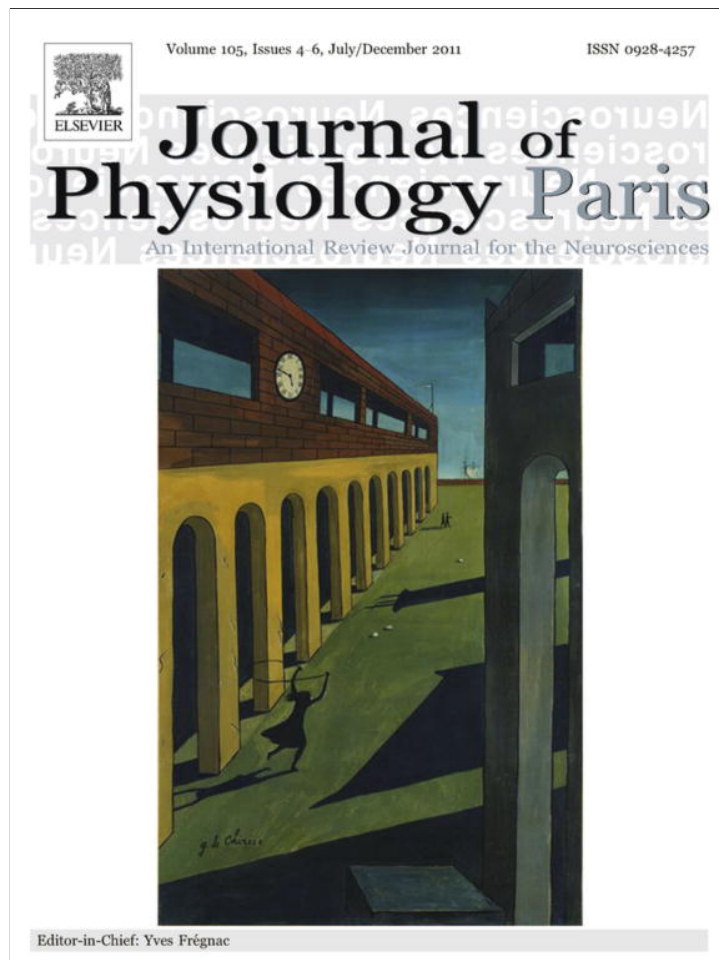




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Journal of Physiology - Paris

journal homepage: www.elsevier.com/locate/jphysparis

Does experimental research support psychoanalysis?

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ARTICLE INFO

Keywords:

Psychoanalysis
Evidence-based medicine
Development
Experimental procedure
Trauma

ABSTRACT

The question of whether a psychodynamic view is compatible with experimental research is still a challenging issue—especially for child and adolescent psychopathology—despite the influence of psychoanalytic theory in this field until the 1980s. In this article, is explored the relationship between psychodynamic theory and experimental research using examples of evidence-based studies in the fields of (i) psychotherapeutic intervention assessment, (ii) placebo response in children and adolescents, (iii) unconscious lasting traumatic effects in children and adolescents, (iv) psychodynamic-oriented psychological testing. There are now a sufficient number of evidence-based studies to support the use of psychodynamic therapy in mental disorders, particularly in personality disorder and anxious/depressive disorder. In addition, placebo responses in children and adolescents with internalizing disorders are significantly higher in major depression compared to obsessive-compulsive disorder or other anxiety disorders, which highlights differential psychopathologies regarding the experience of loss. Also, using an experimental task, psychoanalysts are able to identify, without explicit knowledge and above the level of chance, healthy adults whose siblings had experienced cancer during childhood. This experiment suggests that implicit information regarding a participant's history is conveyed in interpersonal exchanges that can be intuitively perceived by judges experienced in listening to free associations from a psychodynamic perspective. Finally, psychodynamic-oriented psychological testing may predict the transition to schizophrenia in adolescents with a history of manic/mixed episodes. It can be concluded that there are no discrepancies between psychodynamic views and experimental data, whether one tests psychotherapeutic approaches, discusses data from other fields such as psychopharmacology, or designs experiments based on psychodynamic theory.

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1. Introduction

The question of whether a psychodynamic view is compatible with experimental research is still a challenging issue, especially for the field of child and adolescent psychopathology. Given the increasing influence of modern neuroscience and evidence-based medicine, several authors claim that psychoanalysis no longer has a place in psychiatry. Recently, an editorial in *Nature* argued that psychoanalysis is out of fashion (Editorial, 2009). In the present paper, the theoretical and practical issues related to the question “What kind of research in psychoanalytic science?” will not be discussed. The Nobel Prize winning American neuroscientist and psychiatrist Kandel (1998, 1999), French methodologist Falissard (2008), and American psychoanalyst Wallerstein (2009) have already addressed this question remarkably well. For example, Wallenstein distinguished the key issues of several dilemmas:

objective vs. subjective; one vs. many; context of discovery vs. context of justification; general vs. aggregate-type propositions; conceptual vs. empirical research; and quantitative vs. qualitative approaches.

