



POWER training improves officer autonomic health, mindfulness and social connection

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ABSTRACT

In the profession of policing, the accumulation of stressful incidents over the course of a career can lead to a host of adverse health outcomes: increased incidence of injury and illness, diminished cognitive performance, mental health impacts (including anxiety, depression, addiction and elevated risk of suicide), increased risk of cardiovascular disease and early mortality. The toxic climate of dysfunctional agency culture, local community resistance and distrust, and the national political discourse around policing all serve to increase the stress that first responders bear, contributing to erosion of police-community relationships. Beyond Us & Them partnered with California State University San Marcos to offer the Peace Officer Wellness, Empathy & Resilience (POWER) training to university police officers. POWER is a nationally certified 12-week training program, which teaches skills and practices that promote well-being, mindfulness and relationality, and improve police-community relations. Based on survey data from prior cohorts, we realized the potential benefit of adding biometric measurements to look for improvement in autonomic health. Other studies have demonstrated an inverse correlation between heart rate variability (HRV) and cardiovascular disease, cognitive decline and risk of all-cause mortality. Of the 17 participants, 15 completed pre- and post-intervention surveys, and HRV was obtained from 13 of these participants: findings demonstrated improved autonomic health, as well as statistically significant changes in empathy, mindfulness and social connection. Additionally, we noted increased HRV coherence, which may be a physiologic marker of enhanced social connection. Future studies offer the possibility of utilizing HRV coherence as a marker of group connection and performance.

Key Words HRV; empathy; resilience; well-being; biometric.

INTRODUCTION

Policing is one of the most stressful occupations in the world (Maguen et al., 2009; Violanti et al., 2017). Police officers, both sworn and non-sworn, routinely face dangerous, unpredictable, traumatic and potentially life-threatening situations, which lead to higher rates of depression (Hartley et al., 2007), anxiety (Berg et al., 2006) and burnout (McCarty & Skogan, 2013) compared to other professions. Data from the National Occupational Mortality Surveillance reveal that police death from suicide is 2.4 times higher than police death from homicide. Equally startling is the increased incidence of cardiovascular disease and death from all causes in police officers (Hartley et al., 2011), in some areas as much as 20 years younger than the general population. Officers who are stressed and unhealthy are also prone to increased racial bias and use of excessive force (Ma et al., 2013). According to

President Obama's taskforce report on 21st century policing (2015), the police cannot do their jobs responsibly and safely unless they are emotionally and psychologically stable. To that end, one of the six pillars of 21st century policing articulated in the taskforce report focuses on police officer mental, emotional and physical wellness. According to the taskforce report (2015), "Support for wellness and safety should permeate all practices and be expressed through changes in procedures, requirements, attitudes, and behaviors." The report recommends that police departments partner with other agencies and wellness experts to review best practices and offer tailored wellness support services to police officers.

To that end, California State University San Marcos (CSUSM) invited Beyond Us & Them, a non-profit organization based in Los Angeles, to offer the Peace Officer Wellness, Empathy & Resilience (POWER) training to a cohort of sworn and non-sworn participants culled from the police

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departments of four local universities in Southern California. Beyond Us & Them designed the POWER training program in 2019 to bring a rigorous approach to officer well-being and improve police-community relations utilizing a four-quadrant approach that incorporates mindfulness activities, breathing practices, education in contemplative neuroscience and a dialogic practice known as council. The program is designed for cohorts of 20–25 participants to foster communication within the whole group as well as in sub-cohorts of 4–5 participants who meet weekly in council huddles. The POWER training has received California state certification from California Peace Officer Standards and Training (C-POST) and national certification from the International Association of Directors of Law Enforcement Standards and Training (IADLEST). Distinct from other mindfulness-based interventions, the POWER program emphasizes social connection by introducing the peer-facilitated dialogic practice of council. Quantitative and qualitative survey results from previous POWER training cohorts with the Los Angeles Police Department (LAPD) and Jacksonville (Florida) Sheriff's Office (JSO) suggested beneficial health effects in officers. Participants reported impacts in all four quadrants of health: weight loss, blood pressure reduction, recognition of mental bias and negative self-talk, improved relationships with both their families and their coworkers, and an expanded situational awareness that led to improved police-community relations.

