Original Article

Clinical sport psychological, HeartMath training intervention for twelve year old boy

STEPHEN DAVID EDWARDS

Psychology Department, University of Zululand, South Africa

ABSTRACT

This brief, case study reports on a clinical sport psychological skills training intervention using HeartMath techniques with a 12 year old boy. The pre-test and post-test, process and outcome evaluative, research design included qualitative and quantitative, integrated and mixed method techniques, in the form of psychometric testing and diarizing of qualitative experiential descriptions. Findings indicated significant improvements in psychophysiological coherence, sense of coherence, resilience, mood, psychological well-being and mental skills. Findings endorse theoretical principles and practical guidelines for implementing and evaluating clinical sport psychological and HeartMath interventions. **Keywords:** Case study; Clinical sport psychology; HeartMath; Psychophysiological coherence.

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Corresponding author. *University of Zululand. Psychology Department. Private Bag X1001. KwaDlangezwa, 3886. South Africa*.
E-mail: sdedward@telkomsa.net
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INTRODUCTION

Clinical sport psychology (CSP) is an applied discipline that employs practices from both clinical and sport sciences to enhance psychological well-being, mental skills and sport performance (Moore & Bonagura, 2017). The article describes the case study of clinical, sport psychological skills training intervention using HeartMath techniques with a twelve year old boy, pseudonym A, who was referred by his mother for sport psychological skills training related to emotions experienced as captain of a local provincial hockey team. His emotional issues included arousal anxiety before playing important stress producing matches and loss of temper during matches. A played most sports and performed well academically, placing in the top 10 of his class. The initial contact was made by the mother via email, which read: "I am looking for a sports psychologist for my son who is twelve years old. Please can you let me know if you offer this service? If so, please can you send me your details and charges."

During a follow up telephone conversation, the psychologist indicated that he was prepared to interview the family and all participants would be involved in decision making as to whether to continue with a program of sport psychological counselling. Various psychometric assessments were sent that A had to complete on his own before the interview with mother, father and son. Various themes were openly discussed in the interview. All were agreed that the health, fun and social dimensions were especially important in youth sport and that parents and coaches should not overemphasize performance. A spoke openly of abovementioned emotional issues, which he seemed to own. He clearly loved sport and was personally motivated to perform well. Discussion centred on sporting codes, ideals, issues, ethics and phrases commonly taught in youth sport. The psychologist offered a six week HeartMath focussed program, which could be published as a case study. A voluntary, non-financial, six week, research contract was agreed upon by all participants, with all free to withdraw at any stage.

The present study is unique in that it is framed within the HeartMath scientific system, which was founded on heart centred, interdisciplinary research and praxis to promote psychophysiological, personal and social coherence, health, performance and wellbeing Coherence is a core concept, owing to pioneering finding that different, positive, heartfelt feelings were associated with specific, sine-wave type, electromagnetic signatures, whereas negative emotions typically reflected incoherent patterns. Such findings led to the development of various tools and techniques that can be used in the moment to relieve stress, improve resilience, health and well-being, as well as sport performance, while promoting what athletes describe as zone experiences (Childre, Martin, Rozman, McCraty, 2016).

Aim

The aim of the brief case study was to describe and evaluate a clinical, sport psychological, HeartMath training intervention with a 12 year old boy.

Research questions and hypotheses

The applied sport psychological research questions were essentially exploratory in nature and may be formulated as follows: Would a clinical, sport psychological, HeartMath orientated, program be effective in improving psychophysiological coherence, sense of coherence, resilience, mood, mental skills and psychological well-being for this particular client? In view of evidence as to the effectiveness of clinical sport psychological interventions, beneficial helping relationships and HeartMath training, it was hypothesized that would be effective as assessed quantitatively and qualitatively on relevant measures and as evaluated experientially.

METHODOLOGY

Design

Case study research methods are perennially popular in psychological literature because they are descriptive, detailed, longitudinal, and contribute to further research through introducing novel ideas, critical reflection, hypotheses testing, quantitative, qualitative, mixed and integrative methods, theory building and testing (Fetters, Curry & Creswell, 2013; Ridder, 2017; Starman, 2013; Terre Blanche, Durrheim & Painter, 2006). The present pre-test and post-test, case study design included concurrent and convergent design principles of collecting both quantitative and qualitative data, in the form of psychometric testing and qualitative experiential descriptions.

