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Exposure and reorganization: The what and how of effective psychotherapy

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ABSTRACT

Even though the effectiveness of psychotherapy is generally acknowledged, researchers are yet to agree on a plausible explanation for this effectiveness or on possible mechanisms of change that are activated by psychotherapy. To enhance developments in these areas some researchers have called for a focus on treatment principles rather than treatment techniques. In this respect, the technique of exposure is instructive. Despite its common use with anxiety disorders and the successful outcomes it produces, it has only recently been considered as a treatment for other disorders. By focussing on the underlying principles of exposure it is possible to consider exposure as a transdiagnostic component of successful psychotherapies. Understanding exposure from the perspective of Perceptual Control Theory (PCT) enables the identification of a functional, rather than a conceptual or statistical, mechanism of change. Functionally, exposure can be understood as an essential precursor to the internal reorganization that is necessary for the amelioration of psychological distress. PCT suggests a more considered and widespread use of exposure in psychotherapy as a way of improving both the efficiency and the effectiveness of the treatments offered.

Despite the proliferation of psychotherapies in recent years there has not been a commensurate growth in our understanding of the effective ingredients of treatment. It seems unlikely that there are multitudes of different mechanisms and processes through which psychological distress is resolved and that each of these different psychotherapies utilises a distinct item from the collection. In fact, the spawning of hundreds of different psychotherapies is perhaps the most telling sign that there may still be much work to do before the important principles of treatment are described and fundamental mechanisms of change are identified. Could a technique as mundane as exposure hold the key to effective psychotherapy? For psychotherapy, is there just one road leading to Rome but a plethora of ways to travel that road?

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1. Overview

While psychotherapies provide a great deal of assistance to a large number of people it is undoubtedly the case that our efforts could be improved. Asay and Lambert (1999), for example, report that, in terms of psychological treatment, the average treated person is better off than 80% of untreated people. While this is, in many ways, an encouraging result, the perspective from the other side of the bell curve is more sobering. If the average treated person is taken to mean the 50th percentile, then this finding could be stated in the following terms: 20% of untreated people do as well as 50% of treated people (Carey, 2006).

Improving the efficiency of psychotherapy is important on many different levels. An efficient psychological treatment would achieve at least two goals: It would bring about symptom relief (person-effectiveness) and it would do so expeditiously (cost-effectiveness). The experience of long-term psychological distress results in lost potential for individuals as well as disrupted family and social relationships. Chronic psychological disorders also represent a large public health issue. To address this problem, governments are willing to allocate significant amounts of public funds to improve mental health services. For example, in 2006 the Australian Federal Government allocated $1.9 billion over a five-year period for a range of services to be provided to people with psychological disorders and their families and carers (Department of Health and Ageing, 2007). Similarly, the British Government in 2007 announced funding for the Improving Access to Psychological Therapies initiative of £33 million in 2008/9, £70 million in 2009/10, and £70 million in 2010/2011 making a total of £173 million (Improving Access to Psychological Therapies, 2009).

Our knowledge about ways in which symptoms of psychological distress can be alleviated efficiently would be enhanced if common treatment principles and change mechanisms could be identified. Kazdin (2009) is perhaps the latest authority to draw attention to the fact that, on the whole, we do not know why or how our therapies work. He regards the question of how therapy leads to change as perhaps the most pressing question facing our field. To answer this question, however, fresh approaches in both conceptualization and design are needed (Kazdin, 2009).

Kazdin's (2009) sage advice may well be applied to exposure. Exposure has a long and impressive history of effectiveness in the treatment of anxiety disorders. Perhaps it was the way in which exposure was first defined or the early models of how it produced its effects that led to its almost exclusive use with anxiety disorders. Several authors, however, have suggested that focussing on principles of treatment rather than techniques is likely to yield greater gains in understanding (e.g., Moses & Barlow, 2006; Rosen & Davison, 2003). By considering exposure more generally, its effectiveness with other disorders (e.g., depression) and, indeed, with therapy overall, has begun to be recognised.

Perhaps the most important issue with regard to exposure is in the way in which it brings about its effects. Reviewing various explanations of how exposure works illustrates the confusion and ambiguity that exists in this area. For example, systematic desensitization and exposure are often compared, yet, although there is general agreement about their effectiveness, there is little agreement about why they work (Tryon, 2005). In fact, although systematic desensitization depends upon exposure, the two techniques are treated separately in the literature (Tryon, 2005). An explication of the underlying mechanism of exposure may illuminate the important elements of various techniques.

A review of the way in which mechanisms are currently discussed illustrates that mechanisms are routinely explored conceptually or statistically but rarely functionally. Conceptual and statistical investigations, however, have not, as yet, illuminated how any particular mechanism achieves its effects. Hofmann (2007a) suggests that innovative ideas are needed to extract change mechanisms more precisely.

Examining recent ideas about mechanisms of change in psychotherapy, particularly with regard to exposure, supports the view that fresh and innovative ideas are needed. Approaches that are fresh and innovative, however, will also necessarily be unfamiliar to many. The transdiagnostic perspective, which focuses on the similarities across disorders rather than the differences that separate them (Harvey, Watkins, Mansell, & Shafran, 2004), may have been one such approach when it was first proposed.

Incorporating functional—as opposed to statistical or conceptual—models in the examination of change mechanisms may be another fresh and innovative, yet unfamiliar, approach. Although Tryon and Misurell (2008) note that functional explanations were prominent during the 1950s and 1960s, the term "functional" in this paper is not referring to the functional analysis of behaviourism. A functional mechanism in this paper is regarded as a mechanism that functions: A mechanism whose properties are expressed in such a way that a model can be constructed that generates data. A model in this sense mimicks, or simulates, the behaviour being investigated. It is a model that works. This model is different from the more familiar models in psychology that are presented as diagrams with boxes and arrows but leave unspecified the mechanism by which changes occur (Tryon & Misurell, 2008).

A consideration of the workings of exposure supports Marks' (2000) view that different schools of therapy often give similar procedures different names. This has almost certainly been the case with exposure. Techniques such as paradoxical intention (Existential Therapy; e.g., Smither, 2009), the empty-chair method (Gestalt Therapy; e.g., Smither, 2009), behavioural experiments (Cognitive Behaviour Therapy; e.g., Bennett-Levy, et al., 2004), and defusion strategies (Acceptance and Commitment Therapy; e.g., Forsyth & Sheppard, 2009) are activities from specific therapies that have the common purpose of finding ways for clients to engage in material or activities they find uncomfortable or distressing.

Perceptual Control Theory (PCT; Powers, 2005) provides a functional and transdiagnostic approach to the consideration of mechanisms of change. From this paradigm, exposure, in its broadest sense, can be considered a fundamental component of effective psychological treatments. In many ways, it is the case that the field of psychotherapy "remains fragmented into fiefdoms and a federal union seems to lie far into the future" (Marks, 2000, p. 329). Embracing freshness, innovation, and the discomfort that sometimes accompanies unfamiliarity, by understanding the essential elements of exposure from a functional perspective, however, may bring a quantum change in the way psychotherapy and change processes are understood. A functional consideration of exposure seems to indicate that a unified field might not be as far away as it currently appears. In fact, we might already be unified without being aware of it. Brady and Raines (2009) comment that it is difficult to exclude exposure from any therapy study. Sometimes, the hardest things to see are those things that are immediately before us. It is likely that successful psychotherapy accesses the same change process in clients *regardless* of what techniques or

procedures the clinicians think they are using. Perhaps the myriad of psychotherapeutic techniques that exist are the proverbial trees in an exposure forest.

Exposure, from a functional perspective, may invite a "back to basics" approach to psychotherapy and promote an appreciation of the transdiagnostic processes that are currently occurring. Acknowledging, understanding, and refining the similarities that already exist will help to improve both the efficiency of the treatments provided as well as the confidence of the treatment providers. Focussing on what is similar, or the underlying common properties of distinct entities, rather than studying their differences, is akin to the approach taken in the natural sciences (Carey & Mansell, 2009) but is relatively uncommon in psychology where the study of variability is the order of the day. Adopting an interest in common properties and processes, however, could be beneficial. Finding out what to expose clients to, and how to keep them exposed for a sufficient amount of time, may be the essential ingredients of success for clinicians. Exposing the functionality of exposure offers a change in focus for the field and a fresh way of seeing what might have been happening for a long time.