Nor will be discussed the numerous studies related to developmental psychology and infant/attachment research. Early pioneers in child psychoanalysis such as Anna Freud, René Spitz and John Bowlby opened these areas of research. Anna Freud and René Spitz highlighted the impact of deprivation on infant development and discovered infant depression and hospitalism (Spitz, 1945; Freud and Burlingham, 1944). Today, severe deprivation is one of the most documented environmental consequences on biological system. The children orphaned in Romania permitted scientists to assess risk and protective factors related to severe deprivation after taking into account many confounding variables. Severe early deprivation of human contact affects early brain development with cases of autism, intellectual disability or both (Rutter et al., 2007). Despite a large amount of variance across children, IQ is negatively correlated with duration of deprivation. The reversibility of the process depends on the age of the child when normal family rearing is restored (Rutter and O'Connor, 2004) and suggests the

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possibility of a sensitive period in cognitive development (Nelson et al., 2007). Besides cognitive development, severe deprivation also increases the risk of mental disorders, with boys being more at risk than girls (Zeanah et al., 2009). Also, impact of deprivation can be evidenced through EEG (Vanderwert et al., 2010; McLaughlin et al., 2010) as well as brain imaging (Mehta et al., 2009). In sum, these studies show that deprivation affects emotional development and brain functioning as well as anatomic brain organization.

By comparing human to animal development, Bowlby hypothesized that an infant is biologically predisposed to engage in seeking behaviours towards caregivers (Bowlby, 1969). He radically departed from the Freudian paradigm of primary drives that operate independently of the object. The attachment theory, on the contrary, views the formation of bonds as a primary human instinct (Schechter and Willheim, 2009). Many research studies based on this theoretical paradigm were conducted during the last three decades including clinical studies (e.g., disorder of attachment; Main and Solomon, 1986), experimental studies (e.g., the strange situation; Ainsworth et al., 1978) and early interaction studies (e.g., the effect of parental representations on infants' security of attachment; Fonagy et al., 1993; Schechter et al., 2005). Interestingly, one common factor among all these studies is the key focus on infant development in the context of stress environment.

Neuroscience has also investigated early trauma and stress factors. Although psychoanalysts were among the first to highlight the importance of early life adversities on adult mental states as well the importance of family and personal trauma within some patients' repetition trajectories (Marcelli and Cohen, 2009), evidence supporting the non-genomic transmission of behavioural traits has only recently been accepted. Despite the pioneering efforts of Victor Denenberg, who first showed the non-genomic transmission of behavioural traits in animals (Denenberg and Whimby, 1963; Denenberg and Rosenberg, 1967), the move towards genetics in the 1980s made it difficult to understand the importance of stress factors until Michael Meaney and colleagues' recent work. Using animal models, these authors showed that childhood stress, maternal care and stress *in utero* impacted the development of future generations through epigenetic modifications and the hypothalamic–pituitary–adrenocortical (HPA) axis. These modifications could be transferred across generations and were independent of the initial animal's genetic code.

Briefly, these experiments showed that early experiences have a long-term effect on behaviour and biological systems, especially when the mother and her offspring are separated or when the quality of maternal care varies dramatically (Denenberg and Rosenberg, 1967; Liu et al., 1997). Furthermore, certain early experiences may affect future generations, providing a non-genomic mechanism for the transmission of behavioural traits (Denenberg and Whimby, 1963; Francis et al., 1999). These models help illuminate early childhood experiences and the importance of environmental factor timing. In these animal models, environmental enrichment during the peripubertal period leads to a functional reversal of the effects of maternal separation (i.e., HPA and behavioural response) through compensation, rather than a reversal of the neural effects of early life adversity (Francis et al., 2002). Therefore, these studies demonstrate the need to consider not only gene–environment interactions, but also gene–environment by developmental time interactions, as it is hypothesized in pleiotropic effects of neurotransmission during development (Thompson and Stanwood, 2009) or in probabilistic epigenesis models of development (Cohen, 2008, 2010).

Is it possible to extrapolate rodent models to *Homo sapiens*? In other words, is it valid to “translate” or “parallel” these rodent models with some psychopathological proposals related to impaired infant–mother relationship such as Fraiberg et al. (1975)

did in “Ghosts in the nursery”? and what about Schechter and Willheim's proposal (2009) to relate mother's Post-Traumatic Stress Disorder to atypical caregiver behaviour, atypical maternal behaviour to disturbances of attachment, the latter being a risk factor of psychopathology? These key points will not be discussed, given it has been the subject of previous work (Schechter and Willheim, 2009; Leckman, 2007). It will be just mentioned here Barr et al. studies (2004a, 2004b) showing that when chimps are reared separately from their mothers and placed in a situation of emotional depravity, their adrenocorticotrophic (ACTH) levels change as a result of stress. A functional genetic polymorphism that occurs in the serotonin transporter modulates this effect. As adults, only the apes that were both emotionally deprived and had the serotonin transporter promoter genotype (s/l) developed alcoholism when alcoholic drinks were included in their diet. Furthermore, Heinrichs et al. (2003) studied the interactive effects of oxytocin administration and social support on stress response and showed that oxytocin administration enhanced the effect of social support on stress responsiveness.

The objective of this article is to focus on key elements of psychoanalysis and to document whether experimental data and evidence-based studies, or both, support these elements. The following aspects of psychoanalysis are selected here: (i) as a therapy based on free association or play and on the interpretation of transference, is psychodynamic psychotherapy an effective treatment? In other words, are there evidence-based data supporting its use? (ii) Are unconscious phenomena (a keystone of Freud's work) noticeable or measurable outside the context of automatic brain activities? To answer this question, the placebo effect is discussed in youths as well as the unconscious and lasting traumatic effect of a sibling's cancer in children and adolescents; (iii) is psychodynamic-oriented psychological testing a clinically valid tool? To answer this question, its predictive value in adolescent bipolar episode is discussed. For each statement, the available neuroscience literature to provide a scientific context is briefly reviewed. While providing research supporting each statement, methodological proposals that permit to overcome the inherent issues of dealing with psychoanalysis as a science, will also be explored.

