusing on strengthening the alliance might be especially effective. To the best of our knowledge, the question of timing has received little empirical attention to date. One study on in-treatment fluctuations in life satisfaction during cognitive behavioural therapy (CBT) found that when patients reported higher life satisfaction they also benefited more from state-like strengthening in alliance, and achieved better subsequent treatment outcome[125]. Such findings have the potential to provide therapists with empirically supported guidelines on when it is best to intervene to facilitate state-like strengthening of alliance to bring about desirable improvements in treatment outcome.

In summary, patients suffering from disorders with underlying psychopathology involving interpersonal

Moderator
Variable that influences (statistically) the direction or magnitude of the relationship between an independent and a dependent variable.

factors (such as major depressive disorder) and those displaying more interpersonal deficits before treatment benefit more from state-like strengthening of the alliance to achieve a better treatment outcome.

Therapist characteristics. Therapists differ in their ability to form strong alliances with patients[133,134] and in the strength of the alliance–outcome association[135,136]. The latter means that a one-point difference in alliance score might be associated with better treatment outcome for some therapists but not others[23]. However, it is not clear whether this one-point difference refers to the therapist's general trait-like ability to form a strong alliance (a between-therapists effect, aggregated across sessions and patients treated by the same therapist) or to their ability to strengthen within-patient alliance (a between-therapists within-patient effect, aggregated across patients treated by the same therapist). Some therapists might be able to achieve better treatment outcome with their patients by generally forming stronger alliances with them than other therapists, right from the start of treatment. Alternatively (or additionally), some therapists might achieve better outcomes by producing greater strengthening of alliance from one session to the next, for example, by deploying techniques to successfully repair ruptures in the alliance (episodes of tension in the collaborative relationship between patient and therapist)[137–139]. Unfortunately, to date, no empirical work has distinguished between these two possibilities.

Disentangling these two sources of between-therapist variance that account for portions of the alliance–outcome association is critical for testing the extent to which each source is amenable to change by training (or by other means, such as personal treatment for

the therapist). Such knowledge is important for identifying the most promising candidates for training programmes (for example, between-therapist characteristics that are stable across time and patients and less amenable to change could be used to construct evidence-based candidate evaluation tools)[140]; identifying which alliance-focused training programmes should be added to curricula (for example, therapist characteristics that are more amenable to change could be a focus of training programmes)[31]; and personalizing training to individual therapists (for example, if therapist characteristics that are less amenable to change moderate the effect of those that are more amenable, then it might be possible to develop therapist-tailored training programmes suitable for each subgroup of therapists according to their unique characteristics).

In summary, therapists contribute to the alliance–outcome association. However, more studies that disentangle trait-like and state-like components are needed to fully realize the potential utility of this contribution to the distinct roles of alliance in treatment.

Setting and treatment. In some treatments, such as traditional CBTs[141], the alliance is theorized to be a common factor in the background of an effective treatment[142]. Thus, trait-like differences between patients are expected to drive the alliance–outcome association[10]. In other treatments, such as brief relational treatment[31], state-like strengthening of the alliance is theorized to be a central mechanism of change responsible for the alliance–outcome association. Treatments can be lined up on a continuum between these extremes (FIG. 2).

