

OPINION PIECES

# Does a Solution Focused Approach Change Our Brain? How Does Solution Focus Work? Exploring the Neurobiological Effects of Solution Focused Practices

Susan H Colmar, BA, MA (Hons), DipEdPsych, PhD<sup>1</sup><sup>a</sup>, Dion Sing<sup>2</sup><sup>b</sup>

<sup>1</sup> Sydney School of Education and Social Work, The University of Sydney, <sup>2</sup> <https://www.dionsing.org/>

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This opinion piece explores the neurobiological and neuropsychological underpinnings of Solution Focused practice. Neuroscience is increasingly being applied to humans' psychological functions and behaviour; however, there remains a notable gap in research directly connecting therapeutic interventions to changes in neurobiological function. Drawing on our conversations, research, and reflections, we investigate how core Solution Focus components—such as detailed descriptions of preferred futures, client agency, pausing, complimenting, and therapist curiosity—may intersect with concepts like neuroplasticity, memory, motivation, and neurochemical elements such as dopamine and oxytocin. We discuss relevant neuroscience literature and caution against simplistic or overstated claims. Instead, we propose that exploring neurobiological correlates is a promising direction for understanding why a Solution Focused approach works, not to validate it, but to deepen the conversation about its mechanisms. Our aim is to invite more curiosity and inquiry into this emerging intersection of neuroscience and Solution Focused thinking and practice.

Recently we have been exploring the evidence, or lack of evidence of the neurobiological and neuropsychological underpinnings of a Solution Focused approach. We have had some good, sometimes rambling but always interesting, conversations about this topic, not always in agreement but respectfully stimulated to read and think more about what each of us has put forward. We have also both followed up by making notes, reading books and articles, and listening to podcasts, especially those of Andrew Huberman (Huberman, 2020–, various), and watching relevant videos (for example, Gillibrand et al., 2022). Crucially, despite a careful searching in our Journal of Solution Focused Practices, Google Scholar and similar, there is little researched or written about this aspect of the Solution Focused approach,

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<sup>a</sup> Susan Colmar is a practising, qualified educational psychologist who has more than 40 years' experience working with children, parents and teachers. Email [susan.colmar@sydney.edu.au](mailto:susan.colmar@sydney.edu.au).

<sup>b</sup> Dion Sing is a consultant, facilitator, and writer with a passion for creating real-world change through practical, Solution Focused approaches. Email [dion@dionsing.org](mailto:dion@dionsing.org).

most likely because it is hard to research and is currently a developing field. Further, we have done a lot of thinking and have explored a framework for assembling these considerations, liking Haesun Moon's Dialogic Orientation Quadrant (2020) as a real world, practical model of Solution Focused practice. We certainly have not reached any conclusions; however, we do think this is an area to keep open, most particularly as more applied neurobiological approaches are likely to emerge over the next few years.

### **Why Explore Neurobiological Correlates of the Solution Focused Approach?**

A key argument worthy of consideration in our attempts to explore neurological features of a Solution Focused approach is "so what?". Do we need to have neurological correlates or collateral impacts from Solution Focus to confirm its effectiveness? Does an understanding of the changes in a person's brain and overall neurological functioning make it more real? We will argue it is certainly interesting to know more about, and to understand more about how changes might occur and see what is observable and evident at a neurobiological level. It is more than interesting when confirming the effectiveness of Solution Focus for an individual person undertaking a therapeutic or coaching intervention, and particularly the sustainability of its effectiveness going forward possibly because of changes in the person's neurological system's functioning. Embedded within these considerations is the reality that we now have better means of examining the human neurological system and it is reasonable for us to explore and perhaps use these new techniques.

However, a key caveat to these considerations is the misuse of neuroscience and medical science as an explanation. Weisberg and colleagues (2008) researched this area finding that "neuroscience explanations had a particularly striking effect on nonexperts' judgements of bad explanations, masking otherwise salient problems in these explanations" (p. 470). Similarly, Greenberg (2013) critiques both the Diagnostic and Statistical Manual of Mental Disorders (DSM) categorisation system in outlining "symptoms" or behaviours as specifically indicative of a disorder such as depression or ADHD, with implied "neurological" underpinnings. Further, the linking of the relative success of pharmacological intervention with an assumption that the person had a neurobiological "lack" of the appropriate neurotransmitter is unverifiable and naïve. Even the medical model does not suggest a throat infection's cure by an antibiotic occurred because the individual was missing this antibiotic!

