




A HeartMath intervention, focusing on coherence, resilience and faith, following a trauma



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Traumatic experiences can have an impact on faith. HeartMath, which focuses on coherence and resilience, is one approach utilised to help overcome traumatic experiences. This study focused on a HeartMath intervention, emphasising psychophysiological coherence, sense of coherence, resilience and faith following a traumatic experience. A quasi-experimental, single, within-sample design was used. The purposeful sample consisted of 10 participants. A 12-week HeartMath intervention was undertaken. Related quantitative and qualitative coherence, resilience and faith measures were used at pre-test, re-test and, after intervention, post-test, with participant diaries completed. Quantitatively, there were significant post-intervention positive improvements in physiological average coherence, achievement, and low, medium and high coherence level scores. Although not significant, there were improvements in the resilience scale and faith scale. However, there was no improvement in the sense of coherence scale total score. Qualitatively, there were positive integrative thematic changes in experiences of the sense of coherence, resilience and faith. Recommended next research steps were a case study on causal, correlational and relationship mechanisms of change, followed by an appreciative inquiry evaluating HeartMath as a pastoral care and counselling intervention.

Contribution: This article contributes to the area of practical theology, specifically pastoral care and counselling, as it quasi-experimentally explores a HeartMath intervention and faith following a traumatic experience.

Keywords: traumatic experience; HeartMath intervention; coherence; resilience; faith.

Introduction

The three theological areas, namely, spirituality, religion and faith, are interrelated and overlapping (Gall, Malette & Guirguis-Younger 2011; Gschwandtner 2021) with the main focus of this research being faith. Faith involves believing and trusting in a Greater Being (Jacquette 2012) with this study focusing particularly on Christian Anglican religious faith (Plante & Boccaccini 1997), and from a Christian perspective, this faith would be in the Holy Trinity (Durand 2012; Kärkkäinen 2007). Much like psychosocial stages of development (Erikson 1968), according to Fowler, there can be various levels of faith, and reaching higher levels requires being able to transcend (Fowler, Streib & Keller 2004).

Many people will go through a traumatic experience during their lifetimes (Benjet et al. 2016). For instance, the COVID-19 pandemic was a traumatic event that took place during the current research period, impacting people in different ways (Bridgland et al. 2021). Traumatic experiences can have varying effects on faith, for example, leading to loss of faith, decrease in faith, faith remaining the same, discovery of faith, re-discovery of faith or increase in faith (Cataldo 2013; Daniel 2012; Ganzevoort & Falkenburg 2012; Harris et al. 2008).

From a practical theological perspective, this research focused on the sub-discipline of pastoral care and counselling (Capps 1999). This is concerned with the application of psychological paradigms, frameworks, metatheories, theories, methods and techniques (Graham 2013; Osmer 2011). Wilber's integral work can make a key contribution to the field of pastoral theology and counselling (Bidwell 1999). From a transpersonal perspective, connectedness and interconnectedness can be conceptualised using Wilber's (2005) integral theory, which postulates a non-dual universe continually involving and evolving in descending and ascending movements of consciousness present in every breath inhalation and exhalation. Pastoral care and counselling can focus on specific areas, for instance, overcoming traumatic experiences (Harris et al. 2008; Landman 2012), and through this, personal growth can occur (Ganzevoort & Falkenburg 2012) with one key aspect involving focusing on the heart (McCraty & Atkinson 2012).

The word 'heart' appears in the Bible (Berding 2013) 570 times in the Old Testament and New Testament. It is at the centre of connectedness, is central to faith (McCraty & Rees 2009), is the human organ of spiritual perception (Bourgeault 2016) and has been linked with, for example, faith experiences and vice versa (Anderson 2020). HeartMath, a relatively new psychophysiological approach (Institute of HeartMath 2014), founded in 1997, has been presented and discussed as a scientific meditation method in dialogue with theological phenomena (Edwards 2021). HeartMath focuses on aspects including heart rate variability (HRV), breathing cycles and positive emotions (McCraty, Atkinson & Tomasino 2001). It is concerned with coherence (McCraty & Childre 2010), specifically, psychophysiological coherence, which is a state of synchronisation between the heart, brain and autonomic nervous system (McCraty et al. 2006), and sense of coherence, which includes the accompanying experience of the three areas of enhanced life, which are comprehensibility, manageability and meaningfulness (Antonovsky 1987; Edwards 2014b; Edwards et al. 2015). There is a relationship between resilience, and spirituality, religiosity and faith (Schwalm et al. 2021). HeartMath provides a scientific foundation for resilience (Institute of HeartMath 2014), and from a HeartMath psychophysiological understanding, in terms of resilience, coherence is found at the centre of physical, mental, emotional and spiritual dimensions (McCraty & Childre 2010).