2. Is psychodynamic psychotherapy an efficient treatment?

To assess this issue, evidence-based medicine recommends focusing on controlled studies the most “powerful” being double-blind randomized studies. These studies are the gold standard in treatment studies, particularly for psychopharmacology, despite much evidence that these studies have inherent biases (Cohen, 2007). This may be explained by the following: (1) the concept of evidence-based medicine is a scientific framework derived from the work of the medication agencies; (2) the rhetoric of scientific debates always includes propaganda such as filtering information, engineering opinion, using the public relations industry, and marginalising minorities (Balon, 2003). Double-blind, placebo-controlled trials are based on the assumption that treatment effects and placebo effects are additive. High placebo-response rates in youths with major depressive episodes that lead to small differences between drug and placebo effects (see below) have called into question the additivity assumption (Cohen et al., 2008). Anti-depressants may have substantial pharmacological effects that are either duplicated or masked by placebo effects (Kirsch et al., 2002). An alternative method of conducting clinical trials should be developed to test models other than additive ones.

Using this scientific framework, however, there are several ideas that support the use of both short- (Leichsenring et al., 2004) and long-term psychodynamic psychotherapy (Leichsenring and Rabung, 2008) in adults with mental illness. Unfortunately,

despite promising retrospective studies from the Anna Freud Centre in the 1990s (Fonagy and Target, 1994; Target and Fonagy, 1994), evidence based data in child and adolescent psychoanalysis are more limited. In adults, Leichsenring and colleagues reported two meta-analyses on short- and long-term psychodynamic psychotherapy in the well-read journals *Archives of General Psychiatry* and *Journal of the American Medical Association*. In the first study, they reviewed 17 psychotherapeutic trials, including 1758 patients suffering from anxious-depressive or personality disorders; 744 patients received short-term psychodynamic psychotherapy (STPP), and 894 patients received either cognitive behavioural therapy ($N = 11$ trials), treatment as usual ($N = 4$), or other psychotherapeutic approaches ($N = 3$); 120 additional patients were included on a waiting list. All studies combined, each patient received an average of 21 sessions (range: 7–40). The authors calculated the effect sizes of each treatment for targeted problems, general psychiatric impairment, and social functioning at post-treatment and follow-up when available. The results showed that all psychotherapies had similar effect sizes ranging from 0.74 to 1.39. When comparing STPP to patients on the waiting list or to those receiving the usual treatment, STPP effect sizes were (or tended to be) significantly larger for all outcome variables (Leichsenring et al., 2004). The second study investigated a more complex issue: the effectiveness of long-term psychodynamic psychotherapy (LTPP) in chronic mental conditions. Thus, Leichsenring and Rabung reviewed 23 studies (11 randomized controlled trials with 565 patients and 12 observational studies with 488 patients) including patients with chronic mental conditions. The cumulative effect sizes were 0.94 (95%CI: 0.82–1.06) and 0.96 (95%CI: 0.87–1.05) for randomized controlled trials and observational studies, respectively, revealing the effectiveness of LTPP on chronic mental conditions besides other therapeutic approaches such as psychosocial, family and psychopharmacological therapies (Leichsenring and Rabung, 2008). In terms of adult patients, evidence for the efficacy of psychodynamic psychotherapy is available for anxiety disorder (e.g., Leichsenring et al., 2009), anxious-depressive disorders (e.g., Knekt et al., 2008), major depression (e.g., Salminen et al., 2008), eating disorders (e.g., Dare et al., 2001), and borderline personality disorders (e.g., Bateman and Fonagy, 1999, 2001). In child and adolescent psychiatry, most reports regarding the use of psychodynamic therapy are limited to case reports (e.g., Thompson et al., 2005; Leroy et al., 2010) or large retrospective series (e.g., Fonagy and Target, 1994; Target and Fonagy, 1994). However, some evidence-based studies are available on anxious-depressive disorders in youths (Muratori et al., 2003; Trowell et al., 2007).

In addition to the issue of efficacy, several authors have argued that many factors that mediate the efficacy of psychotherapy are not specific. For example, when discussing the large placebo effect in double-blind, placebo-controlled studies of child and adolescent depression, Cohen (2007) speculated that, whether intended or not, the clinician's intervention encourages an unintentional psychotherapeutic dynamic regardless of the clinician's orientation. More generally, non-specific factors may include the therapeutic relationship, patients' expectations of help, patient characteristics (e.g., motivation), and treatment rituals (Gibbons et al., 2009). In addition to more common factors, Frank (1995) stated that all psychotherapies reduce demoralization by seeking to change despair to hope, fear to courage, powerlessness to mastery, and demoralising meanings to favourable ones. In other words, critics argue that most benefits of psychotherapy are produced by factors other than specific procedures (Grencavage and Norcross, 1990; Norcross and Lambert, 2006).