Recent studies have demonstrated that mindfulness-based practices can reduce stress and increase emotional self-regulation and resilience (Schuman-Olivier et al., 2020). More specifically, recent studies demonstrate that mindfulness training can improve well-being and reduce depression among police officers (Stevenson, 2022; Trombka et al., 2021). Mindfulness and self-compassion practices cannot change the stressors, but they can moderate the impact of these stressors on the mental health of police officers (Fleischmann et al., 2021). Beyond Us & Them, in partnership with the Center for Contemplative Practices, decided to use a mixed-methods research protocol to test whether mindfulness practices, compassion-based communication exercises, council huddles and training in wellness-related areas such as stress management and self-care can improve wellness and resilience of police officers. In addition to the pre- and post-intervention psychosocial surveys, we measured heart rate variability (HRV) as a biometric index of autonomic health. Previous studies (McCraty & Atkinson, 2012; Ramey et al., 2017) have established the inter-user reliability of HRV testing. Our study sought to assess whether the reported improved health benefits might correlate with increases in quantitative HRV. Physiologic evidence of improved health brought about by the POWER program coupled with the growing literature on the positive impact of mindfulness practices on police officer well-being and stress levels could be a powerful contribution to the discourse on the need to prioritize officer wellness as a prerequisite for improved 21st century policing.

METHODS

In this study, we used a mixed-methods research protocol. Participants in the 12-week POWER training cohort completed pre- and post-intervention surveys using several psychosocial scales that measured stress levels, emotional regulation and interpersonal reactivity, mindfulness, anger, loneliness, con-

nectedness to others and awareness of positive emotions. They provided qualitative feedback on their experience throughout the intervention period. HRV was measured pre- and post-intervention using HeartMath® technology. We hypothesized that participants undergoing this program would show improved quantitative HRV, experience reduction in stress levels and improve their capacity for emotional regulation and interpersonal connection. The authors obtained approval from the Institutional Review Board committee at CSUSM to conduct this research.

The POWER curriculum consists of 32 hours of in-person training, along with 24 hours of asynchronous online assignments and weekly council huddles self-facilitated by participants over 12 weeks. Two consecutive 8-hour instructional days, led by two trainers, were offered at the beginning of the training, with the trainers returning for two more 8-hour training sessions at weeks 6 and 12. The program is built on four quadrants of health: physical, mental, emotional and energetic/spiritual; each was covered for 3 weeks and reiterated during the in-person trainings. Participants also received intensive training in the practice of council and were provided with tools to self-facilitate weekly small-group council huddles among their peers.

Psychosocial Surveys

We used the following psychosocial scales to measure the variables of interest:

1. Perceived Stress Scale (PSS-4) is a 4-item measure of perception of stress derived from the full version of the PSS (Cohen et al., 1983). Participants indicate how often they have felt a certain way within the past month. Higher scores indicate higher levels of perceived stress.
2. Interpersonal Reactivity Index (IRI) is designed to measure both cognitive and affective empathy (Davis, 1983). The Perspective-Taking (PT) subscale was used for this evaluation. The PT subscale assesses the tendency to spontaneously adopt the psychological point of view of others. Responses are based on a Likert-type scale ranging from 0 to 28 with higher scores representing greater levels of empathy.
3. Difficulties in Emotional Regulation Scale (DERS) is designed to measure emotion dysregulation. DERS is a multidimensional self-report measure assessing individuals' characteristic patterns of emotional regulation (Gratz & Roemer, 2004). The 18-item short version was used for this evaluation (Victor & Klonsky, 2016) with higher scores reflecting greater difficulty in emotion regulation.
4. Five Facet Mindfulness Questionnaire Short Form (FFMQ-SF) is a 24-item scale derived from the full version of the FFMQ (Baer et al., 2006). The FFMQ measures five facets of mindfulness: observing, describing, acting with awareness, non-judging of inner experience and non-reactivity to inner experience. Responses are based on a Likert-type scale with higher scores representing greater levels of mindfulness.
5. PROMIS®-ANGER is a 5-item scale measuring the anger response and has shown acceptable internal

consistency (Cella et al., 2010). Higher scores indicate higher levels of anger.