The heart period can decrease during traumatic experiences and then recover after these are over (Souza et al. 2007). These experiences can activate the sympathetic nervous system (Thurber et al. 2017) and attenuate the parasympathetic nervous system (Tan et al. 2011). Over time, they can impact the body's stress response systems and deplete the autonomic nervous system reserves (McCraty & Atkinson 2012). They can affect the cortisol and dehydroepiandrosterone (DHEA) balance, increase cortisol and decrease DHEA (McCraty et al. 2009). They can result in negative HRV hyperstates (McCraty et al. 2006). HeartMath improves physiological, emotional and psychological areas (Tan et al. 2011) and helps to overcome trauma by creating a new baseline (McCraty & Zayas 2014).

Various HeartMath techniques can be used for related areas, for instance, for assisting to overcome traumatic experiences and for improving physiological coherence, sense of coherence and resilience (Childre & Rozman 2005; Edwards et al. 2015; Ginsberg, Berry & Powell 2010; Institute of HeartMath 2014; McCraty & Zayas 2014). In terms of HeartMath, two studies have demonstrated significant post-intervention quantitative improvement in spirituality (Edwards 2013, 2014a).

Different biological, psychological, social, cultural and spiritual interventions or programmes are linked with enhanced faith (Eagle 1998; Fowler et al. 2004; Roberto 2007; Streib 2003). There is, for example, research on examining the structure and role of emotion in relation to the neurobiology of embodied religious experience (Norris 2005). However, one research area that required further exploration was the

evaluation of a HeartMath intervention and faith following a traumatic experience.

The study question is in what way would experiences of faith after a traumatic experience remain the same or change following a HeartMath intervention. Thus, the aim of this study was to evaluate participants' experiences of faith following a traumatic experience at pre-, re- and, after intervention, post-test. In terms of hypothesis, using participants as their own controls, it was expected that the HeartMath intervention would have a positive effect on the quantitative measurements and qualitative experiences of faith.

Research methods and design

Design

Framed within Wilber's (2005) integral approach, this study used a quasi-experimental, single, within-sample design, where the sample acted as its own control, which involved mixed quantitative and qualitative research methods and techniques. This included pre-test, after 2 weeks re-test, intervention and then post-test.

Sample

The purposeful sample consisted of 10 Caucasian participants, 5 female participants and 5 male participants, who had an age range of 29 to 54 years, with a mean age of 36.30 years and a standard deviation (SD) of 8.99 years. Described years of faith ranged between 17 and 54 years with a mean of 23.20 years and a SD of 17.73 years. They all had traumatic experiences. They were chosen based on their willingness to undertake a 12-week HeartMath intervention, focusing on psychophysiological coherence, sense of coherence, resilience and faith, and observe and share the effect this had on their faith.

HeartMath intervention

The intervention included experiential learning of (1) resilience and the four domains, namely, physical, emotional, mental and spiritual resilience; (2) the inner battery, energy-draining and energy-renewing situations, and depletion to renewal grid; (3) physiological coherence, sense of coherence and intuition; (4) prep, shift, reset and sustain; and (5) heart-focused breathing, quick coherence, inner-ease, freeze frame and heart-lock techniques (Institute of HeartMath 2014). Handouts on the aforesaid were provided and demonstrations of the techniques were undertaken. Participants were then asked to practise these techniques over a 12-week period while using a HeartMath Inner Balance device.

Measurements

All of the quantitative and qualitative measurements were used to collect data and information at pre-, re- and post-test. Quantitatively, the HeartMath Inner Balance device was used for physiological coherence biofeedback purposes, with a

sensor attached to their earlobe and connected to a smartphone (which collected the data), which measured over a 5-min period at testing intervals, and was used by participants during the intervention, via an inner balance application which measured: time elapsed, achievement score, average coherence, and low-, medium- and high-levels of physiological coherence and displayed, for example, the HRV pattern and power spectrum.

The Sense of Coherence Scale (SOC) was a shortened nine-item, seven-point Likert scale with three items reversed. It is a version of Antonovsky's (1987) scale, with a Cronbach's alpha reliability coefficient of 0.79. Antonovsky's (1987) original scale had three subscales, which measured the degree to which persons perceived their world as comprehensible, manageable and meaningful. The shortened version used in this study demonstrated high internal reliability and concurrent validity when assessed against Antonovsky's original 29-item measure (Klepp et al. 2007).

The Brief Resilience Scale (BRS) (Smith et al. 2008) that assessed the ability to bounce back had six items, which were equally positively and negatively phrased, along a five-point Likert scale. Cronbach's alphas for the BRS in six samples were found to be 0.836, 0.902, 0.877, 0.798, 0.754 and 0.702, respectively (Smith et al. 2013).

The Santa Clara Strength of Religious Faith Questionnaire (SCSRFQ) was a 10-item, four-point Likert scale measure of religious faith and engagement suitable for use with multiple religious traditions, denominations and perspectives (Plante et al. 1999). Universally, factor analytic studies found that the SCSRFQ was comprised of one factor (Plante 2010; Storch et al. 2004). Reliability analyses indicated Cronbach's alpha coefficients ranging from 0.94 to 0.97 (Plante & Boccaccini 1997; Storch et al. 2004).

