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The effects of a cognitive-behavioural stress intervention on the motivation and psychological wellbeing of senior UK police personnel.

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Author Contributions

JJ and MT conceived the research idea, and structured and drafted the manuscript. JJ delivered the intervention and collected the data. JJ and MT analysed the data. JB edited the manuscript and made comments on the final version.

1 Abstract

2 Police employees in the U.K. face increased work demands, against a backdrop of
3 increasing crime rates and continued underfunding, due to the ongoing impact of
4 austerity. Stress and mental illness in policing populations is a major concern for the
5 police themselves, and for the communities they serve. The use of cognitive-
6 behavioural one-to-one coaching (CBC) in critical performance contexts has received
7 scant research attention. But CBC could be particularly useful as a stress management
8 intervention in highly demanding occupational contexts such as policing. The current
9 study applies a pre-post experimental field design to examine the effect of one-to-one
10 CBC with a sample of 50 senior police personnel in the United Kingdom. Participants
11 received eight bespoke one- to -one CBC sessions each, and data were collected at pre-
12 intervention, post-intervention, and follow-up phases. Data showed that CBC decreased
13 maladaptive cognitions (irrational beliefs), and increased self-determined motivation,
14 and the satisfaction of basic psychological needs (wellbeing) in senior police personnel.
15 Hair cortisol levels were used to determine changes in stress, but data did not suggest
16 that CBC had a meaningful effect on pre-post cortisol levels. Social validation data
17 indicated that CBC facilitated stress coping, and corroborated statistical analyses. The
18 applied issues surrounding the use of CBC in critical performance contexts are
19 discussed, along with guidance for the future use of CBC in applied psychology
20 research.

21 Keywords: REBT; REBC; rational; CBT; CBC; coaching; one-to-one; work;
22 psychophysiology

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The effects of a cognitive-behavioural stress intervention on the motivation and wellbeing of senior UK police personnel.

Stress has major implications for physical and mental health (Cooper & Quick, 2017). The United Kingdom Health and Safety Executive (HSE) reported that in 2017 12.5 million working days were lost due to work-related stress, depression or anxiety with 526,000 workers reported to be suffering (HSE, 2018). Of those suffering, there is a higher prevalence of stress in public service industries such as policing. Stress in policing can affect occupational performance, and the personal lives of employees (Burke, 1993; Finn & Tomz, 1997; Wilson, Tinker, Becker, & Logan, 2001) and is of global concern (Andersen, Papazoglou, & Collins, 2016). Within UK policing, stress and psychological wellbeing have recently been highlighted as an area of ongoing concern, with 80% of the Police Federation Survey respondents admitting to experiencing stress, low mood, anxiety, or other mental health and wellbeing difficulties (Elliot-Davies, 2019). Due to economic austerity conditions in recent years, policing within the UK has been faced with a program of organisational change which has seen decreases in numbers of employees and programs of organisational change to tackle increasingly complex criminal activity (Hesketh, Cooper, & Ivy, 2016) such as child sexual exploitation, modern slavery, and cybercrime (NCA, 2019), which predictably leads to stressful working environments. Specific stressors reported by senior police professionals include lack of supervisor and co-worker support; psychological and physical job demands; role insecurity; and excessive administrative work (Violanti, Ma, Mnatsakanova, & Andrew, 2019).

As a result of rising concerns for the psychological wellbeing of police personnel there are growing calls to provide evidence-based psychological wellbeing interventions in policing (Hesketh, Cooper, & Ivy, 2016). Further, researchers highlight

1 the need for training which develops effective coping skills to enable warranted officers
2 (e.g. police constables; detectives) and non-warranted staff (e.g. police staff
3 investigators; forensic specialists) to meet the demands of the roles they undertake
4 (Andersen, Papazoglou, Nyman, Koskelarnen, & Gustafsberg, 2015). It is thought that
5 being mentally prepared, by learning to adopt effective psychological coping skills, will
6 reduce debilitating stress, increase psychological wellbeing (Hesketh et al., 2016), and
7 improve performance in key areas such as critical decision making (Andersen et al.,
8 2015). Despite the recognised need for wellbeing programs in policing, there is a dearth
9 of applied research examining the effectiveness of stress management interventions in
10 policing (Hesketh et al., 2016). The purpose of the current study is to evaluate a stress
11 management coaching program within a British police organisation, and provide a
12 foundation for evidence-based programs that proactively support the development of
13 psychological wellbeing in public service organisations.

14 One approach to psychological wellbeing training that is under researched is
15 one-to-one cognitive behavioural coaching (CBC; Neenan & Palmer, 2001). One to one
16 CBC describes the application of cognitive behaviour therapy (CBT; Beck, 1976; Ellis,
17 1956) in non-clinical populations (Kearns, Forbes, & Gardiner, 2007) and has been
18 developed to help address procrastination, assertiveness, decision making, and skills
19 development (Gavriel, 2016). For clarification, while there are many similarities
20 between coaching and psychotherapy, coaching is usually undertaken with non-clinical
21 populations and is concerned with goal achievement and the removal of psychological
22 blocks that hamper goal achievement, whereas, therapy supports the treatment of
23 clinical mental health concerns (Neenan, 2018).

24

1 CBC has been successfully used in various performance domains such as sport
2 (Turner, 2019), and business (Turner & Barker, 2015) and more recently in policing
3 (Onyishi, Ede, Ossai, & Ugwuanyi, 2020). For example, Davis and Turner (2019),
4 conducted a group-level intervention with triathletes, applying a form of CBC
5 underpinned by rational emotive behaviour therapy (REBT; Ellis 1956), helping
6 athletes to reduce their irrational beliefs and become more self-determined in their
7 motivation regulation. In a study concerning the redundancy of blue-chip professionals,
8 Turner and Barker (2015) reported that a two-session CBC psychoeducational group
9 intervention resulted in reductions in irrational beliefs, with participants becoming
10 more motivated and better able to control their emotions following the intervention. In
11 a police setting, Onyishi, Ede, Ossai, and Ugwuanyi (2020) reported that a similarly
12 REBT-underpinned CBC approach (Rational Emotive Occupational Health Coaching;
13 REOHC) significantly improved the subjective wellbeing of police officers.

14 CBC due to its CBT roots is predicated on the premise that the quality and
15 intensity of an emotional response, such as that experienced in highly stressful
16 situations, is not the result of direct interaction with the situation itself, but by the
17 person's evaluation of that situation in relation to a set of appraisals (Schmidt, Tinti,
18 Levine, & Testa, 2010). As a result, in CBC individuals learn to regulate their emotions
19 by challenging their unhealthy thought processes and by developing healthier thought
20 processes in a structured and collaborative manner (Turner, 2019).

21 In the sparsely reported application of cognitive behavioural approaches to the
22 management of workplace psychological health, results have shown promise. In a
23 recent review of workplace interventions, a small number of papers suggest that
24 cognitive behavioural stress management interventions appear to be the most effective
25 (Joyce, et al., 2016). There is strong evidence that CBC interventions carried out in the

1 workplace are effective in reducing common mental health disorders such as anxiety
2 and depression (NICE, 2004). In their systematic meta-review Joyce et al. (2016)
3 suggest that CBC can lead to significant improvements in anxiety and depression
4 symptomology. However, within the police population there is a dearth of evidence
5 available which can inform effective interventions. Results of a recent meta-analysis of
6 stress management interventions for police officers included only 12 primary research
7 articles, concluding that future researchers should focus on the development of stress
8 management interventions (Patterson, Chung, & Swan, 2014). Patterson et al. (2014)
9 called for more rigorous studies concerning the efficacy of stress management
10 interventions among police employees.

11 A specific CBC framework which has the potential to bring about wellbeing
12 benefits in police settings is Rational Emotive Behaviour Coaching (REBC; Kodish,
13 2002; Onyishi, Ede, Ossai, & Ugwuanyi, 2020). REBC encompasses the fundamental
14 aspects of Rational Emotive Behaviour Therapy (REBT; Ellis, 1956), such as the
15 ABCDE model, and the focus on irrational and rational beliefs as key drivers of
16 emotional reactivity. Irrational beliefs are beliefs that are dogmatic, inflexible,
17 inconsistent with social reality and hinder long-term goal attainment, whereas rational
18 beliefs are flexible, consistent with social reality, and aid long-term goal attainment
19 (Turner, 2016). The principle goal of REBC is to replace irrational beliefs with rational
20 beliefs to promote functional emotions using the ABCDE model (Ellis & Dryden,
21 1997). The therapeutic process of REBC first encourages the client or group to
22 understand that in the face of adversity (A) their irrational beliefs (B) about the
23 adversity causes their dysfunctional emotional and behavioural responses (C), not the
24 adversity (A) alone. Once this ABC framework is understood, the client is encouraged
25 to dispute (D) their irrational beliefs and replace them with rational alternatives (E).