2. Exposure and psychological disorders

The ubiquity of exposure in treatments of anxiety disorders is well established, however, it is a less familiar component of treatments for other disorders. Part of the reason for this may have to do with the way in which exposure has been defined and the way in which it is commonly considered. By describing exposure *in principle* rather than *in practice*, its ultimate value as a generic mainstay of effective treatments might by more fully appreciated.

2.1. Exposure defined

Emmelkamp (2004) provides an example of the conventional conceptualisation of exposure with a description of exposure therapy as a process of exposing clients to situations they fear. Throughout the literature it is apparent that exposure is typically considered to be a standard treatment to use in situations involving fear. From this perspective, its widespread use with anxiety disorders is understandable.

Other authors suggest a more generic consideration of exposure. For example, Brady and Raines (2009) describe exposure therapy as a process of "deliberately confronting some ordinarily avoided stimulus that provokes an undesired response, in order to reduce the strength of that response." (p. 51). Similarly Mineka and Thomas (1999) describe passive or active avoidance of aversive situations as dysfunctional patterns and argue that exposure therapy prevents these patterns so that more functional response patterns can be learned.

Considering aversive situations rather than simply feared situations extends the scope of exposure while still retaining its essential properties. It is possible, however, to apply the exposure principle even more widely by clarifying the concepts of "avoidance" and "aversive". "Experiential avoidance" is a term that is becoming more common in the literature and is regarded as a pattern of behaviour that is a pervasive pathological process (Hayes, Wilson, Gifford, Follette, & Strosahl, 1996). This particular avoidance pattern incorporates private experiences which an individual seeks to minimise by altering them, or the contexts that give rise to them, in some way. Particular individuals, for example, might reduce social contact because they believe they are being unfavourably judged by others. Different individuals might develop alcohol and other drug dependence as a way of reducing the perceptual experiences they are having such as hearing voices. Still others could withdraw from activities they enjoy as a way of avoiding an imagined future failure.

Depending upon the way in which one conceptualises exposure, therefore, the technique might be part of, or all of, the treatment for anxiety disorders. By considering exposure more broadly, however, its essential principles can be used to treat psychopathology generally and it can also be recognised as a common element of many well-known psychotherapies.

2.2. Anxiety disorders

Clark (1999) describes exposure to feared situations as a key feature of cognitive therapies for anxiety disorders. Similarly, Hofmann (2007b, 2008) describes exposure therapy as one of the most effective strategies for treating anxiety disorders. Marks (2002) suggests that in randomised controlled trials of adults with anxiety disorders, most participants improve after brief forms of psychotherapy involving exposure.

A similar picture of overall effectiveness is revealed when one considers the anxiety disorders more specifically. Exposure is a feature of successful treatments for both simple phobias and social phobia (e.g., Emmelkamp, 2004; Hofmann, 2004; Marks, 2002; O'Sullivan & Marks, 1991). Marks (2002) suggests that the effects of exposure treatments for people diagnosed with social phobia can last for several years. Hollon, Stewart, and Strunk (2006), however, report that the effects of exposure on its own are not always stable over time for people diagnosed with social phobia although they are more enduring than the effects produced by medication.

Agoraphobia and panic are other disorders that seem to respond particularly well to exposure. O'Sullivan and Marks (1991) reviewed studies that included a follow-up component for people who were treated with exposure therapy for agoraphobia and panic. At long-term follow-up, approximately 76% of clients treated for agoraphobia were improved. O'Sullivan and Marks (1991) report that exposure therapy yields both short and long-term improvements of up to six to eight years. In fact, the best predictor of long-term outcome seems to be the initial response to short-term exposure therapy. Emmelkamp (2004) reports that a combination of cognitive therapy and in vivo exposure is not more effective than exposure alone for the treatment of panic. Hayes et al. (1996) report a marked improvement in the treatments for panic disorder with the inclusion of methods that expose clients to otherwise avoided private experiences such as emotions and bodily sensations.

Long-term gains have also been obtained in the treatment of obsessive–compulsive disorders. Approximately 80% of clients experiencing obsessive–compulsive disorder problems improve when they are treated with exposure and response prevention (Freeston, Ladouceur, Rheaume, & Leger, 1998; Hayes et al., 1996). Given these results it is little surprise that exposure plus response prevention is recommended as the first choice of treatment for obsessive–compulsive disorder by some authors (e.g., Emmelkamp, 2004).

Exposure has also been shown to be effective with post-traumatic stress disorder (PTSD; Hollon et al., 2006). In fact, apart from standard exposure treatments, other well-recognised techniques are based on exposure principles. Bisson et al. (2007), for example, report that eye movement desensitization and reprocessing (EMDR) is an effective treatment for PTSD. Rosen and Davison (2003), however, claim that the effectiveness of EMDR occurs through the process of exposure with the eye movement component of the program being an inert, ancillary feature of the treatment.

Exposure, therefore, could be expected to be a common feature of the procedures used by clinicians who treat people experiencing anxiety problems. There seems to be increasing evidence, however, that it is not a peculiarity of the experience of fear that makes exposure uniquely effective with these problems. It appears to be the case that exposure, in general, can be a helpful process in learning skills, acquiring knowledge, and resolving problems.

2.3. Depression and other disorders

Orsillo, Roemer, Block, Lerner, and Tull (2004) explicitly advocate for an expansion of traditional exposure models. They maintain that,

just as exposure is used to assist clients in approaching their experience of fear, it can also be used with other experiences such as sadness and shame. This would make exposure a useful strategy in the treatment of depression. Indeed, Hayes, Feldman, et al. (2007) cite evidence from a number of different sources to suggest that exposure would be a useful strategy in the treatment of depression. Hayes, Feldman, et al. (2007) suggest that while the *form* of the exposure techniques used in the treatment of depression might differ from those used in the treatment of anxiety, the *function* would remain the same. In this context, exposure is used to reduce avoidance of disturbing emotions, cognitions, and other subjective experiences. Through the strategic use of exposure, disturbances are created that can induce change (Hayes, Feldman, et al. (2007))). Specifically, it seems that exposure in this sense is used as a way of facilitating emotional processing which is regarded as necessary for the resolution of depression (Hayes, Beevers, Feldman, Laurenceau, & Perlman, 2005). As will be mentioned in Section 2.4, however, not all researchers agree that exposure is a necessary aspect of treatments of depression although this may be due to the way in which these particular researchers have conceptualised exposure.

Teasdale (1999) also describes the importance of emotional processing and attributes the enduring reductions in depressive problems to some form of emotional processing having occurred during treatment. The "processing" discussed by Teasdale as well as Hayes et al. (2005), may be similar to the "experiencing" described by Wiser and Arnow (2001). Wiser and Arnow (2001) suggest that experiencing functions in a similar way to exposure for phobias so it seems reasonable to assume that the underlying principles may be the same and even that the same change mechanism is being invoked. Also, Bohart and Tallmann (1999) suggest that mastery of a problem comes from the exposure involved in confronting the problem and Beutler and Malik (2002) affirm that the likelihood of therapeutic change is maximised when behavioural and emotional avoidance are addressed through exposure.

Even earlier, Foa and Kozak (1986) had suggested that emotional processing occurs spontaneously throughout life. In this sense then, the success of exposure may be because it is harnessing an existing, naturally occurring mechanism. The value of exposure is clear to Foa and Kozak (1986) when they suggest that it might be a common principle in the treatment of neuroses. Importantly, Foa and Kozak (1986) maintain that processing can be used to either increase or decrease emotional responding. For example, exposure to an experience that is consistent with a fear memory would be expected to strengthen the fear (Foa & Kozak, 1986). It may be this feature of processing that makes it so widely applicable. This may also explain why it is imperative to understand the function of exposure and the principles underlying it rather than simply focussing on its technical features and applying it in a procedural sense. Brady and Raines (2009), in fact, suggest that poorly applied exposure may exacerbate, rather than alleviate, the problem. Perhaps treatment failures in the application of exposure occur when clients are exposed to an inappropriate stimulus or for an inadequate length of time. More fully understanding the mechanism involved in exposure may help to clarify these issues.

