# Research support for psychodynamic constructs

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Beginning with Freud, psychoanalytic theory has provided a number of clinically rich and useful concepts that illuminate our understanding of normative processes of the self and interpersonal relationships and of the development and treatment of psychopathology. Central to psychodynamics has been a focus on unconscious processes, subjective experience, and defensive processes, among others constructs. Contrary to common misconceptions, there is a great deal of empirical support for psychodynamic concepts, which we will survey in this chapter.

## Basic tenets and concepts

There are a number of basic tenets and concepts that are central to psychodynamic theory. These include the idea that some mental processes, such as motives, desires, and memories, are not available to awareness or conscious introspection. This idea is often referred to as *unconscious mental functioning* or *unconscious processing*. Unconscious mental processes have evolved from a conceptual proposition based on clinical observations to a field of study in psychodynamic research (Westen, 1998) and have been integrated in research within social psychology (Dijksterhuis & Strick, 2016) and neurosciences (Soon, Brass, Heinze, & Haynes, 2008). While attention to unconscious mental life remains central to psychoanalytic or psychodynamic psychotherapy, much of our experience is available and accessible for introspection, reflection, and conscious decision making. As Wachtel (2005) has noted, consciousness is better conceptualized as a matter of degree of accessibility and articulation than as a discrete division between conscious and unconscious. Another tenet of the psychodynamic approach is that while some mental processes happen to be outside of our awareness, people are also motivated to push threatening thoughts or feelings from awareness. This process is the idea of defense or defense mechanism. This concept of defense is generally supported in the empirical literature examining narratives of adults, psychophysiological data, and neuroscience data and is generally well accepted (Cramer, 2000). A third tenet central of

psychodynamic theory is that of a developmental perspective wherein childhood relationships with caregivers are seen as playing a role in shaping current relationships. This is not to imply a linear relationship or a critical period between early experience and later development. Psychodynamic theory, consistent with a developmental psychopathology perspective, is probabilistic rather than deterministic. From this perspective, childhood experiences, in concert with genetic (what Freud called *constitutional*) factors, are considered with regard to their influence on one's internal experience of oneself as well as one's overt behavior. A fourth tenet of a psychodynamic perspective emphasizes the importance of subjective experience or individual or personal meaning of events. Psychodynamic theorists and clinicians are interested in the patient's phenomenological experience, that is, how the patient experiences himself or herself, important others, and the world in general. This differs from the schema concepts of the cognitive-behavioral tradition in that from a psychodynamic perspective, these schemas are seen as having both explicit, conscious aspects and implicit, unconscious aspects, with the latter including both implicit parts (i.e., simply beyond awareness) and parts that are kept out of awareness for defensive purposes. The psychodynamic model also posits that individuals may use one set of representations—inner templates of self and others—to defend against other intolerable representations. Finally, there is greater attention to the emotional aspects of these schemas and to the structural aspects of representations, that is, the degree of differentiation and hierarchical integration of representations (see Blatt, Auerbach, & Levy, 1997). Evidence from developmental, clinical, and neurological sciences provides validation for these basic premises (for a review, see Westen, 1999). In addition to the ideas of unconscious processes, defense mechanisms, a developmental perspective, and subjectivity, the concept of transference (and the related concept of countertransference) is central to psychodynamic clinical approaches. Although other concepts have been stressed within psychoanalysis at various times, such as the Oedipus complex or psychosexual stages, we would contend that these concepts are not as central to contemporary psychodynamic models as they were in the past.

In this chapter we will review evidence for key psychodynamic concepts, with a focus on classic and recent research, in order to develop a big-picture perspective. Specifically, we will focus on the unconscious and defense mechanisms, transference, insight, and mentalizing and on some implications of these concepts for the psychotherapy process. Although the developmental perspective is central to a psychodynamic approach, we will not focus on it in this chapter because it is no longer unique or specific to psychodynamics. However, we will address some aspects of attachment theory, where relevant, and we refer interested readers to the literature of attachment theory as empirical support for this aspect of psychodynamics (see Levy et al., 2015).