6. A Connectedness Measurement tool was developed to capture the intended impact of this program, as existing scales did not adequately address this aspect. Questions ask participants to rate how often they felt connected to others in the last 7 days with higher scores indicating higher levels of connectedness.

Biometric Testing

On the afternoon prior to beginning the POWER program, we measured in each participant a 5-minute resting HRV followed by a 1-minute deep breathing assessment (DBA). Upon completion of the 12-week program, participants underwent the same 5-minute/DBA protocol. The 5-minute assessment is the minimum time needed to obtain frequency domain indices, while the 1-minute DBA allows for assessment of the maximal autonomic variability achievable at a given point in time. Of the 15 participants who completed the surveys, 13 had usable HRV measurements. (One was excluded due to frequent premature atrial contractions (PACs), whereas the other had an exacerbation of Raynaud's phenomenon during post-testing, which prevented accurate plethysmography.)

RESULTS

Psychosocial Survey Findings

Out of 17 participants in this program, 15 completed both pre- and post-surveys. Of the 15 respondents, 10 were men and 5 were women. The average age of the sample was 40.8 years. The age breakdown is provided in Table I.

Paired *t* tests were conducted on all the scales to determine whether the difference in pre-test scores and post-test

TABLE I Age distribution of respondents

Age Distribution (Years)	Number of Respondents
21–30	5
31–40	2
41–50	3
51–60	4
61–70	1

scores was statistically significant (see Table II). The survey results were compared with comparable survey results from the LAPD and Jacksonville Sheriff's Office (JSO). There were three scores where the change was statistically significant. The IRI score increased from 16.47 to 18.4 indicating higher levels of empathy, and it was statistically significant. The FFMQ score increased from 71.6 to 74.13 indicating higher levels of mindfulness, and it was statistically significant. The connectedness to others scores increased from 3.93 to 4.4 and it was statistically significant. The other results were not statistically significant. The mean PSS score did decrease from 3.53 to 2.93 indicating lower levels of stress, but the decrease was not statistically significant. The mean PSS pre-test score for this sample was already low (3.5) compared to the mean PSS pre-test score for the LAPD (4.4) and for the JSO (6.4). The mean DERS score went down from 27.47 to 27.13 indicating lower difficulty regulating emotions, but the decrease was not statistically significant. The mean DERS pre-test score was also lower for this sample (27.5) compared to the mean DERS score for the LAPD (29.6) and for the JSO (38.1). Finally, the mean ANGER score did decrease from 10.2 to 9.8, but the decrease was not statistically significant. The mean ANGER pre-test score was also lower for this sample (10.2) compared to the mean ANGER pre-test score for the JSO (15.4).

Biometric Findings

The 5-minute HRV measurement was used to obtain the power-domain indices (Very Low Frequency (VLF), Low Frequency (LF), High Frequency (HF) and Total Power (TP)). Scores were averaged and then the natural log was calculated for standard reporting. Additional information gathered with this measurement included mean resting heart rate (MHR), standard deviation of the N-N ratio (SDNN) and normalized coherence. Standard two-tailed *t* tests were calculated on all indices, and while none achieved statistical significance, positive trends in all the power-domain indices listed above, that is, VLF, LF, HF and TP (Figures 1–4), MHR (Figure 5), SDNN (Figure 6) and normalized coherence (Figure 7) were noted. The 1-minute DBA results were similarly averaged, and two-tailed *t* tests were performed on MHR (Figure 8), SDNN (Figure 9) and normalized coherence (Figure 10). As with the 5-minute assessments, none achieved statistical significance, but several showed interesting trends. Although one participant's HRV recordings could not be included in data analysis

