




Experiences of emergent change from an applied neurosciences perspective



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Orientation: Traditional models of planned change are no longer sufficient, amidst constantly changing contexts. Applied neurosciences provides a unique, integrated perspective on human functioning. This study employed a neuroscientific perspective to explore participants' experiences of the neurobiological impact of emergent change.

Research purpose: This study explored participants' experiences of emergent change from an applied neurosciences perspective.

Motivation for the study: The impact of emergent change on employees has been underestimated and under-represented in both the literature and practice. Exploring the original voices of employees, as well as the underlying neural mechanisms and their dynamic interactions that shape these experiences, offers new insights into this complex phenomenon.

Research approach/design and method: Nine client-facing employees from a software development company in South Africa, selected through purposive sampling, participated in an interactive qualitative analysis (IQA) focus group and follow-up interviews. Data were collected and analysed by the participants, in keeping with the IQA protocol.

Main findings: Experiences of emergent change were found to threaten individuals' and teams' basic psychological needs, with a significant impact on the physiological, emotional and interpersonal levels. The participants' experiences reflected a dysregulation in mental operating network activation, in response to their compromised needs.

Implications for practice: The findings imply the need for interventions to enhance employees' resilience during emergent change by developing the internal stability and external adaptability of their mental operating networks. This aligns with developments related to well-being in the neuroscience literature.

Contribution/value add: The study provides an insight into individuals' and teams' experiences of emergent change, which can be used to inform new approaches for research-informed interventions and practices aligned with applied neurosciences.

Keywords: applied neurosciences; basic psychological needs; emergent change; interpersonal neurobiology; mental operating networks; organisational psychology.

Introduction

Orientation

The field of organisational psychology has established a strong foundation of research into organisational change. The vast majority of such investigations, however, deal with planned change, whilst traditional planned change models (designed for more stable environments) are no longer sufficiently effective in the face of constantly changing contexts (Bushe & Marshak, 2016; Wee & Taylor, 2018).

In contrast to planned change, emergent change is defined as the unplanned, complex phenomena and processes that occur through interactions and relationships between elements in a system (Bushe & Marshak, 2016; Lewis, 2019; Uhl-Bien & Arena, 2018; Wee & Taylor, 2018). The presence of change as a consistent, significant force in modern organisations is widely accepted (Scarlett, 2016; Wee & Taylor, 2018). Although emergent change may be natural and unavoidable, the collective impact of incremental and compounding emergent changes on employees in the workplace has been significantly underestimated (Scarlett, 2016). Employees often experience significant negative impacts that go unnoticed and remain unattended to, until they reflect it overtly through absenteeism, sickness and burnout, affecting productivity and performance (Sanchez, 2018). This can expose companies to significant risk, leading

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to suboptimal adaptation at the individual, team and organisational levels (Scarlett, 2016).

The argument made here is that exploring the experience of emergent change from an applied neuroscientific perspective could offer valuable insights into the impact of emergent change, as neuroscience describes the underlying biological mechanisms that shape human behaviour. Neuropsychotherapy not only provides a framework for understanding human behaviour but also for changing it (ed. Rossouw, 2014; Wilkinson, 2017); hence, this study largely drew on neuropsychotherapy as a subfield of the applied neurosciences. Insight based on neuropsychotherapy can assist with the development of interventions or leadership practices aimed at enhancing the functioning of employees in unstable work environments. Notably, given the view of the brain and body as integrative systems, the concept of 'mind' is preferred in the more recent literature, especially to make provision for the human body being included in the bodily system (Arden, 2019; eds. Siegel et al., 2021; Wilkinson, 2017).

To explore the experience of emergent change from an applied neuroscientific perspective, emergent change is conceptualised, and that is followed by a presentation of an applied neuroscientific framework. The literature review precedes a discussion on the design of the study and an empirical investigation into the participants' lived experiences of emergent change. Finally, the findings are discussed from a neuroscientific perspective.

Literature review

Emergent change

Emergent change is an integral and natural reflection and expression of life and human existence, and organisations are not excluded from this reality (Chia, 1999; Tasler, 2017). It occurs as a continuous process in modern organisations, facilitated through conversations, interactions, behaviours and actions (Bushe & Marshak, 2016; Grant & Marshak, 2011; Lawrence, 2015; Tsoukas & Chia, 2002; Uhl-Bien & Arena, 2018). This implies a shift away from the known state of making sense of change to a process of sense-making, with a view on organisations as being the result of emerging patterns of sense-making and a focus on organising instead of organisation (Hosking, 2006).

Although emergent change is regarded as a completely natural and unavoidable process, rather than something episodic that needs to be managed with a traditional project management style (Chia, 1999; Tasler, 2017; Worley & Mohrman, 2014), organisations are not sensitively attuned to or aware of shifts in their environment or the impact thereof on employees (Senior & Fleming, 2006). This underscores the imperative for organisations to become and remain flexible and agile if they are to survive and thrive in change-prolific times characterised by emergent change (Hagel, Seeley Brown, & Kulasooriya, 2019; Leach, Wandmacher, Ayres, & Groban, 2019; Liebhart & Garcia-Lorenzo, 2010; Maimone &

Sinclair, 2014; Scarlett, 2016; Senior & Fleming, 2006; Weick & Quinn, 1999). Given the need to consider the impact that emergent change has on the experience of employees, a neuroscientific framework could arguably contribute to a more refined conceptualisation and hence assist with the design of interventions aimed at dealing more appropriately with the demands of an ever-changing environment.

An applied neurosciences framework

This study largely relied on neuropsychotherapy – with its focus on change – as a field of applied neurosciences. According to neuropsychotherapy literature, the mind can be described as comprising self-organising neural networks, with positive and negative feedback loops that coherently work together to find a balance between satisfying bodily needs and adapting to the external environment (Arden, 2019). Menon and Uddin (2010) and Arden (2019) identified three significant self-organising mental operating networks which are relevant to understanding the neurobiological underpinnings of behaviour, namely the executive network (EN), the default mode network (DMN) and the salience network (SN).

The regions involved in the EN form part of the neocortex and are the last brain regions to develop and become fully functional (ed. Rossouw, 2014). These circuits are involved in being present in the moment and performing higher-order functions such as making decisions, planning, taking action and orienting behaviour towards a goal (Arden, 2019; Cozolino, 2017). The EN draws on the explicit memory system and a sense of safety is required for its optimal functioning. This implies that individuals need to first satisfy their basic psychological needs (required for internal stability) before adapting to challenges generated by emergent change in the external world (Arden, 2019; Grawe, 2007).