## Defensive processes

Psychodynamic conceptualizations of defensive processes have evolved considerably since first being proposed by Freud. Quite simply, a defense mechanism is a

process by which one pushes threatening thoughts or feelings from awareness. Freud developed drive theory, in which defense was not just seen as a repression but described as the compromise formation between two competing ideas: on the one hand, a wish, a desire, or a want (impulse) and, on the other hand, a prohibition against the wish, desire, or want. This created an inner conflict and resulted in a compromise formation involving defensive thoughts, feelings, or behaviors. Typically, one or both sides of the conflict were partially or fully out of awareness. Dreams, forgetting, parapraxes (Freudian slips), and neurotic symptoms were all seen as compromise formations or the result of defensive processes. Often, the wish or desire was sexual or aggressive and seen as deriving from an internal drive. In the service of compromise formation, defensive solutions can range from being relatively healthy and mature (reality based) to being very unhealthy, immature, and even underlying psychotic symptoms. More recent conceptualizations emphasize the general regulatory function of defensive operations in light of unpleasant emotions, perceptions, and cognitions. These operations follow a developmental trajectory from less mature mechanisms to more nuanced strategies (Cramer, 2015), helping the individual to remain functional in a complex world by focusing on some information while fading out other information. Defenses, however, can become restricting and dysfunctional under conditions of high levels of internal conflict or low levels of personality integration. From a clinical perspective, defense mechanisms help the therapist to observe the psychodynamics or "mind in motion." While initially seen as predominantly intrapsychic, defensive functioning mayinfiltrate interpersonal relations as well (Westerman, 2018). Given the considerable amount of empirical research on defensive functioning, we will highlight exemplary studies and discuss some of the findings.

## Hierarchy of defenses

The most commonly employed conceptualization of defense proposes a hierarchy of defenses, ranging in severity from mature to neurotic to immature or borderline defenses (Perry & Bond, 2005; Vaillant, Bond, & Vaillant, 1986). Mature defenses, to a degree, recognize the meanings associated with potentially threatening mental contents; an example would be consciously deciding to not deal with distressing interpersonal news until a different point in the day (i.e., suppression). Neurotic defenses attempt to prevent conflicted mental contents from reaching full conscious awareness through avoidance (e.g., intellectualization), misattribution (e.g., displacement, projection), or blocking (e.g., isolation of affect, repression) of threatening mental contents. Immature or borderline defenses entail substantial distortions that affect representations of the self and others and/or external reality to attenuate anxiety (e.g., devaluation) or to express parts of a conflict in an exaggerated, pathological form (e.g., acting out). Overall, levels of self- and observer-reported defensive functioning correlate with degree of psychosocial functioning, both cross-sectionally and longitudinally (Bond, 2004). While individuals with low levels of personality functioning or integration share a considerable amount of immature defenses, there are some specific characteristic patterns of defense that allow blind

observers to differentiate specific personality disorders (Perry, Presniak, & Olson, 2013) as well as symptom disorders (Bloch, Shear, Markowitz, Leon, & Perry, 1993; Busch, Shear, Cooper, Shapiro, & Leon, 1995).

