

Making science work in mental health care

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There is increasing attention for embedding research in mental healthcare. This involves a linkage between scientific research and routine practice, where research is fed by questions from practice and scientific insights are implemented better and faster in clinical practice. This paper illustrates bridging the gap, by focusing on eye movement desensitisation and reprocessing (EMDR), and provides arguments why it is relevant to connect research and practice. It also discusses why experimental psychopathology may have a substantial contribution.

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In recent years, increasing attention has been paid to the “academisation” of mental healthcare in the Netherlands and in other countries. “Academisation” means that mental healthcare and science (but also policy and training) inform each other, such that (1) clinical questions are translated into research questions (and researchers actually work on these questions) and (2) scientific insights are put into practice faster and better (this is known as knowledge valorisation). By merging the academic and clinical environment, both research and clinical care are optimised.

Mental healthcare is catching up with other types of medical care with respect to academisation. General practice, for example, was only academised in the last few decades. Before that, if you had a concussion you were prescribed six weeks of bed rest. This is no longer the case, because research has shown that this does not promote recovery (and is more likely to hamper it).

Important advancements have included the launch of treatment guidelines and more intensive collaboration between mental health institutes and universities. This paper will discuss why the link between care and academia is important. It will also explain how experimental psychopathology can make a major contribution in this effort. First, the meaning of academisation will be illustrated with an example.

Illustration: EMDR

In 1987, Francine Shapiro, a former English teacher, reportedly walked in a park, and noticed that unpleasant thoughts seemed to fade when she moved her eyes quickly back and forth (Luber, 2009; Rosen, 1995). Two years later, she launched a new treatment for post-traumatic stress disorder (PTSD), which is now known as “eye movement desensitisation and reprocessing” (EMDR; Shapiro, 1989a, 1989b). A key part of the procedure is that the patient retrieves traumatic memories while making horizontal eye movements by following the fingers of the therapist moving back and forth in front of the patient’s eyes.

There was no clear theoretical rationale for EMDR. Shapiro wrote about rapid eye movement (REM) sleep (Shapiro, 1989a), and of catalysing and rebalancing the nervous system, and shifting information that is dysfunctionally locked in the nervous system (Shapiro, 1995). This is quite an elusive theory. In any event, she believed that her new treatment was very effective, and provided support for it with her own study of 22 participants who had experienced physical or sexual abuse or Vietnam War combat incidents and had related symptoms (e.g., intrusive thoughts; Shapiro, 1989a). Where previous therapies lasting an average of 6 years had failed, her single session (of about 50 min) apparently succeeded in

desensitizing the anxiety related to traumatic memories. However, there were clear methodological problems: Shapiro did not use standardised clinical measures, and did everything herself: the treatment and interviews. She received a doctoral degree for her research (see McNally, 1999), from an unaccredited school.

The academic community was skeptical about the introduction of EMDR (e.g., Herbert et al., 2000; McNally, 1999; Muris & Merckelbach, 1999). The validity of Shapiro's "wonder therapy" and her cryptic explanation were critically questioned. This was not unjustified. Shapiro went on to train therapists; from 1990 in the USA, from 1991 in other countries (Maxfield, 2009). This widespread commercial dissemination also led to criticism. And this criticism, too, was not unjustified. Nevertheless, the method quickly gained in popularity: many therapists were enthusiastic and convinced that the treatment worked.

That was practice. What did research show? In 1995, the first large randomised clinical trial (RCT) was published: people with PTSD received EMDR or were put on a waiting list (Wilson, Becker, & Tinker, 1995). EMDR performed better than no treatment. Still, such a comparison does not take into account non-specific factors ("placebo"). A next important step was to compare the effects of EMDR with the most effective treatment for PTSD: cognitive behavioural therapy (CBT). In 1998, the first meta-analysis appeared. It showed that EMDR and CBT were, in general, equally effective (Van Etten & Taylor, 1998). This was good news, because there were now more than 25,000 EMDR-trained therapists (Greenwald, 1999).

Why can we not just rely on the experiences of therapists: see if the treatment works in one patient, see if it works in other patients who are treated the same way, and draw a conclusion: the treatment works (or it does not). The problem with this is that important information is missing. I will try to clarify this with an example.