Qualitative information was in the form of questions of experiences of sense of coherence, resilience and faith. During the intervention, participants were asked to keep a diary of energy-draining and energy-renewing situations; physiological coherence; experiences of sense of coherence, resilience and faith; and location on the depletion to renewal grid.

Data analysis

For quantitative data analysis, owing to the sample size, non-parametric testing was chosen with Wilcoxon signed-rank

tests and Spearman's rank-order correlation coefficient. Quantitative data were analysed using SPSS® statistical data analysis package.

The qualitative data were coded and analysed using thematic content analysis (Braun & Clarke 2013). For credibility, there was consensual validation by participants and external researchers, and ATLAS.ti, a qualitative data analysis computer software package, was also utilised and word clouds created, with integrated themes and sub-themes.

Ethical considerations

Ethical clearance to conduct this study was obtained from the Research Committee and Research Ethics Committee, University of Pretoria (No. T013/19). Participant information was provided to each subject, and written consent was obtained from all participants. Participants were free to withdraw from the study at any time. Participants were allocated a participant number to ensure anonymity and confidentiality. Consent forms, quantitative data and qualitative information were kept separately. Necessary consent to use the scales was sought and obtained. This research was undertaken with permission from the HeartMath Institute.

Results

Quantitative results

Based on the aforesaid, as evidenced in Table 1, the Wilcoxon signed-rank test indicated asymptotic positive significant differences with regard to re-test and post-test at the 1% alpha level for achievement score ($p = 0.009^{**}$) and high coherence level ($p = 0.009^{**}$), and at the 5% alpha level for average coherence ($p = 0.011^{*}$), and low ($p = 0.012^{*}$) and medium coherence levels ($p = 0.012^{*}$). While not significant, results indicated an increase in BRS and SCSRFQ scores but not in SOC total score at post-testing. Interestingly, from pre-test to post-test, there was a marked increase in SOC ($p = 0.074$), BRS ($p = 0.016^{*}$) and SCSRFQ ($p = 0.151$) total scores. Based on Spearman's correlation, various SOC items correlated with BRS and SCSRFQ items.

Qualitative results

Descriptions of experiences of sense of coherence

Participant 1: Pre-test: 'My experience of the sense of coherence is being in a peaceful state where my mind and my heart are in sync'. **Re-test:** 'My experience of the sense of

TABLE 1: Pre-, re- and post-test Sense of Coherence Scale, Brief Resilience Scale and Santa Clara Strength of Religious Faith Questionnaire total and inner balance scores, means and standard deviations – Wilcoxon signed-rank test for sample ($N = 10$).

Stage of testing	SOC		BRS		SCSRFQ		Average coherence		Achievement score		Low coherence level		Medium coherence level		High coherence level	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Pre-test	43.70	9.30	21.40	4.30	26.50	6.57	1.86	0.76	112.30	52.59	10.90	9.65	15.60	8.22	74.50	14.34
Re-test	48.70	8.83	23.40	6.38	28.00	5.01	1.51	0.65	93.30	44.79	15.30	11.75	23.50	8.63	61.20	17.57
Post-test	48.40	7.96	24.50	4.01	28.10	7.69	3.63*	1.52	257.00**	181.73	1.10*	2.42	8.40*	11.47	90.50**	12.85

SOC, Sense of Coherence Scale; BRS, Brief Resilience Scale; SCSRFQ, Santa Clara Strength of Religious Faith Questionnaire; SD, standard deviation.

*, $p < 0.05$, **, $p < 0.01$.

coherence was that I should have had control over my environment; even though not thinking of anything, my mind wandered and I lost control of my environment, but once I regained control, I could focus and felt my breathing calm and my environment calm'. *Post-test*: 'I have a positive experience of the sense of coherence. I see how important it is to try and maintain coherence and the positive impact it has when I do. It is not always easy and that impacts on the way that one feels' (female, 29 years).

Participant 2: *Pre-test*: 'I feel that I have a strong sense of coherence depending on a situation, for example, if I have planned for a certain thing, curved balls tend to throw me off'. *Re-test*: 'My experience was not that great as I had too many distractions and had to keep refocusing on my breathing'. *Post-test*: 'I felt I had a high sense of coherence even though there was high activity happening around me' (female, 54 years).

Participant 3: *Pre-test*: 'My sense of coherence is at a rating of approximately 60%. I'm still trying to manage, understand and better my current mental well-being. I'm trying to understand myself better and be a better person for myself and my family'. *Re-test*: 'My sense of coherence could always be better and stronger'. *Post-test*: 'I have a better understanding, and my sense of coherence is more positive than it has been in the past' (male, 39 years).

Participant 4: *Pre-test*: 'Feel unbalanced most of the time. The sense of being out of control overwhelms me and creates frustration and bursts of anger or sadness. I feel the need to always be in control even knowing that it is detrimental to me and others'. *Re-test*: 'I always feel the need to be in control to ensure everyone is "safe" or does what needs to be done. This causes great frustration and makes me feel "unbalanced"'. *Post-test*: 'In the past few weeks, I have had a lot going on within the family environment and the dynamics that go with this. I have come to the realisation that I cannot control everything going on around me and that, sometimes, I just need to "go with the flow", take advice from those more qualified than me and accept the help provided. This has been a tough lesson to learn for me as letting go of control is not who I am. If I don't let it go, it will destroy me' (female, 37 years).