1 Disputation (or cognitive restructuring) helps the client to understand that their
2 irrational beliefs are false, illogical, and unhelpful, and that rational beliefs are true,
3 logical, and helpful (Dryden, 2009).

4 From an REBC perspective stress is governed by the way in which events are
5 perceived, interpreted, and managed (Ellis, Gordon, Neenan, & Palmer, 2001), aligning
6 with Lazarusian (Lazarus, 1999) Cognitive Appraisal Theory (David, Montgomery,
7 Macavei, & Bovbjerg, 2005). The chief aim of REBC is to reduce irrational beliefs and
8 increase rational beliefs to enhance wellbeing (Diguseppe et al., 2013). There is an
9 emerging need to understand the effects of REBC on psychosocial and wellbeing
10 markers in occupational contexts, and the application of one-to-one REBC in policing
11 has not been reported to our knowledge, however, the exploration of irrational beliefs
12 has been highlighted as an important stage in promoting wellbeing outcomes in
13 policing (Papazoglou & Andersen, 2014). Therefore, in the present study we examine
14 the effects of REBC on the wellbeing of police employees, using self-report measures
15 of wellbeing and hormonal markers of stress.

16 Wellbeing has been conceptualised in many ways (Ryan & Deci, 2001), so to
17 ground the current study in strong theoretical foundations, we define wellbeing using
18 the humanistic framework of self-determination theory (SDT; Ryan & Deci, 2000).
19 SDT is a meta-theory concerning the social conditions that enable or prevent human
20 flourishing (Ryan & Deci, 2017). SDT proposes that wellbeing is more than the
21 subjective experience of positive versus negative affect. Wellbeing represents a state in
22 which people are aware, psychologically flexible, and integrated as opposed to
23 depleted, defensive, psychologically rigid, or compartmentalised (Deci & Ryan, 2008;
24 Ryan, Deci, Grolnick, & La Guardia, 2006).

1 By examining SDT's representation of wellbeing (Ryan & Deci, 2000) and
2 comparing this with the theoretical components of REBC (DiGiuseppe, Doyle, Dryden,
3 & Backx, 2013), there appear to be some important conceptual similarities. First, both
4 SDT and REBC theories agree that negative affect alone is not a sign of psychological
5 ill-being. Second, psychological flexibility is promoted as a state that fosters wellbeing,
6 and third, both SDT and REBC theories promote non-defensive approaches to life's
7 adversities and individuals' self-concept. Finally, SDT and REBC both value the notion
8 that behaviour change occurs through a process of integration as opposed to
9 compartmentalisation (Davis & Turner, 2019).

10 In SDT, the maintenance of psychological wellbeing is assumed to occur in a
11 dialectic process between the environment and the human-being (Ryan & Deci, 2017).
12 In the current study, it is proposed that when individuals adopt fewer irrational beliefs
13 the human-environment dialectic is enhanced, and the process of organismic integration
14 is facilitated. REBC's ABC (DE) model can be thought of as a model of general human
15 functioning (David, Lynn, & Ellis, 2010). Irrational beliefs are thought to be important
16 casual mechanisms in psychopathology while their alternative, rational beliefs, are
17 important in the promotion of wellbeing due to the functional, healthy, appropriate, yet
18 often negative responses, that arise from them when individuals experience stress. In
19 REBC there is an emphasis on the connection between the critical environmental
20 activating event and the beliefs that individuals hold about such events (David,
21 Freeman, & DiGiuseppe, 2010). Holding fewer irrational beliefs and adopting rational
22 beliefs as an alternative perspective positively impacts psychological wellbeing as
23 individuals experience qualitatively different emotional responses and associated
24 behaviours, such as problem-solving flexibility (Diguseppe, Doyle, Dryden, & Backs,
25 2014), thus opening broader communication channels between individuals, the dynamic

1 environment and the adverse events that humans encounter. When individuals hold
2 irrational beliefs, they are not in the most effective position to interact with either the
3 environment or the adversity that they face. For example, a person who exhibits
4 extreme, dogmatic, demands such as “life must be fair” prevents effective, optimal
5 interactions with their unfolding environment and may hinder optimal functioning by
6 adopting debilitating and goal hindering behaviours such as giving up, or refusing to
7 engage with goal directed actions (Digiuoseppe et al., 2014). Under these circumstances,
8 it is less possible for an individual to develop personal competence, exercise autonomy
9 over their endeavours, and meaningfully connect with others.

10 To further explain, SDT employs the central concept of innate basic
11 psychological needs theory (BPNT; Ryan & Deci, 2017) and the satisfaction of basic
12 psychological needs (BPNs) as a foundation for the integration of developing
13 behaviours. BPNT proposes that satisfaction of three BPNs, autonomy (the experience
14 of behaviour as choiceful and self-endorsed at a high level of reflection, rather than
15 pressured or coerced; de Charms, 1968), competence (the experience of behaviour as
16 effective and masterful; White, 1959), and relatedness (the experience of mutual
17 connection with and care for important others; Baumeister & Leary, 1995). The
18 satisfaction of these BPNs are essential to optimal human development, integrity, and
19 wellbeing. Psychological need satisfaction is a necessary condition for human thriving
20 and flourishing, and need frustration is harmful to wellbeing. SDT assumes that all
21 people are affected by the satisfaction of BPNs and an SDT approach is concerned with
22 the difference in the degree of satisfaction and frustration of these needs (Chen et al.,
23 2015). Of Importance for the current study, is that individuals can differ regarding their
24 perception of how salient the satisfaction of BPNs are, or how critically the satisfaction
25 of BPNs is represented in their personal goals and lifestyles. The assumption that, in

1 general, people's feelings, beliefs, motives, goals, and their perception of the
2 environment lead to their behaviour (Ryan & Deci, 2008), is a further conceptual
3 similarity between SDT and REBC theory. REBC theory mirrors the view stated above
4 as it is concerned with how individuals perceive events, the content of their goals and
5 how those perceptions and goals impact the quality of resulting emotions, beliefs,
6 motives, and lived experience (DiGiuseppe, Doyle, Dryden, & Backx, 2013).

7 SDT takes a unique approach to the concept of goal-directed behaviour as it
8 differentiates the content of goals or outcomes and it differentiates the regulatory
9 processes through which goal outcomes are pursued (Deci & Ryan, 2000). This process
10 is outlined by SDT's organismic integration theory (OIT; Deci & Ryan, 1985; Ryan &
11 Connell, 1989). OIT, a subtheory of SDT, aims to capture the complex nature of
12 internalisation; the process of taking in values, beliefs, or behavioural regulations from
13 external sources, and integration; transforming those values, beliefs, or behavioural
14 regulations into one's own (Ryan, Connell, & Deci, 1985). OIT was formulated to
15 elucidate the development and dynamics of extrinsic motivation through a process of
16 integration. It describes how extrinsically motivated behaviours become autonomous,
17 classifying motivation within six main categories that fall on a continuum polarized by
18 intrinsic motivation (i.e., undertaking an activity for its own sake) and amotivation (i.e.,
19 lack of any motivation; Deci & Ryan, 1985). Between these poles, four extrinsic
20 motivation levels are encountered: external regulation, introjected regulation, identified
21 regulation, and integrated regulation. Relevant to the present study, the direction of
22 movement along the continuum, from less to more self-determined motivation can be
23 captured by using the Self Determination Index (SDI; Gillet, Vallerand, Amourab, &
24 Baldesb, 2010), which is a weighted aggregate of the OIT categories of motivation.

1 It is of fundamental importance to consider the process of integration when
2 attempting to understand healthy psychological development and the application of
3 effective behaviour change interventions (Ryan & Deci, 2008). But there is little
4 research exploring interventions which may facilitate the integration of new behaviour
5 which reduces stress and impacts psychological wellbeing positively, although, it has
6 been proposed that stress appraisals will be shaped by the type of motivation
7 individuals experience during a stressful encounter (Ntoumanis, Edmunds, & Duda,
8 2009; Amiot et al., 2004; Skinner & Edge, 2002). Specifically, no research has
9 investigated the possible impact that a person's internal belief system (e.g., irrational
10 beliefs) and consequent emotions and actions have on the satisfaction of BPNs and the
11 process of integration.