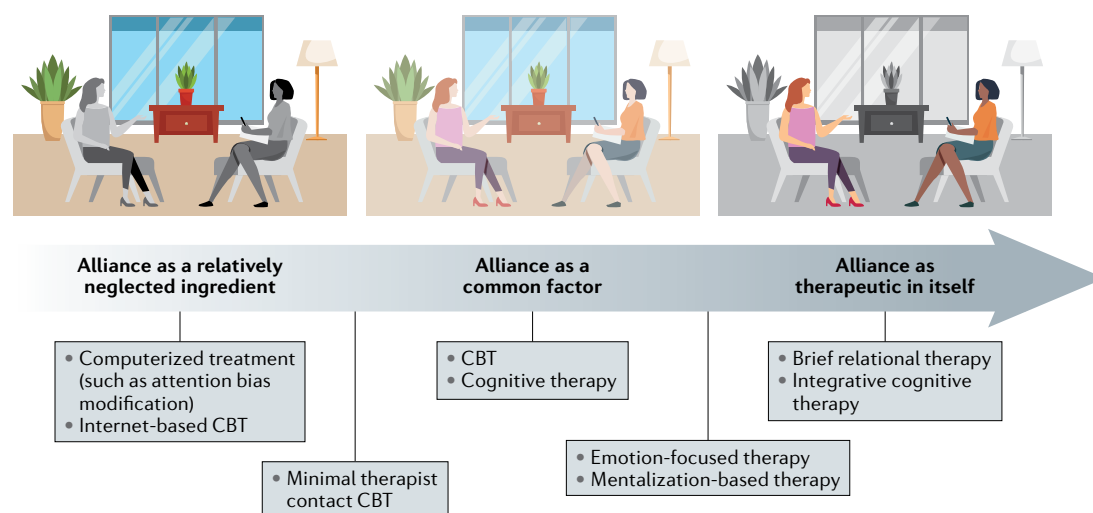Perhaps not surprisingly, there is no significant difference in the state-like alliance–outcome association

Fig. 2 | **A continuum of treatments.** Treatments differ in the extent to which the alliance is conceptualized as serving as therapeutic in itself. For the treatments at the left end of the continuum, such as those managed by a software program, the role of alliance is relatively negligible compared to other ingredients. For these treatments, the relationship between the therapist and the patient has a relatively minor role. For treatments at the right end of the continuum, such as brief-relational treatment, the alliance is conceptualized as having a central role in treatment, and is the main mechanism of change. In these treatments, therapeutic change is expected to be driven by a strengthening of the state-like alliance. In the middle are treatments in which the alliance is conceptualized as a non-specific factor, such as cognitive behavioural therapy (CBT). In these treatments, the strength of the trait-like alliance is expected to be associated with better treatment outcome.

between treatments (such as CBT versus interpersonal psychotherapy; CBT with versus without the inclusion of mindfulness techniques) that do not differ in their location on this continuum, that is, that do not differ in the theorized role of the therapeutic relationship[27,63,96,103,108,124]. However, the alliance plays different parts in treatments that differ in the extent to which the therapeutic relationship is theorized as a central component. In treatments in which the alliance is conceptualized as the main mechanism of change, that is, alliance-focused treatments, such as brief relational therapy[31], integrative cognitive therapy[143], and alliance-fostering therapy[144], the strengthening of state-like alliance is a stronger predictor of subsequent gains in outcome compared to treatments in which the alliance is not conceptualized as the main mechanism of change[97]. For example, state-like strengthening of alliance has a greater effect on treatment outcome in brief relational treatment, which focuses on repairing alliance ruptures, than in a traditional CBT, where alliance is not a central mechanism of change[97,126,145]. By contrast, in treatments in which the main agent of change is a software program and the therapist is only a facilitator, such as treatments in which a computer task is used to train patients with social anxiety disorder to direct their attention away from threatening stimuli, there is little or no effect of state-like alliance on treatment outcome[101].

In summary, although further studies are needed, the available literature does not support the non-specific common role of alliance across all types of treatments. Rather, treatments can be lined up on a continuum between two extremes: at one end alliance is a relatively negligible ingredient, a byproduct of treatment efficacy, and at the other end alliance is therapeutic in itself. For treatments that lie between these extremes, alliance serves as a common non-specific factor.

The role of feedback. Different informants reporting on the alliance (patients, therapists or external observers) might detect distinct aspects of alliance that are most associated with outcome for one of the two components (trait-like or state-like), but show blind spots and be less attentive to aspects associated with outcome for the other component. Therapists are most sensitive to state-like strengthening of the alliance that might drive subsequent improvements in treatment outcome. All five studies in TABLE 1 that tested the effect of trait-like alliance on outcome based on therapist-reported alliance failed to find a significant effect[63,97,105,124,146], whereas more than half of the 11 studies testing the effect of state-like alliance on outcome based on therapist reports found a significant effect[27,69,97,106,114,117,124].