In addition, efforts have been made to link social psychological and other experimental findings as indicating the workings of defensive processes (Baumeister, Dale, & Sommer, 1998). A classic study in this vein examined penile response to erotic images (Adams, Wright, & Lohr, 1996), which in men is typically strongly linked to self-reported arousal (Chivers, Seto, Lalumiere, Laan, & Grimbos, 2010). The study specifically recruited ostensibly heterosexual men who self-reported being very or not at all homophobic and presented to them both heterosexual and homosexual erotic images. Interestingly, among the high-homophobia group, around half of subjects experienced penile engorgement in response to homosexual images, while this was not observed among the low-homophobia men. The authors interpreted this as evidence that homophobia was sometimes the result of the defense of reaction formation, such that strongly antihomosexual attitudes developed in response to or to prevent awareness of conflicted homosexual desires. A recent study using a gaze fixation rather than penile response paradigm conceptually replicated this finding, reporting greater incidence of gaze fixation toward homosexual erotic images among homophobic heterosexually identified men compared to less homophobic men (Cheval et al., 2016). In another study that has been cited to support evidence for projection, subjects who had been classified as high repressors (Weinberger, Schwartz, & Davidson, 1979) were more likely than other individuals to perceive in the ambiguous behavior of others traits they deemed bad, particularly traits that acquaintances indicated that the subjects had but that the subjects themselves did not report to experimenters (Newman, Duff, & Baumeister, 1997).

However, on the whole the experimental literature supporting specific dynamic conceptualizations of defense is underdeveloped. One such experiment purported not to find evidence for the defense of displacement, observing that more narcissistic individuals who were insulted by a confederate did not show evidence of increased aggression toward a third party, while they did express more anger toward the insulting confederate (Bushman & Baumeister, 1998). This experimental operationalization of displacement is arguably misspecified, as displacement theoretically requires that an individual be conflicted about a feeling toward an object, whereas the average individual (never mind a narcissistic person retaliating against narcissistic injury) is possibly not conflicted about feeling angry toward an insulting individual with whom one has no prior relationship.

Another explanation would be that while specific defense mechanisms are highly relevant as sometimes very subtle indicators for detecting and understanding central motivational topics (i.e., wishes and fears) of patients in the clinical situation, their stability and statistical impact on experimental tasks may be rather small. Broader approaches appear to produce more robust findings. For example, attachment theory provides a dynamically informed model for intrapsychic and interpersonal regulation, which includes the strategies of hyperactivation and deactivation. Attachment

theory proposes a basic need or motive to relate that leads to the development of internal representations of the self and significant others in interaction. Depending on early interactions with primary caregivers, secure, and insecure mental representations with regard to attachment develop in early childhood and stay comparably stable across the life span (Fraley, 2002; Simpson, Collins, Tran, & Haydon, 2007). Related to these mental representations are regulatory styles of hyperactivation and deactivation of attachment-related perception, emotions, cognitions, and behavior (Mikulincer, Shaver, & Pereg, 2003). Bowlby (1980) described the mechanisms behind these styles as "unconscious defensive exclusion" employed by children to help them deal with adverse and neglecting caregivers (i.e., by keeping disturbing aspects of care out of awareness). He proposed two central defensive regulatory mechanisms that keep painful thoughts or wishes out of conscious experience: deactivation (i.e., shutting down of attachment-related emotions and cognitions) and cognitive disconnection (i.e., separation of attachment-related event and one's emotional reaction to it and being preoccupied with one's own internal state instead of its cause). Attachment-related defenses in adults are activated to regulate distress resulting from rejection, loneliness, or fear. In classical psychodynamic terms, there is a motive (the need to attach), which results in situational wishes (to relate to possible attachment figures), which are defended against owing to the developmentally acquired expectation that these needs will not be adequately met.

Attachment-related avoidance, which is accompanied by the habitual use of deactivation as a primary regulatory strategy, has in particular been the subject of several experimental studies. Attachment avoidance was found to be related to a better ability to suppress attachment-related cognitions, less encoding of attachment-related information, and lower levels of sympathetic arousal as measured by skin conductance under conditions of normal functioning, stressing the adaptive nature of defensive strategies (Fraley & Shaver, 1997; Fraley, Garner, & Shaver, 2000). However, cognitive or attachment-related emotional loads make these potentially positive effects disappear (Gillath, Giesbrecht, & Shaver, 2009; Mikulincer, Dolev, & Shaver, 2004), suggesting the fragility of inflexibility in regulatory strategies. At the same time it is relevant to consider the outcome criterion being studied. For example, there are main effects of attachment avoidance on the perception, recognition, and reaction to especially negative emotions in others (Dan & Raz, 2012; Dewitte, 2011; Suslow, Dannlowski, Arolt, & Ohrmann, 2010) but also a retrospective overestimation of negative emotions in romantic partners (Overall, Fletcher, Simpson, & Fillo, 2015). Nonsituational variables also have an impact on attachment-related reaction; for example, interactions between adverse childhood experiences and attachment insecurity may affect psychobiological reactivity and recovery (Ehrenthal, Levy, Scott, & Granger, 2018). To sum up, attachment theory may provide a model of studying defensive processes while at the same time pointing out the difficulties of such research. Comprehensive psychodynamic research programs focused on understanding the operations of particular defenses or defensive regulatory styles would be invaluable for disentangling basic and applied aspects of regulatory defensive processes.