Participant 5: *Pre-test*: 'I can often overthink or analyse situations, both the basic daily tasks and the long-term goals. I've grown up being competitive and aiming to try to be the best I can be and not disappoint the people around me. I will generally stress about the tasks at hand, but once completed and the goal is achieved, I feel relaxed, satisfied and proud. The move to New Zealand was quick, scary and stressful; only once things were settled and I felt comfortable that I could tackle a basic understanding of how things operate here, then I was able to start enjoying the basic fun activities in my daily life and enjoy the general normal life around me'. *Re-test*: 'New situations and experiences cause me to stress and get anxious. I will continuously analyse the situation, what needs to be done and the different outcomes based on

the way the situation is handled. Only once performed and completed do I start to settle and realise that the task was not as scary as I expected. I like to keep various tasks separate, start each one and finish it before moving on to the next. I battle with spur-of-the-moment or go-with-the-flow actions'. *Post-test*: 'I am often determined to complete the tasks at hand and achieve the goal set. I often encounter setbacks when performing duties at work, home or in social situations. Depending on the setbacks, I can refocus and adjust to finish what was aimed for' (female, 29 years).

Participant 6: *Pre-test*: 'I cannot really say that I have paid much attention to my sense of coherence; thinking about it now, I would say that for the most part, I have a pretty good sense of coherence, occasionally impulsive but generally of sound mind'. *Re-test*: 'I feel that generally, I have a good sense of coherence; I don't make rash decisions and I am of sound mind. Sometimes, I'm impulsive in decision-making'. *Post-test*: 'My experience of coherence is the feeling of calm or peace that I feel during and after a session. It puts me in a good frame of mind' (male, 30 years).

Participant 7: *Pre-test*: 'Knowing when to take time out for yourself. Resetting at the end of the day and welcoming the new day with a fresh pair of eyes. Not being hard on yourself for feeling stressed or overwhelmed. Opening up about feelings of concern with the ones closest to me'. *Re-test*: 'Not feeling guilty when I need a break from the everyday stresses – and knowing when to ask for help from family and friends – I feel that this is something I experience quite a bit being a stay-at-home mom. Some days, I battle with the monotonous routine of being a stay-at-home mom, but it is knowing when to open up about these feelings with others before they overwhelm me that helps me get into a better frame of mind'. *Post-test*: 'Being a mother you tend to have a high sense of coherence. Looking after kids and working present a lot of everyday stress, and I have learnt to put certain practices and coping mechanisms into place to keep me grounded and on track – two important ones being "knowing when to ask for help" and knowing when I need "time out" to compose myself' (female, 31 years).

Participant 8: *Pre-test*: 'I am a confident person in myself and try to be as positive as possible even in difficult situations'. *Re-test*: 'I am a confident person and tend to do what's best and right. I bounce back quickly after mishaps in life and am a very positive person. I feel that I am very coherent with what life brings or throws at me'. *Post-test*: 'It is about being calm, having clear thoughts and being positive. Keeping your heart rate low and consistent and controlling your breathing puts you in a state of calmness and happiness' (male, 34 years).

Participant 9: *Pre-test*: 'I would describe coherence as the ability to understand and make sense of a situation or having a clear purpose or aim. I feel that I'm getting older and my life has become more stable, that is to say, finishing study and being settled. I have felt less clear in the direction that I am heading as I have achieved most of what I set out to achieve, and currently, I feel like I need to work out what my

priorities are going forward and where I want to be in life. This therefore makes big decisions quite challenging'. *Re-test*: 'Being in tune with yourself. Feeling stable and in control. At the moment, feeling less so that at 1st session'. *Post-test*: 'A sense of coherence is a feeling of calm and stillness in which my head is quieter, and I feel more peace at present' (male, 30 years).

Participant 10: *Pre-test*: 'All the aspects that are important to me seem to connect in the same way and provide me with a sense of internal peace: God, family, partner, children, work, play, dog and friends – even nature and politics'. *Re-test*: 'Connecting actively on each of these domains makes sense of intra- and inter-relationships inclusive of spiritual relationships'. *Post-test*: 'I felt a sense of calmness and clarity of environmental stimuli' (male, 50 years).