To assess this issue regarding psychodynamic psychotherapy, one can refer to comparative studies that show its superiority to alternative psychotherapeutic approaches, or to studies that

investigate specific moderators of change linked to the psychodynamic technique (e.g., transference interpretation). The literature on specific factors is scarce but does exist. In Chilean women with severe depression and a history of childhood trauma ($N = 87$), Vitiello et al. (2009) showed that a psychodynamic outpatient intervention—that screened for and focused on childhood traumas and that helped patients understand current psychosocial difficulties as a repetition of past trauma—reduced psychiatric symptoms and improved interpersonal relationships and social role functioning. The psychodynamic intervention was superior to the standard treatment recommended by the Chilean Ministry of Health. Three studies assessed whether Kernberg's transference-focused psychotherapy (TFP) was superior to other psychotherapeutic approaches with regard to borderline personality disorder. His team conducted a randomized controlled trial ($N = 90$) comparing TFP to dialectical behaviour therapy (DBT) and psychodynamic supportive therapy (PST). Depression, anxiety and global functioning improved in all groups. Suicidality improved in TFP and DBT groups, impulsivity improved in TFP and PST groups, but only TFP significantly predicted changes in irritability and verbal and direct assaults (Clarkin et al., 2007). Doering et al. (2010) compared TFP to community psychotherapy in an Austrian sample of 104 patients with borderline personality. TFP showed significantly lower dropout and suicide attempt rates. Both groups' depression and anxiety improved, although there were no significant effects on self-harming. Notably, TFP showed significantly greater improvements in borderline symptomatology and psychosocial functioning compared to community psychotherapy. The results remained significant even after controlling for the greater number of TFP sessions (Doering et al., 2010). However, a randomized controlled trial on 86 patients with borderline personalities comparing TFP and schema-focused therapy¹ (SFT) showed that both TFP and SFT significantly improved most variables (e.g., borderline severity index, quality of life, and general functioning) at the end of a 3-year treatment. But SFT was superior to TFP on most variables due to the higher dropout rates in the TFP group (Giesen-Bloo et al., 2006).

Finally, in two related articles, Høglend et al. (2006, 2008) examined whether the interpretation of transference in the context of psychodynamic psychotherapy was directly related to patient improvement. The study was conducted on a sample of 100 adults with Axis 1 (anxious-depression: $N = 82$) and/or Axis 2 (personality disorder: $N = 64$) disorders. Patients in a 1-year psychodynamic therapy treatment group were randomly assigned to therapies with or without transference interpretation. In contrast to the belief that classical transference interpretation is the core of the psychoanalytic technique, there were no differences between groups regarding improvement at the end of therapy or at 1-year or 4-year follow-up assessments. However, when the authors investigated possible moderators of treatment effects such as sex, the presence of a personality disorder, and the quality of object relationships as measured by a specific scale, they found that patients with a life-long pattern of poor object relationships profited from therapy with transference interpretations more than from therapy without transference interpretations (Høglend et al., 2008).

Despite these challenging issues and the need to conduct further evidence-based studies, especially in the field of child and adolescent mental health, current research and the available data

¹ “Central to SFT is the assumption of four schema modes specific to borderline personality. Schema modes are sets of schemas expressed in pervasive patterns of thinking, feeling, and behaving. The distinguished modes are detached protector, punitive parent, abandoned/abused child, and angry/impulsive child. In addition, some presence of the healthy adult is assumed. Change is achieved through a range of behavioural, cognitive, and experiential techniques that focus on (1) the therapeutic relationship, (2) daily life outside therapy (also through homework assignments), and (3) past (traumatic) experiences” (Giesen-Bloo et al., 2006).

support the efficacy of psychodynamic psychotherapy in several mental illnesses and the specificity of some of its core constructs.

A second issue concerns whether unconscious phenomena (a keystone of Freud's work) are noticeable or measurable outside the context of automatic brain activities. To answer this issue, first the placebo effect in youths is discussed; second, the unconscious lasting traumatic effect of a sibling's cancer in children and adolescents is addressed.

3. The placebo response in children and adolescents with internalizing disorders

The placebo response is a positive unexpected response in the context of a specific experiment that is mediated by unconscious phenomena. Many studies have investigated both the placebo response and its physiology in both humans and animals. Furthermore, its effects are measurable. Placebo administration activates both dopamine and endogenous opioid peptides in the nucleus accumbens, which suggests the involvement of reward mechanisms in some types of placebo responses. The reward circuit involves the amygdala, nucleus accumbens, ventral tegmental area and orbitofrontal and dorsolateral prefrontal cortices (De la Fuente-Fernandez, 2004; Scott et al., 2008). The placebo effect produces classical conditioning in rodents that can affect immune response (Ader and Cohen, 1975). The behavioural conditioning of immune responses is caused by the crosstalk between the central nervous system and the peripheral immune system. Experimental evidence over the last 25 years has shown behaviourally conditioned effects on humoral and cellular immunity in rodents. Behavioural conditioning can change lymphocyte circulation and proliferation, cytokine production, natural killer cell activity, and endotoxin tolerance (Enck et al., 2008). Brain excitotoxic lesion experiments have showed that the insular cortex is essential in acquiring and evoking this conditioned immunosuppressive response. In contrast, the amygdala seems to mediate the input of visceral information at acquisition time, whereas the ventromedial hypothalamic nucleus participates in the immune system output pathway needed to evoke behaviourally conditioned immune responses (Pacheco-Lopez et al., 2005). The nocebo effect can also occur and may be mediated by other chemical and anatomic mechanisms (Enck et al., 2008).