12 The OIT and BPNT have been selected as targets for change in the current study
13 in part due to conceptual similarities with REBC (Turner & Davis, 2018). To explain,
14 because irrational beliefs reflect self-pressure (e.g., "I should always succeed") and
15 contingent self-worth (e.g., "I am worthless if I fail"), it is possible to predict that
16 higher irrational beliefs will be associated with lower levels of self-determined
17 motivation, and introjected regulation in particular (see Turner, 2016), where direction
18 for action is controlled by self-imposed sanctions such as to avoid feelings of guilt or
19 shame, or to attain ego enhancement such as pride (Ryan & Deci, 2001). That irrational
20 beliefs might relate to motivation regulation is especially important in the workplace as
21 more controlling forms of motivation have been found to predict poorer physical and
22 psychological well-being, greater health risk behaviours, burnout at work, low
23 organisational commitment, less turnover intention, greater work-family conflict, and
24 overall poorer work performance (Fernet, Guay, & Senecal, 2004; Kuvaas, Buch,
25 Weibel, Dysvik, & Nerstad, 2017; Patrick & William, 2012). In addition, in REBC a

1 clients' self-control procedures are developed and refined, and as a result, clients are
2 encouraged to seek and gain greater autonomy over their emotions and behaviors (e.g.,
3 Ellis, 1982). There is a conceptual link between the core principles of REBC and the
4 satisfaction of BPNs that promote psychological wellbeing, and the integration of new
5 behaviours into one's identity.

6 While there are numerous studies that support the role of BPN satisfaction as a
7 central determinant of psychological health (Deci, Olafsen, & Ryan 2017; Gagne &
8 Blanchard, 2007), and conceptual models that link SDT to theories of stress and coping
9 (Ntoumanis, Edmunds, & Duda, 2009), there is little research which has considered the
10 impact of cognitive behavioural interventions on the satisfaction of BPNs and self-
11 determined motivation. Furthermore, research that examines stress as a process that
12 leads to occupational ill health has received minimal attention, although, SDT has been
13 described as a fruitful lens through which stress at work could be viewed (Olafsen,
14 Niemiec, Halvari, Deci, & Williams, 2017).

15 Research evidence that considers wellbeing from an SDT perspective places the
16 satisfaction or frustration of BPNs as central mediators between stress and wellbeing
17 (Aldrup, Klusmann, & Ludtke, 2017; Deci, Olafsen, & Ryan, 2017). Gillet et al. (2012)
18 investigated the satisfaction and frustration of BPNs of organisational employees, and
19 concluded that satisfaction of the three needs led to greater wellbeing and that
20 frustration of BPNs led to lower wellbeing. In an extensive study of employees Vander
21 Elst, et al. (2012) also found that frustration of BPNs predicted poorer work-related
22 wellbeing. In organisational research, there is an emphasis on using SDT to guide the
23 creation of policies, practices, and environments that promote wellbeing (Deci, Olafsen,
24 & Ryan, 2017) and less emphasis on how interventions can aid the self-development of
25 need satisfying perspectives when faced with unchangeable policies, practices and

1 environments. The current study counters this imbalance by placing an emphasis on the
2 latter.

3 The aim of the present study is to report the effects of REBC on the irrational
4 beliefs, self-determined motivation, satisfaction of BPNs, and endocrinological stress,
5 of senior police personnel. We adopt a within and between-groups experimental design
6 where changes in target variables at pre- and post-REBC are compared between an
7 intervention group and a control group. To mark endocrinological stress we collect hair
8 cortisol (Rickard & Vella-Brodrick, 2013), given that the biological stress response has
9 been defined by the secretion of a range of hormones, of which cortisol is considered
10 the most salient. The measurement of chronic stress via analysis of hair cortisol
11 samples at given time intervals has been shown to be a reliable biological marker of
12 stress, and is an emerging biomarker of chronic stress (Russell, Gideon, Rieder, & Van
13 Uum, 2012). There is some evidence that REBC can influence physiological markers of
14 stress (e.g., blood pressure; Wood, Barker, Turner, & Sheffield, 2017), but researchers
15 are yet to examine the longitudinal effects of REBC on physiological markers of stress
16 such as cortisol.

17 The current study expands the extant literature in several ways. First, the current
18 paper reports the first robust (experimental) study of one-to-one REBC in an
19 occupational setting. Compared to past research, the present study recruits a
20 comparatively large-sample of participants, and applies a higher dose of REBC than is
21 typically observed. This is important because past REBC studies are limited by their
22 short duration and brief participant contact (Lyons & Woods, 1991). Second, for the
23 first time in research the effects of REBC on SDT-related variables and hair cortisol is
24 examined. This builds on some initial evidence from sport literature that REBC can aid
25 SDT outcomes (Turner & Davis, 2018), and that REBC can influence biological stress

(Wood et al., 2017). Based on conceptual underpinnings (e.g., Turner, 2016) it was hypothesised that an eight-session one-to-one REBC program would decrease irrational beliefs, increase BPNs and self-determined motivation, and reduce cortisol levels (biological stress) in senior police personnel. It was also hypothesised that participants in the control condition would show no change in target variables.

Method

Participants

To determine a suitable sample size, we used past research with a similar design (Turner, Slater, & Barker, 2014) as a basis for a prospective power analysis (Clark-Carter, 2004; Evans, 2007). To achieve statistical power (0.8) for between-subjects analyses to detect medium-large effects, a sample of $n = 50$ participants ($n = 25$ per group) was required. Therefore, we recruited 60 members of a United Kingdom county police organisation (24 staff; 36 officers; female = 30). With support from senior staff within the police organisation, officers and staff of a senior rank were invited to participate via email correspondence, in which a brief outline of the project was included. Participation was voluntarily. Thirteen participants withdrew from the study due to competing time commitments. Therefore, the final sample consisted of 15 staff and 35 officers ($M_{age} = 45.86$ yrs.; $SD_{age} = 5.65$ yrs.; female = 28). Participants were randomly allocated to two groups using equal allocation systematic randomised sampling, which ensured that each identified demographic subgroup was equally represented (Evans, 2007). The two groups were: experimental group ($N = 24$; $M_{age} = 47.96$ years; $SD = 5.58$ years; female = 13) and control group ($N = 26$; 43.92 years; $SD = 5.09$ years; female = 13). The experimental group received the CBC (REBC) intervention, and the control group received nothing. Members of the control group were offered the same CBC intervention following a study debrief. Ethical approval

1 was granted from a University Ethics Committee and informed consent was gained
2 from participants prior to all data collection. As the REBC practitioner was a part of the
3 research team, steps were taken to mitigate potential bias in the research procedure.
4 There were no inducements for taking part in the study and participants were informed
5 that their participation was voluntary, and that they were free to withdraw from the
6 study without consequence. Psychometric data was collected via online surveys and the
7 research team did not have sight of the research data until full completion of the
8 intervention and data collection.

9 **Design**

10 We used a between and within-subjects design to assess pre-intervention to
11 post-intervention changes in our target variables between the two groups (e.g.,
12 Cornelisee, Stegaren, & Joels, 2011). After random allocation to the two groups,
13 participants in the experimental group received eight 60-minute one-to-one CBC
14 sessions over the same twelve-week period, whilst participants in the control group
15 received nothing. All participants were assessed at the same three time-points, using an
16 online survey, on self-reported target variables; irrational beliefs, the satisfaction of
17 basic psychological needs, self-determined motivation. These time points were pre-
18 intervention, post-intervention (immediately following completion of the intervention
19 or at the 12-week time point for the control group), and follow-up at six months
20 following the intervention. In addition, all participants provided hair samples, to
21 determine cortisol levels, at pre-intervention and post-intervention time points. In
22 addition, fifteen participants in the experimental group completed video diaries
23 throughout the study period to indicate how they felt each week. The remaining
24 participants in the experimental and control group did not feel comfortable recording a
25 video diary and elected to withdraw from this part of the procedure. After the final

1 collection of self-report and cortisol data, social validation was completed with the
2 experimental group, via social comparison by peers, and a short questionnaire at a time
3 point six months following the completion of the intervention to test the long-term
4 impact the intervention.