The following integrated sense of coherence themes and bracketed sub-themes emerged. *Pre-test*: A lack of coherence (not focused upon, often unbalanced, a lack of direction), internal and external factors (occasionally impulsive, affected by the unexpected, not disappointing others, stability, in control), management (planning, purpose, achieving, enhancing mental well-being, daily resetting), sense of coherence level (approximately 60%, pretty good) and sense of coherence (generally sound minded, less thought, confidence, positive person, awareness, understanding oneself more, self-compassion, self-care, mind heart synchronisation, better person, peacefulness, open with loved ones, connection with God, others and the world). *Re-test*: A lack of coherence (not great, less so), internal and external factors (can be impulsive, many distractions, mind wandered, unexpected causes anxiety, lost environmental control, needed control, regained control, stability, orderly, environment calmed), management (focus, much analysis, think things through, understanding internal relationships, understanding external relationships, coping through achievement, focusing on breathing, calm breathing, accessing more support), sense of coherence level (could always improve, good sense of coherence) and sense of coherence (less guilt, sound minded, confident, positive, resilient, ethical, in tune, connecting internal and external). *Post-test*: Work in progress (not always easy), management (achieve the goal set, cannot control everything, need to let go, sometimes must go with the flow, being positive, taking time out, accessing support, take advice), sense of level (good frame of mind, head is quieter, clear thoughts, clarity, generally resilient, more positive, better understanding, high sense of coherence) and sense of coherence (important to maintain, positive experience, has a positive impact, clarity of environmental stimuli, impacts the way one feels, controlling your breathing, heart rate low and consistent, calm, stillness, present, happiness, peace). *Sub-themes categorised into SOC Scale Subscales* pre-test: comprehensible ($n = 5$) manageable ($n = 7$) and meaningful ($n = 9$); re-test: comprehensible ($n = 6$), manageable ($n = 14$) and meaningful ($n = 4$); post-test: comprehensible ($n = 8$), manageable ($n = 11$) and meaningful ($n = 9$).

Descriptions of experiences of resilience

Participant 1: *Pre-test*: 'My experience of resilience is how I am able to tolerate certain events and things that happen in daily life and in major events and how my body and mind respond to them'. *Re-test*: 'I have been working through some tough decisions. They have been springing into my mind and I have overcome them with positive thinking and bounced back'. *Post-test*: 'I tried to maintain my resilience as this helped me push through days of tiredness and depletion, and I feel having strong resilience combined with faith really helped me on days that I was struggling' (female, 29 years).

Participant 2: *Pre-test*: 'I think that through life you experience situations and that makes you resilient, and the older you get, the more resilient you become'. *Re-test*: 'I am a pretty resilient person and try not to let too many things get me down; life is too short, as they say in the classics'. *Post-test*: 'I experienced a good sense of resilience so as not to just get up and go but rather absorb the situation' (female, 54 years).

Participant 3: *Pre-test*: 'My resilience could always be better. I understand my triggers to manage and control them better. A rating of 60% can be given in this current state of mind'. *Re-test*: 'My resilience towards stressful situations can be improved; in some cases, they have been overwhelming'. *Post-test*: 'I feel my resilience is slightly stronger and improving as I focus on it more; I feel my resilience is better than it has been in the past' (male, 39 years).

Participant 4: *Pre-test*: 'I try to give off the impression that I am resilient enough to protect those around me but this can create problems where I may "bottle" things in and then have outbursts, particularly to those I love'. *Re-test*: 'I often think I am quite resilient and can bounce back depending on the situation. However, this facade of believing I am resilient is usually to put others' minds at ease and to ensure my loved ones feel comfortable and safe in a changing environment. I then tend to deal with the change on my own'. *Post-test*: 'I still believe that I am quite resilient, I accept change as a challenge. However, I have felt a little more exhausted lately when it comes to things changing, but think this is because of everything else going on around me, for example, with the forever-changing landscape of COVID, and the day-to-day changes being made because of it, while still caring for family and ensuring their mental, physical and emotional well-being' (female, 37 years).

Participant 5: *Pre-test*: 'I can be strong and competitive depending on the situation. I will normally build up a wall around me to keep focused and strong enough to tackle the tasks that scare me. Often, I need to end up breaking down my wall admitting that I'm scared and let my emotional softness out before I can personally realise that even with my care and concern, I can still complete the task and end up stronger and happier once achieved'. *Re-test*: 'I hide my scared or nervous feelings to be strong when I am nervous about the situation. I can generally analyse when I disagree with others or have a different belief and try to wipe away

the negativity if it's unnecessary or unhappy to my life and the people around me'. *Post-test*: 'I am resilient as I often encounter stressful situations that I can overcome. Depending on the level of importance and stress linked to the task, my resilience can get super-tested and might give me more personal strength to overcome' (female, 29 years).

Participant 6: *Pre-test*: 'I would say that I am pretty resilient; yes, on occasion I get knocked down, but I do not dwell on my failures or bad experiences. I'm pretty quick to get right back up and carry on'. *Re-test*: 'I think that I am very resilient and very few things can get me down. If for some reason I am down, I am quick to recover'. *Post-test*: 'I still feel like a very resilient person, I don't struggle with stressful situations, and I feel like I handle difficult situations very well' (male, 30 years).

Participant 7: *Pre-test*: 'I have the confidence in myself to bounce back. I know where your strengths lie and I use them to work through hard times. I'm not overthinking and looking at solutions as opposed to problems. I know when to start being proactive in moving forward'. *Re-test*: 'I am quite a strong person and tend to think logically about situations and experiences – I can bounce back quickly from being let down or from hard times, without letting myself linger too much in a negative state of mind. I give myself time to be upset or disheartened and then push myself to move forward from those feelings'. *Post-test*: 'I see myself as a very resilient person and have bounced back quickly from disappointment, stressful situations and negative events in my life. To keep moving forward and knowing that the past can't change helps me keep myself resilient and helps me recover from events. I also feel sometimes that I need to be resilient in my family to keep us moving forward as a family unit' (female, 31 years).