Procedure

Quantitative data consisted of psychophysiological readings on HeartMath emWave2 equipment, complemented by responses to psychometric measures of sense of coherence, resilience, mood, mental skills and psychological well-being at both pre-testing and post-testing phases. This was complemented by a care inventory outcome evaluation. Qualitative data consisted of experiential descriptions recorded during pre-test, client journaling of experiences during the counselling process and integrated, triangulated, outcome evaluation by boy, mother and psychologist at the post-test phase after six weeks of the programme. Coherent communication lead to the establishment of a beneficial, client-psychologist relationship, which will be described later under the integrative evaluation section. In addition to these process and outcome, assessment and evaluation measures, the following psychophysiological and psychometric instruments were chosen for purposes of pretesting and post-testing before, during and after the training program respectively.

Instruments

The HeartMath tool, emWave2, served as a general Heart Rate Variability (HRV) assessment and intervention instrument for psychophysiological coherence, resilience and mood complemented by the following psychometric measures of sense of coherence, resilience, mood, mental skills and psychological wellbeing. Details follow:

Heart rated variability (HRV) derived psychophysiological coherence was measured with five minute recordings on the HeartMath biofeedback tool, emWave2. In this case five minute recordings of coherence as well as accumulative coherence points were chosen for pre-test and post-test purposes. Both direct and biofeedback as well as indirect biofeedback via games are provided. Psychophysiological coherence is characterized by a heart rhythm pattern of elevated amplitude in low frequency heart rate variability of around 0.1 Hz, accompanied by positive emotions, indicating harmony between sympathetic and parasympathetic divisions of the autonomic nervous system. It is experienced as a state of relaxed alertness, which sportspersons describe as “being in the zone” (Childre, et al., 2016).

The Sense of Coherence measure consisted of a shortened nine item version of Antonovsky’s (1987) scale, with a Cronbach alpha reliability coefficient of .79. Antonovsky’s (1987) original scale has three subscales, which measure the degree to which persons perceive their world as manageable, meaningful and predictable. The shortened version used in the present study has been shown to demonstrate high internal reliability and concurrent validity when assessed against Antonovsky’s original 29 item measure (Klepp, Mastekaasa, Sorensen, Sandanger & Kleiner, 2007). Participants’ reported their feelings in relation to items such as, “Do you have the feeling that you don’t really care about what goes on around you?” on a nine item, seven point Likert scale anchored by the terms, “very often” and “very seldom”.

The Brief Resilience Scale (BRS) (Smith, Dalen, Wiggins, Tooley, Christopher & Bernard, 2008) has 6 items, which are equally positively and negatively phrased, along a 5 point Likert scale, with requested answers ranging from "strongly disagree" to "strongly agree". Cronbach's alphas for the BRS in six samples were found to be .836, .902, .877, .798, .754 and .702 (Smith, Epstein, Ortiz, Christopher & Tooley, 2013).

The Profile of Mood States (POMS) was initially developed as an "economical method of identifying and assessing transient fluctuating affective states" (McNair, Lorr & Doppleman, 1971, p. 5), with special reference to the therapeutic relationship. The original scale consisted of sixty-five adjectives rated along a five point intensity scale with special focus on anxious sad, confused, angry, sad, and, the odd one out, energetic feelings. A very short six item POMS (Dean, Whelan & Meyers, 1990), which was used in the present study, is a valuable, quick way to assess these same mood states, in addition to a cumulative score of positive mood as derived from reverse scoring negative phrased items related to the abovementioned feelings.

Bulls Mental Skills Questionnaire measures imagery, mental preparation, goal-setting, self-confidence, anxiety and worry management, concentration, relaxation and motivation, which result in individual subscale scores and a total scale score. The questionnaire has 28 items that assess participants along a six-point Likert scale, requiring item responses ranging from 'strongly agree' to 'strongly disagree'. It has been standardized for South African conditions. The full scale, 28-item reliability analyses yielded a satisfactory Cronbach alpha coefficient of 0.89 for a sample 211 respondents (Edwards, Stein, Buscombe & Edwards, 2014).