In the field of clinical psychopharmacology, the placebo response needs to be controlled to avoid false interpretation of the results. In addition, the lower the placebo response is the better the power of statistical analyses. Variables that are repeatedly used to mediate placebo response are treatment expectation, patient age, type of disorder, number of study visits, patient origin, date of publication, and study design (Cohen et al., 2010; Rutherford et al., 2009). Psychological interpretations of placebo responses usually refer to conditioning or suggestion mechanisms. When studying the literature on antidepressants in children and adolescents, one can hypothesize that placebo responses were high for depression because of specific psychopathological factors associated with major depression in youths. To test this hypothesis, Cohen et al. (2008, 2010) compared placebo response rates in pharmacological trials for major depressive disorder (MDD), obsessive-compulsive disorder (OCD) and other anxiety disorders (AD-non-OCD), three of the main uses for antidepressant medications. They reviewed the literature relevant to the use of psychotropic medication in children and adolescents with internalized disorders, restricting the review to double-blind studies including a placebo group. Placebo response rates were pooled and compared according to diagnosis (MDD vs. OCD vs. AD-non-OCD). From 1972 to 2007, they found 23 trials evaluating the efficacy of psychotropic medication (mainly SSRIs) involving youths with MDD,

7 pertaining to youths with OCD, and 10 pertaining to youths with other anxiety disorders ($N = 2533$ patients in placebo groups). As hypothesized, the placebo response rate was significantly higher in MDD studies compared to those examining OCD or AD-non-OCD (49.6% [range: 17–90%] vs. 31% [range: 4–41%] vs. 39.6% [range: 9–53], respectively; ANOVA: $F = 7.1$, $p = 0.002$; see Fig. 1). They concluded that MDD in children and adolescents was more responsive to placebos than other internalized conditions.

Given that children and adolescents with MDD appear to be more responsive to placebos than youths with other internalized conditions, highlighting differential psychopathologies (i.e., pharmaceutical dissection) may help formulate hypotheses about this pattern. The different theoretical views of psychoanalytic theory, cognitive-behavioural theory, and family-systems theory clearly differentiate depression from anxiety disorders. Whether it is called self-esteem or narcissism, children need to encounter love, particularly in interactions with their early caregivers that help them construct self-confidence and a strong sense of self during development. When this does not occur (e.g., due to early life adversities), children become vulnerable to a variety of loss experiences. This vulnerability to loss manifests in a specific search for adult recognition, care, and love, as it may restore negative self-views (Cohen et al., 2008). Fear is the main emotional dimension in AD but does not appear much in theories of depression (unless that depression is secondary to or comorbid with AD; Kovacs et al., 1989). Conversely, when loss is involved in the psychopathology of an AD, it is at the level of threatened loss of the object-relationship, rather than at the level of real experience of loss (Hamilton et al., 1994). Several empirical studies support this distinction. Loss events are significantly more prevalent among MDD patients than those with AD, both in youths (Williamson et al., 2005) and in adults (Kendler et al., 2003). Furthermore, the importance of early life adversities distinguishes youths with MDD from adults with MDD (Jaffee et al., 2002). Therefore, the reason why placebo response rates are higher in youths with MDD than in youths with AD may be that, in a double-blind placebo-controlled trial, many aspects of the patient's psychosocial background are considered because they may account for treatment outcomes, compliance, and protocol acceptance. Regardless of intent, the clinician's intervention may restore self-esteem or narcissism in the depressed children and adolescents. Furthermore, the intervention may encourage intense transference movements

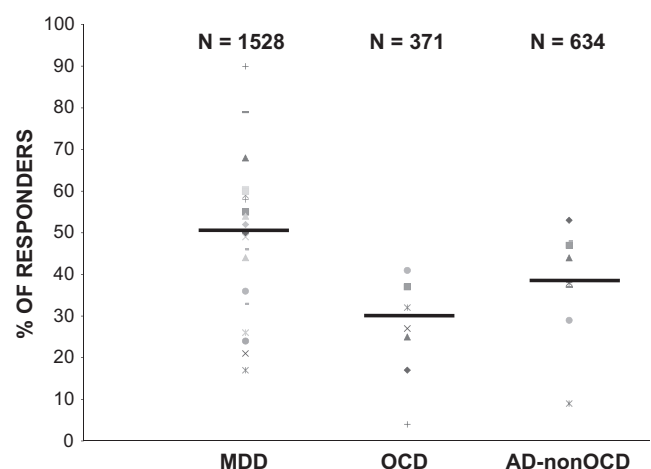


Fig. 1. Placebo response rates (%) in trials for children and adolescents with major depressive disorder (MDD, number of trials = 23), obsessive-compulsive disorder (OCD, number of trials = 7), and other anxiety disorders (AD-non-OCD, number of trials = 10). ANOVA: $F = 7.1$, $df = 2$, $p = 0.002$. N = total number of youths included in the placebo arms; PBO = Placebo. From Cohen et al., 2008, PlosOne.

at the first meeting (Cohen, 2007). Indeed, the formation of a therapeutic alliance is essential to the child's participation in a research efficacy trial. Frequent and regular trial meetings offer children the unique opportunity to restore their self-esteem and confidence in the adult world, resulting in an unintentional psychotherapeutic dynamic regardless of the clinician's orientation. Authors hypothesize that this phenomenon partially explains the higher placebo response in youths with MDD compared to youths with other internalized disorders (Cohen et al., 2008). However, these data constitute only indirect evidence of the importance of object relationships, early life adversities and the experience of loss in the context of depression in children and adolescents. The long-term consequences of traumatic experiences and how they impact life at both conscious and unconscious levels, are going now to be discussed.