Given the extent to which exposure is regarded as an important element of the amelioration of psychological problems by researchers, it might be expected that clients would endorse these views as well. In a qualitative study of the process of change in psychotherapy, clients who had experienced different problems and various treatments for these problems were asked to describe their process of change (Carey et al., 2006, 2007). The participants in this study described a realisation that avoiding their problems was not going to solve them. They suggested this realisation was an important part of the change process.

Exposure, therefore, in some form, seems to be a necessary component of the resolution of psychological problems generally. Its value in the treatment of anxiety disorders is well established but is also becoming increasingly appreciated in treating problems of depression as well as general problems of psychological distress. So it is perhaps not surprising to discover that exposure techniques can be identified, either explicitly or implicitly, in many psychotherapies.

2.4. From the perspective of psychotherapy

The use of exposure in behaviour therapies, cognitive behaviour therapies, and cognitive therapies is clear. What is less obvious from a cursory glance at the literature, however, is the extent to which exposure is incorporated into psychotherapeutic techniques generally. By acknowledging the links between exposure and the concepts of processing and experiencing mentioned in Section 2.3, the common theme running through different psychotherapies can be more easily discerned.

Rogers (1951), for example, describes the importance of the client perceiving previously threatening and denied experiences in the therapeutic context. Hayes et al. (1996) also acknowledge the efforts of client-centred therapy to reduce client avoidance by helping clients become open to experience. Additionally, Hayes et al. (1996) identify the reduction of avoidance as an important component of psychoanalysis, gestalt, and rational-emotive-behaviour therapies. It is hard to envisage avoidance or the denial of experience being addressed other than through some form of exposure to the experience.

The same reasoning can be applied to the process of emotional experiencing. Positive outcomes have been associated with emotional experiencing across experiential, psychodynamic, and cognitive therapies (Wiser & Arnow, 2001). Again, it seems that some form of exposure would be a necessary aspect of efforts to assist clients in experiencing difficult emotions or events that give rise to difficult emotions. Wiser and Arnow (2001) make the point that different psychotherapies approach the task differently but the fundamental feature of helping clients experience difficult emotions remains central. Lambert and Erekson (2008) confirm this point with experiential psychotherapies by suggesting that interventions in this area facilitate clients accessing and deepening their experience of previously avoided negative emotions.

Orsillo et al. (2004) highlight the use of exposure in the more recent acceptance-based approaches even though they explain that the rationale and goal of the approach is different from conventional methods. In acceptance-based approaches exposure techniques are designed to reduce avoidance without necessarily reducing internal responses. Hofmann and Asmundson (2008) also suggest that the key difference between Cognitive Behaviour Therapy (CBT) and Acceptance and Commitment Therapy (ACT) is that CBT targets changing antecedent-focussed emotion regulation strategies whereas ACT addresses response-focussed emotion regulation strategies. Again, these differences might become less important if more attention is devoted to underlying principles and mechanisms rather than practice-based procedures and techniques.

Behavioural Activation (BA; Hopko, Lejuez, Ruggiero, & Eifert, 2003) is another innovation in psychotherapy treatments that addresses the behavioural avoidance that is a feature of depression. Hopko et al. (2003) suggest that exposure strategies are not fundamental to the activation process within this approach and they even suggest that BA should be distinguished from in vivo exposure. They consider exposure, however, from within a classical conditioning framework. This issue will be explored further in Section 3.2 yet even from what has been presented thus far it might be evident that it is possible to understand exposure from perspectives other than classical conditioning. In BA clients are taught to reduce escape and avoidance behaviour by assessing the function of their behaviour, making choices about whether to continue avoiding or to begin engaging, and to integrate behaviour into their lifestyle. From this description, then, the principles of exposure still seem relevant even though they may use a different

means for the same effects to be achieved. Furthermore, Hayes (2004) suggests that recognizing and dealing with experiential avoidance are central themes in modern behaviour therapies (of which BA is one) which, once again, implicates exposure as a core feature. Hopko et al. (2003) seem to recognise this conundrum when they explain that some "avoidance behaviours characteristic of depressed individuals may partially be a function of the aversive nature of situations or individuals." (p. 712). In this context they concede that "the therapeutic effects of guided activity (or activation) and graduated systematic exposure might be functionally similar." (p. 712).

A fundamental point of this paper is that assisting people in psychological distress to consider in detail, material they would otherwise avoid, is what matters in psychotherapy. Issues such as whether this occurs in vivo or imaginally, or whether a graded approach is taken in preference to flooding, or whether avoidance occurs due to fear or some other emotion, are secondary to the fundamental task of helping people sustain their attention in areas that are difficult. Decisions about how exposure occurs (such as through a graded, in vivo procedure) will perhaps depend on the specifics of each situation such as the clinician's level of expertise and characteristics of the client. These decisions are important in terms of making exposure occur most effectively but they do not change the basic feature of exposure. Imaginal, graded exposure is just as much exposure as in vivo, flooding exposure. Similarly, exposing client's to feared stimuli in order to reduce the fear they experience is just as much exposure as exposing clients to reinforcing environments in order to increase the reinforcement they experience.

Focussing on the principles involved in exposure can reveal similarities in unexpected ways. Wright and Gilbert (2007), for example, suggest that both behaviourism and Buddhism use exposure. A technique with an application as far ranging as Wright and Gilbert (2007) would suggest, perhaps deserves closer scrutiny. Wright and Gilbert's (2007) proposal of the general applicability of exposure is far from being an isolated assertion. Lambert (2005) suggests that almost all psychotherapies encourage people to face rather than avoid difficult situations. Lambert, in fact, has identified exposure as one of the common factors of any effective psychotherapy (personal communication, 7 October 2009). Similarly, Hayes et al. (2005) propose that the processing facilitated by exposure is a central variable of change across different psychotherapies. Stiles' (2001) assimilation model of psychological change is also generally applicable across psychotherapies. The assimilation model suggests that people experiencing psychological distress move through a number of stages beginning with avoidance of the problematic experience to integration of the experience. "The fundamental observation is that problematic experiences change from being feared or unwanted in early sessions to being understood and integrated by the end of successful treatments" (Stiles, 2001, p. 462). Once again it would seem that exposure, in some form, would be necessary for clients to integrate previously avoided experiences.

In summary then, there seems to be an implicit consensus in the literature that facing, confronting, experiencing, becoming aware of, integrating, or otherwise being exposed to, those experiences which one would otherwise avoid or not engage with, is an essential component of successful psychotherapies. Where there is much less agreement, however, is in suggesting plausible mechanisms through which exposure has its effects. Numerous explanations have been proposed including conceptual and statistical descriptions. Articulating how exposure produces its effects is clearly seen as an important pursuit. The logic of this endeavour is plain. If we know the mechanism by which a technique produces its effects, we are in a much better position to design more efficient treatments (Shafran et al., 2009). Moreover, we would be able to change treatments when they did not seem to be proceeding as expected. There are various difficulties with current explanations which limit any sort of unified understanding of this process despite the extent to which it is commonly employed. The difficulties, however, could be resolved, perhaps, through the investigation of functional explanations of how exposure produces change.

3. How does exposure achieve its effects?

Explaining how effective psychological treatments achieve the changes they produce has been described as a guiding question for treatment research (Kazdin, 2009). By understanding psychotherapy change processes, methods for optimising change should be clearer. Yet, despite the stated importance of the issue of change, psychotherapy technologies often develop without any clear rationale of the change process. Orsillo et al. (2004), for example, report that although there is increasing evidence for the effectiveness of mindfulness practices, there is no clear explanation for how mindfulness works.

These general observations are particularly applicable to exposure. A range of explanations of the underlying processes of exposure is provided in the literature. There are suggestions from different sources that one learning process is likely to be responsible for change despite the many different methods there are for activating this process. Even here, however, there is not unanimity. Explanations of the way in which exposure leads to change also vary from quite specific processes to general descriptions. Finally, a review of the explanations of exposure would be incomplete without attention to the literature referring to exposure from a mechanistic perspective.

After examining the way in which mechanisms are currently described the benefits of considering mechanisms in a functional, mechanistic sense might be more apparent. The suggestion here is that the most important aspect of a mechanism is an articulation of the way in which it performs. How does the mechanism bring about its effects? This is a question which statistical and conceptual descriptions fail to answer. While a review of the literature does not reveal any degree of consensus regarding how exposure produces change, it is possible to discern common themes and concepts which provide possible clues to the important components to include in a transdiagnostic explanation of exposure.