Ryff's (1989) Psychological Wellbeing Scale has six dimensions of psychological well-being: autonomy, personal growth, environmental mastery, purpose in life, positive relations with others and self-acceptance. Cronbach alpha coefficients reported were: autonomy (.88), personal growth (.81), environmental mastery (.81), purpose in life (.82), positive relations with others (.83) and self-acceptance (.85) (Ryff, 1989; Ryff & Keyes, 1995). South African norms were established with a sample of 348 university students (Edwards, Ngcobo & Pillay 2004).

The Consultation and Relational Empathy (CARE) Measure is an internationally validated practitioner evaluation questionnaire (Mercer, Watt, Maxwell, & Heaney 2004). It is a Likert type scale with 10 items ranging from "poor" to "excellent" and also includes a "does not apply" rating.

Data analysis

Quantitative data were analysed using the computer based Statistical Package for the Social Sciences (SPSS), with specific reference to descriptive, nonparametric statistics for the psychophysiological and psychometric measures.

Ethics

University, private practice and psychometric test ethical clearance and written client family consent were obtained.

RESULTS

Qualitative findings

First Interview

Initial interview with A and both parents included establishment of rapport, feedback on psychometric assessment completed electronically before the interview, provision of information, practical demonstration and discussion as to envisaged HeartMath based sport psychological skills training intervention, ethical considerations and procedures with regard to case study research, autonomy, confidentiality, contracting for weekly visits for approximately 6 to 8 weeks and signed informed consent forms. The contract was to focus on balanced and harmonious health and life skills, which provided the essential foundation for specific sport psychological skills. During this first session A performed excellently on the emWave2, with a score of 86% in the green, high coherence zone.

Information provided included underlying theoretical framework to HeartMath coherence model, power spectrum, and practical energetic approach to explain the dualistic connection between negative and positive emotions, instruction and examples of skills, tools and techniques. For example when A gets stressed before provincial trials, he can practice HeartMath attitude skill of taking significance out of the occasion by regarding sport as a game and his role as a leader and role model and promote focus on sport psychological skills, such as sportsmanship and sociability, in addition to speed, stamina, suppleness and strength. Another example would be when he functions incoherently by losing his temper, he practices various skills in the moment in order to optimize his talents for self and team. Family were to work on emotional intelligence power tools of the heart such as appreciation and care, rather than overcare. Other general family information and discussion included the scientific rationale of the coherence model, with love as most coherent of all emotions, and practical energetic model of optimizing energy through positive emotions rather than wasting or draining energy with negative emotions.

Second interview

Mother related that she and A were both feeling stressed and tired as A's father was away on work in Africa. A was distractible and fidgeted during the four HeartMath sessions. The HeartMath biofeedback tool, emWave2, which was loaned to the family was loaded on their computer. It was agreed that the family would use emWave2 when convenient and as often as possible.

Third interview

It had been a hectic two weeks with rugby trials. The emWave2 had been practiced on four occasions with coherence percentages shared roughly equally between low middle and high percentage coherence scores. A had been disappointed that he had not made the trials team, and the team had been severely criticized by the coach. A group of parents had discussions with the coach to go easier with the boys who need encouragement as well as criticism. The therapy session was spent working though the disappointments- how setbacks and tough times made one stronger- also that there would be many such setbacks in life and that all were learning opportunities to make the most of tough times and grow from them. Discussion was about how setbacks were opportunities for resilience, which developed from such setbacks, making it easier to bounce back quickly in the future. These discussions took place in company with his mother.

Fourth interview

During the interview the initial battery of psychological test results were again discussed, with particular focus on developmental areas of autonomy, relaxation, purpose in life, such as realizing his talent becoming a top sportsman, resilience through relaxed focus, channelling and optimizing negative energy such as anxiety and anger into excitement, concentration and bouncing back after setbacks. The interview specifically focused on optimizing energy through zone experiences and relaxed focus. In that the following week was apparently very full of tough sporting commitments, the psychologist interpreted that life has many ups and downs and that it would be interesting to see how effective the techniques would be in a really tough week. The motto

discussed was: "When the going gets tough the tough get going," and that top sportsmen enjoy and live for such challenges for the opportunity to compete, show skills and flow at higher level. Various interpretation and sporting examples were given of centring in the heart and aligning lower movement and upper thinking centres, the latter "monkey mind' activity being associated with fidgets, distractibility and anxiety and how stress increases if events are perceived as stressful. Emphasis was on getting into zone through "hurrying slowly", using more haste and less speed, which improved effectiveness and fun. Heart centred zoning offered the opportunity for more enjoyable and improved performance in life as well as sport and schoolwork.