TABLE II Results from paired *t*-test analysis

Scales	Pre-Test Score		Post-Test Score		Paired <i>t</i> Test	
	Mean	Variance	Mean	Variance	T-Statistic	<i>p</i> Value
IRI ^a	16.47	6.12	18.40	3.83	-3.24	0.003
PSS	3.53	12.41	2.93	5.50	0.75	0.23
DERS overall	27.47	67.98	27.13	94.55	0.20	0.42
FFMQ ^a	71.60	29.11	74.13	40.98	-1.92	0.04
ANGER	10.20	26.31	9.80	14.17	0.27	0.40
Connectedness ^a	3.93	1.35	4.40	0.40	-2.43	0.01

^aStatistically significant.

DERS, Difficulties in Emotional Regulation Scale; FFMQ, Five Facet Mindfulness Questionnaire; IRI, Interpersonal Reactivity Index; PSS, Perceived Stress Scale.

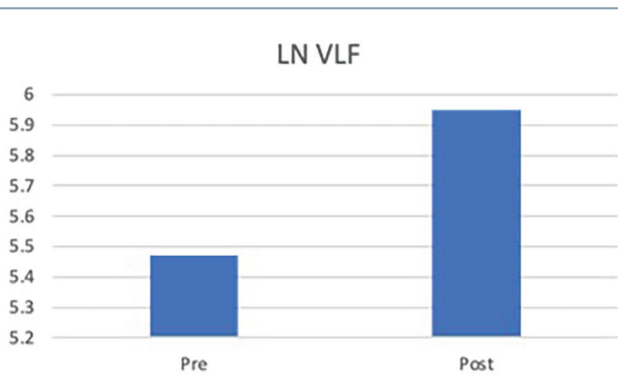


FIGURE 1 Average LN VLF Index based on 5-minute HRV measurement. HRV, heart rate variability; LN VLF, natural log of the very low frequency power

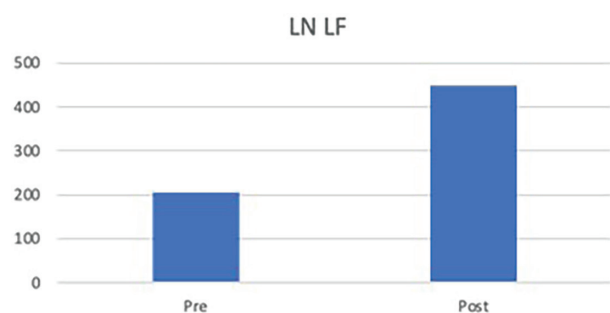


FIGURE 2 Average LN LF Index based on 5-minute HRV measurement. HRV, heart rate variability; LN LF, natural log of the low frequency power

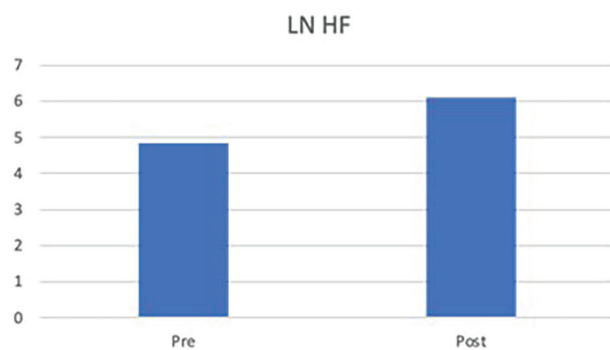


FIGURE 3 Average LN HF Index based on 5-minute HRV measurement. HRV, heart rate variability; LN HF, natural log of the high frequency power

due to frequent PACs, we include their tracings before and after the training in Figures 11 and 12.