## Defense change in psychotherapy

If generally agreed-upon features of defense are valid—that defenses act uncon-sciously to prevent awareness of conflicted mental contents, both preventing the working through of conflict and underlying symptoms and dysfunctions in them-selves—it should be expected that improvements in defensive functioning would be a unique signature of longitudinal treatment success. Perhaps the most rigorous examination of change in defense to date, defensive functioning of patients in a mixed sample (predominantly personality disordered; $n = 21$) receiving long-term psychodynamic therapy was rated near the beginning of therapy, midtreatment (approximately 6 months), and after 2.5 years rated by blind observers using the Defense Mechanisms Rating Scales (Perry & Bond, 2012). Patients who experi-enced greater improvement in observer-rated defensive functioning from the beginning of treatment to 2.5 years evidenced superior improvements in symptoms ($r = 0.58$) and psychosocial functioning ($r = 0.60$) over the next 2.5 years of follow-up, controlling for their intake severity in symptomatology and psychosocial functioning. Improvements in defensive functioning reflected diminished use of defenses theorized to be less mature and adaptive (e.g., projective identification; $d = -0.67$) as well as increases in the use of adaptive defenses (e.g., humor; $d = 0.80$) (Perry & Bond, 2012). Several other studies have also found correlations between contemporaneous improvements in defensive functioning and symptomatic remis-sion or functional improvements in binge-eating disorder (Hill et al., 2015), cluster C personality disorder (Johansen, Krebs, Svartberg, Stiles, & Holen, 2011), depres-sion (Kramer, de Roten, Perry, & Despland, 2013), adjustment disorder (Kramer, Despland, Michel, Drapeau, & de Roten, 2010), and samples with a mix of mood, anxiety, and personality disorders (Bond & Perry, 2004; Lindfors, Knekt, Heinonen, Harkanen, & Virtala, 2015).

Across investigations of change in defense mechanisms, it is typically reported that the use of mature defense mechanisms and immature defenses generally shifts the most during treatment (Perry & Bond, 2017). In addition, a change in these defense bands—but not neurotic or high-borderline defenses—is often found to cor-relate with symptomatic and functioning improvements (Schauenburg, Willenborg, Sammet, & Ehrenthal, 2007). This might lead to a conclusion that defensive func-tioning changes through a combination of including more mature defenses in the defensive repertoire while simultaneously cutting down on the use of the most dis-torting defenses. However, these group-level findings may belie substantive clinical heterogeneity in defense style and change between individuals, thereby inviting consideration of whether changes in defenses that are specific to the individual's characteristic use are particularly predictive of improvements in therapy. For example, an individual with borderline personality traits whose defense use indicates a high focus on affect and action over meaning making (e.g., acting out) may especially benefit from using relatively more obsessional, affect-dampening defenses (e.g., intellectualization, isolation of affect). However, further research is needed, which takes into account dynamic and static aspects of defenses and how they relate to other aspects of functioning such as emotion regulation

(Aldao, Nolen-Hoeksema, & Schweizer, 2010) or ego functioning (for an international perspective, see Ehrenthal & Benecke, 2019).