5 **Measures**

6 **Irrational Beliefs.** The irrational performance beliefs inventory (iPBI; Turner et
7 al., 2016) was used in the present study. This inventory has 28 items for which
8 participants are asked to indicate the extent to which they agreed with each of the 28
9 statements on a 5-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly*
10 *agree*). Higher scores indicate stronger beliefs. The iPBI is currently the only scale that
11 specifically measures performance related beliefs. The iPBI has indications of good
12 criterion, construct, concurrent and predictive validity in professional working
13 environments (Turner et al., 2016). In the current study, Cronbach's alpha across all
14 three time points ranged from .87 to .95.

15 **The Satisfaction of Basic Psychological Needs.** The basic psychological need
16 satisfaction in general scale (BNSG; Johnston & Finney, 2010) measures the general
17 need satisfaction in one's life (Gagné, 2003). The scale was adapted from a widely-used
18 measure of need satisfaction in the workplace (Deci et al., 2001). The scale consists of
19 21 items and 3 subscales that correspond to the degree to which the participant
20 experiences satisfaction of the need for autonomy, competence, and relatedness.
21 Participants were asked to what extent the scale items were true to them using a 7-point
22 Likert-scale ranging from 1 (*not true at all*) to 7 (*very true*). Higher scores indicate
23 greater need satisfaction. The reported internal consistency for the subscale ranges from
24 acceptable to good. As in previous research (Molix & Nichols, 2013) the three

1 correlated subscales were averaged to obtain a single index of general need satisfaction
2 ($\alpha = .74 - .85$).

3 **Occupational Motivation and Self Determination Index.** An adapted version
4 of the Sport Motivation Scale (SMS; Pelletier, Tuson, Fortier, Vallerand, Briere, &
5 Blais, 1995) was used to measure the motivation of the participants in their work. The
6 SMS consists of seven subscales of four items each, that measure intrinsic motivation
7 (to know, to accomplish things, and to experience stimulation), extrinsic motivation
8 (identified, introjected, and external), and amotivation. The SMS has adequate
9 psychometric properties including fair levels of construct validity and test retest
10 reliability. Participants are asked to indicate to what extent each scale item corresponds
11 to the reasons for which they currently perform their work roles. Each item is rated on a
12 7-point Likert-scale between 1 (*does not correspond at all*) and 7 (*corresponds*
13 *exactly*). Subscales can be used in combination to form a summary score (Otis &
14 Pelletier, 2005). Using procedures outlined by Vallerand (2001) and in line with
15 previous research (Blais, Sabourin, Boucher, & Vallerand, 1990; Grolnick & Ryan,
16 1987; Senecal et al., 2001) and recent research (Turner & Davis, 2018), a self-
17 determination index (SDI; also known as the Relative Autonomy Index) was calculated
18 (e.g., Gillet, Vallerand, Amourab, & Baldesb, 2010). Higher SDI scores reflect greater
19 self-determined (or autonomous) motivation and a lower score represents less self-
20 determined (more controlling) motivation. Cronbach's alpha across all three time points
21 ranged between .89 to .92.

22 **Stress.** Hair samples taken from the scalp were used to extract cortisol as an
23 objective biomarker of chronic stress (Manenschijn, Koper, Lamberts, & Rossum,
24 2011). Hair cortisol, in contrast to saliva and urine cortisol, enables longitudinal
25 monitoring of stress suitable for assessing stress management strategies (Russell,

1 Koren, Rieder, & Van Uum, 2012). Following previous research (Kirschbaum, Tietze,
2 Skoluda, & Dettenborn, 2009), participant hair strands were cut with scissors as close
3 to the scalp as possible at a posterior vertex position. The size of the strand was
4 selected with the aim of providing a minimum of 50mg of hair for a 3cm segment. To
5 extract cortisol from hair, hair samples were sent to the Biomarker Analysis Laboratory
6 at Anglia Ruskin University. Extraction procedures are in line with those published in
7 previous research (Davenport, Tiefenbacher, Lutz, Novak, & Meyer, 2006).

8 **Social Validation.** The current study can be viewed as a series of single-cases,
9 therefore social validation has been undertaken at the end of procedures to supplement
10 statistical data (Page & Thelwell, 2013; Deen, Turner, & Wong, 2017). It has been
11 argued that statistics alone do not fully detail the efficacy of interventions, and social
12 validation can reveal details of socially important outcomes of interventions and the
13 intervention procedures (Page & Thelwell, 2013; Kazdin, 1982). Social validation
14 procedures were used to determine whether the participants' behaviour and/or
15 responses, during the intervention and at 6 months following the intervention, were
16 changed (Kazdin, 1977). Participants were asked to respond anonymously to a post-
17 intervention social validation questionnaire. The questionnaire was emailed to the
18 participants in the experimental group 6 months following completion of the
19 intervention phase. The aim of the questionnaire was to establish the practical (applied)
20 effectiveness of the intervention (Mellalieu, Hanton, & Thomas, 2009) and its ongoing
21 impact (Richardson & Rothstein, 2008). The protocol followed was in-line with
22 previous work (Mellalieu et al., 2009) where a short questionnaire consisting of four
23 Likert-response questions and one open-ended question was used. Social validation
24 questions were systematic, concise, based on a single item, and unambiguous (Shaw &
25 Wright, 1967). The questions addressed the three areas of social validity identified as

1 the social significance of the goals, the social appropriateness of the procedures, and
2 the social importance of the effects (McCarthy, Barker, Jones, & Moran, 2011). Open-
3 ended questions were collated and themes were deducted by following guidelines of
4 thematic analysis (Braun & Clarke, 2006). A deductive approach was chosen due to the
5 specificity of the research questions presented. The collected data was read and re-read,
6 so that familiarity with the content was achieved, after which coding and theme
7 development were directed by the existing theory of REBC, stress, and the satisfaction
8 of basic psychological needs (e.g., Deen, Turner, & Wong, 2017).

9 **Intervention Procedure**

10 The CBC (REBC) intervention was delivered by a qualified REBC practitioner
11 (Advanced Certificate Practicum), to the participants in the experimental group over a
12 concurrent 12-week period. All one-to-one sessions were conducted in a private
13 meeting room within the police organisation's headquarters and lasted approximately
14 60 minutes. Each participant in the experimental group received 8 individual sessions,
15 equating to 200 hours in total. The intervention followed guidelines of previous similar
16 research (see Turner, 2016, for a review), and was also in line with typical REBC
17 procedures (Dryden, 2009). The intervention included teaching REBCs ABCDE model
18 (A = activating event; B = belief system; C = cognitive, emotional and behavioural
19 Consequences; D = disputes or discussions to reveal engagement of the irrational belief
20 system; E = presentation of rational and effective new beliefs and their resulting
21 consequences; Ellis & Dryden, 1997). As is usual in REBC, participants identified the
22 goal of each session and collaboratively worked with the practitioner in the assignment
23 of homework tasks (Digiuseppe et al., 2014). In sessions, the practitioner and
24 participant explored the participant's current work performance and general wellbeing
25 with a view to promoting greater attainment of goals and wellbeing.

1 **Analytic Strategy**

2 Prior to main analyses, data were screened for missing data, normality, and
3 outliers. For self-report data, Shapiro Wilks tests were performed, and if the presence of
4 significant ($p < .05$) outliers were indicated, then z scores for significant outliers were
5 assessed. Data-points with z scores greater than two were winsorized ($n = 30$). For hair
6 cortisol, data were significantly positively skewed and kurtosis (Skewness = 9.85;
7 Kurtosis: Time 1 = 17.87, Time 2 = 17.00) and contained significant outliers. Indeed,
8 hair cortisol concentration obtained from the participants ranged from 1.39 pg/mg to
9 184.02 pg/mg. Therefore, log10 transformation was applied, and data above $-2/2$ SDs
10 were winsorized ($n = 1$ for Time and $n = 1$ for Time 2). After log10 transformation,
11 data were less skewed and kurtosis (Skewness: Time 1 = 3.03, Time 2 = 3.05; Kurtosis:
12 Time 1 = 2.97, Time 2 = 3.27).