The DMN refers to brain circuitry that provides the capacity for reflection on the self and on relationships, for looking back to the past, as well as projecting into the future (Arden, 2019). Memories of past experiences shape expectations about the future (Grawe, 2007). This network thus forms narratives about emergent change experiences, retrospectively and pre-emptively, as a process of sense-making, and despite drawing on both implicit and explicit memory systems, it is not active during the experience per se (Arden, 2019). When autobiographical stories are exchanged with others in safety and new perspectives are shared in supportive ways, fresh possibilities can emerge through this network. If the SN and DMN are co-activated excessively, however (as in the case of a perceived threat), it can lead to dysfunction and intrusive negative rumination, where the focus is on dominant past experiences or anxiety about projected future experiences based on negative memories (Arden, 2019).

The SN refers to the neurobiological regions and circuits involved in physiological and emotional experiences of life (Arden, 2019). Feeling, identifying, accepting and approaching one's somatic and emotional elements of experience – a process

known as interoception – has been found to influence one's sense of safety and hence to decrease a sense of anxiety and panic in the nervous system. The SN is active during experiences but mostly without awareness, as it draws on the implicit memory system at the procedural and emotional levels (Arden, 2019).

A healthy activation of the SN mediates between the other two mental operating networks, as it determines whether stimuli are perceived as safe or not and whether the focus should be on internal or external stimuli (Arden, 2019). The neurobiological determination of whether or not a situation is safe is referred to as neuroception, which is largely determined by interoceptive signals (Porges, 2021). Therefore, SN helps to inform the mind of the next best course of action when having to focus on either stability or adaptability (Arden, 2019; Siegel, 2018). A dysregulated hyperactivation of the SN can therefore lead to threat sensitivity, with a lack of openness and flexibility.

Homeostasis or a sense of balance, integration and regulation between these three main mental operating networks is required on an ongoing, dynamic basis to maintain healthy overall functioning and well-being, whereas dysregulation can lead to overall dysfunction and, in extreme cases, pathology (Cozolino, 2017; Siegel, 2020). During optimal functioning, dynamic stability is provided by reflecting on the past and planning for the future through the activation of the DMN, whilst the activation of the EN enables the individual to deal with challenges in the present moment. If current challenges are experienced as overwhelming, however, change is experienced as chaotic, with an increase in anxiety levels. By contrast, if too much focus is placed on stability, it might lead to rigidity and even depression. Optimal functioning therefore implies functioning between the boundaries of personal stability and the capacity to adapt to a changing environment.

Considering this, these three operating networks are involved (to varying degrees) in the activation of different employees or teams in response to the inconsistencies presented by global narratives of emergent change. This highlights the importance of determining the impact of the work environment on the functioning of the brain during the experience of emergent change.

According to Grawe's (2007) consistency model, the goals formed during a person's life ultimately serve to satisfy his or her basic human needs with associated neural correlates, namely the need for control and orientation, attachment, pleasure maximisation or pain avoidance and self-esteem enhancement or maintenance. Satisfying these needs is a requirement for regulating and maintaining consistency in mental functioning (as described here) and forms the basis for experiencing physical and emotional safety. Whereas approach motivational schemata are applied to satisfy these needs, avoidance schemata serve to prevent them from being violated. Importantly, these two motivational schemata function on different neural pathways.

The need to experience a sense of control over the environment is the most fundamental psychological need, and it prevents the activation of the fear-based system (Epstein, 1998, 2003; Grawe, 2007). A sense of control is experienced if the environment is perceived as aligned with the individual's life goals and is consequently determined by the perception of the number of options available to act upon in order to create such alignment. The need for orientation involves making sense of and forming an accurate appraisal of the environment (Dahlitz & Rossouw, 2014). Therefore, a clear understanding of the environment contributes to the experience of control and permits alternative options to become more apparent.

Although the need for attachment begins during infancy as a survival response, it remains important throughout life (Cozolino, 2017). As infants are not able to exercise control over their environment, they satisfy their need for control through their attachment to caregivers. Thus, attachment serves as a secure base from which a child learns to confront the challenges presented by the environment (Bowlby, 1973; Van der Kolk, 2014). Hence, proximity is used to regulate fear (Cozolino & Sprokay, 2006) and serves as the first line of defence when confronted with threats (Van der Kolk, 2014). The need for attachment in the workplace is evident, amongst others, in the need to belong to a team and organisation, build trusting relationships and establish mutual support systems on which to depend in order to meet predetermined goals.

The need for pleasure maximisation or pain avoidance refers to the neurobiological evaluation of experiences as either good or bad, with the intention of maximising the good and avoiding or minimising negative or bad experiences (Grawe, 2007). Dopamine is released in the reward system of the brain not only in anticipation of good experiences but also when successful in avoiding pain of stressful experiences (Grawe, 2007; ed. Rossouw, 2014). In the latter instance, change might be avoided, even if such change is for the better. However, the motivation for pleasure maximisation might be strong enough to deny some short-term pleasure for long-term gain (Dahlitz & Rossouw, 2014). According to Grawe (2007, p. 244), an optimal state of pleasure is experienced when our 'current perceptions and goals are completely congruent with one another, and the transpiring mental activity is not disturbed by any competing intentions'.

Although the need for self-esteem enhancement or maintenance is largely regarded as a higher-order need (Henson & Rossouw, 2013) that requires conscious self-awareness and the capacity for reflective thinking, it develops from other needs and is influenced by life experiences related to those needs. Self-esteem is defined as a person's self-evaluation of his or her own worth as a person (Grawe, 2007; Henson & Rossouw, 2013). According to Grawe (2007), the motivation to enhance self-esteem can be related to approach schemata and self-esteem protection to avoidance schemata.

Based on this discussion, a perception of a proper match between the environment and the needs and goals of the individual – known as congruency (Grawe, 2007) – is needed for neural integration and well-being (Grawe, 2007; ed. Rossouw, 2014). If there is an incongruent match, but the individual believes she or he can restore that incongruency, controlled incongruency is experienced, and that can be a beneficial catalyst for growth (Cozolino, 2017; Grawe, 2007).

If both approach and avoidance motivational schemas are engaged simultaneously to try to meet a need or restore congruence, discordance is experienced (Grawe, 2007). Incongruence and discordance are forms of neurobiological inconsistency that can be resource-intensive and distressing, leading to compromised functioning and mental health challenges (Grawe, 2007).

It therefore stands to reason that if emergent change is experienced as controllable, it may serve as a catalyst for growth and well-being, but if it is experienced as uncontrollable incongruence or discordance, avoidance schemata – which act as a form of self-protection (Grawe, 2007; Levine, 2015) – could be applied, with negative implications for well-being and optimal functioning.