By contrast, external observers, who are often exposed to a snapshot of one session of treatment, are able to detect trait-like differences in alliance strength between patients that indicate who is more likely to have better treatment outcome[104]. TABLE 1 also shows that patients, even more than therapists, are able to detect indications of state-like strengthening of the alliance over the course of treatment[27,67,69,83,84,95–97,100–103,106–109,111–123,125,126], which may result in better treatment outcome. Patients were also sensitive to their own trait-like characteristics

that might be indicative of their prognosis for a good outcome[95–105].

Together, these findings suggest that therapists might fail to detect aspects of each component of the alliance, especially trait-like alliance, that are associated with treatment outcome (TABLE 1). To provide a corrective experience in which the alliance fulfills the role of a mechanism of change, the therapist should be aware of both the trait-like alliance that needs to be 'corrected' and of the state-like changes required to do so[10]. The size of this blind spot might be reduced by asking patients to provide feedback to their therapists on their alliance and symptom severity after every session. Continual feedback on alliance and outcome might also raise therapists' and patients' awareness of ruptures in the alliance, therefore increasing the likelihood that such ruptures will be successfully repaired[31].

Many studies support the advantages of feedback for psychotherapy in general[147,148]. For example, research suggests that ongoing feedback on patients' outcome progress can be instrumental in guiding treatment decisions and making therapists more responsive to their patients[149–151]. Feedback systems, which provide therapists with timely reports on patients' outcome progress based on self-reporting questionnaires, improved the likelihood that patients would benefit from treatment, especially patients who were at risk of treatment failure[152,153].

Some studies have reported promising results regarding the effects of feedback on the alliance–outcome association[96]. For example, one study found that session-by-session feedback on patients' well-being and their alliance enhanced treatment outcome by improving the therapeutic alliance[154]. In general, however, the literature is mixed. Specifically, in some studies feedback on alliance resulted in a stronger association between state-like[96] or trait-like alliance[102] and outcome, but other studies found no difference in alliance–outcome associations when feedback was provided compared to when it was not[116]. However, in the majority of these studies feedback provided to therapists was based on raw alliance scores that conflate trait-like and state-like components[96,102,116]. Disentangling the two components of alliance in the feedback given to therapists might provide more instrumental information for the therapists about the use of the different roles of alliance in improving patients' well-being.