Participant 8: *Pre-test*: 'I would describe myself as very resilient. I have experienced a lot of tough times and dark moments in my life, which helped me become more resilient as a person'. *Re-test*: 'I am very resilient and not much gets me down in life. I tend to see the positive in life and focus on the good rather than the negative. Not much gets me down, and if so, I pick myself up very quickly and move forward'. *Post-test*: 'It is about being mentally tough and having a positive mindset and outlook on situations and life on a daily basis. The more resilient you are, the happier you will be with a higher sense of coherence' (male, 34 years).

Participant 9: *Pre-test*: 'I would define resilience as the ability to be flexible, deal with challenges in life and "bounce back". I would historically have said that I feel I have high resilience; however, because of having my own family, increased responsibility and going through COVID-19 a long way from close family and friends and without access to usual coping strategies (because of lockdowns), this has been harder and I've had less resilience; however, when the challenging situation has resolved, I've been able to bounce back quite well'. *Re-test*: 'I feel that the ability to bounce back after stress is reasonably good at this moment, but it's a struggle

during the events'. *Post-test*: 'I can feel the ability to recharge after stressful events and improve my energy levels and focus' (male, 30 years).

Participant 10: *Pre-test*: 'Resilience allows me the time to adapt and learn from it. I felt a positive reflection soon after my experience. Most recent, moving 3x in one year and later in New Zealand. It was a great and most humbling experience, an output of true resilience for me'. *Re-test*: 'Getting back into action and making plans about the future rather sooner than later after experiencing the recent move to New Zealand and the change of work. Remaining optimistic with process'. *Post-test*: 'Restore energy quickly after a stressful day and/or events' (male, 50 years).

The following resilience themes and sub-themes emerged.

Pre-test: Internal and external stressors (defences, internalisation causing outbursts, manage triggers, COVID-19 lowered resilience, response to events), coping (tolerating daily events, tolerating major events, managing moving, deal with challenges, being proactive, looking at solutions, resolution, focus on strengths, can be strong, can be competitive, confidence, self-belief, don't dwell, not over thinking), bouncing back (bounce back, get back up, carry on, flexible), resilience level (rating of 60%, could always improve, pretty resilient, high resilience, very resilient), resilience (increases with age, situations increase resilience, learning, post reflection). *Re-test*: Conceal emotions (pretend for others, hide nervousness or scaredness), internal and external stressors (struggle during events, some stressors overwhelming, managing other's negativity, not getting down), coping (self-reliant, making plans sooner, think logically, working through decisions, optimistic, positive thinking, focus on positives, focus on the good), bouncing back (bounced back, move forward, quick to recover, giving oneself time to recover), resilience level (quite a strong person, little affects me, quite resilient, pretty resilient person, very resilient, could be improved). *Post-test*: Internal and external stressors (resilience can get really tested, little more exhausted from COVID-19 change), coping (absorb the situation, being mentally tough, positive mindset and outlook, accept change as a challenge, improve focus), bouncing back (helped tiredness, helped depletion, recharge, improve energy levels, restore energy quickly, keep moving forward), resilience level (still quite resilient, still very resilient, I am resilient, strong resilience, very resilient person), growth (slightly stronger, improving with more focus, feels better, maintaining resilience, handle difficult situations very well, resilient for family, good sense of coherence, higher sense of coherence, being happier, faith helped).

Descriptions of experiences of faith

Participant 1: *Pre-test*: 'I will often relate certain things in my daily life to faith and later in the day I will reflect back on my day and how faith played a role in it and certain parts where faith is what helped me make a certain decision or not or

whether to act upon something or not'. *Re-test*: 'I always rely on faith to help me through difficult situations and to help me move forward with my decisions'. *Post-test*: 'My experience of faith is strong and again with maintaining a strong sense of faith one feels whole and stimulated, when I had low faith I felt drained and tired and couldn't focus my mind, as soon as I turned to faith my mind was clear and I was able to better handle situations' (female, 29 years).

Participant 2: *Pre-test*: 'Faith has been with me throughout even though at times I have felt there has been no faith. Through faith I have managed to overcome obstacles and achieve outcomes that I have thought impossible'. *Re-test*: 'My faith is giving me the strength to support my family in their new adventures and to guide me into making right decisions'. *Post-test*: 'I had a strong experience with faith, which enabled me to deal with what was happening around me' (female, 54 years).

Participant 3: *Pre-test*: 'Faith has been a roller coaster journey of many ups and downs, but focusing on faith and the Lord has always seen me through some difficult and challenging times. My faith could always be better at a rating of 65%'. *Re-test*: 'Faith has been a struggle for me at times, understanding and trusting God's plan has been a challenge at times. However, every stressful situation has brought me closer to God through prayer for guidance and strength'. *Post-test*: 'During the testing and during these challenging times, COVID-19 environment, I feel that I have been able to grow with my faith experience' (male, 39 years).