Research design

Research approach

The qualitative study reported here sought to discover and explore participants' lived experiences of emergent change. Interactive qualitative analysis (IQA), with social construction as paradigm, was used because it preserves the original voices of the participants and culminates in visual, qualitative systems that allow for a deeper understanding of the interactions and nuanced complexities of the dynamics between elements on both an individual and a group level (Northcutt & McCoy, 2004).

Research strategy

A focus group was used to simultaneously collect and analyse the data. This was followed by semistructured interviews in accordance with IQA protocol (Northcutt & McCoy, 2004). The findings from the individual interviews were subsequently combined and compared with those obtained from the focus group. This not only served as a form of comparison but also contributed to data depth and saturation (Northcutt & McCoy, 2004).

Research method

Research setting

The research was conducted at a small South African software development company with 31 employees, all of whom worked in cross-functional project teams.

Entrée and establishing researcher roles

Permission for the study was granted by the chief executive officer and the general manager of the concerned company.

The participants were responsible for collecting and analysing the data, whilst the role of the researcher was to facilitate the group process, in keeping with IQA protocol (Northcutt & McCoy, 2004). The researcher's role subsequently changed to that of interpreter when comparing the perceptual systems (referred to as system influence diagrams [SIDs]) of the focus group with those of the interviews.

Research participants and sampling methods

Purposive sampling was used for both the focus group and the interviews, with the IQA criteria of distance and power being considered for the former. Accordingly, only participants who did not form part of management and had daily close contact with clients were included (Northcutt & McCoy, 2004). The focus group had nine client-facing participants, of whom five were male and four female, aged 26–43. In terms of race, there was one mixed-race person, one black person and seven white people. All the focus group participants were included in the follow-up interviews.

Data collection methods

Data collection occurred in two phases, namely a focus group and follow-up semistructured interviews. In the focus group, the researcher asked participants: 'how do you experience emergent change at work?' They were asked to write down their responses on content cards, representing one idea, phrase, image or feeling per card, until saturation was reached (Northcutt & McCoy, 2004). The group's findings served as a framework for the questions guiding the individual interviews. Both the focus group discussion and the interviews were voice-recorded and transcribed.

Data analysis

Data collection and analysis were performed simultaneously by the focus group by means of axial coding, followed by theoretical coding. Participants clustered the content cards into categories or themes (affinities), which were then named and defined through consensus, reflecting on what each theme meant to the group. Affinity relationship tables (ARTs), indicating the relationships and direction of the relationships between the themes, were then identified first on an individual basis and then by group.

A Pareto analysis was also conducted to determine which relationships to analyse that described the greatest variance within the qualitative system (Northcutt & McCoy, 2004). Conflict analysis was also conducted on the results of the Pareto analysis, to determine any conflicting direction amongst the relationships (Northcutt & McCoy, 2004), following which conflicting relationships were removed.

Interrelationship diagrams (IRDs) were subsequently used to order and assign the affinities temporary positions in the system, in terms of drivers, pivots and outcomes (Northcutt & McCoy, 2004). A primary driver affects other

affinities but is not affected by them, whilst a secondary driver influences more affinities than it is influenced by. An affinity that serves as a pivot has an equal influence on the system as the rest of the system has on it. A secondary outcome refers to an affinity that is influenced by more affinities than it influences, whilst a primary outcome affinity does not influence any other affinities in the system. Using the IRD, the researcher created a cluttered and uncluttered SID to visually represent the entire social system of experiences of emergent change for the group. The SID served as a framework for the individual interviews. The focus group SID was analysed by the individual participants and compared with their own interpretations during the interviews, as a form of triangulation. From the interviews, a composite interview SID was constructed, as per IQA protocol. Thereafter, the composite interview SID with the individual participants was interpreted by the researchers, providing greater depth and granularity to the focus group SID.

Ethical considerations and strategies employed to ensure the rigour of the research

Ethical clearance was obtained from the Department of Industrial and Organisational Psychology Ethics Review Committee of the University of South Africa (ref. no. 2018_CEMS IOP_007), prior to volunteers being recruited. Informed consent was obtained from both the organisation and the individual participants. Participation was voluntary and the researchers explained and maintained the confidentiality and anonymity of the participants, who could withdraw from the study at any time without explanation or fear of penalty. All data were generated and analysed by the participants themselves, through the focus group and interview protocol prescribed by the IQA (Northcutt & McCoy, 2004). The IQA protocols supported the rigour, integrity and trustworthiness of the data, through the comparison of the focus group SID with the interview data, which added further depth and detail to the findings.

Reporting

Firstly, the elements and the relationships between them in the system, as described by the focus group, are reported with examples to substantiate the findings. Secondly, the findings are discussed, followed by the practical implications of the study, its shortcomings and recommendations.

Findings

Findings regarding the affinities

The following eight affinities, which were identified and named by the focus group, were arranged according to the SID (Figure 1).

Affinity 1: Cognitive

'Cognitive' was defined as 'the resulting impact of change on your mental faculties'. Three subthemes emerged from the participants' description thereof. Firstly, participants described how emergent change led to impaired decision-making through 'loss of perspective', being unable to 'think straight', feeling that 'your mind is rushing, but you may not necessarily be aware of it' and becoming 'more self-focused'. One participant described these experiences thus:

'I often make snap judgements and I don't take time to think things through and am prone to misunderstand. I think I'm responding in the best way, but I may not be.'

Secondly, participants expressed the need for time, space and structure, explaining that to deal with the cognitive effect of emergent change, they needed 'time to absorb' and 'time to do it [...] properly'. They needed 'to have the space to say, "I don't know, but I can figure [or] find it out"' and expressed a 'need [or] desire for [a] new plan [or] structure to be created'. One participant described the function of the need for time and structure thus: 'I need to have the time and structure to order my thoughts and get out of a chaotic state'. Thirdly, participants expressed a need for trust whilst cognitively wrestling with emergent change:

'I have a need for others to trust my knowledge and competency.'
'I need my opinion to be trusted, and don't ask me to ask someone else something I already know.'