It is important to know not only the current level of alliance (for example, that a given patient reported 5 out of 7 on an alliance measure), but also whether this represents an increase or a decrease from the previous session. Furthermore, knowing whether a patient has a generally high or low trait-like score is also relevant for developing their treatment programme. For example, if a patient has low trait-like alliance and state-like alliance is increasing, this could indicate that a corrective experience process is occurring. By contrast, if a patient has strong trait-like alliance and state-like alliance is decreasing, this could indicate that the patient is facing a crisis either outside treatment or with the therapist. In such cases, it is important to explore the nature of the crisis with the patient. This type of knowledge and its
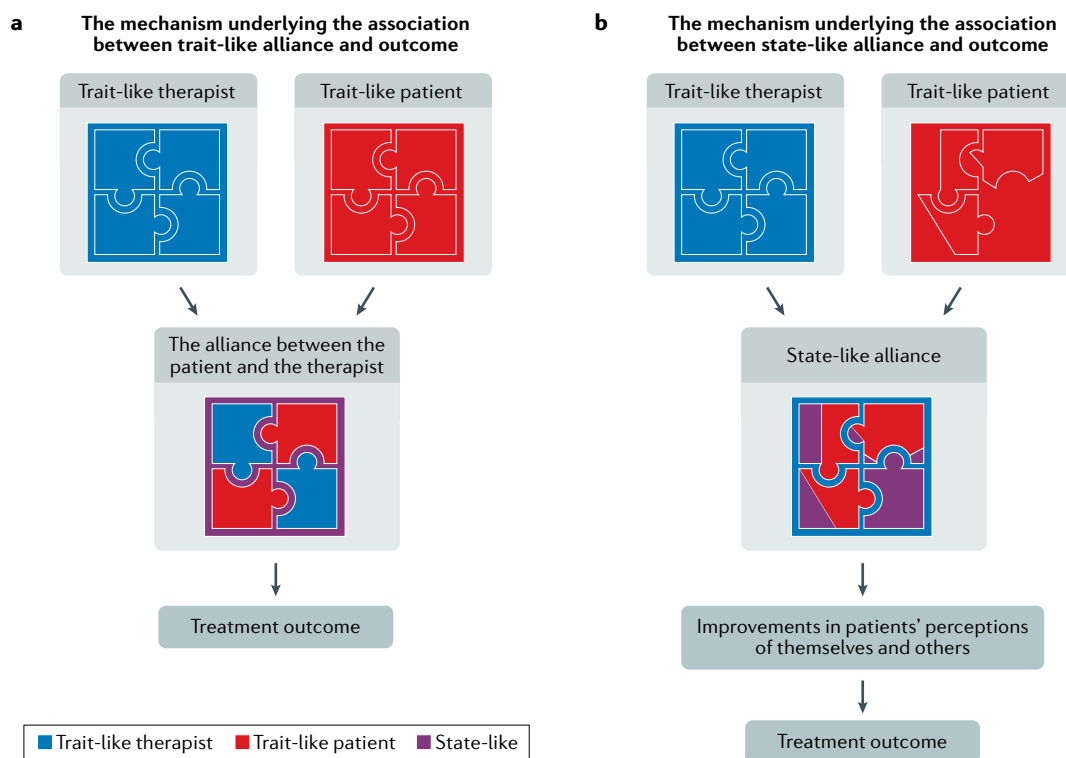
a The mechanism underlying the association between trait-like alliance and outcome

b The mechanism underlying the association between state-like alliance and outcome

Fig. 3 | **The mechanisms underlying the association between trait-like and state-like alliance and treatment outcome.** **a** | Trait-like alliance is a product of the patient's and the therapist's trait-like characteristics, and has a deterministic effect on treatment outcome. When the trait-like alliance of both patient and therapist is strong, the trait-like alliance can serve as a facilitating environment in the background of effective treatment, providing an environment appropriate for implementing effective techniques in treatment. In such cases, those techniques, and not the alliance, are the mechanisms promoting change in treatment. **b** | When the patient's trait-like alliance is impaired ('broken'), the alliance may serve as a central mechanism of change in treatment, in which the alliance is 'corrected' through a corrective emotional experience with the therapist. Such corrective experiences might then result in improvements in patients' perceptions of themselves and others, leading to better treatment outcome.

potential implications can be instrumental in developing treatment programmes and revisiting them during treatment.

Taken together, both state-like and trait-like alliance make a unique contribution to treatment outcome, but the strength of their relative effects depends on the context. Although further studies are needed, the existing literature suggests that the effects of state-like and trait-like alliance depend on patient and therapist characteristics, the extent to which the alliance is conceptualized as therapeutic in itself in the given treatment, and on the blind spots of the informants.

Underlying mechanisms

The two components of alliance are conceptualized as being associated with treatment outcome through different mechanisms (FIG. 3).

Mechanisms underlying trait-like alliance–outcome associations. Trait-like alliance is the product of patient and therapist traits that enable the dyad to build a strong alliance between the patient and the therapist, so that they can work collaboratively to evoke change through various therapeutic mechanisms. For example, regardless of their preferred treatment intervention, therapists might find it easier to implement effective interventions

with a cooperative and accepting patient than with a recalcitrant one[142]. By definition, trait-like alliance cannot serve as a mechanism of change, as it is not expected to change (at least in the short term), and thus it cannot produce changes in treatment outcome[155]. Thus, trait-like alliance is in the background of effective treatment, and can create a facilitating environment for the effective implementation of therapeutic techniques[12].