# Transference

Generally, transference is considered to be a tendency in which representational aspects of important and formative relationships (such as with parents and siblings) can be both consciously experienced and/or unconsciously ascribed to other relationships (Levy, 2009). Similar to defensive functioning, transference has a normative side that is closely related to the economy of social cognition but may significantly distort the perception of others.

## *Experimental studies of transference*

In discussing experimental support for transference, it is helpful to distinguish between what can be termed general transference and dynamic transference. General transference refers to the degree to which relational schemata developed from past experiences of important relationships are activated to influence perceptions, goals, and behaviors toward other people in the current relational environment. There is ample evidence supporting the existence of general patterns of transference in day-to-day life (Przybylinski & Andersen, 2012). A typical experimental paradigm for examining general transference entails two steps, the second taking place at least a week after the first and ostensibly entailing a different study. In the first step, subjects are asked to generate several positive and negative descriptions of at least two significant life figures. In the second step, these same subjects are presented with an individual (either through verbal description or in the form of a confederate) whose traits match those of significant life figures provided in the first step, often to a shallow or minor degree. The alternative condition in such studies typically pairs a subject with individuals matched to other subjects' significant others. Common findings in this literature generally demonstrate that people often "fill in the blanks" of presented individuals with superficial similarity to significant life figures so as to resemble those life figures, while they do not attribute these traits to individuals without such similarity (Przybylinski & Andersen, 2012).

By contrast, a specifically dynamic understanding of transference incorporates ways in which other motivated, conflicted, or defensive components of the self interact with relational schemata to produce a manifestation of transference. For example, an individual who has an unusually negative reaction toward someone who resembles a beloved parent, because the individual is conflicted about becoming too intimate with someone they might really like (e.g., the parent and, by extension, the acquaintance), might be said to be exhibiting dynamic transference.

Much of the current empirical evidence for dynamic transference comes from research examining the ways in which attachment styles predict different patterns

of expressing transference. Securely attached individuals who are undergoing transference induction concerning a parental figure report a relative increase in positive mood compared to more anxiously or avoidantly attached individuals (Andersen, Bartz, Berenson, & Keczkemethy, 2006). In comparison, more anxiously attached individuals experience a unique increase in anxiety under transference induction, while avoidantly attached individuals express motivation to avoid an individual who reminds them of a past positive life figure. Thus attachment styles interact with mental representations activated by transference to drive mood and motivational states, such as concern about whether the other might be accessible to them (anxious) or a desire to avoid emotional contact with a potentially desirable other (avoidant). In another attachment study involving transferential processes, individuals were asked to generate lists of traits they believe describe their actual self and traits that they "are most glad [they] don't possess and [they] don't want to have" and then were invited to one of three allegedly unrelated experiments (Mikulincer & Horesh, 1999). Across experiments, subjects with more anxious attachment styles were more likely to regard novel others as having traits that the subjects described for themselves, had an easier time correctly remembering novel others as having those self-traits, and exhibited memory biases toward recalling novel others as having been described with those traits even if they were not originally described that way (Mikulincer & Horesh, 1999). Strikingly, subjects with more avoidant attachment showed the opposite pattern, in which traits that were regarded as undesirable for the self were those projected onto novel others. These results suggest that more anxiously attached patients tend toward transference patterns in which they experience others as like them, whereas avoidantly attached patients are more likely to experience a transference in which others resemble what they dislike about themselves.

Other studies have examined the degree to which factors such as past relational history and current mood state affect transference manifestations. In one study, individuals underwent transference induction concerning a loved significant figure toward whom the individual felt chronically relationally dissatisfied (Berk & Andersen, 2008). In the transference induction condition only, the degree to which these individuals felt hostility toward the new other predicted their behavioral persistence on a task designed to solicit liking from this new person. The authors interpreted this to indicate a conflict played out in the transference, by which individuals were frustrated with dissatisfying others but also were reciprocally motivated to (finally) acquire the others' attention and liking. Another study hypothesized that dysphoric college students, relative to other college students, when transference-induced regarding a loved past other, would experience transference patterns commensurate with expectations of disappointment and rejection (Miranda, Andersen, & Edwards, 2013). These dysphoric students undergoing transference induction concerning a loved significant figure showed increases in state depressed mood and offered more rejected self-descriptions as compared to induction regarding a disliked significant figure.