3.1. One process or many?

Throughout the literature it has been suggested that a common learning process may apply to the resolution of different psychological problems using different methods. The assimilation model mentioned in Section 2.4 is proposed to be a general description of the change process that is applicable across different psychotherapies (Stiles, 2001). Wolpe (1978) also considers it reasonable to assume that learning might involve a common process. He suggests that learning is likely to be the same physiological process in the nervous system despite different connections being involved in different situations. Similarly, Wiser and Arnow (2001, p. 159) suggest that different schools of psychotherapy use different terms such as "insight", "altered schema", "creation of meaning", and "restructured core cognitions" to refer to a similar event in which a client's existing framework of understanding is reorganized to a more adaptive and effective framework. Tryon and Misurell (2008) support this view when they suggest that effective clinicians, regardless of their theoretical orientation, help clients to process information differently by implementing a common, trans-theoretical principle.

The importance of approaches that are fresh and innovative becomes clear, when one considers the nature of the learning process from a mechanistic perspective. Myers and Davis (2007), for example, assert that it is likely to be the case that extinction proceeds through multiple mechanisms. On the other hand, Lovibond (2004) concluded that human conditioning research indicates that a single mechanism governs acquisition. It seems improbable that learning would occur through a single pathway whereas unlearning would occur through multiple pathways. Generally, then, it seems that there is more justification for

giving greater weight to accounts that are broadly applicable and suggestive of common, underlying processes than explanations suggesting multiple and distinct pathways. Occam would surely support such an approach. This issue may only be satisfactorily settled, however, with a major advance in the precision and rigour of the models that are used to explore the proposed mechanisms.

3.2. Specific explanations

Explanations regarding how exposure works that attempt to isolate specific processes generally focus on conditioning principles. Hofmann (2007b) explains that exposure therapy grew out of the Pavlovian fear conditioning paradigm. Exposure from this perspective is described as producing its effects by either weakening or strengthening various connections between different stimuli or between stimulus and response. Wolpe and Plaud (1997), for example, maintain that if a response that is incompatible with anxiety is produced while the individual is exposed to the anxiety-producing stimulus then the bond between the stimulus and the anxiety response will be weakened or eliminated. The issue of how the weakening of one bond and the strengthening of other bonds occurs has been attributed to processes such as reciprocal inhibition, counterconditioning, habituation, and extinction although Tryon (2005) suggests that there is little empirical support for any of these as explanations of exposure. Mineka and Thomas (1999) also identify problems with habituation and extinction as theories of how the change process occurs and argue that explanations "which focus on changes in internal representations of fear have distinct advantages over earlier models" (p. 752). Specifically, they suggest that disconfirming a "low sense of perceived control is one of the critical cognitive changes that occurs in exposure treatments" (p. 750).

Aspects of conditioning itself have also been questioned. Papini and Bitterman (1990) suggest that the contingency between the conditioned stimulus (CS) and the unconditioned stimulus (US) "is neither necessary nor sufficient for conditioning" (p. 396). Poulton and Menzies (2002) concur with this assertion and propose that it is learning about the contingency or the predictive value of a stimulus that is critical. While this discovery has assisted with many of the criticisms of early conditioning models it has also generated neoconditioning models that lack parsimony (Poulton & Menzies, 2002) and the addition of so many assumptions that testing becomes difficult (McNally, 2002). Explanations of the effects of exposure now generally include higher order cognitive processes such as expectancies (e.g., Hofmann, 2008; Lovibond, 2004; Myers & Davis, 2007). Marks and Dar (2000), however, give good reason for the enthusiasm surrounding cognitive explanations to be tempered slightly when they remind us that "exposure reduces responses even in invertebrates and in single cells" (p. 508). An accurate explanation of exposure, therefore, would need to incorporate the possibility of both higher and more basic processing.

Regardless of the specific explanation invoked, an explanation of "how" this particular process operates is absent. The process by which CS–US contingencies are established is not clear and neither is the process by which expectancies are modified. Changes in contingencies and expectancies may be descriptions of *what* occurs but they are not explanations of *how* these effects come about.

Pavlov himself in fact, foreshadowed these difficulties with conditioning explanations. Although psychologists adopted conditioning as an explanatory category, Pavlov considered the establishment of conditioned reflexes to be a way of generating data from which to formulate hypotheses about underlying cerebral processes (Danziger, 1997). Pavlov (1932) did not regard conditioning as a principle of learning but merely as a starting point to indicate ways in which the underlying principles might be fruitfully explored. Pavlov (1932), therefore, seemed aware of the importance of specifying how learning occurs. Unfortunately, this physiological perspective did not transfer to the research interests of psychologists. A lack of specification of how change occurs is similarly evident when general descriptions of exposure are considered.

3.3. General descriptions

The distinction between specific and general explanations is an arbitrary demarcation created here to impose some order in this section of the review. The separation of explanations is not intended to reflect any difference in quality or explanatory power. It does seem to be the case, however, that some explanations are expressed in more general terms or are more widely applicable than other explanations. A common element of all current explanations, however, is that they lack a plausible description of *how* exposure produces its effects in terms of actual physical processes.

One form of explanation suggests that exposure works by enabling clients to disconfirm that they need protection from that which they had previously avoided (Lovibond, 2004; Mineka & Thomas, 1999). Hofmann (2004) expresses similar ideas when he suggests that repeated exposure to the feared object in the absence of negative consequences forces clients to re-evaluate their beliefs. Hayes and her colleagues (Hayes et al., 2005; Hayes, Feldman, et al., 2007) maintain that exposure works by facilitating processing from the perspective that increasing anxiety ultimately reduces it. This may well be the resurgence of a much older idea that, within limits, the more discomfort clients are exposed to the more they learn to tolerate the discomfort (Marks, 1973). Rachman (2001) also suggests that processing enables emotional disturbances to be absorbed in such a way that the disturbing effects decline, allowing experience and behaviour to proceed without disruption. Rachman (2001) goes on to explain that repeated presentations of disturbing stimuli lead to the transformation and neutralization of these stimuli through the promotion of adaptive and benign cognitions.

Hayes, Laurenceau, Feldman, Strauss, and Cardaciotto (2007) go some way to describing how change might occur through the analysis of nonlinear change in dynamical systems. They suggest that a reorganization of the system can occur through an increase in variability and a destabilizing or loosening of old patterns. This explanation might overlap conceptually with the notion that exposure therapy leads to structural changes in the fear system (Foa & Kozak, 1986). As with other explanations, however, the parameters within which a system reorganizes are not clear.

3.4. Discussions about mechanisms

Kazdin (2009, p. 419) defines a mechanism as "The basis for the effect (i.e., the process or events that are responsible for the change; the reasons why change occurred or how change came about)". With this definition in mind it is easy to appreciate the drive to discover the mechanism of exposure. If it were possible to articulate the process responsible for the change that exposure produces, or if we understood the reasons why exposure achieves the results it does, we would be in a much stronger position to produce these results more reliably. This is not a new argument. Wolpe (1968) declared that the mechanisms of therapy required study approximately 40 years ago and Moras (2006) claims that more than 55 years of mechanism research has produced little causal evidence to suggest why effective treatments are effective. Tryon and Misurell (2008) suggest that the mechanisms of change currently proposed in the literature have limited explanatory power.

The lack of success in discovering explanatory mechanisms may have more to do with the way in which mechanisms are currently conceptualised than the complexity of the phenomena being investigated. The term "mechanism" is used quite freely in the literature in both a conceptual and statistical sense. In all cases, however, the way it is used lacks both specificity and precision. Conditioning, habituation, and extinction are variously referred to as

mechanisms. Recently, more abstract processes have been identified. Orsillo et al. (2004), for example, refer to metacognitive awareness as a possible mechanism underlying cognitive therapy for anxiety disorders. Hofmann (2008) suggests that cognitive processes are the primary mechanisms of change during exposure therapy. Hayes, Feldman, et al. (2007) hypothesise that the mechanism of change in exposure is increasing understanding and tolerance and coming to new meanings.