Affinity 2: Emotional

'Emotional' was described as an 'emotional response in the course of change'. There was consensus about feelings of 'anxiety and fear – fight, flight, freeze'; 'frustration'; 'feeling agitated'; 'a loss of control'; 'powerlessness' and 'persistent low-level stress' during emergent change. The feelings of 'loss of control' and 'powerlessness' were further elaborated on by a participant who explained that 'sometimes I feel like a puppet'. One participant elaborated on the feeling of fear during emergent change, questioning: '[w]hat have I done? ... and am I in shit?' The intensity of the frustration

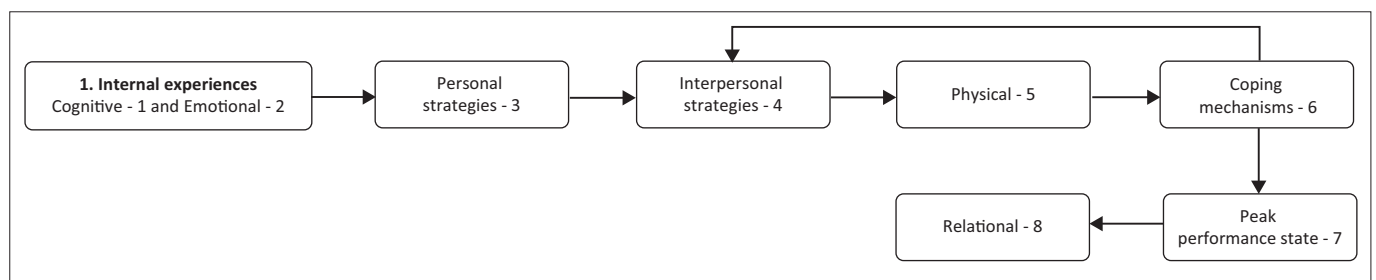


FIGURE 1: Composite interview system influence diagram.

experienced was illustrated by a participant saying: '[s]ometimes I want to drop to my knees and scream WHY?' Other participants described feeling 'removed from my body' and explaining that they were 'not comfortable in the emotional realm'.

The participants further expressed an intense need to 'get away and switch off from these negative feelings' and even to become forceful in avoiding emotions:

'I am too forceful in shutting off the emotions, in my effort to calm down. They just kind of ... It's almost like putting a pillow on their face. Like, "be quiet."'

Whilst the emotional experience was predominantly negative, a few participants reframed the stress associated with emergent change as exciting or refreshing:

'[S]ometimes [it is] stressful in a negative way but can also be exciting and energising.'

'I feel that company-driven organisational change is refreshing. I like the "fresh start" feeling. I see it as an opportunity for improvement and look forward to the benefits.'

Affinity 3: Personal strategies

Participants defined 'personal strategies', along with theme four (interpersonal strategies) as 'the activities an individual engages in to get into a position to deal with change or deal with change directly', notably emphasising the individual. The function of personal strategies was to reduce anxiety and find solutions to challenges. As the participants reported, it involves 'go[ing] back to the breath and keep[ing] everything still to find a solution to the problem'; 'I put personal strategies first, because that's my space-maker ... I create lists, plan and make decisions about what I want to do next'.

There appeared to be a three-way split in the group in terms of examples of personal strategies, with several focusing on action and execution by taking 'immediate steps' and 'managing panic through action'. Others used more cognitive approaches, such as 'slowing down', 'stepping back', 'processing', 'recalibrat[ing]' and 'reflecting'. Some preferred a more embodied response, by 'taking a brisk walk to calm down' or 'making tea as an outlet for physical energy'. Participants also used reframing as a personal strategy: 'after an initial internal freak-out, I try to look for the positive [or] opportunity to do something better', 'consider multiple perspectives', 'zoom out to [the] big picture', and some expressed a need to reorient themselves by creating structure: 'focus on organisation and (re)creating order'.

Affinity 4: Interpersonal strategies

'Interpersonal strategies' were defined as 'the activities a group or individuals within a group engage in to deal with change or deal with change directly'. Participants described using consultation or engagement as an interpersonal strategy: 'chat to my colleagues to see how they feel about this change', '[d]isclose more', 'rallying the troops so we're all

focused'. They described taking action that supports the team: '[i]t's not about thinking for yourself, it's to execute for the group'; '[i]f it's particularly stressful, I look after my team before I look after myself'. Participants also cited humour: 'make bad jokes', 'say something funny [or] sarcastic to lighten the mood'; 'planning' and the 'redistribution of personal capacity and resources' are further examples of interpersonal strategies. One participant highlighted the dynamic, interdependent nature of emergent change experiences:

'Sometimes other people's personal strategies or interpersonal strategies will impinge on what's happening to me, just because they are in my environment ... Because I'm in a community of individuals having their own private experiences, using their own strategies that feed into mine.'

Affinity 5: Physical

'Physical' was defined as the 'physiological response to change stimuli in the course of change'. The group expressed that 'fight or flight is physical and emotional at once – it's tied to anxiety', reflecting their own awareness of the ambiguity and overlap between the physiological and emotional elements of their experiences. Participants described the physiological element of emergent change as a visceral experience of anxiety: 'physical sensation of panic'; 'fast breathing ... heart beating ... muscles tensing'; 'stomach in knot'; 'physically feeling my blood pressure drop and rise'.

Participants mentioned that they become disconnected from their physical needs and neglect self-care:

'When I am in my robot mode, I don't take care of myself. I might not realise that I'm hungry or need the bathroom. And when I eventually do, I might prolong it because I want to complete a task first.'

'I'm a bit ... unsure how to represent it, because I'll often have a physical response to a sudden indicated change, but I usually ignore it or suppress it.'

Affinity 6: Coping mechanisms

'Coping mechanisms', in the view of the participants, encompass 'the tactical activities a person engages in to soothe discomfort or achieve a state of pleasure'. Participants regarded the use of coping mechanisms as sometimes being beneficial, but in most instances as unhealthy: '[w]e do judge our coping mechanisms – we must consider their relative constructivity'. One participant described the negative effect of using a coping mechanism to 'fulfil a need for ... comfort', stating that 'you pick a coping mechanism – smoke a cigarette, have a coffee – to try and calm yourself down. But it actually just makes it worse. The coping mechanism fails'. Participants provided numerous examples of unhealthy coping mechanisms, including 'coffee', 'smoking', 'mindless TV', 'social media' and 'snacking', 'intellectualisation', 'suppression of empathy' or 'complain[ing] and swear[ing] and feel[ing] guilty about that', the 'urge to be mean' and 'mak[ing] inappropriate jokes to mirror the turmoil I feel inside'.

One participant highlighted the benefit of using a coping mechanism to 'give you the space to deal with your cognitive state', explaining: 'There's a reaction in the moment, but it does allow me to go straight to the personal strategies next. I need [*the coping mechanism*] as a gateway'.

Affinity 7: Peak performance state

'Peak performance state' was described as 'a productive state of being which leads to productive output. A confluence of physical, emotional, spiritual, cognitive and attentional experience'. This affinity took the group the longest time to name and describe, as it meant different things to different people. The most prominent characteristic of their experience of a peak performance state was the ability to focus:

'When I think about peak performance, it's usually a lonesome experience. Not in a bad way, but it's me on my own. I know what I'm doing, I'm focused and I'm just hitting the targets.'

'[It's] about feeling capable of doing something in the moment and doing it.'