## Therapeutic focus on the transference

A transference interpretation is a tactful comment that clarifies and links the patient's experience of others outside of therapy with that of the therapist in therapy

and with the patient's experience of past relationships with caregivers (Levy, 2009). A predominant clinical hypothesis among psychodynamic clinicians and researchers is that, for patients with highly dysfunctional object relations and more severe personality pathology, transference interpretations may be too destabilizing or that such patients do not have enough capacity to work with such interpretations in a productive manner. A contrasting clinical hypothesis would be that patients with poor object relations and personality pathology may particularly benefit from the use of transference interpretations. An integrative view would be that transference interpretations may be especially helpful for individuals with low levels of personality functioning (including deficits in their ability to understand others) if the interventions are adapted to what such patients can tolerate.

Recently, three trials of psychodynamic therapies were structured to focus predominantly on the therapeutic relationship and transference. The First Experimental Study of Transference compared psychodynamic therapy for a mixed disorder population, randomizing patients to receive or not receive transference interpretations (Høglend et al., 2008). In the subsample of patients with poor personality functioning (predominantly cluster C personality disorders), therapy without transference interpretations was less effective at improving patients' insights into their conflicts and patterns of defense (see later), leading to worse improvements in psychosocial functioning compared to therapy with consistent use of transference interpretations (Hoglend et al., 2008; Høglend, Dahl, Hersoug, Lorentzen, & Perry, 2011; Johansson et al., 2010). Consistent with the integrative view stated above, for individuals with lower levels of personality functioning, transference interpretations were especially helpful if the therapists acted from a "parental" stance, whereas the converse was true for individuals with higher levels of personality functioning (Dahl et al., 2014). Among samples of patients with borderline personality disorder (BPD), transference-focused psychotherapy (TFP) has been compared to dialectical-behavioral therapy, dynamic-supportive therapy, and treatment by community experts (Clarkin, Levy, Lenzenweger, & Kernberg, 2007; Doering et al., 2010). In both trials, TFP was also shown to uniquely promote patient improvements in mentalization and attachment security (Buchheim, Horz, Rentrop, Doering, & Fischer-Kern, 2012; Fischer-Kern et al., 2015; Levy et al., 2006), which is consistent with a view that transference interpretation may be uniquely helpful in this population specifically for fostering intrapsychic integration. Chapter 3, Attachment and mentalization in contemporary psychodynamic psychotherapy, provides a more comprehensive consideration of transference and cyclical relational patterns in the context of psychotherapy.

# Psychodynamic psychotherapy processes

## *Insight*

Insight refers to the degree to which an individual richly understands his or her own internal conflicts, defensive functioning, and maladaptive relationship patterns (Ulberg, Amlo, Dahl, & Høglend, 2017). Psychodynamic conceptions of insight

incorporate both cognitive/intellectual and emotional levels of self-understanding. Higher-insight individuals who habitually find themselves in problematic romantic relationships not only can describe how and why they find themselves instantiating this pattern, but also have experienced the affects associated with these conflicts and have learned to recognize and tolerate them.