13 Main data analyses were completed in two stages. First, to assess changes in
14 each dependant variable (DV) across the three time-points (within-subjects independent
15 variable), between experimental and control conditions (between-subjects independent
16 variable), three separate mixed-methods MANOVA's were conducted for irrational
17 beliefs, the satisfaction of basic psychological needs, and self-determined motivation
18 (SDI). For hair cortisol, a mixed-methods MANOVA was conducted across two time-
19 points (time-point 1 and time-point 3). Second, pairwise comparisons were conducted
20 across time points within each condition for all DVs. A probability alpha value of $p <$
21 $.05$ was considered statistically significant, and small ($.01$), medium ($.06$), and large
22 ($.14$) effect sizes were determined using partial eta squared (η^2 ; Cohen, 1988).

23

24

25

Results

Change over time

Irrational beliefs. For irrational beliefs, the mixed-methods MANOVA revealed a significant large ($\eta^2 = .23$) interactive effect for time*group, Wilks Lambda = .77, $F(2, 42) = 6.12$, $p = .005$. Pairwise comparisons for the REBC condition across the three time points revealed that there was a significant ($p < .001$) difference between time 1 ($M = 92.96$, $SD = 9.04$) and time 2 ($M = 79.85$, $SD = 10.99$), a significant ($p = .001$) difference between time 2 and time 3 ($M = 72.88$, $SD = 16.53$), and a significant ($p < .001$) difference between time 1 and time 3. Pairwise comparisons for the control group from time 1 ($M = 92.45$, $SD = 2.55$) to time 2 ($M = 90.45$, $SD = 2.41$) and to time 3 ($M = 87.36$, $SD = 2.86$) revealed no significant differences.

Self Determination Index. For self-determined motivation, the mixed-methods ANOVA revealed a non-significant medium-large ($\eta^2 = .08$) main effect for time*group, Wilks Lambda = .919, $F(2, 42) = 1.039$, $p = .169$. Pairwise comparisons revealed that there were no significant differences between any of the time points in the REBC group or the control group.

Basic Psychological Needs. For the satisfaction of BPNs the mixed-methods ANOVA revealed a significant large ($\eta^2 = .19$) interactive effect for time*group, Wilks Lambda = .089, $F(2, 44) = 1.516$, $p = .009$. Pairwise comparisons for the REBC group revealed that there was a significant increase ($p = .025$) from time 1 ($M = 32.27$, $SD = 4.00$) to time 3 ($M = 34.21$, $SD = 3.43$). There were no significant differences between any of the other time points. Pairwise comparisons for the control condition revealed that there was no significant difference from time 1 ($M = 31.91$, $SD = 3.39$) to time 2 ($M = 30.05$, $SD = 5.03$) to time 3 ($M = 31.05$, $SD = 3.46$). See supplementary material for individual BPNs analysis.

1 **Hair Cortisol Concentrations.** For hair cortisol, the mixed-methods ANOVA
2 revealed a non-significant small ($\eta^2 = .01$) interactive effect for time*group, Wilks
3 Lambda = .990, $F(1, 48) = .499$, $p = .483$. There were no significant differences
4 between Time 1 and Time 3 in the REBC group or the control group.

5 In summary, data analyses indicate that participants in the REBC group reported
6 significant reductions in irrational beliefs and significant increases in the satisfaction of
7 BPNs from pre- to post-intervention. There were no statistically significant changes in
8 self-determined motivation and hair cortisol concentration. See table 1 for a summary
9 of changes in dependent variables across time and between groups.

10 **Social Validation.**

11 Seventeen participants reported that the intervention was both satisfactory and
12 effective. Participants indicated that the performance components that they selected
13 were meaningful to them ($M = 6.12$, $SD = .97$, $Range = 2.00$), and that any changes that
14 had occurred following the intervention were significant in their lives ($M = 5.69$, $SD =$
15 1.06 , $Range = 4.00$). Also, participants reported that these changes have been
16 significant to other people in their lives, such as work colleagues, team members,
17 and/or family members ($M = 5.06$, $SD = 1.30$, $Range = 5.00$). Participants reported
18 satisfaction with the intervention ($M = 6.35$, $SD = .10$, $Range = 4.00$) and indicated that
19 the delivery of the intervention was practical and acceptable ($M = 6.35$, $SD = .61$,
20 $Range = 2.00$). There was also strong agreement that the intervention was useful to
21 participants ($M = 6.47$, $SD = 1.01$; $Range = 4.00$). But there was less agreement that
22 others had commented on significant changes to participants' performance following
23 the program ($M = 4.18$, $SD = 1.74$, $Range = 5.00$). This score was lower than other
24 social validation scores, possibly because the behavioural consequences of the
25 cognitive shifts reported by participants may not have been overt enough for others to

1 notice. Perhaps participants' emotional changes were more salient to them, which are of
2 course experienced more privately. Finally, participants agreed that they had a good
3 understanding of the REBC (ABCDE) framework ($M = 5.59$, $SD = 1.42$, $Range =$
4 5.00).

5 Qualitative data were thematically analysed following relevant guidelines
6 (Braune & Clarke, 2006). Five themes and eleven sub-themes were collated (Table 2)
7 from the social validation data, which are presented below with examples. The first
8 theme centred on 'decreases in irrational thinking' and increases in rational beliefs,
9 with seven participants articulating that the intervention helped them to adopt an
10 alternative perspective (e.g., participant 17 "It gave me the understanding to see things
11 and think things through differently") and greater clarity of thought (e.g., participant 3
12 "It enabled me to think more clearly, become more balanced and measured in my
13 assessment of what is going right and wrong in my approach to work").

14 The second theme centred on the articulation of 'reductions in stress'. A sub-
15 theme of "experiencing pressure without stress" demonstrated that while external
16 events are unchanged, the intervention provided an opportunity to experience stress in a
17 different and more helpful way (e.g., participant 5 "I was able to make sense of how I
18 was feeling and recognise what a difficult period I had been through and this enabled
19 me to ensure I was proportionate in my response to myself"). The second sub-theme
20 highlights that the intervention provided strategies for enhancing participants' ability to
21 cope (e.g., participant 6 "I feel I have the tools to help me diffuse that more effectively,
22 limiting the impact" and participant 7 "The experience was a little relief for a new tool
23 kit and way of working in an otherwise overwhelming world where we are just coping
24 and not improving").

1 The third theme centres on ‘increased psychological wellbeing’ and participant
2 6 reported that they “recognise how valuable it has been to my well-being”. Sub-themes
3 demonstrate the impact that the intervention had on satisfaction of each of the three
4 basic psychological needs, (e.g., for autonomy satisfaction, participant 6 stated “Once
5 the [intervention] had finished I felt far more in control of my life and career”, for
6 relatedness satisfaction, participant 10 stated “I realised everyone had been in the same
7 boat at one time or another”, and for competence satisfaction participant 16 stated “This
8 course gave me the confidence to confront my fears, my lack of confidence in my
9 abilities and what I needed to do to improve my performance and abilities”.

10 The fourth theme of ‘psychological consequences’ further demonstrates the
11 experimental groups emotional and motivational responses to the intervention. In terms
12 of emotion, participants reported a range of positive emotional states (e.g., participant
13 3 stated that they felt “exhilarated, reflective and ambitious” and participant 1 stated
14 that they felt “positive, good to be challenged and supported” and participant 9
15 commented that they were “able to let certain issues go more easily”). In terms of
16 motivation, participants reported that as a result of the intervention they were
17 “empowered” as stated by participant 9 and “motivated to do [their] job”, as stated by
18 participant 5.

19 For the final theme of ‘client experience’, participants reported that the
20 intervention was useful and practical (e.g., participant 7 stated that the intervention was
21 “probably the most useful and practical development experience of my career” and
22 “the practical element and philosophical approach, for me, had great application to the
23 police and like services”). The participants also gave some suggestions for the
24 enhancement of the intervention, (e.g., participant 3 stated “It took me a session or two
25 to work out what they were really about and how they could help. That may be a

1 reflection on working for the police where we are used to very tactical and transactional
2 conversations” and participant 7 stated “I do think you need to feel the flames of not
3 coping or not achieving to try this. It just makes sense but you do need your own
4 examples to work through and apply the framework”).

5 **Discussion**

6
7 The aim of the present study was to examine the effects of an REBC
8 intervention on the irrational beliefs, self-determined motivation, satisfaction of BPNs,
9 and stress as measured via hair cortisol, of senior police personnel. We hypothesised
10 that the REBC intervention would decrease irrational beliefs and stress, and increase
11 self-determined motivation and basic psychological need satisfaction.