We need to be cautious in assuming that neurobiological terminology makes a therapy like Solution Focused therapy more real and believable. Self-reporting of and evidence of change in the person's functioning in their world may be stronger data in its person-centredness than some assumed neurobiological explanation.

## Our Working Description of a Solution Focused Approach

A Solution Focused approach can be defined as doing more of what is working and not changing what is already working. Solution Focus is a way of having conversations that help a person move forward by focusing on what they want, the aptly named best hopes, and what's already going well for them in their lives. To quote our definition: "Conversations that have people understand what they want. What is working that is moving them towards that future. And what might guide them closer." (D. Sing and S. Colmar, S., personal communication, 8<sup>th</sup> July, 2025).

Across the Solution Focused communities there are accepted methods and tools deployed to achieve this focus. We recognise that underpinning the successful use of the Solution Focused approach is the way its practitioners see people, holding beliefs and respectful assumptions about their rights, strengths and capabilities too. Critical consistent principles apply when using a Solution Focused approach with an individual therapeutically or with groups or with organisations; however, for simplicity we are largely using the classic therapeutic counselling mode for explanations in this paper.

In a Solution Focused conversation, the focus is on specific details and eliciting and supporting rich descriptions of the person's best hopes moving forward. Jackson and McKergow write about the "radical simplicity" of the approach whereby you "sidestep the often fruitless search for the causes of problems. [Instead you] take the direct route forward, and use small steps to build toward the better future - the 'solution' "(2024, p. xiv).

Solution Focus as an approach has many unique features: using the miracle question, scaling and examining exceptions closely are all specific elements of Solution Focused therapy, although also co-opted into other therapeutic frameworks. For example, living with the problem but managing it better is crucial to a Solution Focused approach; however, it is also embedded in Acceptance Commitment Therapy (ACT, e.g., Harris, 2022) as well. Clearly the reverse applies in that Solution Focused practitioners may still draw on and use the accepted tenets of effective therapeutic counselling.

A Solution Focused approach does involve the therapist asking many questions, showing real interest and curiosity in working with the person to co-construct their preferred future, with an accepting, non-judgemental stance being important in the therapist's role. Sometimes, and particularly during an initial meeting for the individual, telling their story and being heard is a unique and empowering experience. Complimenting is another key element, specifically asking questions that allow a person to compliment themselves, understanding their role in their progress. Further, the recipient of a Solution Focused approach is always self-motivated and "in charge", with the Solution Focused tools facilitating what the person wants and where they are headed going forward.

An excellent example of using Solution Focused specifics is the nature of, and wording of the question asked. Moon (2020) describes, with examples, the role of words in a Solution Focused approach in determining the nature

of the question asked and heard. The potential therapeutic difference created by a single word can be astonishing (McKergow, 2022), yet is this measurable at a neurological level even though recognisably crucial to therapists and clients? Recently at an Australasian Solution Focused Association (ASFA) members' meeting (February 19<sup>th</sup>, 2025) the discussion focused on the different possibilities that might arise depending on the therapist's introductory openings with the client, and timing of and types of questions. Respect for the client and their autonomy and choice were strongly acknowledged, alongside the role of the Solution Focused practitioner's curious, frequent, but always relevant, questions.

We know that Solution Focus does not label or diagnose people, nor overly focus on the problem or the feeling of being "stuck" (Durrant, 2012) that brought them into therapy. However, following the Dialogic Orientation Quadrant model (Moon, 2019), which encompasses four quadrants: Positive or Preferred Future (Q1), Positive or Resourceful Past (Q2), Negative or Troubled Past (Q3), and Negative or Dreaded Future (Q4), the range of aspects of the difficulties they are encountering right now are not ignored. Moon also includes the notion of a person's narrative or story within the therapy, which may lay out a neurological pathway for moving forward.

### **Neurological Considerations**

In exploring the neurological underpinnings and outcomes of Solution Focused work several general and some specific points have become clear to us. It is likely that some of the common practices across therapeutic and coaching practice such as listening, especially demonstrably active listening as evidenced by, for example, asking contingent questions, and a respectful, non-judgemental stance on the part of the listener, are helpful. Further, these "counselling" skills are generally very different to what a person typically meets in everyday life, especially when raising something that is of personal concern. As examples, these two elements of good therapy are certainly key parts of a Solution Focused approach and are likely to be useful, perhaps because of underlying neurobiological change; however, these links are not well understood, nor have they been well researched. In this article we will attempt to argue from a neurobiological basis how and why Solution Focus appears effective and efficient, in part because progress towards desired outcomes occurs relatively quickly in the context of the time spent in the therapeutic conversation.