Eight participants reported seldom feeling they were reaching peak performance: 'I can't give you an example, because I feel like it has been such a long time [since] I have been in peak performance state'. Participant E explained how emergent change prevented him or her from reaching a 'peak performance state', and described the fatigue resulting from having to keep producing in a state beyond peak performance:

'Projects are chaotic, and the working environment and processes need to be in place to support peak performance, but right now they are not. Every now and then I get this feeling of "ooh, I'm [...] on a roll," but it never lasts for long ... I feel like I've been in this loop for ... How long have I been on this project? It's a perfect example of how you can get stuck in this cycle. Every time I think I can start rolling into peak performance, I'm constantly shut down. [*It's one*] event and then next event and then next event ... I'm stuck in this loop, and I'm getting very, very tired.'

Affinity 8: Relational

'Relational' was defined as the 'elements that come together to create the relational environment during change' and 'the relational consequences of change'. The relational affinity was named last in the focus group and seemed to be an afterthought for the participants, as if it were a group comprising the few leftover cards they did not know how else to sort. It had the fewest content cards in it, and the group spent the shortest amount of time discussing it. In the individual interviews, however, this affinity prompted rich discussion. Participants expressed that emergent change experiences led to them 'suppressing rage' and put a 'strain on interpersonal relationships'. Certain participants reported becoming 'less communicative' during emergent change, yet others described that they 'speak to friends [*or*] whinge', reflecting how 'less communication and the need for more support feed into each other like a vicious cycle'. This was further reinforced when Participant G said that:

'There is a relational response to support, but at the same time paradoxically to become less connected ... I can also be very

switched off to stimuli unless this [*relational environment*] happens. I don't think I really get affected by things much, unless there's a relational thing.'

In part, as one participant stated, 'as you have emotions, and with fight or flight, you're less able to communicate'. Whilst participants experienced a negative impact on the relational environment during emergent change, they also commented that 'after the fact, [*I wish to express*] gratitude to my colleagues, who always pull together to overcome the trial [*or*] challenge'.

Findings regarding the relationships between the affinities

The composite interview SID (CI-SID), reflecting the relationships between affinities as experienced by the participants, is presented in Figure 1.

Primary driver

Whilst participants conceptualised 'emotional' and 'cognitive' as two different affinities, they struggled to identify a linear, causal relationship between them. Participant H explained the difference between the intellectual and experiential conceptualisation of the two affinities:

'I feel like there's a very close integration. I don't actually consider them as separate, so I wouldn't actually [...] separate my thoughts and emotions. They are actually the same thing. The reality of my experience is that they are blurred, that they're blended and that there's actually no way to separate them. Intellectually, I can separate them and think about them as individual entities, but more as a way to make them more intelligible, rather than [...] a reflection of reality.'

These two affinities are therefore combined and labelled as the 'internal experience' of emergent change. This is supported by Participant A, who commented that these affinities are 'internal experiences of emergent change that aren't always visible to others but impact external elements of their experience'.

Secondary driver

The secondary driver (Affinity 3 – Personal Strategies) was used to create some distance between the participant and his or her internal (emotional and cognitive) experience of emergent change:

'I put personal strategies first because that's my 'space-maker', I said I'd do lists, planning, make decisions about what I want to do next.'

'I need to do some spacing and to calm this [*emotional and cognitive*] down ... so that I don't shut down by limiting what's coming in ... I need to withdraw, but that does allow me to go straight to my personal strategies.'

'Personal strategies: that's when I sort out my own thinking and get down to it.'

Secondary outcomes

The CI-SID presents four secondary outcomes, namely Affinity 4 (interpersonal strategies), Affinity 5 (physical),

Affinity 6 (coping mechanisms) and Affinity 7 (peak performance state). The interpersonal strategies a participant chooses to use are influenced not only by his or her own personal strategies (Affinity 3) but also by the personal and interpersonal strategies of others in the team, as evidenced by the following statement:

‘Sometimes other people’s personal strategies or interpersonal strategies will impinge on what’s happening to me, just because they are in my environment ... Because I’m in a community of individuals having their own private experiences, using their own strategies that feed into mine.’

Although Affinity 5 (physical) was regarded as a secondary outcome in the CI-SID, influenced by interpersonal strategies, during the interviews, participants found it difficult to not include the theme as part of Theme 1, as an internal experience:

‘So it’s like a three-way between them [*physical, emotional and cognitive*], it’s just sort of bouncing off against each other... Knowing where the body and mind ends can be quite tricky as well. The lines are blurry.’

‘The physical and emotional are actually intertwined.’

This placement of ‘physical’ in the CI-SID is explained by participants initially suppressing their physical responses to emergent change and only becoming aware of these responses or attending to them at a later stage, as the following comments indicate:

‘I’m a bit ... unsure how to represent it, because I’ll often have a physical response to a sudden indicated change, but I usually ignore it or suppress it...’

‘When I am in my robot mode, I don’t take care of myself. I might not realise that I’m hungry or need the bathroom.’

The findings regarding the affinities, together with the placement of Affinity 5 (physical), provide evidence that unless personal and interpersonal strategies succeed in reducing the negative internal experience (emotional and cognitive) of emergent change, the physical experience becomes salient or conscious. As highlighted by Participant H earlier, interpersonal strategies may also be a source of anxiety during emergent change. To cope with the discomfort of the physical experience of emergent change, participants resort to using ‘coping mechanisms’ (Affinity 6). At this point, the experience of emergent change splits. If unhealthy coping mechanisms (as discussed in the findings regarding affinities) fail, participants seek support through interpersonal strategies:

‘It can often turn into an interpersonal strategy, because my reactive behaviour is just to want to vent but often is just from me venting ... Whoever I am venting at often asks me good questions and turns out into rallying, it turns into an actual strategy, which is helpful.’

According to the SID, the degree to which participants can use personal and interpersonal strategies and coping mechanisms to mitigate the negative impact of change determines the degree to which they experience peak

performance (Affinity 7). Unfortunately, the participants reported that their experiences of emergent change prevented them from entering a peak performance state or ‘knocked [*them*] out of it’, once they had entered it:

‘I have been struggling with this lately ... I haven’t spent a lot of time in this space [*peak performance state*] at all.’

‘Every time I think I can start rolling into peak performance, I’m constantly shut down. ... [*One*] event and then next event and then next event.’

Primary outcome

The CI-SID indicates that the dynamic relationships between all the elements (affinities) within participants’ experience of emergent change produce the relational environment (Affinity 8) as a primary outcome. Despite not receiving much attention during the focus group discussion, participants explained in more detail (during the interviews) that the relational environment was not only an outcome at the end of the emergent change experience but also a context that was continuously being created by all the elements throughout the emergent change experience:

‘Relational is like an environment. [...] [*F*]or me, that’s kind of like overarching. I’m just going to put “relational” up here, because everything falls under relational; because all of these impact [*the relational*] ... The event or change itself is relational – someone says something or sends me something, and that’s how it starts ... Everything that happens in the cycle affects the relational environment, and the relational environment affects how I go through this cycle.’