12 In-line with our hypotheses, data indicated that irrational beliefs reduced
13 significantly in the experimental group compared with no significant changes in the
14 control group. The reduction in irrational beliefs is in-line with previous researchers
15 applying REBC based interventions across sport (e.g., Turner & Davis, 2018), business
16 (Turner & Barker, 2015), and exercise settings (Outar, Turner, Wood, & Lowry, 2017).
17 Given that a chief goal of REBC is to reduce irrational beliefs, our data is unsurprising,
18 but nonetheless, reflect the first indication that REBC as applied in a police context has
19 comparable effects on irrational beliefs as found in many samples (see David, Cotet,
20 Matu, Mogoase, & Simona, 2018). In sum, the reductions in irrational beliefs reported
21 in our study echoes the vast corpus of the extant literature.

22 Also, as hypothesised, there was a significant increase in the perceived
23 satisfaction of BPNs (autonomy, competence, and relatedness) for those in the
24 experimental group. Indeed, this study is the first to demonstrate the effects of REBC
25 on the satisfaction of BPNs, and is the first evidence that there may be an association
26 between irrational beliefs and the satisfaction of BPNs. To explain, the main purpose of

1 REBC was to target and reduce irrational beliefs and so the satisfaction of BPNs were
2 not explicitly addressed in the intervention. However, the REBC intervention may have
3 caused a shift in an individual's perception of the locus of causality of emotional
4 responses, enabling individuals to take responsibility for their emotional experiences
5 and act constructively to negotiate adverse events (Palmer & Dryden, 1993). For
6 example, it is common that individuals believe that their emotional responses are the
7 sole result of the adverse events which befall them, rather than resulting from the
8 perception they autonomously choose to take of the event. This heightened perception
9 of autonomy satisfaction speaks to an association between one of the core processes of
10 REBC and perceptions of autonomy satisfaction. That is, since participants are
11 encouraged to take responsibility for their thoughts and beliefs and to learn to challenge
12 these thoughts and beliefs independently, it is possible that they feel greater autonomy
13 satisfaction when they experience emotions and behaviours (Ryan & Deci, 2008).
14 Further, at the core of REBC is the idea that people can choose their beliefs, and this
15 notion of choice is at the core of autonomy satisfaction (Deci & Ryan, 2000). These
16 theoretical contentions are supported by post-intervention comments made by several
17 participants. To illustrate, participants became aware and could accept that they could
18 be the source of their stress and were "inflicting stress" on themselves and then were
19 able to decide on how they responded to their own performance by being
20 "proportionate" in their response to their self.

21 Increases of a person's perspective of their competence could be viewed more
22 optimally by holding a rational mindset. It is possible and was demonstrated with the
23 social validation data that a rational approach helped participants to develop new skills
24 and professional relationships, this in turn, had a positive impact on their perception of
25 competence satisfaction. Furthermore, holding a rational perspective enabled

1 participants to demonstrate their capabilities in what were personally high-risk
2 situations, such as speaking up at meetings or facing challenging conversations. In
3 support of this contention Ellis (1978) teaches executive leaders to use a rational
4 approach to improve professional relationships and previous research has supported
5 REBC as a means of managing social anxiety (Turner, Ewen, & Barker, 2018).

6 There was a positive effect on co-worker relationships following the
7 intervention. Rational philosophy holds as one of its core beliefs the concepts of
8 unconditional self, other, and life acceptance (Diguseppe, Doyle, Dryden, & Backx,
9 2013). Therefore, it is logical that unconditional acceptance underpins relatedness
10 satisfaction. Indeed, Ellis (1962) started his psychotherapeutic career as a relationship
11 psychologist but concluded that the foundation of effective relationships was an
12 individual's acceptance beliefs both of one's self and of others.

13 Despite the theoretical overlaps between irrational beliefs and OIT (Turner,
14 2016), the results of the current study indicate no significant increases in self
15 determined motivation from pre-REBC to post-REBC. There are several explanations
16 for this. First, unlike in previous research (e.g., Davis & Turner, 2019) the SDI did not
17 form part of our pre-screening for the study. Therefore, low participant SDI was not
18 necessary for inclusion in the study. It could be that the small but not statistically
19 significant increases observed in SDI in the current study reflects a sample who are
20 already high in self determined motivation. Second, it is of course possible that
21 irrational beliefs and self-determined motivation are not associated, since a reduction in
22 irrational beliefs would presumably be accompanied by increases in SDI scores.
23 Finally, the lack of statistically significant increases in SDI scores may be linked to the
24 psychometric properties of the index. Self-determined motivation is a complex
25 construct made up of a range of regulation types. Readers should be aware that the

1 appropriateness of calculating the SDI has been questioned on conceptual and statistical
2 grounds in SDT literature (e.g., Chemolli & Gagné, 2014). Readers should view these
3 results with caution and future research should explore the links between REBC and
4 SDI scores in more detail.

5 Concerning stress, inferential statistics indicate that hair cortisol concentrations
6 remained stable for both the experimental and control groups. Descriptive data did,
7 however, indicate that the intervention influenced the cortisol concentration of those in
8 the experimental group, who showed a small reduction. Specifically, hair cortisol
9 concentrations decreased in most of the experimental group participants ($n = 17$),
10 compared to the control, group ($n = 9$). The practical and subjective impact, as opposed
11 to the statistical significance, for those participants who did demonstrate reductions in
12 hair cortisol concentrations is potentially important, given that higher cortisol is related
13 to poorer health outcomes. When individual data is considered, in line with single-case
14 analyses, alongside inferential statistics, it is possible to understand the idiographic
15 effects of the REBC intervention on hair cortisol concentrations. Indeed, there are
16 current debates in applied psychology which highlight an over-reliance on inferential
17 statistics (Fricker, Burke, Han, & Woodall, 2019). The current study is an example of
18 where a broader evaluation of results, which can often be considered subordinate to p -
19 value, is needed (McShane, Gal, Gelman, Robert, & Tackett, 2019).

20 Despite the reduction in cortisol concentration for seventeen participants, the
21 sample size was limited due to the expense of processing hair cortisol leaving the
22 analyses under-powered. Due to small sample sizes, inherent in intervention studies it is
23 not clear whether measuring stress by evaluating hair cortisol concentration is the most
24 suitable method for indicating biological stress change. For example, there was a range
25 in hair cortisol concentration from 1.83 pg/mg to 184.02 pg/mg at time point 1, and

1 from 1.39 pg/mg to 151.48 pg/mg at time point 2. This variation makes the data
2 difficult to evaluate using standard statistical tests. There are limited studies
3 demonstrating a change in hair cortisol concentration following stressful events. The
4 intervention studies that have been conducted focus on extreme stress responses (e.g.
5 Feng et al., 2011) or participants have been pre-screened for stress (Goldberg et al.,
6 2014). Also, there is a variation in the way in which chronic stress is measured via hair
7 cortisol concentration with some studies evaluating 3 cm hair sample length, as in the
8 current study, compared with 1 cm hair sample length in others (e.g., Goldberg et al.,
9 2014). Future researchers could address these limitations in several ways. They could
10 base study participant selection on hair cortisol levels, ensuring that only those with
11 higher hair cortisol concentrations were participating. Additionally, they could measure
12 salivary or blood cortisol at regular intervals to observe and report on acute changes in
13 stress giving a clearer picture of the overall stress response (Russell, Koren, Rieder, &
14 Van Uum, 2012). Alternatively, the addition of a subjective measure of stress may be
15 useful as there are debates within the literature regarding inferences of stress made with
16 objective measures when participants do not report experiencing it (Panari, Guglielmi,
17 Ricci, Tabanelli, & Violante, 2012). In the case of predicting the impact that CBC
18 interventions have on stress, objective measures such as hair cortisol concentration may
19 fail to capture the extent to which individuals' experience stress (Muckler & Seven,
20 1992). Objective measures of stress reflect what is happening biologically and fail to
21 capture coping, the resources used while coping, the resources still in reserve, personal
22 experience, and levels of motivation. Subjective ratings also consider individual
23 differences in ability, state, and attitude. Such differences are not captured by objective
24 measures, giving subjective measures some important advantages, whilst also suffering
25 the limitation of potential response bias.