There is perhaps nothing wrong with any of the above exposure mechanism candidates. In their current form, however, the above terms are descriptors of *what* could possibly be happening while they leave the issue of *how* change occurs unspecified. From a mechanistic perspective it is the issue of how that is paramount. A suggested mechanism should refer to a physical process that is an internal feature of an individual but one which also applies generally across individuals. Negative feedback, for example, could be described as the mechanism responsible for homeostasis.

Part of the problem may be the approach we have adopted. Mechanisms are currently explained almost exclusively in statistical or conceptual terms. Statistical and conceptual explanations, however, are non-functional expressions of putative mechanisms. That is, they do not *do* anything. In the same way that a sketch of a dream home may be the beginning of an actual dwelling, statistical and conceptual suggestions should be considered *potential* models. At best, they are a starting point for the construction of a functional model capable of generating data.

Kazdin (2007), for example, provides detailed recommendations such as using multiple regression and structural equation modelling techniques as well as randomized controlled trials and component analyses to identify mechanisms of change. Statistical methods are extremely useful tools for analysing group data in order to make inferences about population characteristics (Blampied, 2001). The conclusions from this aggregated data, however, invariably do not apply to one or more individuals in the sample yet the process of change is an internal and *individual* phenomenon. Statistics can identify trends and patterns but statistical techniques are not well suited to answering questions about how an entity functions.

Without being expressed in the form of a working model it is very difficult to assess the legitimacy of a claim of mechanism status. Also, it seems that process and outcome are easily confused when a standard of producing a simulation is not required. For example, Wolpe (1981) and Wolpe and Plaud (1997) identify reciprocal inhibition as a mechanism. Given, however, that Wolpe (1954) describes reciprocal inhibition as "the complete or partial suppression of the anxiety responses as a consequence of the simultaneous evocation of other responses physiologically antagonistic to anxiety." (p. 205), it seems more likely that reciprocal inhibition is the *outcome* of a process. The mechanism by which the responses are suppressed is left unexplained.

Tryon (2005) provides a notable exception to the current work on mechanisms. Tryon (2005) employs Parallel Distributed Processing Connectionist Neural Network (PDP-CNN) models which he describes as empirically supported mechanisms. Using these models he articulates a hypothetical three-layered feedforward network which he uses to explain how exposure can work. The benefit of this model is that it is expressed in terms that allow computer simulations to be constructed as a way of testing its basic properties. So this model certainly represents a large step forward in terms of specificity. While this might be a model of how exposure *can* work, however, that does not necessarily mean that it is a model of how exposure *does* work. For example, although Tryon (2005) identifies this as a feedforward model, he also describes network iterations which would imply that there is feed*back* from the output to the input. It is not clear from the S-O-R design, however, how this feedback would occur. Nevertheless, this is the kind of query that is not even possible with the way in which the vast majority of those processes and events purported to be change mechanisms of exposure are currently expressed. Tryon (2005) has certainly indicated a positive new approach that might yield greater rewards in the exploration of exposure mechanisms.

3.5. Extracting common themes

Although there is no discernible consensus in the literature regarding how exposure brings about therapeutic change, there does appear to be some common themes across explanations. Isolating shared elements of different explanations might provide hints about the important components that a transdiagnostic explanation should incorporate. It may be constructive, therefore, to summarise areas of explanatory agreement.

In general, at least three broad themes can be delineated from the literature. The first theme describes a tangible entity that exposure alters in some way. Use of terms such as "system", "circuit", "framework", "network", and "structure" (or derivatives of these as in "systems" and "circuitry") are common (e.g., Foa & Kozak, 1986; Hayes, Feldman, et al., 2007; Hayes, Laurenceau, et al., 2007; Hofmann, 2008; Hofmann & Asmundson, 2008; Lovibond, 2004; Mineka, Keir, & Price, 1980; Teasdale, Segal, & Williams, 1995; Teasdale, 1999; Tryon, 2005; Wiser & Arnow, 2001). The second theme concerns the notion of a process that affects the entity being referred to. Terms such as "detaching", "weakening", and "reorganization", (Foa & Kozak, 1986; Hayes, Feldman, et al., 2007; Hayes, Laurenceau, et al., 2007; Moses & Barlow, 2006; Wolpe, 1958; Wolpe & Plaud, 1997) are suggestive of some type of process. The third theme includes terms that indicate a direction, quality, or function of the process. This theme incorporates terms such as "consonance seeking", "disconfirming", "error signal", "discrepancy", "stability", "homeostasis", and "corrective" (Emmelkamp, 2004; Foa & Kozak, 1986; Hayes, Feldman, et al., 2007; Hayes, Laurenceau, et al., 2007; Lovibond, 2004; Mineka & Thomas, 1999; Myers & Davis, 2007; Orsillo et al., 2004; Tryon, 2005).

Thus, there appears to be an unstated agreement that exposure facilitates a process of reorganizing aspects of a circuit or system in such a way that connections are weakened by consonance seeking or disconfirmatory experiences which restore stability to the network. Synthesising the seemingly disparate explanations of exposure in this way provides some useful clues about how to proceed in discovering the functional mechanism of exposure. Perceptual Control Theory offers a coherent, robust, and parsimonious explanation as to why these ideas might be hinting at something important.

4. An integrative solution

It is clear from reviewing the exposure literature that calls for fresh and innovative approaches in both conceptualization and design (e.g., Hofmann, 2007a; Kazdin, 2009) are well founded. Perhaps the field of psychotherapy is in a similar position now to the state of astronomy when it was studied from a geocentric perspective. At that time, none of the predictions and explanations were glaringly dreadful but nor did they fit the data very well either. Additions and modifications were constantly required to the existing models in order to account for new and unexpected observations with the consequence being that models became increasingly complex. A quantum improvement in understanding and predictions came, not from advances in techniques or methods, but from a change in the way the situation was understood. Astronomers did not need to improve their skills, they needed to change their understanding of the phenomenon they were investigating. Once they realised they were investigating a heliocentric system rather than a geocentric one, improvements in models and predictions followed (Carey, 2008a).

In the area of psychotherapy in general, and exposure in particular, the same lesson might apply. Rather than getting better at answering the same questions we have been asking for a long time, perhaps we need to look at the problem from a different perspective. A different

understanding of the phenomenon we have been staring at might provide surprising answers to existing questions and also suggest new avenues of exploration.

4.1. Considering perceptual control theory as a potential solution

Psychology has proceeded as the study of behaviour for well over a century and yet answers to quite fundamental questions such as how does psychotherapy work still seem distant and remote. A new perspective might help. Powers (2005) suggests that behaviour is one component of the phenomenon of control. Control is regarded as a fact of nature (Powers, 2008) that may well be the defining feature of life. Any entity that lives must be able to act on the environment it inhabits (which often changes in unpredictable ways) to control important aspects of its internal state. Perceptual Control Theory (PCT) explains how such an entity might be organized in order to control (see Fig. 1).

Since PCT proposes that the phenomenon of control is a characteristic feature of living things (Powers, 2005), Fig. 1 can be regarded as a blue-print of the basic building block that represents the functioning of single-celled organisms as well as multi-celled creatures. From a PCT perspective, Fig. 1 is the structure referred to by the terms summarised in Section 3.5 such as a circuit or a system. "There are many of these systems at the same level, and many levels. The environment of higher-level systems includes lower-level systems." (Powers, 2008, p. 28). PCT, therefore, is able to account for the increasingly complex behaviour that is evident in higher order organisms and, as an explanation of a general process of living, is able to accommodate Marks and Dar's (2000) observation of the effects of exposure with invertebrates and in single cells as well as Hofmann's (2008) work on the role of higher-level cognitions in exposure.

It is perhaps important to appreciate the kind of theory PCT is. PCT is a meta-theory at the level of Stimulus–Response (S–R) theory. The idea that stimuli (either external or internal) cause responses is an implicit underlying assumption of almost all theories in psychology. The standard method of research where independent variables are manipulated to determine the effect on dependent variables speaks directly to the S–R model. Even S-O-R innovations retain the linear progression from stimulus to response. PCT invokes the concept of circular rather than linear causality and suggests that it is the input to the system, rather than the output, that is the variable of interest. Although S–R theories assert that stimuli produce responses they do not specify *how* it is that a specific stimulus can generate the appropriate response. Nor do they specify how the same stimulus can generate different responses at different times or how different stimuli can generate the same response. PCT, however, provides a model of how a living thing lives.