Empirical findings based on mediation models support this conceptualization of trait-like alliance as the product of the patient's and the therapist's trait-like characteristics, which is then associated with treatment outcome (TABLE 2). For example, four studies that estimated trait-like alliance by aggregating several observations of the alliance found significant mediation effects, such that trait-like alliance was a product of the patient's pre-treatment expectations, which in turn predicted treatment outcome[156–159]. Similar mediation models show that other patient characteristics, such as belonging to high-conflict co-parenting families[160], are associated with trait-like alliance, which is in turn associated with treatment outcome. Similarly, more desirable therapist trait-like characteristics, evident early in treatment, such as emotional response[161] and empathy[72], predict stronger trait-like alliance, which is in turn associated with better treatment outcomes.

Mediation model
A model testing the effect of an intervening variable that accounts (statistically) for the association between the independent and the dependent variables.

Table 2 | **Studies investigating the mechanisms underlying the association between trait-like and state-like alliance and treatment outcome**

Study	Predictor	Predictor time of measurement	Mediator	Mediator time of measurement	Outcome	Outcome time of measurement	Mediation estimate
Trait-like alliance							
Abouguendia et al. (2004)[156]	Patients' outcome expectations	Pre-treatment	Alliance	Average across sessions	General symptoms	Post-treatment	Mediation/direct (%) = 22.4**
Anderson et al. (2019)[160]	Format and patients' distress	Pre-treatment	Alliance	After first session	Dropout		Format: mediation/direct (%) = 46, Patient distress: mediation/direct (%) = 40
Barzilay et al. (2020)[161]	Therapists' negative emotional response	After first session	Alliance	After first session	Suicidal ideation	1-month follow-up after initial assessment	Mediation/direct (%) = 44**
Johansson et al. (2011)[157]	Patients' outcome expectations	Pre-treatment	Alliance	Average of sessions 1, 7, 16 and post-treatment	Depressive symptoms	Post-treatment	Mediation/direct (%) = 80**
Joyce et al. (2003)[158]	Patients' outcome expectations	Pre-treatment	Alliance	Average across sessions	Severity of presenting problem	Post-treatment	Patient-rated alliance: Mediation/direct (%) = 39.7* Therapist-rated alliance: Mediation/direct (%) = 40.0*
McClintock et al. (2018)[72]	Therapists' empathy	First session	Alliance	Average of sessions 1–5	Depressive symptoms and psychological well-being	Post-treatment	Mediation/direct (%) = 12*
Vîslă et al. (2018)[159]	Patients' outcome expectations	Session 3	Alliance	Average of session 1 and session 5	Depressive and anxiety symptoms	Post-treatment	Mediation/direct (%) = 15.4*
State like-alliance							
Coyne et al. (2019)[107]	Alliance (at time t)	t	Interpersonal problems ($t+1$)	$t+1$	Worry ($t+2$)	$t+2$	Mediation/direct (%) = 52.6*
Fisher et al. (2016)[85]	Alliance (at time t)	t	Emotional experience	$t+1$	Functioning ($t+2$)	$t+2$	Mediation/direct (%) = 92.9*
Lackner et al. (2021)[164]	Alliance (week 5)	Week 5	Self-efficacy	Week 8	Outcome (week 12)	Week 12	Indirect effect = 0.01, $z = 3.37$*
Rubel et al. (2019)[83]	Alliance	t	Coping experience	$t+1$			$\beta = 0.22$
Schwartz et al. (2018)[118]	Alliance (bond) (at time t)	t	Self-efficacy ($t+1$)	$t+1$	Depression symptoms	$t+2$	Mediation/direct (%) = 90.7

Studies were included if they appropriately disaggregated state-like and trait-like alliances (see BOX 2). Because only a few studies examined alliance as a mediator using at least three observations to investigate trait-like mechanisms, we also included studies that explored this mediation using average alliance across at least two sessions or the alliance from the first session. For the same reason, for state-like alliance we also included an article that modelled alliance at time T while controlling with the previous alliance level ($T-1$). t is the time of measurement; $t+1$ is the time of measurement that followed time t. Mediation/direct (%) mediation is the effect of the predictor variable (X) on the predicted variable (Y) through the process variable (M), the direct effect is the effect of X on Y controlling for M. As such the mediation/direct ratio can be interpreted as the proportion of the predictor effect accounted for by the potential mediator variable when both are present in the regression equation, calculated as $\frac{\text{path a} \times \text{path b}}{\text{path a} \times \text{path b} + \text{path c}'}$. Path a is the effect of the predictor (X) on the mediator (M), path b is the effect of the mediator (M) on the predicted variable (Y), and path c′ is the direct effect of the predictor (X) on the predicted variable (Y). For an overview of mediation models and the ways of calculating their effects, please see[174,175] *$P < 0.05$; **$P < 0.01$.