1 In further relation to stress, some of the findings of the current study are not in
2 line with the extant literature. Specifically, a meta-review presented by Joyce et al.
3 (2016) concluded that CBT based stress management interventions have a significant
4 and positive impact on stress, however, the studies included in Joyce et al. (2016) used
5 only subjective measures of stress which may respond differently to CBC interventions
6 using objective markers. In the current study, there were no statistically significant
7 improvements in objective markers of stress. The lack of statistical significance could
8 be explained in several ways, for example, objective markers of stress do not capture
9 the subjective stress experience, also the variability of the objective marker used in the
10 current study may have hindered the analysis of the data, as noted above. It would be of
11 advantage to continue to use psychophysiological markers of stress so that comparisons
12 can be made to other, non-psychological, stress reduction strategies, such as physical
13 activity interventions (Richardson & Rothstein, 2008). So, comparing the current
14 findings to research which relies upon subjective stress markers, such as the literature
15 covered in Joyce et al. (2016) is problematic. In contrast, the meta-review reports
16 findings which *are* consistent with the current study in relation to counselling
17 interventions. To be clear, the one-to-one CBC intervention conducted in the current
18 study can be thought of as a hybrid of both counselling interventions and stress
19 management interventions. Joyce et al. (2016) report limited evidence for the effects of
20 counselling interventions on reducing the symptoms of stress echoed by the findings of
21 the current study. McLeod and McLeod, (2001) found a small yet positive impact on
22 work-related outcomes such as job commitment, work functioning, and job satisfaction
23 for counselling approaches. These work-related outcomes are kin to the satisfaction of
24 BPNs in the current study. Both McLeod and McLeod, (2001) and the current study
25 demonstrate increases in these work-related outcomes.

1 In addition, an increased sample size would be desirable, but the intervention
2 elements at the core of the study would be compromised. Given the nature of the study,
3 with its requirement for cortisol collection and analyses and the use of one-to-one
4 sessions, the financial and time investment from the policing organisation was already
5 large, and a bigger sample size would have been disagreeable.

6 The present study has some additional limitations that if addressed, would
7 strengthen the work. For example, data collection occurred at three main time-points,
8 but continuous (daily, weekly) data collection would also add to our understanding of
9 when and how change occurs. There is of course an ethical balance between the burden
10 placed on participants in a stress-related research project and the amount of data that is
11 reasonable to collect. Adding daily or weekly measures to an already complex protocol
12 could affect participant motivation and result in greater participant drop-out. In the
13 present study, the effects of CBC have been compared to the absence of an
14 intervention. Such is the growing burden on resources within public services, the
15 participating police constabulary could simply not have resourced an attention placebo,
16 as well as an REBC programme. Since there is an ethical requirement to inform
17 participants about study design and to describe the intervention conditions under
18 experimentation (Popp & Schneider, 2015), an attention-placebo condition was less
19 desirable and ethically not justifiable for this sample, because of the pressures under
20 which the police perform their roles. Future research could compare CBC to an
21 attention-placebo condition or alternative interventions (e.g., Turner, Slater, & Barker,
22 2015) such as relaxation, as this could strengthen the argument for applying a REBC
23 approach as opposed to simply receiving an intervention. The addition of an attention-
24 placebo condition is desirable so that the specific effects of the psychological
25 intervention can be examined with high internal validity (Vickers & Craen, 2000). An

1 attention-placebo condition, or alternative intervention, would allow for the assessment
2 of the stability of the intervention effect since a placebo or alternative intervention is
3 less likely to produce stable reductions in dependant variables (Vickers & Craen, 2000).
4 The need for an attention placebo would also help to account for socially desirable self-
5 report responses in the treatment condition. That is, if both groups received some
6 meaningful interaction with the practitioner, then reporting changes in target variables
7 in the treatment condition over and above the attention placebo condition would
8 strengthen the conclusions that the intervention worked through targeted mechanisms
9 (e.g., irrational beliefs) over and above the working alliance. Future research could
10 employ a more tightly controlled laboratory protocol to experimentally examine the
11 effects of REBC protocols compared to a attention placebo condition.

12 The lack of statistical significance may also be an important indication for us to
13 explore. What is apparent is that there is no worsening of motivation or satisfaction of
14 BPNs and cortisol levels did not spike because of the intervention, but, an important
15 observation to make is that many of the participants were able to put themselves into
16 situations in which they would have previously not been able to do. The social
17 validation data suggests that participants could develop new skills and take more
18 interpersonal risks following the intervention. Such an increase in facing stressful
19 situations could arguably cause a drop in BPNs, and it is likely that the intervention
20 provided the participants with the psychological ability to face their fears and
21 challenges.

22 The current study offers various valuable applied insights due to its use of one-
23 to-one intervention support. Practitioners are often prepared to receive cynical and
24 pessimistic participant groups displaying some resistance in terms of engaging with the
25 intervention (Turner & Barker, 2014). The simplicity of the ABCDE model aided in the

1 rapport building process as participants could very quickly see the use and application
2 of the model and the practitioner in this instance did not experience such resistance. In
3 a transactional command environment such as policing, the REBC model may lend
4 itself to the prevalent leadership style present in police culture. In addition, seven
5 participants became visibly emotional during sessions and it was necessary to ensure
6 that the sessions were conducted in a private space. Participants felt safe in the sharing
7 of information once there was a clear understanding of the limits of confidentiality
8 under which sessions fell. It was important at key points to remind participants of this,
9 specifically when they appeared to be at a point of conflict about what was an honest
10 reflection and what they felt was appropriate to share. It may be important to give more
11 information about what participants can expect in sessions. For example, there may be
12 a need for an orientation session which specifically explains how the intervention
13 works or how change comes about when applying the REBC intervention so that
14 participants know, to some degree, what to expect. It is important that clients
15 understand the extent to which REBC can support them as well as the vital importance
16 of their role and actions in the process of change (MacAskill, 1995).

17 After the completion of the current study, a recent piece of research emerged
18 that is highly relevant to the discussion. Onyishi, Ede, Ossai, and Ugwuanyi (2020)
19 conducted a REBC based intervention with police officers and staff in Nigeria,
20 demonstrating positive effects on subjective wellbeing. Considering the findings of
21 both the present study and Onyishi et al., there is rationale for further integration of
22 REBC interventions into police settings. REBC could be used efficiently across large
23 groups using educational workshops (Turner & Barker, 2015), Rational Emotive
24 Education programs (REE; Knaus, 1977), online coaching (David, Predatu, & Cardoso,
25 2018), and one to one REBC as is reported in this study. Further testing of the

1 intervention is required which addresses the limitations of the current study, such as the
2 use of police specific measures of target variables, and a more detailed idiographic
3 approach to data analysis in order to examine the details of the content of one-to-one
4 sessions and how those subtleties impact intervention process and outcomes. Finally,
5 programs which focus on developing REBC skills within leadership development
6 programs, or wellbeing “champion” roles within policing, may broaden the positive
7 impact that applying REBC has.

8 **Conclusion**

9
10 The current study adds to the extant literature by demonstrating that REBC can
11 impact positively upon psychological wellbeing through the support of basic
12 psychological needs. The study also addresses limitations found in previous research
13 (Richardson & Rothstein, 2008) and in psychology research in general (Normand,
14 2016). Specifically, it addresses calls for stress management intervention studies which
15 incorporate random assignment to treatment and control groups, reports on the long-
16 term effect of the intervention through means of social validation data, and reports the
17 results of all the outcomes measures, regardless of statistical significance and so
18 revealing the complexity of the subject. The aim of many stress management
19 interventions is to reduce the symptoms of stress, anxiety, low mood, or other
20 difficulties (Joyce et al., 2016) but they do not further promote the development of
21 psychological health. Meanwhile increasing evidence supports the health protective
22 features of psychological well-being in reducing risk of ill health and promoting length
23 of life (Ryan & Deci, 2017). The concept of psychological wellbeing goes beyond the
24 absence of psychological ill-health and promotes quality of life; positive affect and
25 optimal functioning (Ryan & Deci, 2017). Focusing the goal of stress management
26 interventions on a more positive and holistic sense of wellbeing (including rational

1 beliefs and motivation) could be advantageous as this may promote personal
2 development and could have a positive impact on human functioning and performance.

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1 Table 1. Changes in dependent variables across time and between groups.