Across multiple studies of psychodynamic psychotherapy it has been found that patients who attain greater observer-rated insight over the course of treatment have superior long-term outcomes, even statistically controlling for their prior symptomatic improvements during treatment (see the review in Ulberg et al., 2017). Conversely, patients whose insight does not improve tend to have less stable gains from therapy and do not make further positive changes across follow-up. This pattern is consistent with the perspective that gains in insight represent a unique, positive psychological change that is capturing something meaningfully different from acute symptom relief. Providing some support for this perspective, a recent meta-analysis of 22 studies (involving 1112 individuals) found a moderate effect of insight on treatment outcome (r = .31; 95% CI = .22−.40), that is, it found that insight across a variety of conditions is indeed an important treatment factor in psychotherapy (Jennissen, Huber, Ehrenthal, Schauenburg, & Dinger, 2018). The authors state that the meta-analysis was underpowered to reliably detect moderator effects, indicating that further research is needed to determine whether insight is especially related to outcome in insight-oriented treatments or is broadly applicable to different types of treatments.

## Mentalizing/Reflective Functioning

Historically, there has been a schism between psychodynamic treatments and behavioral and cognitive-behavioral treatments in terms of focus on symptoms versus a focus on what psychodynamic scholars call structural change. By *structural change*, dynamic scholars mean change in the structure or organization of one's mind; what was unconscious is now conscious, what was undifferentiated is now differentiated, and what was unintegrated is now integrated. In psychodynamic psychotherapy, structural change was seen as the Holy Grail of improvement, and symptom change was relegated to secondary importance. In contrast, Cognitive-Behavioral Therapy (CBT) and especially behavioral treatments privileged symptom change. While psychodynamic therapy has over time paid increasing attention to symptom change, most dynamic treatments still focus on structural change and often consider structural change to be the mechanism by which symptom reduction occurs.

Levy et al. (2006) examined structural change, defined as change in attachment and mentalizing/reflective function (RF), in the context of a randomized controlled trial for BPD. Patients receiving TFP exhibited superior improvements in RF as compared to patients who received dialectical-behavioral therapy (DBT) or manualized dynamic-supportive therapy (*d* vs DBT = 0.56, *d* vs supportive = 0.85). In fact, RF did not reliably change in either of the two comparison treatments.

Importantly, and increasing our confidence in the findings, they were replicated in another randomized trial for BPD: Patients who were randomized to TFP exhibited significantly greater improvements in RF as compared to patients in an enhanced treatment as usual condition with expert community providers ($d = 0.45$), among whom RF did reliably not increase (Fischer-Kern et al., 2015). Intriguingly, patients who improved their RF capacities also tended to develop healthier personality organizations ($r = 0.31$), bespeaking an increasing capacity to stably maintain a complex image of themselves and of others by integrating different types of representations.

## Psychodynamic neuroscience

Evidence is mounting that psychodynamic therapy encourages neurobiological changes that are commensurate with, yet unique from, those produced by cognitive-behavioral therapies (Abbass, Nowoweiski, Bernier, Tarzwell, & Beutel, 2014; Roffman, Gerber, & Glick, 2012). Neurobiological changes during psychodynamic treatments have been observed in major depressive disorder (MDD), panic disorder, BPD, and somatoform disorder (Abbass et al., 2014; Perez et al., 2016; Roffman et al., 2014; Wiswede et al., 2014). These neurobiological changes are typically found to correlate with the degree of symptomatic improvements patients experienced in therapy.

By contrast, psychodynamic theory has not strongly informed the probes and tasks that patients undergo in neurobiological studies, even in most examinations of psychodynamic therapies. For example, in neuroimaging investigations of MDD, patients often perform basic neurocognitive exercises, such as *n*-back working memory tasks, Go/NoGo response inhibition and signal detection tasks, classifying generic faces as reflecting broad emotional categories (e.g., happy, sad), or reading generic positively, negatively, or neutrally valenced sentences (Muller et al., 2017). These studies generally assume that a basic neurocognitive function instantiated in particular brain regions is commonly dysregulated among individuals with MDD, building on research identifying cognitive deficits and differences in MDD patients, such as attentional bias toward negatively valenced stimuli (Warren, Pringle, & Harmer, 2015).