The effect of trait-like alliance on outcome might be mediated by the ability of the patient and therapist to become synchronized during treatment in a manner that facilitates acquiring new skills and gaining new insights[162]. For example, better patient trait-like abilities might result in greater patient–therapist biological synchrony (for example, synchrony in the release of the oxytocin hormone), which could in turn result in better treatment outcome[163].

Mechanisms underlying state-like alliance–outcome associations. In contrast to trait-like deterministic models, in which patient and therapist characteristics predict trait-like alliance, which in turn predicts treatment

outcome ('the rich get richer'), state-like alliance presents a more optimistic picture of the prospect of therapeutic change. When state-like strengthening drives subsequent improvements in treatment outcome, the alliance serves as a mechanism of change. For example, many patients seek treatment because they fail to form satisfying relationships with others. If treatment strengthens state-like alliance with the therapist, this corrective interpersonal experience can produce changes in how patients perceive themselves (for example, as deserving the positive regard of others) and others (for example, as willing to help in time of need or as having benevolent intentions)[83,107].

Empirical evidence supports this conceptualization, and shows that strengthening of state-like alliance predicts subsequent improvements in patients' perceptions of themselves and others, which in turn predict better treatment outcome (TABLE 2). For example, strengthening of state-like alliance predicts better subsequent coping experiences[83], sense of mastery[118], and self-efficacy[118,164] in patients, which in turn predict better treatment outcomes. Similarly, strengthening of state-like alliance predicts improvements in patients' interpersonal competence[99,107] and emotion experience and expression[85], which in turn predict better treatment outcome.

State-like alliance might also be part of a network of mechanisms, such that for each individual patient a different sequence of effects occurs, with one mechanism initiating the sequence and the others unfolding thereafter. For example, an increase in a patient's understanding of repetitive interpersonal patterns[84] and their expectations[69] might interact with strengthening of state-like alliance to predict subsequent improvement in treatment outcome. Similarly, state-like strengthening of the alliance might interact with therapeutic techniques to promote therapeutic change[165,166]. For example, one study found that the implementation of psychodynamic techniques in one session (session T) more strongly predicted treatment outcome in the subsequent session (session $T+1$) when the alliance at session T was higher[165]. A similar trend was reported for the implementation of cognitive techniques, which more strongly predicted subsequent cognitive change when alliance was higher[166].

In summary, findings based on mediation models suggest that trait-like alliance mediates the effects of patient and therapist baseline characteristics on outcome, whereas state-like alliance is the mechanism by which alliance might drive therapeutic change.

Summary and future directions

Research that disentangles trait-like and state-like components of alliance has accumulated rapidly in the last five years. The findings reviewed here suggest that the strength of trait-like alliance is the product of the patient's and the therapist's intrapersonal and interpersonal trait-like characteristics, whereas the strengthening of state-like alliance represents therapeutic processes. Consequently, the two types of alliance show opposite patterns of associations with other variables. For example, greater interpersonal problems are a risk factor for poorer trait-like alliance, but indicate the potential for improvement during treatment and are therefore associated with greater strengthening of state-like alliance.

The findings reviewed here further suggest that treatment outcome is associated with both trait-like and state-like alliance. These studies also provide insight about for whom and under which circumstances each component of alliance is most critical for treatment outcome. For example, state-like strengthening of alliance is associated with greater reduction in symptoms, especially for patients with greater interpersonal problems and in treatments that implement techniques to explicitly improve the alliance. For these patients and treatments, alliance might be therapeutic in itself. Trait-like and state-like alliance also differ in the manner by which they are associated with treatment outcomes. Trait-like alliance mediates the effects of the patient's and the therapist's trait-like characteristics on outcome, whereas state-like alliance predicts other curative processes in treatment, which in turn predicts subsequent improvement in treatment outcome.