Encouraging was A's apparent learning during actual HeartMath practice and growing insight about relaxing more when challenged to optimize resilience as well as improve focus and flow. He performed exceptionally well on the breath pacer with 91% green high coherence, showing vast and developing potential for fun focus. Discussion centred on full heart focused breathing. Interpretation also centred on the amplitude and coherence of his heart rate variability pattern, spanning 30 beats or more as indication of alignment, balance, harmony, adjustment and health. Most importantly, A. himself observed how his performance decreased when he fidgeted and improved when he relaxed with fuller heart focused breathing. He will monitor retention of this insight and skill next week.

Fifth interview

HeartMath equipment was malfunctioning, thus decision to discontinue its use at home and rather continue daily practise of the quick coherence technique involving heart-focused breathing and cultivation of positive feelings of fun and flow. Every week A continued to perform better in the HeartMath session, especially the first sessions. He continued to bounce back with more relaxation and focus if his performance momentarily dropped off. Much less fidgets and distractibility were noticed and more relaxed, full diaphragmatic breathing. The psychologist interpreted that A was a model sportsman and a joy to coach. A committed relationship had developed, and the family are maintaining their motivation and support for the programme.

Sixth interview

Wrap up session with A and Mother. Discussion on teacher's concern as to certain friends' negative influence on A. Emphasis on flow and zone activities. We had five HeartMath sessions with over 80% high coherence in the last three sessions. Discussion was on optimal experience, balancing fun, focus and flow, as well as rank ordering main sports with more attention on first ranked sport, and "less is more" is a wise strategy to prevent overtraining and optimize fun and performance. HeartMath sessions throughout focussed on breathing through heart at ten second rhythm with rationale that the "floating" coherence experience was simply a slow motion type version of activity on the sports field. Emphasis was again on the importance of optimizing energy in life and sport, and using the trigger words "fun, focus and/or flow" whenever negative emotions of anger or anxiety arose.

Quantitative findings

As observed in Table 1, An improved on all dimensions of the quantitative assessments – except Ryff's psychological wellbeing subscales of self-acceptance, which stayed the same and positive relations, which decreased slightly. This latter finding is interesting indeed and provides some assurance as to the sensitivity and validity of this instrument in view of the incident with friends and teacher that occurred in the same week.

Table 1. Psychophysiological and psychometric measures at Pre-test and Post-test

Psychophysiological and Psychometric and Measures		**Pre-test**	**Post-test**
emWave2	High coherence percentage mean	40	70
Sense of coherence		34	42
Resilience		17	23
Profile of Mood States	Anxious	2	4
	Sad	2	4
	Confused	1	3
	Angry	2	5
	Energetic	2	4
	Tired	2	4
	Total Positive Mood	11	24
Bull's Scale	Imagery	15	19
	Mental preparation	17	20
	Self-confidence	20	20
	Anxiety and worry management	13	16
	Concentration ability	14	20
	Relaxation ability	7	18
	Motivation	16	21
	Total mental skills	102	134
Ryff's scale	Autonomy	8	14
	Personal growth	15	16
	Environ mastery	11	13
	Purpose in life	10	13
	Positive relations	17	16
	Self –acceptance	17	17
	Total Psychological wellbeing	78	89

Integrative evaluation

On the CARE scale the client rated the psychologist as good or excellent on all 10 questions: 1) Making you feel at ease, 2) Letting you tell your "story", 3) Really listening, 4) Being interested in you as a whole person, 5) Fully understanding your concerns, 6) Showing care and compassion, 7) Being positive, 8) Explaining things clearly, 9) Helping you to take control, 10) Making a plan of action with you. Family commitment was demonstrated by the mother's emailed reports each week, which were very detailed, some over 600 words in length. These are not included verbatim in this report for space purposes.