Friendly dolphin

Now and then we hear a story about a shipwrecked sailor or a surfer who is saved by a dolphin. According to the social psychologists Tavris and Aronson (2007, pp. 108–109), "It is tempting to conclude that dolphins must really like human beings, enough to save us from drowning. But wait—are dolphins aware that humans don't swim as well as they do? Are they actually intending to be helpful? To answer this question, we would need to know how many shipwrecked sailors have been gently nudged further out to sea by dolphins, there to drown and never be heard from again." We do not know about those cases, because they do not live to tell us about their evil-dolphin experiences. "If we had that information, we might conclude that dolphins are neither benevolent nor evil; they are just being playful."

This fallacy is known as confirmation bias: information that fits with our own hypothesis is weighted more heavily than conflicting information, and evidence to the contrary is not sought. To determine whether a treatment works, a clinician must not rely only on his or her own experience and intuition, because you never know how a different treatment would have fared in the same patient: a clinician only makes *uncontrolled* observations. If you draw conclusions on these grounds, they may be clearly wrong. Consider a cold: treated, it will go away after one week; untreated, after seven days. This is why scientific research using control groups is needed. This comparison forms a *hypothetical counterfactual*. The great philosopher of science, Karl Popper, reported a nice anecdote about this.

Popper and Adler

Adler believed that all sorts of psychological distress are rooted in the "inferiority complex". In the interbellum, Popper was working in one of Adler's clinics in Vienna. He reported a case to Adler which did not seem particularly Adlerian. It took Adler little time to analyse the case in terms of the inferiority complex. Popper asked how he could be so sure. Adler replied: "Because of my thousandfold experience." Popper then writes: "I could not help saying: 'and with this new case, I suppose, your experience has become thousand-and-one-fold.'" Each previous observation was coloured by the observation that preceded it, but was advanced as "new evidence". And so it started to dawn on Popper that this apparent strength (that the theory could explain everything) was in fact a weakness (Popper, 1963/2002, pp. 46–47). If every result confirms your hypothesis, then your ideas are a matter of belief rather than science. A theory must be *falsifiable* (that is, refutable), and in testing a hypothesis we must look for evidence to the contrary. Hundreds of white swans do not prove that all swans are white. A single black one proves the hypothesis wrong.

Thus, the origins of the falsification theory lie in mental healthcare itself. Of course, Popper was not talking about mental healthcare. His criticism was aimed at Marxism, naive empiricism, Freud, Plato's ideas on polity and much more. But crucial was his notion that confirmation through (clinical) observation does not count in favour of the theory. At least, it only counts if the observations are set up such that they *can* serve as *falsification*. So what counts, are critical tests. And those who make extraordinary claims, for example, about a "miracle cure", also need to have extraordinary evidence.

Returning to EMDR: the treatment now consists of several sessions, and its efficacy has been demonstrated in meta-analyses (e.g., Bisson et al., 2007; Bradley, Greene, Russ, Dutra, & Westen, 2005; see also Wampold et al., 2010). The research findings have been so convincing that

EMDR is now registered alongside CBT as the preferred treatment for PTSD in, for instance, the Netherlands (Trimbos, 2011) and United Kingdom (NICE, 2005).¹ These guidelines are “evidence based”, meaning that the best evidence is used to guide decisions related to care. Of course, this should not detract from the fact that more than one third of patients have little benefit from these treatments (Bradley et al., 2005), and that further improvement is still needed.

Interim conclusions: EMDR came directly from practice and has been studied in a number of RCTs (which is consistent with the first aim of academisation). This has resulted in guidelines for practice. For that, knowledge transfer is needed (e.g., training) and guidelines need to be promoted within the organisation (this is consistent with the second aim).

So, now we know that EMDR works, but *how* does it work? It was initially thought that EMDR is CBT plus eye movements, and you could just as well leave out the latter, but this does not seem to be the case: eye movements appear to be doing something (Lee & Cuijpers, 2012). If we can figure out what they do, we would know why and when to use EMDR (e.g., only for PTSD or also for other disorders?). This knowledge is also needed to further optimise the treatment. Shapiro thought that other alternating stimulation would work just as well, such as sounds (“beeps”) coming alternately from left and right headphones. Many therapists started using these beeps, which seemed convenient, but they had not yet been researched.

To determine how eye movements actually work in EMDR, a model is needed to guide research. The renowned Dutch psychologist Linschoten (1964) wrote that the starting point of science is that the occurrence of a phenomenon is determined systematically and can thus be explained by way of reduction. It is also very useful to work with a model in the lab: you can change one variable, hold others constant, and assess the effect. This way, you can draw conclusions about causality.