Discussion

The purpose of the study reported on here was to explore the experience of emergent change from an applied neuroscience perspective. Even though the applied neuroscience literature does not explicitly report on emergent change in organisations, several propositions can be made from an integrated lens, as applied neurosciences offer insights into the underlying neural mechanisms shaping these experiences.

Based on the findings, it is postulated that the experience of emergent change negatively affected the functioning of participants’ neural networks. The compromising impact of emergent change on the EN, known for its higher-order functioning, was especially evident in the participants’ experience, as described in Affinities 1 and 2. In a state of survival, blood flow and oxygen levels are reduced in the regions that form part of the neocortex, with a decline in their functionality (ed. Rossouw, 2014). This can lead to the over-activation of the DMN and hinder the healthy activation of the EN, making it difficult to engage in goal-directed behaviour, choose adaptive strategies and employing coping mechanisms instead (Arden, 2019). This also explains why most participants did not experience a ‘peak performance state’ (Affinity 7) or a conducive environment (relational) as outcomes.

There was also an indication that the experience of the environment as threatening had a negative impact on the

functioning of participants' DMN. If the DMN is excessively activated, especially if co-activated with the SN, it might lead to dysfunction and intrusive negative rumination, with the focus on dominant past experiences or anxiety about projected future experiences based on negative memories (Arden, 2019). It seems plausible that participants most likely 'got stuck' in the looping narratives of the DMN, as reflected in the feedback loop in the SID (Figure 1), enabling them to have detailed rationalisations and intellectualisations about their experiences but preventing them from being able to 'snap out of' the habitual patterning by engaging their EN. This overwhelmed SN also compromised the network's ability to mediate optimally between the DMN and EN (Arden, 2019).

Consequently, it transpired that the SN of participants was also not in a healthy state. Instead of finding meaning in emergent change, they experienced negative emotions (Affinity 2) and eventually physiological symptoms (Affinity 5) and only became aware of the negative impact of change (i.e. neglecting their bodily needs) through reflection during the study (Affinity 5). It is unsurprising that the participants experienced ambivalence regarding the placement of Affinities 2 and 5. This bidirectional interplay between physiology and emotions is well described in the literature (Arden, 2019; Grawe, 2007; Siegel, 2018). Bodily experiences are responsible for the emergence of emotions in the SN and the experience of the self as an emotional being (Arden, 2019). Physiological experiences can therefore be regarded as indicative of the severe impact that emergent change has on emotions (Affinity 2). It is well established in the literature that unless negative emotional experiences are appropriately dealt with, they might negatively affect an individual's physical well-being (Van der Kolk, 2014).

It is further postulated that the inappropriate functioning of and lack of integration between the neural networks can be ascribed to the violation of participants' basic human needs, as identified by Grawe (2007) and Rossouw (ed. 2014). The violation of the need for orientation, for instance, is evident in the 'loss of perspective' and 'need for structure' (Affinities 1 & 2), whereas control and the impact on the sense of self are especially evident in Affinity 3 and the need for pleasure in participants' definition of Affinity 6.

Although evidence from different affinities suggests that all four basic human needs were threatened or unmet to varying degrees, the needs for control (and orientation) and attachment seemingly played the most important roles as drivers in the participants' experience. Control was, for instance, self-identified by multiple participants in the group as a key need, and the need for attachment was evident in their definition of Affinity 4 and expressed in 'the need for ... comfort' in Affinity 6. Applied neurosciences acknowledges the resource-intensive nature of inconsistency and how it can also have a negative impact on the relational environment, as individuals are able to pick up on the stress of others at a procedural and emotionally implicit level, even if they may not consciously know that it is happening or why (Grawe, 2007; Levine, 2015; Scarlett, 2016; Siegel, 2018).

Although unmet needs may catalyse and drive development and therefore evolution (Grawe, 2007), the extent and frequency of the experience of challenges such as those expressed as 'persistent low-level stress' may have led to the experience of uncontrolled incongruence (Grawe, 2007), despite attempts to apply approach motivational schemata, as evident in Affinity 4. If incongruence is perceived as controllable, individuals may respond adaptively and engage in an adaptive personal strategy (Grawe, 2007). If the incongruence is perceived as uncontrollable, through complexity or sheer volume, however, participants may respond maladaptively (Grawe, 2007), turning reactively to coping mechanisms that could bypass other elements of a more holistic, integrated experience and in so doing compromise their ability to both reach peak performance state (Affinity 7) and enhance the relational environment (Affinity 8).

It is postulated that the personal strategies that the participants employed to deal with emergent change can be regarded as attempts to downregulate their emotions in a 'top-down' manner to reach homeostasis (Cozolino, 2017; ed. Rossouw, 2014). Although the strategies that the participants referred to are regarded as successful for the 'worried well' (ed. Rossouw, 2014), they are not helpful if the capacity of the EN is compromised to the extent that it is unable to fulfil this function. In such instances, an approach is needed to facilitate neuroceptive safety as a priority in order to activate the parasympathetic nervous system (Porges, 2004, 2021; Van der Kolk, 2014). Ongoing activation of the stress response results in the dysregulation of the neural networks, which is regarded as the onset of the anxious brain and psychopathology (ed. Rossouw, 2014).

Furthermore, reverting to interpersonal strategies (Affinity 4) as an outcome may be regarded as an attempt to fulfil the need for attachment by co-regulating emotions through making connections and mutual sharing. People in conversation adjust their social attention and emotional arousal in response to another person – a process known as right-brain-to-right-brain communication (Porges, 2021; Schore, 2021). Interpersonal neurobiology highlights presence as an integral aspect of healthy attachment relationships with the self and others, as well as being a biological preserver of gene health and integrity (Siegel, 2018). Thus, it is possible that Affinity 4 supports the literature, suggesting that an individual's well-being is connected to the well-being of others (Cozolino, 2017; Siegel, 2018).

If the need for attachment is overly activated, interpersonal strategies can become disorganised – a state in which attachment is simultaneously experienced as a need and a threat (Steele, 2021). The increased need for relationships during emergent change may thus reflect that these participants simply need help. This hypothesis is supported by Affinity 8 (relational) as the primary outcome of the participants' experience, as well as (to some extent) by the

feedback loop from coping mechanisms (Affinity 6) back to interpersonal strategies (Affinity 4).