There appears no reason to doubt the integrity and authenticity of the quantitative or qualitative findings. Further randomized controlled studies, with larger samples, as well further in depth investigations are needed to address quantitative criteria such as reliability and validity as well as qualitative criteria such as dependability and transferability. It is considered that a main reason for the apparent success of this intervention was the contractual agreement amongst all stakeholders and shared view that health, developmental, social dimensions and fun were especially important in youth sport and that parents and coaches should not overemphasize performance. The study approximated what Knight and Holt (2013) found to characterise optimal parental involvement in children's sport, such as consistency between the goals parents and children have, the emotional climate parents create, and actual parenting practices. As was the case with a similar intervention with an adult, male rugby player (Edwards, & Edwards, 2016), the present

child case study is instructive with regard to (a) integration of theory and practice of clinical and sport psychology (b) integration of different types of intervention (c) integration of different modes of intervention. Clinical sport psychological case studies will probably increase in future and Virues-Ortega & Martin (2010) offer valuable guidelines and various designs for sport psychologists to use in evaluating their clinical case interventions. The present study concluded with the following experiential evaluations by child, parent and psychologist. Further evaluation by other stakeholders including school and other family members would have added to the integral validity.

Client A.'s evaluation

I have never been to a psychologist or a councillor before. I was expecting to talk more about actually playing sport and getting tips on how to improve my game more physically. For example: how do I get faster on the field and how do I improve my game. My mom explained to me that a sports psychologist is there to help me with my sport mentally, by understanding how my mood can affect how I play my game and to give me advice on how to focus and stay calm during a game. Sometimes I get very frustrated and irritated with myself while playing a rugby match or ice hockey game. I never thought about how your mind can change how you play sport before. After going to the sessions over the past few weeks I understand now what she meant. I will need to practice the breathing and focusing a lot more so that I can feel it working when I am playing sport. I also need to remember to practice and use it often so I don't forget the technique. I am feeling a lot calmer when I am playing sport now and use my words – fun and flow – when I feel I am getting frustrated with my teammates or the referee and with myself for making mistakes during a game."

Mother's evaluation

From my side, I wanted to thank you for taking such an interest in A and I hope that he has helped you with your research. I must apologize for not sending you his school reports as discussed in our earlier sessions, but I can't seem to find them. I will try and get them to you at some stage, should you still want to see them. I think the "HeartMath" system you are working on is very interesting and has a lot of benefits for people who apply and use the technique. I think Seth is still a bit young to fully comprehend the idea. He is also a practical thinker and may find some of the aspects of it "strange" as it relates to something he can't see or touch. It is more on a spiritual level. He definitely sees the benefit of the relaxation and taking a step back when he starts to get frustrated during a game is something that he has put into practice and has seen how it benefits his game in a positive way. Both A and I agree with what you advised with regards to him maybe choosing specific sports to play as opposed to playing everything he loves to see if this helps him with his muscle aches. We will also make a point of allocating more time for rest and recovery. I will keep chatting to A about your program and remind him to use his trigger words – fun and flow. I think, for A, the "seed" has been planted with regard to focusing on what's important in life and having tools like this to help him on the field can only improve his game. He fully agrees with the importance of getting into the zone, and now he has the means to achieve this, simply by using the information you have given him. So for that we thank you.

Psychologist's evaluation

A need to continue to ensure his energy use is not too relaxed and bored or too tense and focused. Balanced harmonious energy use is like driving in the middle of road using accelerator and brake optimally. If too anxious he can use the power words, fun and flow. If too relaxed, bored, fidgety, then focus more. Remember fidgets are just random energy that can be better used for more fun, focus and flow. The perfect game is always just around the corner, around the next bend in the road. It is important that we do our best, make optimum use of our energy and play in the true spirit of the game, which is always greater than the players. We are fellow travellers on the sporting life journey. The sporting life may often be more about losing than winning, about breaking down muscles in order to make them stronger, more about not getting the puck in

the net than scoring goals, more about near misses than goals, but what is most important is the process, the journey, the fun of practice, the comradeship etc. As leader and role model A has especially learnt sport psychological skills, sportsmanship and sociability. It has been a joy to work together.

CONCLUSION

This aim of this brief case study was to describe and evaluate a clinical, sport psychological, HeartMath training intervention. Although the research hypothesis of effectiveness of clinical sport psychological interventions, beneficial helping relationships and HeartMath training, received quantitative, qualitative and integrative support, measured improvements were unexpectedly consistent. Findings endorse theoretical principles and practical guidelines for implementing and evaluating clinical sport psychological and HeartMath interventions. As typical of case studies, communication, relationship and training program variables formed integral, necessary and sufficient components of the greater, ultimate, wholeness of this applied, sport psychology research intervention.

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