Participant 4: *Pre-test*: 'Honestly, I wish I could call on my faith more especially during tough times but I tend to dwell on the past and can't let go. I do question why things happen when they happen instead of believing that it is God's will'. *Re-test*: 'My faith is good, it could be stronger in the sense that I should rely on my faith to help make decisions in my life. I tend to look at the most logical point of view and leave faith on the outside of my decision-making'. *Post-test*: 'I think I did lose my sense of faith for a while, not that I stopped believing, but that I was questioning "Why" all the time. It's been a bit of a tough season but I realised that unless you have faith in something – for me, God – you are not going to get through it' (female, 37 years).

Participant 5: *Pre-test*: 'When I was in primary school the parents induced me to faith. I was never forced to continue with my faith or beliefs, it was left open to my own personal choice to embrace my faith where or when ever I felt comfortable. I believe in God and will often turn to Him to ask for advice or thank Him all that He has done for me and people around me. I keep my faith personal and don't often discuss it with people around me because I don't want them to feel any pressure that if they don't have the same faith as me that I have anything against them'. *Re-test*: 'I am starting to notice that with the modern society a fair amount of people around me are changing the way they interpret faith. I don't like to push my views and beliefs on other. I prefer to keep my relationship with God personal and reach out to the Lord

depending on the situation'. *Post-test*: 'Faith is a great guide in my life to help me refresh and think about how I should tackle tasks that I am unsure of' (female, 29 years).

Participant 6: *Pre-test*: 'When I was younger I used to have what I consider an incredibly strong relationship with my church and God, I have, shamefully so, since grown incredibly distant for no apparent reason'. *Re-test*: 'As previously stated, I was very involved with my church and belief at a younger age, have since grown distant'. *Post-test*: 'As you will see in the results on the aforesaid tests, I am not very active in my faith and the church does not play as big a role in my life currently. I do believe in God and have faith but feel as though my faith is currently dormant' (male, 30 years).

Participant 7: *Pre-test*: 'Having that comfort in your life that keeps you going. Support and feeling that you're never alone. The voice that is always in the back of your mind when dealing with situations or everyday life events'. *Re-test*: 'In this case my faith is my family support as I am not a religious person. My family is the core of my life – my strength through hard times and the upliftment for me in good times. They are always on my mind when making decisions in my life and they are the force that keeps me going'. *Post-test*: 'My faith and family is very important to me. They are at the centre of who I am and how I lead my life. They are my source of comfort and my voice of reason sometimes. I seek out their opinion and advise with certain situations in my life and they are the guiding voice in my decision making. I am a firm believer that family is and should be at the centre of everything' (female, 31 years).

Participant 8: *Pre-test*: 'I grew up in a very religious household with strong morals and values, over the years I have drifted from those practices and no longer put in the time I used to, however still I am a believer and carry those values and morals with me and try my best to carry them out'. *Re-test*: 'I have strong core values in life and use those values and faith in how I carry myself and treat others around me, and in difficult times it helps me to work through those moments and stay positive'. *Post-test*: 'Faith is something that helps me get through tough times and situations. It is knowing that there is always light at the end of the tunnel. It also defines how we act and carry ourselves' (male, 34 years).

Participant 9: *Pre-test*: 'I would understand faith to relate to religion or belief in a structured religion. I was brought up as a Christian and attended a C of E school but would not say I am religious or have been religious since my teenage years. I would say that I have some "spiritual" beliefs and believe that religion can be a uniting power that can be very positive for a lot of people, although it can be used in a divisive way, however I would not describe myself as religious and therefore I would not say that faith is a big part of my life as I would perceive faith to relate more to a belief in something that you cannot necessarily experience or know to be true'. *Re-test*: 'Belief in organised religion or something that cannot be proven. Would maybe describe myself as having spiritual

beliefs but not faith – I feel that faith implies belief in something it is not possible to prove and I tend to rely on my own experience’. *Post-test*: ‘I still struggle with the term faith as to me that implies belief in something that you have not experienced, that is to say I have faith that things will be ok. I would say that there is more a source of “oneness” that comes with HeartMath but I don’t think that I would necessarily associate the experience with the word faith’ (male, 30 years).

Participant 10: *Pre-test*: ‘Blindly jumping into darkness and just knowing that something and/or someone will catch me. I refer to this entity as God, Christ or Holy Spirit’. *Re-test*: ‘To know that I know that I know that there is order and wisdom in everything and a privilege to be part of it in some way – strangely purposeful’. *Post-test*: ‘Feeling connected with source of love and reaching towards it’ (male, 50 years).