There are lab models that are well suited to examining clinical phenomena. In research on eye movements, the model looks like this. Healthy participants recall aversive memories and focus on the most emotionally charged image. Then they rate how vivid and unpleasant it is. After that, they recall the image for a longer period in two conditions: without or with eye movements (by looking at a dot on a computer screen that moves from left to right and back again). After a break of several minutes or days, the memory is recalled and assessed again.

In recent years many experiments have been done using this model (see Van den Hout & Engelhard, 2011). First, the research focused on whether eye movements work in

the lab. They do: in more than 15 experiments, memory recall with eye movements worked best. This was also found with an objective memory task (Van den Hout, Bartelski, & Engelhard, in press) and with physiological measurements² (Engelhard, Van Uijen & Van den Hout, 2010).

Then it was examined whether eye movements work by promoting communication between the left and right brain hemispheres (“interhemispheric communication”). This theory is popular among EMDR therapists and prompted many of them to switch to using the beeps mentioned earlier. Canadian researchers Gunter and Bodner (2008) tested this hypothesis by adding one condition: recalling a memory with *vertical* eye movements. Just recalling the memory had no effect. In the case of horizontal eye movements vividness and emotionality decreased. But this also happened with vertical eye movements; they were *equally* effective. Thus, the popular explanation of “interhemispheric communication” turned out to be a misconception. Here, research serves to correct practice.

So how does EMDR work? The idea arose that it might have something to do with “working memory”. This is used to perform cognitive tasks, and it has limited capacity; when we do two tasks at the same time that both require attention, these tasks compete for this limited capacity. Accordingly, if you think of a memory and move your eyes back and forth at the same time, there is less capacity available for the memory. As a result, the memory should become more vague (see Andrade, Kavanagh, & Baddeley, 1997). It is important to note that whenever we retrieve a memory, this memory is temporarily susceptible to change and is then reconsolidated in long-term memory. This way, a memory can become more vivid and realistic. This is called “imagination inflation”.

Imagination inflation

The memory researcher Elizabeth Loftus (Loftus & Palmer, 1974) showed participants a film of a car accident, and then asked some of them: “How fast were the cars going when they hit each other?” Others were asked the same question, except that “hit each other” was replaced by “smashed into each other”. This word influenced the estimated speed: with “hit”, participants guessed approximately 55 km per hour; with “smashed” they thought 66 km. A week later, the participants were asked if there was any broken glass at the scene. Those who had been asked the question with “smashed” most often thought (incorrectly) that broken glass had been shown in the film. In other words, the suggestive information had become part of the original memory. Later it was shown that you can also get people to recall unpleasant things that

¹However, it fell short of meeting the Institute of Medicine’s even stricter criteria for efficacy for treating PTSD (see McNally, 2008).

²In the case of positive memories.

never happened (“false memories”). You do this by having them visualise an event repeatedly. This gives rise to a vivid, detailed (pseudo-)memory, which soon becomes confused with a “real” memory (see Crombag & Merckelbach, 1996; McNally, 2003). These findings were highly relevant for practice. In the 1990s, a great deal of attention was paid to “recovered memories” of people who were searching for “repressed traumas”. These often proved to be pseudo-memories, which were “recalled” out of *nothing* during “recovered memory” therapy via hypnosis or other suggestive techniques. From the late 1990s there were far fewer cases involving disputed recovered memories, perhaps because therapists who used such techniques were being more cautious (Schacter, 2001, p. 130).

Returning again to EMDR. According to the theory, the combination of retrieving memories and eye movements should lead to the opposite—that is, to imagination deflation. From this theory, new predictions can be derived for further research.

First, the theory predicts that memories fade not only through horizontal eye movements, but also through other (demanding) dual tasks. This is correct, and applies, among other things, to *vertical* eye movements (as we have already seen), drawing a complex figure (Gunter & Bodner, 2008), mental arithmetic (Engelhard, Van den Hout, & Smeets, 2011; Van den Hout et al., 2010), playing the computer game Tetris (Engelhard, Van Uijen, et al., 2010), and “attentional breathing” (Van den Hout, Engelhard, Beetsma, et al., 2011). The latter is an important component of mindfulness therapy, which—like EMDR—consists of a package of interventions. In attentional breathing, if people get unpleasant thoughts or images, they should allow them, but focus their attention on their breathing. This seems to place demands on our working memory, just as eye movements do (Van den Hout, Engelhard, Beetsma, et al., 2011). It may also explain some of the effects of mindfulness. So there seems nothing special about eye movements, as other demanding tasks work just equally well.