Further, the nature of and the differential impact of therapy would clearly differ depending on the client's age, both chronological and developmental. The young child's brain changes rapidly, as do the brains and neurological systems of all persons as they develop and adapt as they get older, albeit more slowly. Additional elements, such as disease states and the use of prescribed pharmacological substances, legal and illicit drugs, may add an overlay in terms of immediate and sustainable therapeutic impact and what is going on neurologically.

An important distinction is described and evaluated in a paper by Dierolf and McKergow (2009) who clarify that people interact with and behave in their world and that the brain or neurobiological systems are in effect serving the person. “The different grammars of neuroscience (molecular grammar) and SF practice (people grammar) are not transposable, and according to Wittgenstein one cannot be reduced to the other” (p. 42). A Solution Focused approach is primarily about people and observable positive change in people’s interactions with their world, not about hypothesised and largely not measurable neurobiological changes in their brain.

Throughout this article we will endeavour to explain what we think “might” be happening on a neurobiological system level. We emphasise the word “might” as very limited evidence exists, and neither of the authors are experts in this realm, rather we are keen observers of these phenomena. Our hope is that by highlighting these links it may pave the way for further exploration and discussion. When we refer to neurobiological aspects of a person, the authors are not suggesting that our brains act in solo but rather as a part of a whole complex human being interacting with their world, which crucially includes other people. Further we will use the term neurobiological to cover the many features of human functioning, including acknowledging the role of our environment or context in impacting our functioning as human beings. We also confirm that neurobiological and neuropsychological elements each have somewhat different meanings, however, exploring these is beyond the scope of this paper.

### **How a Solution Focused Approach Changes our Neurobiological Functioning**

Neuroplasticity is a key concept that certainly has relevance when examining the Solution Focused approach. Change and future-focused hopeful change are possible with a Solution Focused approach and likely manifest neurologically, drawing particularly from work in neuroplasticity. Neuroplasticity is now widely accepted as the brain’s ability to change and reorganise based on experience. It is crucial in the young child, especially the first thirty-six months; however, it continues to be significant as the person develops and ages and is exposed to many experiences within the context of their life. Obviously, a hopeful forward-looking therapy is more likely to lead to changes in the person’s future that are of their choosing and are positive. When the person attends a Solution Focused session and is offered a respectful acknowledgement that they know themselves best and are given expertise and agency, they are enabled to build further on an existing path or road (Sing, 2023). This approach contrasts with having to navigate somewhere unfamiliar, or worse build a new road or neurological pathway of the therapist’s choosing.

However, although neuroplasticity is almost universally accepted, understanding how our brain and nervous system reorganise is open to much speculation. There are a few commonly accepted influences in this

re-organisation and predisposition to neurological and physiological nervous system change (Fuchs & Flügge, 2014). Given that we may have the ability to trigger the release of neurochemicals and neuromodulators through focusing a conversation in a particular direction, we argue that this is one of the reasons Solution Focus as an approach is more potent than, for example, exploring a person's past, or focusing primarily on positivity and gratitude. We would argue that a Solution Focused conversation's ability to grow hope and develop a detailed picture of a preferred future that is firmly grounded in the person's own reality is why Solution Focus stands out as the most efficient and effective route to positive change within a minimal amount of time, and perhaps effort.

Other areas to be considered include the so-called lifestyle factors such as sleep, diet and exercise. These may be outside the scope of Solution Focus as it is commonly practiced, although mind-body links are now acknowledged as relevant to psychological functioning. The complexities of what is mind and personness, and what is brain and neurobiological are not irrelevant, but they are beyond the scope of this paper. As humans we function within our own world, and it is our management of our interactions with our environments, most particularly including other people, that is observable, and which essentially defines who we are and who we are seen to be as a person. There are some links we think could be explored further based on the theory that the successful use of Solution Focused conversations is likely to promote positive change in a person's physical brain/body infrastructure and wellbeing both physically and psychologically. However, given a key underpinning of Solution Focus is about the client's agency and choice, then they need to choose to build these elements into their preferred future rather than having them imposed.