A model in PCT is considered to be "a precise quantitative proposal about the way some system operates in relation to its environment" with the proposal "stated in a way that can be used to calculate behavior as a function of moment-by-moment variations in the independent variable" (Bourbon & Powers, 2005, p.141). Testing theoretical predictions by building models that run as simulations

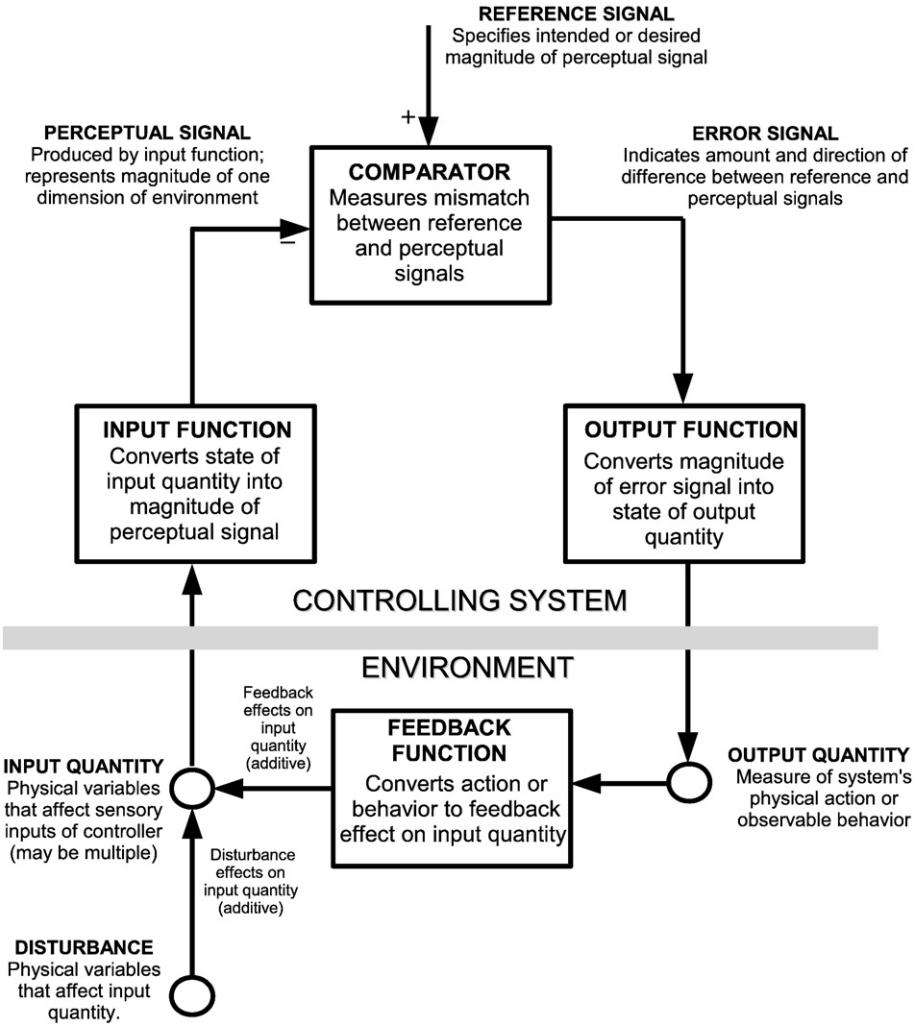

Fig. 1. The basic unit of PCT: A closed causal negative feedback loop (Reproduced with permission from Powers, 2008, p. 28).

produces correlations in excess of 0.97 between the PCT model and the behavior being modelled (e.g., Bourbon, 1996; Marken, 1991). These models have provided a firm foundation for a science of living control by rigorously testing the basic principles of the theory. Sound scientific procedure recommends developing understandings of complex phenomena from simple principles (Marks & Gelder, 1966; Tryon, 2005).

The modelling methodology of PCT might assist with the definitional problems that plague psychology. Problems defining terms even as basic as "stimulus" and "response" have been acknowledged for a long time (e.g., Marks & Gelder, 1966). Table 1 provides definitions of some of the important PCT terms discussed in this paper: control, conflict, error, and reorganization. To some, these word strings will seem no more precise and accurate than other psychological definitions. The difference with a PCT definition is that it is tied to a functional, working model capable of generating data through time. In a sense, when theories are expressed in such a way that mathematical models can be constructed to test their basic principles, then quibbles over terms and definitions are transcended. Researchers, for example, might be uncomfortable with the term "error" or they might think the definition of control is confusing and cumbersome. If they can agree, however, that the simulated data before them is very similar to the data generated by the behaviour they are seeking to understand, then individual preferences over word selection or order become less important.

Decisions about which model to base one's research or clinical interests on are no doubt influenced by many factors. Given the array of different theories and models available in psychology the process of model selection is certainly not straightforward. From a scientific perspective, however, models that express their important relationships in mathematical terms so that simulations can be constructed to test the accuracy of the principles would be regarded as superior to descriptive or conceptual models. These models are not magic and they do not answer every question that might be asked. They do, however, provide a rigorous way of testing fundamental principles of a theory. When models are expressed in such a way that they allow simulations to be conducted then the data from different models' simulations can be compared. The model that most accurately simulates the behaviour under investigation would generally be regarded as the better model. In one such study, when the essential properties of S–R models were compared with a PCT model in simulation tasks, the PCT model demonstrated accurate and robust performance while the S–R models failed to simulate different behaviours in important ways (Bourbon & Powers, 2005).

Table 1
Definitions of selected PCT terms.

Term	Definition	Example of model
Control	Achievement and maintenance of a preselected perceptual state through actions on the environment that cancel the effects of disturbances (Powers, 2005, p. 296).	Powers (2008)
Conflict	A situation in which two control systems attempt to achieve incompatible perceptions such that efforts that reduce error for one control system increase error for the other control system.	Carey (2008a)
Error	The discrepancy between a perceptual signal and a reference signal, which drives a control system's output function (Powers, 2005, p. 297).	Error is a feature of all PCT models
Reorganization	The process of changing the forms of functions in the hierarchy of control systems (Powers, 2005, p. 299).	Marken & Powers (1989); Powers (2008)

PCT, therefore, is a theory that affords opportunities to consider existing problems in new ways. It is not a specific theory in the sense that conventional psychological theories such as the Theory of Planned Behavior (Ajzen, 1985), Cognitive Dissonance Theory (Festinger, 1957), or the Cognitive Model of Depression (Beck, 1976) might be considered. It is not an explanation of any particular behavior but an explanation of how an entity must be organized to behave in any way at all. Fundamentally it is a way of integrating different psychological concepts within the ubiquitous phenomenon of control.

From a control perspective many of our current observations will remain the same, however, our understanding of these observations will be altered in fundamental ways. Whether you believe you are standing on a flat earth or a round one you will see ships sail out to see and disappear over the horizon. Your understanding of what happens to the ship once it disappears from view, however, will be crucially different depending on which earth you believe you are standing on. Similarly, whether you believe in control *of* behavior (S–R) or control *by* behavior (PCT) you will see a hungry rat press a bar and receive food pellets. Based on your beliefs, however, you will either understand that the food pellets are controlling the rate of bar pressing by the rat *or* that the rat is controlling the rate of pellet delivery by bar pressing.

The way in which control is understood has important ramifications in psychotherapy. The importance of control in the manifestation of psychopathology is well-recognised in the literature (e.g., Carey, 2008b; Carey, Carey, Mullan, Spratt, & Spratt, 2009; Mansell, 2005). People seek the assistance that psychotherapy provides when they have trouble controlling their behavior, or their thoughts, or their emotions, or some other aspect of their experience. People who are able to make things happen in their life the way they want do not tend to visit psychotherapists. A lack of understanding of how control works, however, can lead to dramatic conclusions. In ACT, for example, control is seen as a problem that needs to be overcome (Hayes, 2004). Orsillo and Batten (2002) suggest that "ACT is based on the assumption that attempts to control internal experiences are not only futile, but also life interfering." (p. 263). From a PCT perspective, however, psychopathology arises from a *lack of control* and psychological distress is removed once control is *restored*. Control of internal experiences is not life interfering, it is life *preserving*.