Coping mechanisms (Affinity 6) as a secondary outcome can be regarded as an attempt to experience pleasure or avoid pain during emergent change. The activation of the reward system as part of the SN may have assisted participants in engaging with (approach) colleagues (Affinity 4) to assist with co-regulation or engaging with their tasks, in order to experience peak performance as an outcome (Affinity 7). Notably, the examples provided to describe coping mechanisms are indicative of developing habit circuits in the brain that can limit the alternatives to act upon and hence limit the experience of control, thereby enhancing the possibility of addiction (Arden, 2019; Morgan, 2019). This proposition is supported by the difficulty in experiencing a peak performance state (Affinity 7) and the primary outcome of the relational (Affinity 8), which the participants described as a discordant experience.

In the light of given discussion, the findings appear to suggest that this participant group had formed some negative associations with emergent change because of overexposure, creating negative memories that could have led to avoidance motivational schema, maladaptive coping mechanisms and a self-perpetuating negative spiral, which could hinder neural proliferation (Grawe, 2007). These factors likely combined to create heightened change sensitivity and elements of negative change-orientation, even though change can be refreshing at times, and a few participants described their hypothetical ability to access more adaptive strategies if their needs were met, which likely referred to controllable incongruence.

Overall, the findings suggested that the experience of emergent change in the workplace could systemically be ascribed to the impact that the uncertain environment (within and outside the organisation) had on the functioning of participants' neural networks. It is well established that a compromised environment leads to the activation of the stress response and fear-based learning (Arden, 2019; ed. Rossouw, 2014). It thus seems that prolonged uncertainty in the workplace is experienced as a threat which, without a functional supportive social engagement system, not only negatively affects the optimal functioning of the networks but also their balanced activation and integration, with dire consequences for health, work performance and relationships in the long run. Although participants employed personal and interpersonal strategies that could assist with the self-organising of neural networks, these were not sufficient to establish homeostasis.

Implications

The findings of this study imply a need for external interventions to enhance employees' resilience during emergent change by facilitating the development of internal stability and the external adaptability of their mental operating networks. This is in line with the development of well-being as described in the neuroscience literature (Arden,

2019). To enhance the integration of neural networks, interventions need to be experienced as meaningful and embedded in a supportive organisational culture, where employees experience safety and a sense of belonging to satisfy the need for attachment. Appropriate interpersonal strategies, such as an adapted form of appreciative inquiry (Geldenhuys, 2020), may provide additional resources to tap into. This can make the incongruence controllable and even provide opportunities for growth. Thus, participants can gain new perspectives by themselves and from others by activating the DMN adaptively, and the EN can be employed to engage positive goal-oriented behaviour, rather than reactivity based on a perceived threat. In this way, resources can be pooled to meet individual and team needs, so that employees feel resourced and resilient and face the change instead of avoiding the experience of incongruence.

Limitations

The participants were frontline employees, dealing with clients on a daily basis. This could have a different influence on their experience compared with employees working in different contexts. Furthermore, the use of IQA as a method could have had an impact on the experience of the participants, which may have influenced the findings. For example, the participants became aware of their feelings only during the research process. It is thus recommended that similar studies be repeated in different contexts.

Conclusion

Employees' experiences offer an invaluable source of system feedback, which remains relatively unexplored. This study explored these experiences empirically and attempted to offer a deeper understanding thereof by incorporating a discussion on the neurobiological mechanisms underlying human behaviour, as conceptualised in the applied neuroscience literature. The findings illuminated, in support of the literature, the complexity, diversity and bi-influential dynamism of experiences and the significant challenges and opportunities facing employees at work in an environment of constant emergent change. The findings also highlighted the ongoing, evolving, cyclical process and nature of emergent change, thus supporting contemporary emergent change literature (Brendel & Chou, 2016; Wee & Taylor, 2018).

Integrating these findings highlights how the experience of emergent change co-activates mental operating networks to varying degrees, in ways that can lead to dysregulation between them, thus compromising well-being, relationships and performance. Consequently, facilitating better integration between those networks can help to enhance the experience of stability and adaptability amidst emergent change so that individuals and teams can feel safer, meet their needs more effectively, access their creativity, deepen relationships, enhance productivity and performance and enrich their experiences. Emergent change can thus be viewed as a force that triggers interpersonal neurobiological inconsistency and threatens neuroceptive safety and basic

psychological needs, yet paradoxically it is also required to reach a peak performance state, to strengthen intra- and interpersonal relationships and to grow.

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Competing interests

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Authors' contributions

G.G. conducted the research as part of the requirements for the completion of the MCom Industrial and Organisational Psychology qualification and wrote the first draft of the article. J.M.V. supervised the study and contributed to the writing and review of the article prior to submission. D.J.G. acted as a mentor on the study and contributed to the writing and review of the article prior to submission.

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Data availability

Data that support the findings of this study are available from the corresponding author, J.M.V., upon reasonable request.