4. Can experimental psychology measure the unconscious and lasting traumatic effects of a sibling's cancer in children and adolescents?

The unconscious was described in several fields such as philosophy, psychology, neurology and psychiatry long before Freud and Janet's description of unconscious phenomena (Ellenberger, 1970). For example, in *Les passions de l'âme*, Descartes (1649) describes how unexpected and incomprehensible passions may be related to childhood events: "The event is forgotten, the aversion remains". Although Freud's, Charcot's and Janet's descriptions of unconscious phenomena date to the early 1900s (e.g., Janet, 1886; Freud, 1896, 1900; Bouchara et al., 2010a, 2010b), experimental psychology has only recently provided supporting evidence (Naccache, 2006; Shevrin and Fritzler, 1968). Studies with blind-sight patients (Morris et al., 2001) and those using subliminal masking in normal individuals (Whalen et al., 2004) have shown that non-symbolic stimuli such as emotional faces can induce a modulation of amygdala activity in the absence of conscious perception. Similarly, priming with number words (Naccache and Dehaene, 2004; Greenwald et al., 2003) and emotional words (Gaillard et al., 2006) can induce unconscious semantic processing. Suppression of unwanted conscious memories by executive control occurred in an experiment with modified go/no-go tasks (Anderson and Green, 2001) and may be correlated with specific neural networks, thus providing a viable model of repression (Anderson et al., 2004). However, in these experiments, the authors only manipulated conscious suppression and could not validate Freud's concept of unconscious repression that is his genuine original concept of repression. Freud's concept of repression refers to the defensive inhibition of "unbearable" mental content. For him, exclusion from consciousness is effected not simply through suppression (the voluntary form of repression) (Berlin and Koch, 2009), but also by a variety of distorting techniques, some of which are deployed to degrade latent content, and all of which are eventually subsumed under the rubric of defence mechanisms (the widest sense of repression) (Erdelyi, 2006). Perceptual learning can occur as a result of exposure to subliminal stimuli without the participant's attention (Watanabe et al., 2001), and this processing may not be passive (Seitz and Watanabe, 2003). Decision-making strategies may involve both conscious and unconscious processes, as demonstrated in studies of patients with damage to their pre-frontal cortex (Bechara et al., 1997) and in studies of consumer choice (Dijksterhuis et al., 2006).

These studies on the neuroscience of consciousness helped to renew interest in psychoanalytic theory (Naccache, 2006; Shevrin et al., 1996; Berlin and Koch, 2009). Most of these experimental data are related to basic cognitive processing with the notable exception of the psychology of decision-making (Dijksterhuis

et al., 2006; Tversky and Kahneman, 1981) and the psychology of social influence (Weisbuch et al., 2009). In studies investigating basic cognitive processes, experimental paradigms from cognitive psychology have manipulated variables to be sure that raters' responses were secondary to unconscious stimuli. Such manipulations have focused on the duration of stimuli presentation, stimuli masking, the use of unconscious primes, or all three. Unconscious processing may have resulted in different reaction times during experimental tasks, differential brain functional imaging, or both (Shevrin and Fritzler, 1968; Seitz and Watanabe, 2003). Other studies were based on a neuropsychological paradigm and included patients with brain damage (e.g., Bechara et al., 1997). In summary, although these studies support unconscious processing, they do not support other aspects of psychoanalytic theory.

Surprisingly, the cognitive psychology of unconscious phenomena and the developmental investigation of early life adversities (see Section 1) did not cross to propose experiments within a psychodynamic framework. Therefore, the claim that specific abilities (e.g., personal psychodynamic experience) can enhance the recognition of unconscious phenomena in peers—in other words, blindly detect knowledge related to individual self-experience (e.g., a traumatic event)—remains one of Freud's most debated postulates.

To assess this issue Cohen et al. (2011) conducted an experiment that took advantage of several characteristics of childhood trauma studies. First, according to Freud, people usually overcome a traumatic experience through repression (Freud, 1915). Second, traumatic experiences may be followed by incomplete amnesia or repression that leads to a spectrum of manifestations including Post-Traumatic Stress Disorder (Carrion et al., 2002). Third, the amnesia pattern may differ based on cues related to the traumatic experience itself; for example, children abused by a trusted caregiver are more likely to eventually forget the abuse than those mistreated by strangers (Anderson, 2001). Fourth, while mourning for a deceased sibling, the survivor may exhibit guilt related to an unconscious wish to kill a competitor (Marcelli and Cohen, 2009). The experimental design also took into consideration the specificity of the analytical situation based on free association, which usually focuses on intermediate states of consciousness, dreams, and unexpected and unwanted events (e.g., lapses of memory; Gabbard, 1994).