DISCUSSION

Significant changes in mindfulness, empathy and connectedness over a 12-week period are not readily accomplished. It is remarkable to note that we observed a significant increase in quantitative measures of mindfulness, empathy and connectedness. Studies have shown that organizational stressors

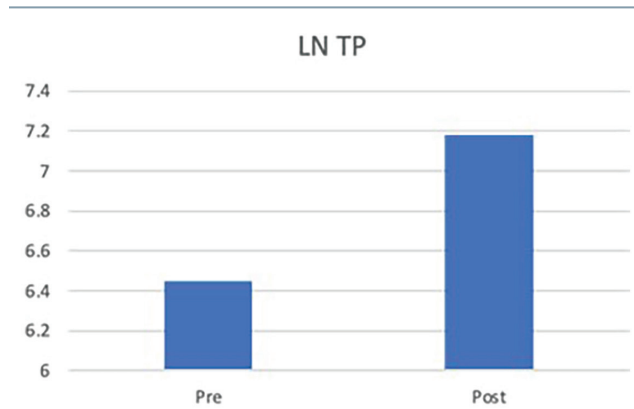


FIGURE 4 Average LN TP Index based on 5-minute HRV measurement. HRV, heart rate variability; LN TP, natural log of the total power

such as lack of social support contribute to poor physical and mental health among police officers (Goh et al., 2015). Police departments have often been resistant to offering or accepting emotional support interventions (Evans et al., 2013). Yet police officers show a preference for discussing difficult events with other police officers who understand what they are experiencing on a daily basis (Waters & Ussery, 2007). Our study points to the importance of the weekly council huddles, where officers discuss their emotions and reactions to daily stressors with each other. Providing such opportunities increases empathy and connectedness to others, which contributes to improved mental health and well-being and improved job performance.

The significant increase in mindfulness that we found indicates that the participants took the training very seriously and practised the activities on a regular basis. The qualitative comments indicate that participants were able to bring greater awareness to their own emotional and physical selves. They frequently mentioned learning to cultivate a pause before reacting, which is one of the main emphases of the POWER training program. They also commented that they were able to be more patient with themselves and others and were able to provide themselves and others more space and grace to process their emotions. Many participants said that they learned to listen better to themselves and others, which helped build trust and empathy. They also talked about self-care and the importance of taking a break when they were feeling overwhelmed. It is important to note that the pre-intervention test was conducted in July when the university was experiencing its summer semester, which tends to be a quieter and less stressful time for the police department. The post-intervention test was conducted in October when the university is in the middle of the fall semester, which is often a very busy time for the police department. This difference might explain why CSUSM and LAPD/JSO differed in certain measurements.

Previous studies have called for further investigation of within-subject HRV changes (Corrigan et al., 2021), which our study addresses. The POWER training was developed with the intention of mitigating the increased incidence of heart disease, hypertension, stroke and shortened lifespan seen in law enforcement personnel. Low VLF has been correlated