Disclaimer

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References

- Arden, J.B. (2019). *Mind brain gene*. W. W. Norton & Co.
- Bowlby, J. (1973). *Attachment and loss. Volume 1: Attachment*. Basic Books.
- Brendel, W.T., & Chou, C.C. (2016). Transforming organizational change through collaborative digital storytelling. *Journal of Educational Technology Development and Exchange*, 13(91), 13–28. <https://doi.org/10.18785/jetde.0901.02>
- Bushe, G.R., & Marshak, R.J. (2016). The dialogic mindset: Leading emergent change. *Organization Development Journal*, 34(1), 37–65. <https://doi.org/10.1108/S0897-301620140000022002>
- Chia, R. (1999). A 'rhizomic' model of organizational change and transformation: Perspective from a metaphysics of change. *British Journal of Management*, 10, 209–227. <https://doi.org/10.1111/1467-8551.00128>
- Cozolino, L. (2017). *The neuroscience of psychotherapy: Healing the social brain*. W. W. Norton & Co.
- Cozolino, L., & Sprokay, S. (2006). Neuroscience and adult learning. *New Directions for Adult and Continuing Education*, 2006(110), 11–19. <https://doi.org/10.1002/ace.214>
- Dahlitz, M.J., & Rossouw, P.J. (2014). The consistency-theoretical model of mental functioning: Towards a refined perspective. In P.J. Rossouw (Ed.), *Neuropsychotherapy: Theoretical underpinnings and clinical applications* (pp. 21–41). Mediros.
- Epstein, S. (1998). Cognitive-experiential self-theory. In D.F. Barone, M. Hersen, & V.B. Van Hasselt (Eds.), *Advance personality* (pp. 212–238). Springer Science & Business Media.
- Epstein, S. (2003). Cognitive-experiential self-theory of personality. In T. Millon, & M.J. Lerner (Eds.), *Comprehensive handbook of psychology, Volume 5: Personality and social psychology* (pp. 159–184). Wiley & Sons.
- Geldenhuys, D.J. (2020). Valuing and adapting appreciative inquiry to enhance well-being using a neuropsychotherapeutic framework. *SA Journal of Industrial Psychology/SA Tydskrif vir Bedryfsielkunde*, 46(2020), a1823. <https://doi.org/10.4102/sajip.v46i0.1823>
- Grant, D., & Marshak, R.J. (2011). Toward a discourse-centered understanding of organizational change. *Journal of Applied Behavioral Science*, 47(2), 204–235. <https://doi.org/10.1177/0021886310397612>
- Grawe, K. (2007). *Neuropsychotherapy: How the neurosciences inform effective psychotherapy*. Lawrence Erlbaum.
- Hagel, J., Seeley Brown, J., & Kulasooriya, D. (2019). *Change from the outside in*. Retrieved from <https://www2.deloitte.com/insights/us/en/industry/technology/pragmatic-pathways-scaling-edges.html>
- Henson, C., & Rossouw, P. (2013). *Brain-wise leadership: Practical neuroscience to survive and thrive at work*. Learning Quest.
- Hosking, D.M. (2006). Organizations, organizing, and related concepts. In D.M. Hosking, & S. McNamee (Eds.), *The social construction of organisation* (pp. 54–68). Copenhagen Business School Press.
- Lawrence, P. (2015). Leading change – Insights into how leaders actually approach the challenge of complexity. *Journal of Change Management*, 15(3), 231–252. <https://doi.org/10.1080/14697017.2015.1021271>
- Leach, A., Wandmacher, R., Ayres, J., & Groban, T. (2019). *The case for internal change capability*. Retrieved from <https://www.accenture.com/za-en/insight-outlook-creating-internal-change-capability-right-organizational>
- Levine, P.A. (2015). *Trauma and memory: Brain and body in search for the living past*. North Atlantic Books.
- Lewis, L. (2019). *Organizational change: Creating change through strategic communication* (2nd ed.). John Wiley and Sons.
- Liebhart, M., & Garcia-Lorenzo, L. (2010). Between planned and emergent change: decision maker's perceptions of managing change in organisations. *International Journal of Knowledge, Culture and Change Management*, 10(5), 214–225. <https://doi.org/10.18848/1447-9524/cgp/v10i05/49976>
- Maimone, F., & Sinclair, M. (2014). Dancing in the dark: Creativity, knowledge creation and (emergent) organizational change. *Journal of Organizational Change Management*, 27(2), 344–361. <https://doi.org/10.1108/JOCM-12-2012-0197>
- Menon, V., & Uddin, L.Q. (2010). Saliency, switching, attention and control: A network model of insula function. *Brain Structure and Function*, 214(5/6), 655–667. <https://doi.org/10.1007/s00429-010-0262-0>
- Morgan, O.J. (2019). *Addiction, attachment, trauma, and recovery: The power of connection*. W. W. Norton & Co.
- Northcutt, M., & McCoy, D. (2004). *Interactive qualitative analysis: A systems method for qualitative research*. Sage Publications.
- Porges, S.W. (2004). Neuroception: A subconscious system for detecting threats and safety. *Zero to Three*, 24, 19–24.
- Porges, S.W. (2021). The COVID-19 pandemic is a challenge to our nervous system. In D.J. Siegel, A.N. Schore, & L. Cozolino (Eds.), *Interpersonal neurobiology and clinical practice* (pp. 73–84). W. W. Norton & Co.
- Rossouw, P.J. (Ed.). (2014). *Neuropsychotherapy: Theoretical underpinnings and clinical applications*. Mediros.
- Sanchez, P. (2018). The secret to leading organisational change is empathy. *Harvard Business Review*. Retrieved from <https://hbr.org/2018/12/the-secret-to-leading-organizational-change-is-empathy>
- Scarlett, H. (2016). *Neuroscience for organizational change: An evidence-based practical guide to managing change*. Kogan Page.
- Schore, A.N. (2021). The interpersonal neurobiology of therapeutic mutual regressions in reenactments of early attachment trauma. In D.J. Siegel, A.N. Schore, & L. Cozolino (Eds.), *Interpersonal neurobiology and clinical practice* (pp. 27–58). W. W. Norton & Co.
- Senior, B., & Fleming, J. (2006). *Organizational change* (3rd ed.). Prentice Hall.
- Siegel, D.J. (2018). *Aware: The science and practice of presence*. Scribe.
- Siegel, D.J. (2020). *The developing mind: How relationships and the brain interact to shape who we are* (3rd edn.). Guilford Press.
- Siegel, D.J., Schore, A.N., & Cozolino, L. (Eds.), 2021, *Interpersonal neurobiology and clinical practice* (pp. 85–112). W. W. Norton & Co.
- Steele, K. (2021). Beyond attachment: Understanding motivational systems in complex trauma and dissociation. In D.J. Siegel, A.N. Schore, & L. Cozolino (Eds.), *Interpersonal neurobiology and clinical practice* (pp. 85–112). W. W. Norton & Co.
- Tasler, N. (2017). Stop using the excuse 'organizational change is hard'. *Harvard Business Review*. Retrieved from <https://hbr.org/2017/07/stop-using-the-excuse-organizational-change-is-hard>
- Tsoukas, H., & Chia, R. (2002). On organizational becoming: Rethinking organizational change. *Organization Science*, 13(5), 567–582. <https://doi.org/10.1287/orsc.13.5.567.7810>
- Uhl-Bien, M., & Arena, M. (2018). Leadership for organizational adaptability: A theoretical synthesis and integrative framework. *Leadership Quarterly*, 29(1), 89–104. <https://doi.org/10.1016/j.leaqua.2017.12.009>
- Van der Kolk, B. (2014). *The body keeps the score: Brain, mind, and body in the healing of trauma*. Viking Adult.
- Wee, E.X.M., & Taylor, M.S. (2018). Attention to change: A multilevel theory on the process of emergent continuous organizational change. *Journal of Applied Psychology*, 103(1), 1–13. <https://doi.org/10.1037/apl0000261>
- Weick, R.E., & Quinn, K.E. (1999). Organizational change and development. *Annual Review of Psychology*, 50, 361–386. <https://doi.org/10.1146/annurev.psych.50.1.361>
- Wilkinson, M. (2017). A whole-person approach to dynamic psychotherapy. In M. Solomon & D.J. Siegel (Eds.), *How people change: Relationships and neuroplasticity in psychotherapy* (pp. 73–96). W. W. Norton & Co.
- Worley, C.G., & Mohrman, S.A. (2014). Is change management obsolete? *Organizational Dynamics*, 43(3), 214–224. <https://doi.org/10.1016/j.orgdyn.2014.08.008>