Further, certain evidence is accumulating recording the impact of pharmacological interventions on the brain and neurological system and it is important to attempt to extend these data to other therapeutic interventions. In one paper in this area, Karlsson (2011) considered how psychotherapy might change the brain compared with diagnostically prescribed medications, with some evidence of brain changes observed with therapy but with inconclusive findings.

Possibly another key factor in neuroplasticity and memory is the modification of synaptic connections among neurons predisposing collections of neurons to fire. Therefore, telling a story or teaching a skill to another is a way of embedding this in our memory effectively, thereby organising a set of neurons to fire more readily than their neighbours. This is a valid argument suggesting that building rich descriptions of a person's preferred future is indeed predisposing the person's memory to be able to recognise and locate this memory more easily giving the preferred future a greater likelihood of occurrence. Moon's concept of the resourceful past (Positive or Resourceful Past [Q2]) also links in with the notion that we have

managed our lives well at times in the past and can look forward to managing them well again in the preferred future. Again, the key point applies that doing more of what works is defining for a Solution Focused approach.

### ***Re-membling the Future***

Memory can also be seen as a key neuro-cognitive construct, where existing exceptions can be talked about and can become the stepping stone for more exceptions and ways of managing the issue. It is almost certain that spending time discussing a preferred future (Moon's DoQ quadrant 1) with strong links to reality develops a neuro pathway or predisposes a collection of neurons to firing again in the future. The only defining difference between experiencing a rich description of the future and memories of past events is the timing we associate with that memory. By default, both must create physical changes in our "plastic" brain and, as we recall either past or future events, we draw on or re-memember this memory that has been created. When we build together a full and complex description of what someone wants that is connected to their reality, we are increasing the odds that they will achieve this future, by signposting the direction and behaviours likely to lead to this outcome. An important caveat here is the skills of the Solution Focused practitioner in supporting the person's conversation towards their preferred future. It is possible that repeating old stories, including traumas, may entrench them and over-emphasise their importance, leading to additional rehearsing of the problem rather than moving towards a solution or a hopeful future. Clarke (2012) possibly said it best.

*Human beings have an amazing ability to imagine things which have not (yet) happened. The magic of the Miracle Question lies in the way it taps into this ability so that the client experiences – in his/her mind's eye and body – what things would be like in the absence of the problem. Not only does this provide sensory clues to how things could be in a better world, it also widens the client's sense of what is possible and it provides a muscle memory that can be recalled later. Thus imagination is transformed to memory – a re-membling. The search for exceptions – examples of the desired outcome happening in the past – thickens this strand of memory. (p. 7)*

### ***A Solution Focused Approach: Dopamine and Motivation***

To go even a step further and discover aspects or instances of this preferred future that are already happening almost certainly triggers dopamine release not only giving a positive emotional experience but also balancing a person's sympathetic nervous system response. In turn, this allows them to remain motivated by higher levels of adrenaline whilst not overloading the system. Each time the person sees a sign of the intended progress it further boosts

dopamine, thereby keeping them motivated (Huberman, 2020–). The loop of noticing change, experiencing success, and building on it is not only psychologically effective but likely neurobiologically reinforcing.

### **Solution Focused Therapeutic Relationships and Oxytocin**

Another possibly relevant neurochemical aspect of a Solution Focused relationship and its positive impacts is the role of oxytocin. Whilst acknowledging that one chemical is never acting alone, we will draw attention to its potential role. It is likely that the building of a therapeutic relationship (this includes a relationship in the context of workshop facilitation, coaching supervision or any Solution Focused activity) is likely to heighten the levels of oxytocin and its benefits (feelings of trust, nurturing and promoting of prosocial behaviour). One study using oxytocin nasal spray found participants were more trusting in economic games (Kosfeld et al., 2005), suggesting oxytocin plays a direct role in promoting cooperative relationships. We would suggest that Solution Focus, through its non-pathological focus on the person, brings attention to their own resources and hopes, and reaffirms positive relationships. Although many other approaches utilise a therapeutic relationship, the ability of Solution Focus to compound the strength of and retain the genuine balance of this relationship is likely to give Solution Focus an edge.

### ***A Solution Focused Approach and Stress Responses***

There is growing research into stress arousal reappraisal (SAR). Stress arousal is the heightened level of alertness derived from high levels of adrenalin and boosted heart rate. Reappraisal means seeing it in a different way, so how we see and experience the high arousal.