The following faith themes and sub-themes emerged. *Pre-test*: Faith development (religious household, parents induced faith in primary school, attended a C of E school, had a personal choice, don’t pressure others, faith is personal), struggles with faith (not religious, not a big part personally, grown distant, strong when I was younger, rollercoaster, tend to dwell, questioning instead of believing God’s will, rated at 65%, faith could be better, wish I could call on my faith more), uncertain (spiritual, religion, religion as uniting and positive or divisive), belief (still believe, faith even when didn’t feel it, focusing on faith, relate life to faith, morals and values, role of faith, never alone, comfort in life, support, safety, faith in decisions, ask God for advice, voice through situations or events, keeps you going, Lord seen me through, overcoming obstacles through faith, achieved impossible through faith, believe in God, Holy Trinity, I thank Him). *Re-test*: Faith development (personal, don’t push on others), struggles with faith (not religious, something that cannot be proven, interpretations changing, rely on own experience, logical over faith, when younger, grown distant, organised religion, challenging or struggle at times, could be stronger), and belief (family is faith, spiritual not faith, from situations, strong core values, be part of it, always rely on faith, order or wisdom in everything, help through difficult situations, guiding right decisions, pray for guidance and strength, gives me strength, my faith is good). *Post-test*: Struggles with faith (struggle with the term, currently dormant, not very active, low faith, lost faith for a while, was questioning why), and belief (have faith, faith or family is very important, stimulated, clear mind, a great guide, helps me get through, handle situations better, always light at the end, strong, whole, more a source of ‘oneness’ that comes with HeartMath, faith is essential, defines us, reaching towards it, faith has grown, feeling connected with the source of love, believe in God).

Discussion and conclusion

In terms of the results, quantitatively, using the valid and reliable HeartMath, BRS, SCSRFQ and SOC measurements, there were positive significant differences between re-test and post-test on average coherence; achievement score; and low, medium and high coherence total scores. This supported the previous research on psychophysiological coherence (Edwards 2013, 2014a; Edwards & Edwards 2021; Edwards, Edwards & Highley 2015). Results also indicated an increase in BRS and SCSRFQ total scores at post-testing. This supported previous research on resilience (Edwards et al. 2015), and the only two previously published studies on spirituality (Edwards 2013, 2014a). Although not in this study, perhaps because of the large mean SOC score change between pre- and re-test already having occurred, various previous studies had demonstrated post-intervention improvements as measured on SOC (Edwards 2013, 2014a; Field 2017; Field et al. 2018). Interestingly, there was a marked increase in SOC, BRS and SCSRFQ total scores, from pre- to post-test, which was attributed to being part of the study and the focus on these areas in terms of pre-test questions stimulating thinking in relation to these concepts.

Qualitatively, there were positive thematic changes in experiences of the sense of coherence, resilience and faith at post-test. For *sense of coherence*, there was an increase in the level of sense of coherence experiences and more combined comprehensible, manageable and meaningful sub-themes. For *resilience*, there was a greater number of growth in terms of bouncing back experiences. For *faith*, there was an increase in experiences of spirituality and belief (Fowler et al. 2004; Streib 2003).

In terms of hypothesis, based on the integrated quantitative results, and qualitative themes and sub-themes, with caution as this is an initial study with a small sample, there seems to be enough data and information to support the potential that a HeartMath intervention could have a positive effect on faith following traumatic experiences. However, this effect might be both directly and indirectly, where from a HeartMath psychophysiological understanding, in terms of resilience, coherence is found at the centre of physical, mental, emotional and spiritual dimensions (McCraty & Childre 2010); thus, through a HeartMath intervention, improving coherence and resilience could then have a positive effect on faith. This has value and makes a contribution in terms of the areas of HeartMath as well as pastoral care and counselling interventions towards individual, social and global change. Validity and credibility were, via the consistent quantitative and qualitative results, through the use of SPSS® quantitative and ATLAS.ti qualitative data analysis computer software packages, consensual validation by participants and external researchers, and audit trials.

The results also seemed to attest to the three theological areas, namely, spirituality, religion and faith (Gall et al. 2011; Gschwandtner 2021), as well as coherence, resilience and faith (Schwalm et al. 2021), being inter-related and

overlapping. This was supported by the Spearman's correlation, which revealed various SOC items correlated with BRS and SCSRFQ items, and inter-related and overlapping experiences of sense of coherence, resilience and faith-integrated themes and sub-themes.

As a limitation, while the sample size is small, it was deemed adequate, as the design involved mixed quantitative and qualitative research methods and techniques. Such mixed methods designs are powerful in investigating complex processes (Fetters, Curry & Creswell 2013). Generalisability and transferability should naturally be done with caution, because of the sample size, all the participants being Caucasian and the Anglican focus. This research focused on a number of complex interrelated and overlapping components. As this was an initial study on this area, recommended next research steps would be a case study focusing on the causal, correlational and relationship mechanisms of change and then an appreciative enquiry to evaluate HeartMath as a pastoral care and counselling intervention.

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Competing interests

The authors declare that they have no financial or personal relationships that may have inappropriately influenced them in writing this article.

Authors' contributions

D.J.E. conceptualised the research, completed the investigation and wrote the original article. Y.D. and B.J.M.S. supervised the research and reviewed and edited the manuscript.

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Data availability

Tabulated quantitative results and qualitative participant responses have been included as part of the article.

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