From a PCT perspective psychological problems are understood as disruptions in control processes. Recent models by Hayes and her colleagues (Hayes et al., 2005; Hayes, Feldman, et al., 2007; Hayes, Laurenceau, et al., 2007) as well as Tryon and his colleague (Tryon, 2005; Tryon & Misurell, 2008) seem to be converging on this area. Concepts such as disturbances to the steady state of a system as well as the dissonance induction/reduction principle are highly suggestive of interruptions to control processes. The phenomenon of control and the principle of error reduction clarifies the direction or quality of the change process promoted by exposure which was summarized in Section 3.5 using terms such as "consonance seeking", "corrective", "disconfirming", and "stability". Understanding the nature of psychopathology from a PCT perspective will help to explain the change process in this model as the mechanism involved during exposure treatments.

4.2. Conflict and control

The PCT model of psychopathology has been discussed in detail elsewhere (e.g., Carey, 2006, 2008a,b; Carey & Mullan, 2008; Mansell, 2005; Mansell & Carey, 2009), however, a brief overview would be useful to the current discussion. Given that control is seen as the order of the day within a PCT paradigm, something will be a problem to the extent that it interferes with the process of control. Transitory events, such as changes in the weather, often interrupt plans and events but a remarkable feature of control systems is their adaptability and

resilience. With many events, the control system counteracts the effects of the disturbance as part of the routine process of control.

When problems persist, however, an internal state of instability emerges. This arises when two control systems become organized in such a manner that they directly counteract and oppose the efforts of each other. This situation is known as conflict. Control systems locked in this conflict for a sustained period of time will be unable to control, and the patterns of behaviour, cognitions, and emotions that we recognise as psychological disorders will appear. The physical organization of conflicted control systems produces rebounds and vacillation that are familiar in the literature (e.g., Hayes, Feldman, et al., 2007). There is evidence, for example, that suppressing a thought can lead to later increases in the suppressed thought (Hayes et al., 1996). This is the result a model of control system conflict would predict.

Conflict is mentioned routinely, either implicitly or explicitly, throughout the literature with regard to psychological distress (Carey, 2008a, 2008b) yet its role in providing a generic formulation for psychopathology is rarely acknowledged. According to Wells (2005), for example, people with Generalised Anxiety Disorder (GAD) are in conflict in the sense that they are in "two minds about worrying" (p.110). Hayes (2009) suggests that clients are entangled in futile wars against their own inner lives. Rollnick and Miller (1995) describe Motivational Interviewing as a way of helping people explore and resolve ambivalence with ambivalence taking "the form of a conflict between two courses of action (e.g. indulgence versus restraint), each of which has perceived benefits and costs associated with it." (p. 326). Stiles et al. (1990) in their integrative assimilation model describe internal problematic experiences as conflicting experiences.

The salient feature of conflict is that there are two equally important and equally valid reasons or purposes that are opposing each other. There is an important reason to leave the house and an important reason to stay at home. There is an important reason to contain your emotions and an important reason to express them. There is an important reason to speak your mind and an important reason to agree with others. Clinically, goal conflicts such as: live my own life versus obtain other's approval; be relaxed and easy going versus make sure things turn out right; and be close to my partner versus make my partner behave the way I want, are common. (See Bird, Mansell, & Tai (2009), Carey (2002, 2008a), and Spratt & Carey (2009) for more detailed clinical examples of conflict.).

Many common clinical symptoms can be signs of underlying conflict. Avoidance and thought suppression, for example, are two common problems for many clients. Avoiding something, however, is generally only a problem if you also want to approach that which you are avoiding. Avoiding your boss at work will be a problem if you also want to ask for a promotion. Thought suppression can be considered a type of avoidance although in this instance it is an internal, rather than an external, experience that is being avoided. PCT, however, considers mental control processes to be just as much a part of normal control activity as moving one's arms and legs. People might use imagery, for example, to reduce the error they experience between their goals and their current perceptions.

Perhaps part of the explanation for the chronicity and durability of conflict is because of the value of both of the incompatible goals. The PCT model of psychopathology is an optimistic one in the sense that it does not require control systems to be broken or dysfunctional for conflict to occur. In fact, it is quite the reverse. "The worst aspect of conflict between control systems is that the higher the quality of the control systems, the more violent and disabling the result of conflict" (Powers, 2005, p. 266).

The reason that clients in psychotherapy describe trying to control some aspect of their behaviour or thoughts or feelings is because their normal, routine control processes have been disrupted by conflict. Control as a natural, physical phenomenon occurs seamlessly and continuously throughout day-to-day living. Anyone who has leaned into a headwind as they walked along, or squinted late at night when they turned on a light, or asked for extra dressing on their salad, or "kissed and made up" after a disagreement, has experienced the tangible effects of acting on their environment to achieve and maintain a desired state of affairs.

Similarly, anyone who has hovered over a menu with two or more equally delicious offerings, or sat with their hand poised above the phone deciding whether or not to make the call, or stood transfixed in front of their wardrobe unable to choose the right garment, has experienced the immobilising effects of conflict. While the experiences just mentioned are generally transient they provide a fleeting insight into how debilitating chronic conflict can be.

The PCT suggestion of psychopathology as conflict is the proposal of a physical organisation underlying the manifestation of psychological distress. For more detail about conflict between control systems as a physical process see Carey (2008a). From this perspective the relevance of exposure as an important, integrative, and common feature of psychological treatments might be apparent. Exposure programs isolate and sometimes exacerbate the conflict so that, by making the form of the conflict the focus of the client's attention, the conflict can be reorganized and a successful resolution can be generated.

4.3. Reorganization—A functional learning mechanism

Assuming that a mature organism is not born with the characteristics it has in later life, a process must exist to change the newborn state into the mature form. This could be called a process of learning but it cannot be a learning process that itself relies on being learned. Brainstorming, for example, is a process that many individuals learn as a very useful strategy while they are maturing. Brainstorming, therefore, cannot be a strategy that exists at the beginning.

Powers (1973, 1975), Powers, Clark, & McFarland (1960)[1]) has proposed an inherited mechanism called reorganization as the process responsible for developing and growing networks of control systems as well as adjusting and improving the control systems of mature organisms. Reorganization is a trial and error process that operates according to the principle of error reduction (Powers, 2005). Since both animal and human research indicates that learning arises when a discrepancy is detected between what is expected and what actually occurs (Lovibond, 2004), the reorganizing of control systems may be the mechanism by which the discrepancy is accommodated.

When there is error in the systems that are necessary for the survival of the organism, such as those controlling biochemical variables (Powers, 1975), random changes are generated in the network of control systems with the consequence being that if a change reduces error then the next change is delayed. "Reorganization changes the connections and components, and therefore the reference signals, so much that outcomes not previously possible (not previously in the repertoire, so to speak) can now be brought about." (Runkel, 2005, p. 229). Essentially, when there is a problem reorganization says, "do something (anything) different". If the something different begins to make things better reorganization says, "keep doing it". If the something different does not make things better the "do something different" message is repeated.

In simulation studies reorganization has been shown to be a remarkably efficient method (Marken & Powers, 1989). In these studies Marken and Powers (1989) began with findings from existing research. Then "the approach taken by control theorists in proposing an explanation of behavior is, wherever possible, to construct a working model that will reproduce the same behavior. By requiring that the model actually run and that it be capable of generating predictions of behavior through time, we can be sure that the offered

[1] In the first explanation of reorganization, the reorganizing system was referred to as the "Negentropy System" (Powers et al., 1960, p. 79) which was later changed to reorganization (Powers, 1973).

explanation is complete in itself, not requiring added interpretation to make the model capable of predicting a specific behavior" (Marken & Powers, 1989, p. 1351). Once the model was constructed, research participants completed a simple activity on a computer and the model also completed the activity. The data from the participants and the data from the model were then compared. Because there was a very strong degree of correspondence between the data, the model was then tested under different conditions. Once again, the model performed as predicted providing strong justification for confidence in the model.