Strikingly, a recent large-scale meta-analysis of functional magnetic resonance imaging studies comparing blood oxygen level dependent (BOLD) activation in various scanner tasks among MDD patients as compared to control subjects (Muller et al., 2017) found no replicated areas of hyperactivated or hypoactivated brain regions consistent across different experiments. Patients with depression comprise a heterogeneous group with multiple etiologies for their depressed state (Fisher & Boswell, 2016) that may not reflect common neural substrates for shared symptomatology. It is possible that these types of neuroimaging tasks do not capture more nuanced or idiosyncratic interpersonal or intrapersonal processes that give rise to and maintain a depressed state. Psychodynamically informed, personalized

neuroimaging probes could potentially produce more informative, replicable, and clinically interesting results.

A novel psychodynamic approach to neuroimaging in depression attempted to develop personalized psychodynamic-interpersonal stimuli for patients, under the hypothesis that these stimuli would activate mental representations of their idiosyncratic dynamics (Kessler et al., 2011). To organize the construction of these stimuli, experienced clinicians conducted a structured clinical interview using the Operationalized Psychodynamic Diagnosis system (OPD Task Force, 2008). Individualized stimuli of sentences describing a subject's most typical interpersonal pattern were generated on the basis of coding of the subject's interviews by independent judges. For example, one subject was assigned the following personalized experimental stimulus set: "You wish to be accepted by others," "Therefore you do a lot for them," "That is often too close for them, so they retreat," "Then you feel empty and lonesome." Stimulus sets were generated for both depressed and psychiatrically healthy subjects, and patterns of whole-brain BOLD activation were compared for both viewing of the individual stimuli and a control condition consisting of a stressful narrative about navigating traffic. As compared to controls, patients evidenced patterns of activation suggesting especially heightened limbic (e.g., amygdala) and subcortical (e.g., basal ganglia) hyperactivity when viewing their individualized stimulus compared to the control narrative. The authors interpreted this to indicate that the depressed patients may have increased emotional involvement with and affective activation from situations reflecting their interpersonal conflicts.

Interestingly, a follow-up study was performed on these same patients and control participants after the patients had received 8 months of psychodynamic therapy, which focused on the intrapsychic conflicts and dysfunctional interpersonal patterns derived from the OPD that were used to generate their personalized experimental stimuli (Wiswede et al., 2014). After treatment, patients no longer evidenced hyperactivity of limbic and subcortical structures in response to reading about their problematic interpersonal patterns, which could be a neurobiological signal of working through these conflicts. Another trial of 15 months of psychodynamic therapy for recurrent MDD also used personalized stimuli as neuroimaging probes, this time developed from attachment-relevant narratives generated by the Adult Attachment Projective picture set (Buchheim et al., 2012). Similarly, limbic normalization compared to control subjects was observed before and after treatment. Unique to this study, normalization of task-generated activity was observed in the subgenual cingulate (specifically implicated in treatment-resistant depression) and the medial prefrontal cortex (implicated in voluntary emotional regulation), which correlated with degree of symptom improvement. A more rigorous control condition for these types of investigations would be to have subjects also view another subject's personalized stimuli. This would help to determine whether observed differences in activity constitute altered responses to interpersonal narratives generally or specifically interpersonal narratives reflecting problematic patterns that define the individual's own life.

# Conclusion

There is strong, accumulating evidence from attachment theory, experimental psychology research, including neuroscience, and psychotherapy research that supports the validity and clinical usefulness of several constructs (defensive processes, transference and countertransference, insight, and mentalizing) that underlie psychodynamic psychotherapy. For instance the concept of transference is consistent with what is known about schemas and pattern matching, implicit memory processes, and other concepts from cognitive and neurological sciences. There is also interesting preliminary evidence that transference is not just a cognitive-information bias or process but that it is also a dynamic process related to attachment and defensive processes. The psychodynamic model of mind is a generative research framework. Future experimental and clinical work on psychodynamic psychological mechanisms may not only help to elucidate the processes of psychotherapy and change, but also provide unique hypotheses and data with which to richly describe and predict human cognition and behavior.

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# Further reading

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