Future studies should focus on individuals from diverse groups and populations to inform how the distinct roles of alliance can be used in ways that are sensitive to the needs of different populations, and maximize treatment benefits for individual patients. Empirically supported guidelines, developed from the findings reviewed here as well as from future research on the trait-like and state-like alliance, will help to identify the patients who might benefit most from targeting alliance as a mechanism of change in treatment (for example, those with poorer interpersonal abilities). They will also help pinpoint techniques that can be used to strengthen state-like alliance with given patients, such as providing therapists with feedback. Finally, they will make it possible to identify patients with a strong trait-like alliance for whom alliance is expected to be easily established and which can then serve as a facilitator for other therapeutic processes.

In parallel with the accumulation of context-specific knowledge for the development of evidence-based tools for the use of the alliance, there is also a need to develop clear principles regarding the statistical methods most applicable for disentangling trait-like and state-like alliance. Currently the pluralism in analytic methods is more a source of confusion than an engine for progress. For example, in some articles trait-like alliance is operationalized with reference to the mean level of alliance across treatment, whereas other articles operationalize trait-like alliance in terms of the first-session or mid-treatment alliance. This has subsequent implications for the measurement of state-like deviations from trait-like alliance. Future research should develop guidelines for choosing among operational definitions in alliance research in particular and in psychotherapy research in general. Some of the considerations for such selections include the nature of the trait-like component under investigation, whether it can be measured, at least partially, before the start of treatment (that is, outside of the patient–therapist dyad), the best approach for capturing, during treatment, those aspects of the trait-like

alliance that cannot be measured before treatment, and whether trait-like alliance has a stable dynamic pattern or is by definition an invariant construct[167]. After determining how trait-like alliance is operationalized, state-like deviations can be assessed.

The conceptual trait-like versus state-like distinction does not entirely overlap with the statistical distinction between within-individual versus between-individual variance. For example, statistically the patient slope of change refers to between-patient variance whereas conceptually it can be regarded as reflecting the process of change (BOX 2). Innovative approaches for disentangling the process of change should also take into account pre-treatment trait-like dynamic representations. For example, individuals who are slow to warm up to people might display this general trait-like tendency in the course of treatment, but might deviate from it and show state-like changes in this tendency in the relationship with the therapist. Innovative designs and statistical approaches that can capture the richness of dynamic trait-like characteristics and state-like deviations from them are needed.

Another source of confusion in the literature concerns valid approaches for estimating effect sizes. Although the advantages of reporting effect sizes are clear[168], the methods of calculating them in the case of the multilevel statistical models used in the literature reviewed here are not[169,170], resulting in only about 14% of the articles reviewed reporting traditional measures of effect sizes (such as R^2 or Cohen's d)[85,95,101,115,119,127], and about 42% reporting standardized betas. Fortunately, valid methods for calculating effect sizes for trait-like and state-like effects, which also take into account how the trait-like and state-like components were operationalized, are beginning to mature[169], and can be implemented in future alliance research.

Finally, the findings we reviewed here suggest no beneficial effect of non-specific therapist experience and training on alliance strength and strengthening[64,70,74] (and even some adverse effects). By contrast, there are beneficial effects of alliance-focused training on the association between state-like alliance and outcome[97,126,145]. Yet, at present only a small number of therapists receive alliance training, and at most training institutions worldwide alliance is perceived as a non-specific factor that is either present or absent, and that cannot be activated. The evidence reviewed here suggests that training should aim to increase therapists' responsiveness to patients and to the therapeutic context[171]. Therapists should learn how to identify the trait-like characteristics of the patient and, from this knowledge, decide whether and how to activate state-like alliance as a mechanism of change. Placing alliance in context is a key building block in the development of personalized psychotherapy science.

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