Variable	REBT			Control			<i>F</i>	η^2
	Time 1	Time 2	Time 3	Time 1	Time 2	Time 3		
	M(SD)	M(SD)	M(SD)	M(SD)	M(SD)	M(SD)		
Irrational beliefs	92.96 (9.04)	79.85 (10.99)	72.88 (16.53)	92.44 (2.55)	90.45 (2.41)	87.36 (2.86)	6.12*	.23
SDI	1.84 (17.94)	6.89 (13.82)	6.27 (16.58)	0.856 (16.12)	-3.46 (21.58)	0.97 (16.09)	1.04	.08
BPN	32.27 (4.00)	33.00 (3.28)	34.21 (3.43)	31.91 (3.39)	30.05 (5.03)	31.05 (3.46)	1.52*	.19
Competence	31.16 (4.59)	32.63 (4.54)	33.83 (4.43)	30.49 (4.60)	28.71 (6.42)	29.33 (4.53)	3.57*	.07
Autonomy	28.76 (4.67)	30.08 (4.01)	31.09 (3.36)	29.16 (3.95)	27.56 (5.28)	28.93 (4.12)	1.34	.03
Relatedness	36.74 (5.28)	36.63 (3.59)	37.78 (3.69)	38.23 (4.32)	35.56 (5.49)	36.11 (4.46)	3.87*	.08
Cortisol Conc. pg/mg	8.26 (5.98)	-	7.86 (7.26)	10.01 (11.51)	-	10.09 (12.19)	.499	.01

2 Note. * $p < .01$

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1 Table 2. Themes emerging from thematic analysis of social validation data.

2

Themes	Sub-themes	Extract examples
Reduction in irrational thinking	Reappraisal	<p>I have tried to reflect on events from a more rational mind set so to avoid a negative response and inflicting stress on myself.</p> <p>It gave me the understanding to see things and think things through differently. Seeing challenges as opportunities and that feeling of fear around change should be seen as being brave.</p> <p>It did very much allow me to be more measured in how I thoughts about things and responded.</p>
	Clarity of thought	<p>I have used the ABC model at work and at home to help understand and rationalise behaviour and thought. I have focussed more on my goals and I am more conscious of language in my interactions with others. This has significantly helped me approach issues at work.</p> <p>It enabled me to think more clearly, become more balanced and measured in my assessment of what is going right and wrong in my approach to work .</p> <p>Clear on my goals, strategies etc</p>
Reductions in Stress	Experiencing pressure without stress	<p>This came at a particularly stressful time for me and assisted me in coping and recovering from heightened levels of anxiety and stress.</p> <p>I was able to make sense of how I was feeling and recognise what a difficult period I had been through and this enabled me to ensure I was proportionate in my response to myself.</p>
	Increased ability to cope	<p>The experience was a little relief for a new tool kit and way of working in an otherwise overwhelming world where we are just coping and not improving personally or as a Force.</p> <p>More able to deliver and also cope with whatever was thrown at me.</p> <p>I feel I have the tools to help me diffuse that more effectively, limiting the impact.</p> <p>More able to cope</p> <p>More able to cope with whatever was thrown at me</p>
Increased psychological wellbeing	Satisfaction of BPNs	<p>I have focussed more on my goals and I am more conscious of language in my interactions with others. This has significantly helped me approach issues at work.</p> <p>I recognise how valuable is has been to my well-being.</p> <p>Just thank you for listening and providing me with mental tools to improve my performance.</p>

	Competence	<p>I have been able to take on new challenges and push myself outside of my existing comfort zone.</p> <p>I have suffered with a lack of confidence for a long time which is not in keeping with my career progression or the way I am often seen by others. The sessions helped me to look at the areas which troubled me and appreciate the positive elements of the work I carried out every day and the many positive facets of my life. I feel that this has assisted in my happiness and confidence in my ability to deliver at work.</p> <p>The coaching let me reflect on how I perform and what I could consider to try to make improvements.</p> <p>This course gave me the confidence to confront my fears, my lack of confidence in my abilities and what I needed to do to improve my performance and abilities.</p> <p>I learnt a range of techniques to improve my confidence and also my performance under pressure.</p> <p>Happy, positive and more able to deliver and also cope with whatever was thrown at me.</p> <p>I have the learning and have benefitted from the experience, I have flourished in my work and home life during the period since the course - I do not think that is a coincidence.</p> <p>I honestly believe it helped me settle into my role a lot quicker than if I had been left to my own devices.</p> <p>I have a lot of positive attributes to bring to my role and that no one could do it better than I was.</p> <p>More able to deliver</p>
	Relatedness	<p>I was able to make sense of how I was feeling and recognise what a difficult period I had been through and this enabled me to ensure I was proportionate in my response to myself.</p> <p>I realised everyone had been in the same boat at one time or another.</p> <p>This has significantly helped me approach issues at work.</p>
	Autonomy	<p>More at ease with myself.</p> <p>Identifying my personal goals has been incredibly helpful and I can see that.</p> <p>I now prioritise work according to that without even thinking.</p> <p>I was able to make sense of how I was feeling and recognise what a difficult period I had been through and this enabled me to ensure I was proportionate in my response to myself.</p> <p>Once the course had finished I felt far more in control of my life and career.</p>

Psychological Consequences	Emotion	<p>Positive, good to be challenged and supported.</p> <p>Really positive</p> <p>Exhilarated, reflective and ambitious.</p> <p>Informed, interested and a bit more knowledgeable and thoughtful.</p> <p>Uplifted and positive.</p> <p>Happy, positive</p> <p>I was able to let certain issues go more easily.</p> <p>Elated , more positive, exciting</p>
	Motivation	<p>Empowering</p> <p>Lifted</p> <p>Empowered</p> <p>Motivated to do my job.</p>
Client Experience	Positive/Critical	<p>A really useful process, thank you.</p> <p>Probably the most useful and practical development experience of my career.</p> <p>The practical element and philosophy approach, for me, had great application to the Police and like services.</p> <p>The practitioner provided me with the guidance I needed to be able to sit back and consider situations in a different way. This really helped and I use it on a daily basis.</p> <p>I couldn't recommend this type of coaching highly enough.</p> <p>I was open minded about the whole thing, but very happy with the outcome.</p> <p>I found the coaching sessions to be a new and different experience, I valued the challenging dynamic of them in a safe environment. It was far more beneficial an experienced then I expected.</p> <p>A really worthwhile programme. The practitioner helped me rationalise a lot of anxiety I had.</p> <p>I thought it was superb and am very interested in the outcomes.</p>
	Areas for intervention enhancement	<p>I do think you need to feel the flames of not coping or not achieving to try this. It just makes sense but you do need your own examples to work through and apply the framework.</p> <p>I found it difficult to commit the time needed to get the most from the sessions.</p>

		<p>I found it difficult to get fully involved throughout and because I struggled to understand the concepts I was not encouraged to make the time available.</p> <p>It took me a session or two to work out what they were really about and how they could help. That may be a reflection on working for the police where we are used to very tactical and transactional conversations.</p>
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Supplementary material

Additional change over time analyses

Competence. The mixed-methods ANOVA revealed a significant medium-large ($\eta^2 = .07$) effect for time*group, $F(2, 44) = 3.568, p = .032$. Pairwise comparisons for the REBC group revealed that there was a significant increase ($t = 2.86, df = 21, p = .009$) from time 1 ($M = 31.16, SD = 4.59$) to time 3 ($M = 33.83, SD = 4.43$). There were no significant differences between any of the other time points. Pairwise comparisons for the control condition revealed that there was no significant difference between any of the time points.

Autonomy. The mixed-methods ANOVA revealed no significant ($\eta^2 = .03$) effect for time*group, $F(2, 44) = 1.343, p = .266$. Pairwise comparisons for the REBC group revealed that there was a significant increase ($t = 2.75, df = 22, p = .012$) from time 1 ($M = 28.76, SD = 4.67$) to time 3 ($M = 31.09, SD = 3.36$). There were no significant differences between any of the other time points. Pairwise comparisons for the control condition revealed that there was no significant difference between any of the time points.

Relatedness. The mixed-methods ANOVA revealed a significant medium-large ($\eta^2 = .08$) effect for time*group, $F(2, 44) = 3.872, p = .024$. Pairwise comparisons for the REBC group revealed that there were no significant differences between any of the time points. But pairwise comparisons for the control condition revealed that there was a significant decrease ($t = 3.21, df = 24, p = .004$) from time 1 ($M = 38.23, SD = 4.32$) to time 2 ($M = 35.56, SD = 5.49$), and a significant decrease ($t = 3.35, df = 26, p = .027$) from time 1 to time 3 ($M = 36.11, SD = 4.46$).

In summary of the additional analyses, there were some increases over time for competence and autonomy in the REBC group, and whilst no significant changes occurred for relatedness in the REBC group, participants in the control group report a decrease over time.