Second, many people are not (only) plagued by bad memories (flashbacks), but also by future-oriented images (flashforwards). For example, a person with panic disorder may imagine having a heart attack in a busy store, and a person with hypochondrias may imagine receiving a life threatening diagnosis. The theory predicts that “flashforwards”, too, should fade when working memory is taxed. This was indeed found to be the case (Engelhard, Van den Hout, Janssen, & Van der Beek, 2010; see also Engelhard, Ven den Hout, Dek, et al., 2011; 2012). This potentially important finding could lead to an extension of the indication range of “working memory taxing therapy”: from trauma in the past to pathological “catastrophic scenarios” about the future.

The theory also predicts a dose-response relationship: the dual task should not be too easy (this leaves too much capacity available for the memory), but also not too hard (this makes it too difficult to recall the memory). The optimal working memory load would lie somewhere in between. Taxing of working memory can be established using reaction time tasks. Shortly after the Queen’s Day tragedy on April 30, 2009 in the Netherlands, participants recollected distressing images they had seen in the media. Four groups performed tasks that were increasingly demanding: group 1 only recalled the memory, groups 2 and 3 recalled the memory while doing simple or slightly harder arithmetic, and group 4 recalled the memory while doing difficult arithmetic. As predicted, the largest effect (i.e., the biggest decrease in the emotional intensity of the memories) was observed in the middle groups (Engelhard, Ven den Hout, & Smeets, 2011). However, no such effect was found for vividness ratings.

Another prediction concerns working memory capacity. According to the theory, people with lower working memory capacity should benefit more from dual tasks than those with higher working memory capacity. This was indeed found (e.g., Gunter & Bodner, 2008; Van den Hout et al., 2010).

Based on current research, individual tailoring seems to be important: gearing the degree of working memory load to the individual patient. If the mental image remains too salient, the load can be increased (e.g., faster eye movements, more difficult arithmetic), and if the image cannot be retrieved vividly (e.g., in the case of people with lower working memory capacity or children) the load can be reduced.

Finally, what about those beeps? Listening to sounds is a passive task. Therefore, you would expect that it barely taxes working memory and is thus less effective than, for instance, eye movements. This is exactly what we found in recent research in the lab (Van den Hout, Engelhard, Rijkeboer, et al., 2011) and in research among patients with PTSD (Van den Hout et al., 2012). These findings suggest that switching over from eye movements to beeps was premature.

Thus, there is clear evidence for a new theory on the effect of eye movements, and this may have relevant clinical implications. These suggestions still need to be examined in clinical practice (so it is important that universities have access to patients for research purposes), but it is better to improvise on the grounds of a strong theory, supported by experimental data, than on the basis of untested assumptions. These research findings have been translated by Dutch EMDR trainers into guidelines for practice and training (Beer et al., 2011).

To summarise: due to scientific research, over the course of 20 years EMDR has transformed from an unconventional intervention on the basis of an unusual theory into a “proven” treatment for PTSD, which we are

only just now beginning to understand. It is rare that a treatment works its way from the periphery to the centre of regular healthcare. Due to convincing data, this did happen with EMDR. Francine Shapiro faced a lot of criticism, but to her credit, she always has been willing to subject her treatment to scientific examination (McNally, 2001).

Science is crucial to improving care

The example of EMDR illustrates four important things about academisation.

- (1) Practice often forges ahead of science, and new treatments can spread rapidly. Research makes amendments and corrections in this process. This is often how things work in mental healthcare: new ideas are accepted faster than new insights from research.
- (2) It rarely happens that a single study changes healthcare. Typically, many studies are needed to develop knowledge that can actually be implemented.
- (3) Although it is important to know whether a technique or a therapy works, it is also important to know *why* it works. A better understanding of the working mechanism not only improves the treatment (consider the beeps and arithmetic), but also creates other areas of application—such as the extension from flashbacks to “flashforwards”. And if patients understand how it works, the therapy is more credible (which in itself has a therapeutic effect; Kazdin, 2005), and they can apply the insights themselves.
- (4) Sometimes clinically relevant research is done outside mental healthcare (e.g., fundamental or translational research in the lab or epidemiological research). If it has passed this phase, it needs to return to mental healthcare so that important results can be put into practice quickly. Sometimes a lot is known through research, but this knowledge does not find its way directly into therapeutic practice. The path of implementation is bendy: it is unusual that researchers find something and then transfer that knowledge to therapists. For instance, it took years for knowledge about “false memories” to find its way into practice. This process might be accelerated by involving therapists in research from the outset.