Researchers call these a challenge response (good/useful stress) and a threat response (not good). One of the indications from research is that when we experience a feeling of a lack of resources it causes us to see this arousal as a negative experience (threat). In contrast, observing our resources and perceiving that we have resources may allow us to use the high levels of arousal without the negative impacts often associated with stress (challenge). “Although both responses are accompanied by sympathetic activation, challenge is characterized by improved cardiac efficiency and dilation of the peripheral vasculature, whereas threat decreases cardiac efficiency and constricts the vasculature in anticipation of damage or defeat” (p. 1-2, Jamieson et al., 2013). Solution Focused questions, such as coping questions “so how have you been coping with this?” or scaling, so asking for a simple rating of what is already working, draw attention to the individual’s existing coping resources. These techniques are likely to have similar if not more potent impact than the SAR interventions studied that focus on education whereas a Solution Focused approach is bringing attention to what is already happening in the person’s reality and confirming what is helpful.

## **A Solution Focused Approach and EEG Measures**

Gillibrand et al. (2022) devised several methodologically sound observational studies of Solution Focused therapy in action, measuring factors such as brain activity using EEG technology as outcome data. One fascinating finding is that allowing the client time to respond with the therapist waiting quietly was critical, especially when the client stated they had no answer or didn't know. Meantime, brain activity confirmed that thinking was ongoing, and a response was eventually reached. This confirms Insoo Kim Berg's assertion of allowing five to seven seconds of silence (cited in Thomas, 2013). In addition, Colmar's research (2011, 2014) encouraging young children with language difficulties to talk also incorporated the pause as a key component. Typically, an adult speaker in western culture fills any gap in conversation rapidly and often takes over. Allowing the child time to speak by pausing, led to them using language more, and more often, and to becoming a more competent language user. To extrapolate, pausing allows the other person in the communicative interaction to use their own language (and thinking), and at their own pace, and to state what they want to say, not to be overtaken by the therapist's second guessing them. Pausing is a measurable key component of an effective model for all human communication, yet it is an aspect that can often be violated or overlooked.

### **Experimenting in the Real World.**

Linked to neuroplasticity is that a key component of a Solution Focused approach is the client acting by undertaking experiments in their own real-world contexts (Sherwin, 2024), noting the notion of behavioural experiments is used in other approaches (such as CBT and behaviour analytic approaches where exposure therapy is used, e.g., Hudson & McKinnon, 2024). Experiments include testing out something difficult or participating in a situation or event that perhaps the person had been avoiding, thereby exploring a new neurological path with therapeutic support or going forward afresh on a previously well-established path. A link to states of arousal, and stress arousal reappraisal as already described suggests that rather than being afraid of stress the person accepts stress, leaning into it using a challenge response versus trying to avoid the stress and thus experiencing a threat response. Practice and repetition of the new behaviour or skill they have experimented with is also important in strengthening the new neural pathways.

### **Measuring Neurobiological Impacts of a Solution Focused Interaction**

Potential neurological correlates of psychological and therapeutic interventions on areas such as wellbeing, and attentional and memory enhancement probably exist and these elements are potentially measurable with written or spoken instruments. However, the accuracy of these psychological instruments is constrained by the same limits of all psychological measurement including questioning and recording bias, poor

validity, low or incomplete reliability data, persons' truthfulness, and so on. However, physiological and neurobiological measurements are also imperfect and again have certain limitations, with the most obvious being what we choose to look at and then attempt to measure. The history of science at theoretical and applied levels confirms that thinking and ultimately accepted realities do change and keep changing, and this is both healthy and necessary (e.g., Daston, 2017).

We also must acknowledge the existence of false information, and of course false conclusions or incorrect interpretations from data. Moving into apparently more scientifically robust examinations of human's psychological functioning by examining neurobiological correlates is no guarantee of "truthfulness". Perhaps the simple reporting back and opinion of the person receiving the Solution Focused interaction may be a more accurate and real measure of its success, as evidenced in changes perceived by the person and those around them.

### **A Solution Focused Approach is Interactive**

Acknowledging that therapy (or counselling or coaching, again confirming we are using the word therapy to encompass all these options) is an interactive context is crucial; therefore, the person providing the therapy or coaching is important as well as the recipient of the support. Czeszumski et al. (2020) examined hyperscanning, which broadly encompasses the measurement of neural inter-brain underpinnings of social interaction, acknowledging that interactions between people, as in therapeutic and conversational contexts, must be considered. In simple terms neurobiology, as well as observable behaviours, are impacted by social interactions. They examined evidence of measuring "neural brain activity" where both persons' brains are monitored with functional magnetic resonance imaging (fMRI) and functional near-infrared spectroscopy (fNIRS). Crucially, measurement difficulties and the relative artificiality in creating a context for such experimental work using these methods are noted as key limitations.