The method is summarized as follows: first, authors collected 14 videos from seven healthy adults whose siblings had cancer during childhood and seven control participants matched for age and sex. All participants gave a 5-min spontaneous, free-associating speech following specific instructions created to activate a buffer zone between fantasy and reality (Cohen et al., 2011). Next, several groups of raters who were blind to the participants' histories (e.g., psychoanalysts, medical students, oncologists, cognitive behavioural therapists and independent people with the same experience of trauma) were shown the videos in a random order and asked to blindly classify them based on the likelihood of traumatic history. Using a permutation test, they found a significant relationship between group and recognition score. Psychoanalysts recognized healthy adults whose siblings had experienced childhood cancer above chance levels (power = .88; $p = .002$). Conversely, medical students, oncologists, cognitive behavioural therapists and people with siblings who had also cancer could not. This experiment suggests that implicit information of a patient's history is conveyed via interpersonal exchanges that can be intuitively perceived by judges experienced in listening to free associations from a psychodynamic perspective (Fig. 2). In other words, the recognition of a participant's history depends on the raters' specific abilities. Psychoanalysts appear better able to recognize the presence of childhood trauma.

The experimental paradigm was based on the psychology of decision-making under a psychodynamic framework that is the

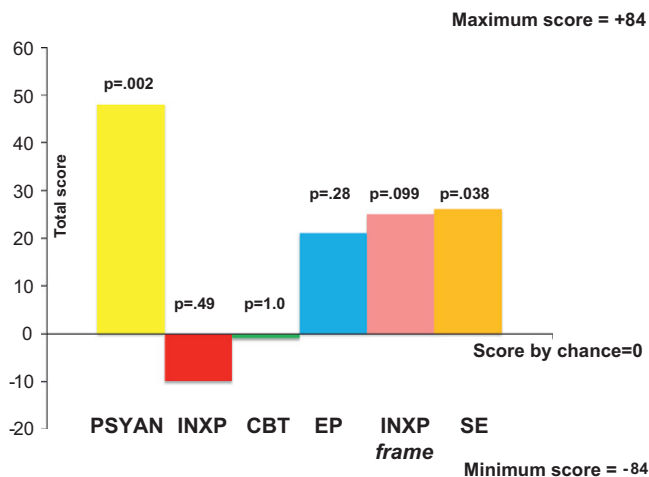


Fig. 2. Recognition scores of each rating group. Psychoanalysts [PSYAN], inexperienced professionals' [INXP] in similar and simple rating instruction condition [so called INXP-frame], cognitive behavioural therapists [CBT], experienced professionals [EP], and individuals who had the same experience of history of sibling's cancer [SE] scores when determining whether healthy adults had experienced sibling cancer during childhood, without explicit knowledge of this history. For each group, the score could vary from +84 for all perfect guesses to -84 for a complete failure and the probability that the score differed from chance was calculated using a permutation test. ANOVA combining all groups of raters: $p = .0006$. Computed p -value for each group of raters is indicated upon the bar (level of significance $p < .009$). From Cohen et al., 2011, PlosOne.

psychoanalytic theory of trauma. First, authors selected a traumatic event involving a sibling to ensure both its traumatic impact and its specific internal echo regarding the unconscious wish to evict a competitor. Second, they selected adults who have likely experienced the effects of repression from the time of the traumatic event to the time of the current experiment. Third, to facilitate accessing unconscious traces, participants who gave the 5-min spontaneous free-associating speech received specific instructions designed to activate a buffer zone between fantasy and reality. Fourth, authors hypothesized that raters who were experienced in listening to free associations would blindly recognize participants with a history of sibling's trauma above chance.

However although the study protocol was based on the psychodynamic theory of trauma, the results do not explicitly support this theory because one does not know the parameters involved in unconscious communication, nor does one know the extent to which one needs a special theory of trauma to accurately classify cases from controls. Furthermore, authors cannot exclude the possibility that even raters with an opposing or different theory detect trauma but are less confident.

5. Is psychodynamic-oriented psychological testing a clinically valid tool?

In this section, psychological testing is presented as another area of psychodynamic-oriented clinical practice. Despite its controversial position in modern psychiatry, psychodynamic-oriented psychological testing is still alive in Europe (Chagnon, in press). In addition to the dogmatic views regarding psychoanalysis, some of the controversies are based on the limited number of experimental/evidenced-based studies with a psychodynamic background and the subjective nature of psychodynamic processes (Nature Editorial, 2009). Balancing the subjective nature of psychoanalysis with evidence-based studies is challenging; however, it is critical to develop methods to translate aspects of the psychodynamic experience into quantitative variables. Although exploratory in nature, Louët et al. (2010) used the Clinical Global Impression

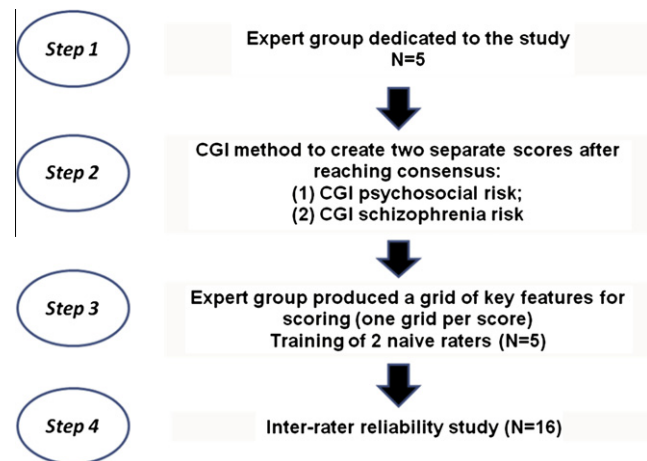


Fig. 3. Step-by-step Clinical Global Impression method to quantify psychodynamic-oriented testing for psychosocial risk and transition-to-schizophrenia risk. Details available in Louët et al., 2010, J. Physiol-Paris.