After this illustration I would like to focus more on *reasons* for promoting the academisation of mental healthcare. First and foremost, it increases critical thinking in the field. Academisation includes not only research, but also science as an intellectual discipline. The importance of control conditions and the need to be wary of incidental observations belong to the basic do’s and don’ts

of methodology. In daily therapeutic practice, this importance quickly fades from view. Consider once more *confirmation bias* (“we often see what we want to see”). This was discussed earlier as a psychological cause of problems. Methodology is a set of rules that we can follow to counter confirmation bias (see also Lilienfeld, 2010). And academisation means regularly asking yourself: “what works, how does it work, and what method will give us the greatest benefits?” Sometimes you have to put aside your intuition and personal experiences and say: “I have the feeling that this is true, but I know through research that it isn’t.” After all, we all see that the world is as flat as a pancake.

Second, various care guidelines are being developed in the Netherlands and in other countries. In line with research, we expect the largest effects from these treatments. But clinicians often offer these treatments sub-optimally or not at all (Shafran et al., 2009). It has frequently been said that the guidelines need to be used more often, but we do not know *how* often this should be. People do or do not apply the guidelines for good or bad reasons. Good reasons may include the patient simply having a different preference. Bad reasons might be that a clinician wrongly believes that the effects of treatment studies will not apply to his or her patients (“effectiveness”). There are all sorts of misunderstandings about guidelines: that they are protocols, that everything in them is contrived, that they are all “evidence based”. This is not the case: guidelines are a snapshot, a great deal is based on consensus and “effectiveness” is not known for all recommendations. Moreover, many patients do not benefit much from application of the guidelines. We need to do more research on this. But this does not detract from the fact that controlled data should be taken seriously. Patients are disadvantaged if they are treated with techniques or procedures that have not been “proven effective” or have been proven “not effective”, while there are better alternatives.

An important third reason is that university research agendas are determined more by an assessment of new opportunities and continuity of traditions than by a general responsibility towards healthcare. As a result, important clinical questions do not always find their way into scientific research. This is the case, for example, with general therapy factors.

Fourth, academisation corrects the undesired tradition in which researchers have little incentive to share their findings with practitioners. Their responsibility seems to end after publication in scientific journals. The problem is that—understandably—therapists seldom read these. However, it should also be reiterated that much of the research in mental healthcare has *no* practical implications and many studies are needed to effect changes in care.

Finally, the disease burden of psychological problems is enormous (World Health Organization, 2003), and this is a further argument why academisation deserves to be prioritised. There are many patients, and there is little money. So knowledge needs to be used well. Efficiency studies can help to make mental healthcare less expensive, although, of course, there is a limit to this.

Success calls for a certain attitude

Academisation is a common topic at conferences, as can be seen in recent themes such as *Translating Science into Practice* (WCBCT in Boston, June 2010) and *Translating Research into Care* (EPA in Vienna, March 2011). It is also a common theme in professional associations aiming to strengthen the role of science in training and practice via scientific committees, for example, the Board of Scientific Affairs of the European Federation of Psychologists' Associations (EFPA), and it is commonly discussed in journals.

A great deal has been done, but there is still more to do. According to the “law of the handicap of a head start”, a head start often means there is little stimulus for further improvement. From this is derived “the law of the stimulative arrears”; precisely because you can be fresh, you can gain a lot of momentum. This is why gains are to be made through academisation. The challenge is to keep the momentum going, in spite of the government's austerity measures.

Success requires the enthusiasm of the parties involved. It is important that managers facilitate, safeguard priorities and promote an academic culture; that clinicians are open to a scientific approach; and that researchers have an eye for the questions and problems that emerge in practice. Bridge-builders are needed—“amphibious” psychologists, psychiatrists and nurses who are familiar both with practice and with research.

The foundation, of course, is training, in which students and trainees learn not only clinical skills but also, for example, how to read research papers well. The number of publications out there is not equal to the amount of valuable knowledge (see Lilienfeld, Lynn, Ruscio, & Beyerstein, 2010). However, many students choose clinical psychology, not so much out of an interest in science, but because they want to do something for suffering people. Kultz (2004) wrote a satirical article with the title: “I want to fly a helicopter, not look at a bunch of crazy dials”. For years he has dreamt of flying a helicopter, and he starts taking flying lessons. But during these lessons he has to pay attention to the buttons and the lights on the dashboard. This is not what he had dreamt of. He wants to use his intuition and judgement; if he sees a tree he will fly over it; an electricity pole he will go around. His passion is for *flying*. Just like pilots, therapists, too, need knowledge about the methods and techniques in order to be able to treat their patients.

Students need to be taught this in their training, so they can be better prepared to help those in need.

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