Preliminary development of the reorganizing model, therefore, suggests that it is a powerful and efficient way of generating solutions to intractable problems. When there is a problem in the network, however, it is important that only the systems involved in the problem are reorganized and other systems, which are currently functioning adequately, are left unchanged. Powers (1973, 2005) has proposed that reorganization is linked to awareness such that it is the systems in awareness that are reorganized.

As a trial-and-error process reorganization will not necessarily generate the best solution first. This feature fits with clinical observation. The priority of reorganization is error reduction so it will continue generating alternatives until error is reduced. Unfortunately, reorganization is value neutral. If a particular response reduces error, then that is the response that will persist until error once again begins to increase. Perhaps this explains the manifestation of some behaviours such as avoidance or the use of alcohol and other drugs. If one of these strategies helps to reduce error then that will persist until error once again increases. Understanding reorganization, therefore, helps to explain why some problems might seem to get worse before they get better and it also explains why different people will need different durations of exposure. The concept of reorganization would also seem to fit with Foa and Kozak's (1986) observation that emotional processing occurs throughout life and can either increase or decrease emotional responding.

An important area of research for the field of psychological treatments may be the rate at which reorganization occurs. Through simulation models Powers (personal communication November 14, 2009) has identified that there is an optimum range within which the reorganization process generates changes. If changes occur too slowly then the error will not be reduced. If the changes occur too rapidly then each alteration will not have a chance to reduce error before the next one occurs which will result in a series of random changes that continue indefinitely. Perhaps part of the function of effective psychotherapy is to increase reorganization that is too slow or to slow down reorganization that is too rapid. Clarifying this issue might deepen our understanding of some clinical presentations as well as the most efficient ways of assisting them.

The PCT model of reorganization suggests it is not necessary (and sometimes can be unhelpful) to introduce predetermined solutions. While some people might find suggestions helpful, it could be ultimately counterproductive to constrain the natural learning mechanism of reorganization by prescribing the path it should take. Because of the proposed relationship between awareness and reorganization (Powers, 1973, 2005), the important component of therapy from a PCT perspective is to keep the conflict in awareness until reorganization generates a satisfactory solution. Effective psychotherapies differ in the way they achieve this but the result is the same. Often, the insights and solutions generated by reorganization might not seem extremely profound to an observer. For the clinical examples of goal conflicts mentioned in Section 4.2, reorganized solutions might be that a client realises that obtaining approval is not an "all or nothing" situation, or that disaster will not befall them if events do not unfold as they had imagined, or that closeness in a relationship can be sustained even when people behave in different ways. These seemingly banal solutions, however, can have a dramatic impact for the person who was conflicted as they are now able to experience aspects of their world in new ways.

4.4. Clinical implications

By combining the familiar with the unfamiliar a new direction for psychotherapy and clinical psychology might be possible. Exposure is a familiar concept in the area of psychological treatments. Scrutinising the literature indicates that exposure is, indeed, a transdiagnostic treatment principle and is a component of all successful psychotherapies. Exposure, therefore, could be considered the "what" of effective psychotherapy.

Reorganization is a relatively unfamiliar concept. Areas of the existing psychotherapy literature, however, provide encouraging hints that something like reorganization is occurring. Simulation studies suggest that it is a functional change mechanism. It is, perhaps, the most basic of all learning. Reorganization, therefore, could be considered the "how" of effective psychotherapy. Coalescing the transdiagnostic treatment principle of exposure with the functional change mechanism of reorganization has important and useful clinical implications.

Reviewing and synthesising the existing literature related to psychotherapy and psychological treatments indicates that a fundamental component of successful interventions is bringing about a situation where the person who is psychologically distressed spends sustained periods of time focussing on the source of the distress. The particular technique by which exposure is accomplished is secondary to that fact that it is accomplished. The concept of exposure need not be constrained by only being used in relation to fear and anxiety. From a PCT perspective perhaps a useful definition of exposure would be: An activity designed to reduce psychological distress by focussing attention on the source of the distress for sustained periods of time.

The realm of psychotherapy has, perhaps, become too focussed on procedural and strategic aspects of treatment and neglected important principles. The suggestion is that it does not matter whether exposure is accomplished with empty chairs or by sending thought-laden leaves downstream. It is exposure to the distressing material that is crucial.

Similarly, it is not crucial whether exposure happens in a series of little steps or in one big jump. Nor is the decision to confront an actual distressing experience or to imagine the confrontation pivotal. The best way to deliver exposure is the way that best suits a particular client and a particular problem.

Considering exposure from basic principles rather than therapeutic procedures broadens the scope of therapeutic activities. If the basic goal of exposure remains fixed, the means by which exposure occurs can vary enormously. These are the roads to Rome mentioned in the first paragraph. For some clients, a graded approach to exposure will work best. Other clients may prefer to plunge into the deep end first. How exposure is best accomplished could be a topic of discussion with the client.

The transdiagnostic treatment principle of exposure harnesses the functional change mechanism of reorganization. As a trial-and-error learning process, the best solution will not always be generated first and some effective solutions might be surprising or even seem mundane. To maximise the efficiency of treatments, therefore, it will become increasingly important to understand the characteristics and parameters of reorganization. For example, during reorganization, some deterioration in function before improvement occurs can be quite common. People can sometimes experience an increase in psychological distress as reorganization generates different possibilities and new solutions. While it is important to stop treatments that are ineffective it is also important to be able to discern an ineffective treatment from reorganization in action. Once again, discussing reorganization with the client beforehand and maintaining checks throughout the process is likely to be useful.

Acknowledging the role of reorganization in generating solutions to problems of psychological distress incorporates a degree of uncertainty and unpredictability for clinicians. Reorganization does not operate under set time frames. While it might be generally accepted that people learn at different rates this has not always been reflected in psychological treatments that prescribe specific numbers of sessions. Individuals can

be expected to reorganize differently. While the process of reorganization is standard, the length of time reorganization takes, or the way in which it unfolds will be unique to each individual and each problem. Many clients will reorganize quite quickly and others will take much longer. Thus, the delivery of treatment could be flexibly adapted according to individual client preferences (see Carey & Spratt, 2009).

Through reorganization, clients will generate their own solutions to problems. While offering suggestions can provide clinicians with a sense that they are contributing to the treatment, the suggestions might not be helpful to the reorganizing process. When clients do not follow clinicians' recommendations they are not necessarily noncompliant or disengaged. Understanding reorganization enables clinicians to achieve a greater sense of clarity about their role in the problem resolution process. The important function of the clinician is to provide ways that make it palatable and tolerable for the client to sustain their attention in areas where they would rather not be. If this task can be accomplished, the client will generate their own solutions given sufficient time.

5. Conclusions

Understanding how psychotherapies work is widely acknowledged as an important, even fundamental issue. Currently, however, psychotherapy is a splintered discipline. Recently, there have been efforts to bring a sense of unity and cohesion to the field. The transdiagnostic approach has been one of those efforts.

PCT can contribute to this work by providing a robust, integrative, theoretical framework. It is a theory that starts from a basis of function rather than dysfunction and builds its model of psychopathology from that foundation. PCT offers an opportunity to consider the field of psychotherapy from the vantage point of circular causality where simulation models indicate that controlled perceptual input is the important variable to understand.

It is perhaps ironic that a technique from the heartland of behaviourism would point the way to a new understanding of human functioning. Understanding how psychotherapy works, however, requires a fresh and innovative approach. With the question of "how?" being central, adopting a model that works as the overarching framework seems like a sensible way to proceed. From this perspective, exposing people to material and experiences they find difficult can be understood as a transdiagnostic treatment principle that is characteristic of effective psychological treatments. Exposure harnesses the mechanism of reorganization to remove psychological distress by resolving the underlying conflict between control systems. Thus, the effectiveness of psychotherapy hinges on the extent to which clients expose themselves to their conflicts for as long as it takes their reorganizing processes to generate an effective solution. Our work is as simple, and as complicated, as that.

By exposing how exposure works with the model offered by PCT a physical, functioning mechanism has been identified. Understanding reorganization in more detail and discovering how best to promote and encourage it will be important future work. By linking the practices of psychotherapy with identified physical processes, along with a theoretical explanation of how these processes function, exciting opportunities arise. Psychotherapy from the perspective of perceptual control could provide a unified focus for the field with new ways of conceptualising the design and delivery of psychotherapy to dramatically improve the efficiency of the treatments we offer.

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