(CGI) method (Guy, 1976) to score psychosocial risk and the schizophrenia risk. They used psychodynamic-oriented psychological testing and applied this method to assess the potential prognostic value within the context of an outcome study in adolescents with bipolar disorder type 1 (BD-I; Brunelle et al., 2009; Consoli et al., 2009).

The CGI procedure is presented in Fig. 3. Five psychodynamic-oriented psychological testing experts (Chabert, 1987; Shentoub, 1990) produced consensus psychosocial and transition-to-schizophrenia risk CGI scores after reviewing the early psychological testing of 25 adolescents with bipolar disorder who were followed up for 8 years. After reaching a consensus on each patient's score, the experts were asked to create a grid for each score to make explicit on which characteristics they reached consensus for scoring. For CGI psychosocial risk, experts estimated patients' adaptation and integration capacities, which allow for autonomy in a particular profession and possible relationship investments supported by narcissistic safety (i.e., self-esteem; internal object). Experts used both global intelligence data (Wechsler scales) and projective tests (Rorschach and Thematic Apperception Test; TAT). For CGI transition-to-schizophrenia risk, experts underlined typical signs of schizophrenia in both Rorschach and TAT. The grid gave examples related to thought processes, body image, quality of narcissistic foundations, object relations, and affect (for details, see Louët et al., 2010). Based on the experts' guidelines, two psychodynamic-oriented psychologists blind to the study methods scored the same psychological protocol. The intra-class correlations and Kappa scores of CGI-risk scores ranged from 0.53 to 0.75. Finally, because 11 patients (44%) changed their lifetime psychiatric diagnosis from BD I to schizophrenia (SCZ) spectrum disorder, authors assessed CGI scores predictive value regarding transition-to-SCZ spectrum disorder at follow-up. Univariate analyses showed that two variables were associated with a diagnosis of SCZ spectrum disorder at follow up: the presence of a mixed episode ($p = 0.049$) and CGI-psychosocial risk ($p = 0.017$). CGI-schizophrenia risk tended to be associated with a diagnosis of SCZ spectrum disorder at follow up ($p = 0.09$). It is noteworthy that none of the following variables at entry in the study were associated with transition-to-SCZ at follow-up: age, sex, socioeconomic status, the duration of hospitalization, and the presence of psychotic features during the index manic episode.

Although exploratory in nature, this study offers promising research tools for the field of psychodynamic-oriented psychological testing. Many methods have been developed to quantify

patient response, but they all result in complex scoring systems with multiple subscores and often have no scoring synthesis or hierarchy. Compared to a more specific scoring procedure, the CGI scales potentially capture many characteristics in unknown proportions that are not strictly related to the symptomatology in question but rather related to the subjective clinical expertise translated into a quantitative variable (Kadouri et al., 2007). In the study described above, a modified CGI procedure summarized psychodynamic-oriented psychological testing experts' global impression regarding the outcome risks of adolescents hospitalized for an acute manic/mixed episode. This CGI method is not limited to supporting psychodynamic-oriented psychiatric practice. Indeed, both CGI risk scores were associated with schizophrenia risk at follow up, suggesting that this approach may predict patients at risk for schizophrenia. In this respect, the CGI psychosocial score that also included data from the WISC or WAIS predicted more than the CGI-schizophrenia risk score. Whether cognitive and psychodynamic-oriented psychological testing also predicts transition to schizophrenia needs to be assessed in studies of at-risk adolescents, in particular when the psychopathology does not reach the complete SCZ clinical symptomatology, such as in patients with an ultra-high-risk (UHR) of psychosis, where the probability of a schizophrenia diagnosis at a two-year follow-up is around 15% (Yung et al., 2008). In these studies, there are few predictors for schizophrenia, and they are limited to early age of onset, sex, poor early functioning and cannabis consumption (Ammeringer et al., 2006; Bonnot and Mazet, 2006). In reference to German psychiatric phenomenology, McGorry and colleagues argued that a sense of self-disturbance might be a core marker of psychotic vulnerability (Nelson et al., 2008), particularly of schizophrenia (Speranza, 2009). Identifying self-disturbance in UHR population may provide a means of identifying individuals at high risk for schizophrenia, and therefore of supplementing the UHR identification approach. Given that some sense-of-self aspects are captured in psychodynamic-oriented psychological testing (Louët et al., 2010), the current CGI-risk method may be helpful to test this prediction and generalize its conclusions.

6. Conclusion

After examining several key constructs of psychoanalytic theory and practice, it can be asserted that there are no discrepancies between psychoanalysis and experimental data. Together with indirect neuroscientific evidence (in particular, the biological effects of trauma and early-life adversities, the study of placebo response, the cognitive psychology of unconscious phenomena, and child development modelling), experimental and evidence-based studies that more directly assess these constructs exist in the literature, albeit in limited number. This is true whether testing psychotherapeutic approaches, discussing data from other fields such as psychopharmacology, or designing experiments based on aspects of psychodynamic theory.

In line with Wallerstein's (2009), it appears that the most important methodological issues are related to qualitative vs. quantitative evidence and objective vs. subjective evidence. It can be suggested that experimental or evidence-based research applied to psychoanalysis should create multidisciplinary frameworks that include psychodynamic-oriented clinicians, statisticians and methodologists, allowing them to establish a research hypothesis so that issues related to the subjective/qualitative nature of psychodynamic phenomena can be overcome.

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