Choi's 2023 paper noted that "the client's solution-focused talk was rather a product of dynamic interaction than a linear consequence of a single therapeutic intervention (Choi, 2023, p. 115)" Hence, in solution-focused terms, the microanalysis approach (Simon & Taylor, 2023) may provide details that could be linked to the neurological responses of both the therapist and the person who is the recipient and co-creator of the therapeutic solution. Not that this is at all simple or easy to research. And yes, we need to keep restating this point!

### **Time as a Factor in a Solution Focused Approach**

Another key element of Solution Focus, and what makes a Solution Focused approach different, is it is often brief in terms of the number of sessions, and yet effective (Pakrosnis & Žak, 2024; Vermeulen-Oskam et al.,

2024), moving away from the notion of prolonged sessions being required to achieve progress, or naïvely a “cure”, or in neurological terms, a new connection.

Importantly the brief name was derived compared with the long slow examination of a person’s complex and perhaps problematic past. Some other therapies appear to not always have the expectation of the person in therapy being able to go forward and live their life well, successfully and independently, essentially to thrive or flourish (Seligman, 2011). Solution Focus is about good life functioning not perfection and not a “cure”.

### **Summary and Conclusions**

In this paper we have examined some of the limited evidence of neurobiological changes that appear to or might occur when an individual experiences a Solution Focused interaction. Measuring neurobiological correlates of change is difficult and may not be more reliable, valid or meaningful than psychological checklists or simple reporting back or the observed changes in the individual’s functioning with their world. Importantly, as in all scientific research, the choice of what you observe, and how you attempt to measure it, determine and limit your findings and conclusions.

Specific areas such as neuroplasticity, EEG impacts, and measuring dopamine and oxytocin were explored. Further, we considered the role of specific neurological elements such as memory. In exploring the potential neurobiological underpinnings of a Solution Focused approach, we must look at the dynamic and mutual interactions, both for each individual and between the individuals during sessions. As an example, pausing within a Solution Focused conversation may be of critical importance.

We also examined stress responses, particularly the reappraisal of these responses as challenge instead of threat. The role of experiments, as in the deliberate, real-world use of the behaviours explored in a Solution Focused session is a crucial adjunct to the talk within a session. Ultimately a Solution Focused approach is about facilitating person-centred change in managing and interacting with their world. It is not aiming to impact their neurobiology, even if this is able to be reliably measured, particularly in real environments. The effectiveness of Solution Focus relative to the time spent in a therapeutic context is another key area to be researched further and perhaps considered in neurobiological terms.

We would argue strongly for the simplicity, flexibility and effectiveness of a Solution Focused approach and its key focus on working “with the client” as a co-facilitator who asks many good, curious, relevant questions to enhance the shifts in actions and thinking, and possibly neurobiological factors for their clients. Nevertheless, elements of good counselling and therapeutic skills are also necessary and will probably be present in establishing a successful working therapeutic alliance.

To separate out Solution Focus exclusively at a neurological level is not easy, although Gillibrand et al. (2022) did include studies moving in this direction. And as we have outlined, we believe there is a strong neurobiological basis as to why Solution Focus is effective and stands out among other modalities. In a Solution Focused approach, the detailed exploration of the person's best hopes for their own future provides depth, with a realistic picture of the future, which may establish relevant, stronger and sustainable neurobiological connections. We are not suggesting that neurobiological connections or correlates validate Solution Focus; however, they may extend our thinking about, and examination of the mechanisms and factors involved in its effectiveness. Clearly the Solution Focused approach is about people in conversational contexts not about neurobiological and brain-based changes that might occur in these contexts. Nevertheless, the latter are certainly relevant and fascinating and are crucial to our humanness.

To date the evidence for a Solution Focused approach is generally positive; however, why and how and if changes occur at the neurobiological level is currently less well researched and understood. In our opinion, as outlined in this paper, examining the developments in this area and becoming part of this conversation is a task worth pursuing whilst retaining our skills in elucidating change by observation and in conversation with the person we are working with.

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