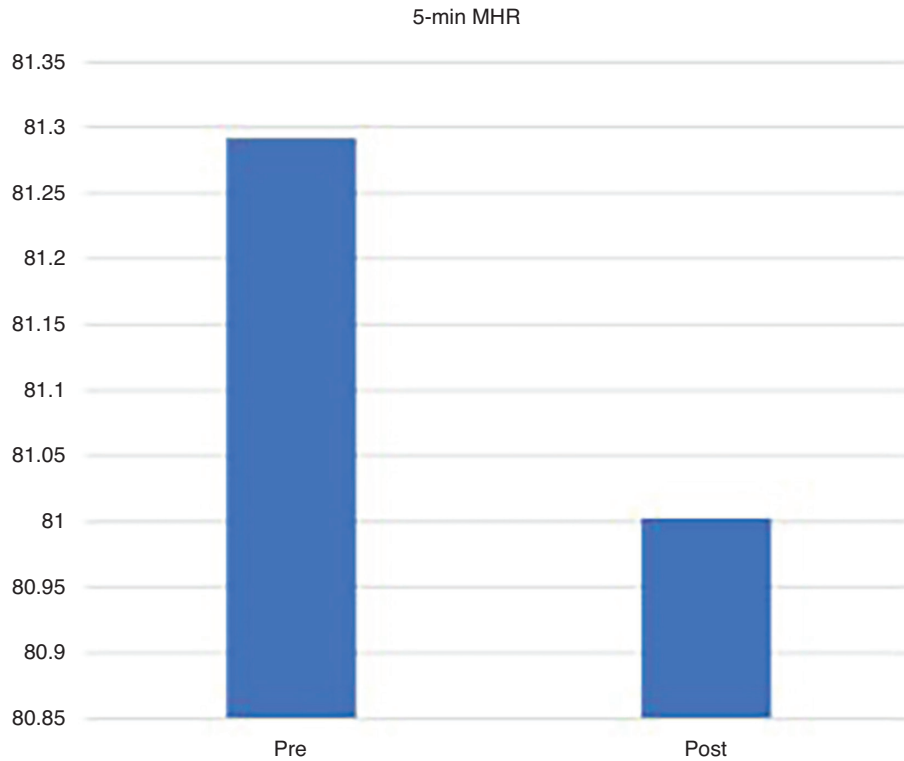


FIGURE 5 Mean resting heart rate (MHR) based on 5-minute HRV measurement. HRV, heart rate variability

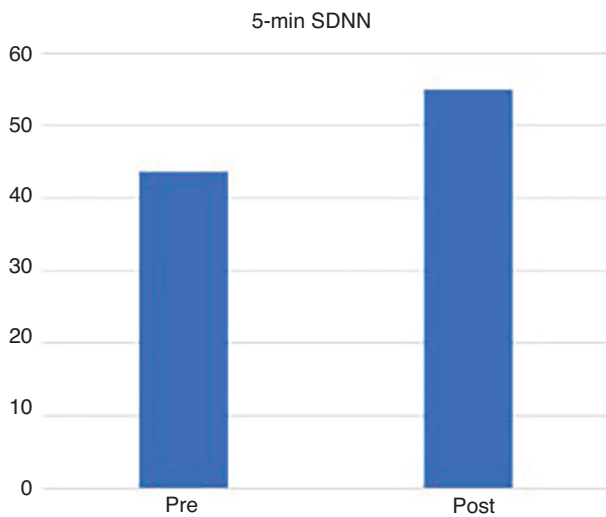


FIGURE 6 Standard deviation of the N-N ratio (SDNN) based on 5-minute HRV measurement. HRV, heart rate variability

with increased risk of these same conditions. Although it did not reach statistical significance, we think the increase seen in VLF is noteworthy. Increases and decreases in VLF have the strongest correlation with health, and increases in VLF translate to a decreased risk for cardiovascular disease and all-cause mortality (McCraty et al., 2009). That our findings showed an increase in VLF over 3 months' time is notable,

as this is a relatively short time frame. We acknowledge the limitations of our small sample size, which makes the HRV results particularly sensitive to outliers. Factors that contribute to the small sample size include the intentional limitation to 20–25 participants per cohort as well as the understaffing that agencies across the country experience. Departments are challenged to fill trainings of any type due to lack of personnel to backfill duty shifts. The limitations of our small sample size could be overcome by pooling measurements from participants in concurrent future cohorts. Additionally, we hope to repeat testing at later dates after the completion of the POWER program to look for persistence of benefit.

Aside from the analysis of the group, one remarkable outcome was the resolution of PACs noted in a single participant (see Figures 11 and 12). In Figure 11, each deep spike represents a PAC. These were quite frequent and prevented quantitative analysis of the data. The participant was queried about caffeine or other stimulant intake and denied any consumption in the preceding hours prior to testing. Such frequent PACs may be indicative of underlying heart rhythm abnormalities. After assuring the participant was asymptomatic, we decided to wait the full 3 months and reassess their HRV. To our surprise, the PACs were gone at subsequent testing, as demonstrated in Figure 12. What was additionally notable were the comments from this participant (linked by the same anonymous identifier) who found the weekly practices—particularly the breathing and mindfulness ones—to be highly effective. The participant noted upon completion that “I realize now that in order to take care of others I have to first care for myself.”

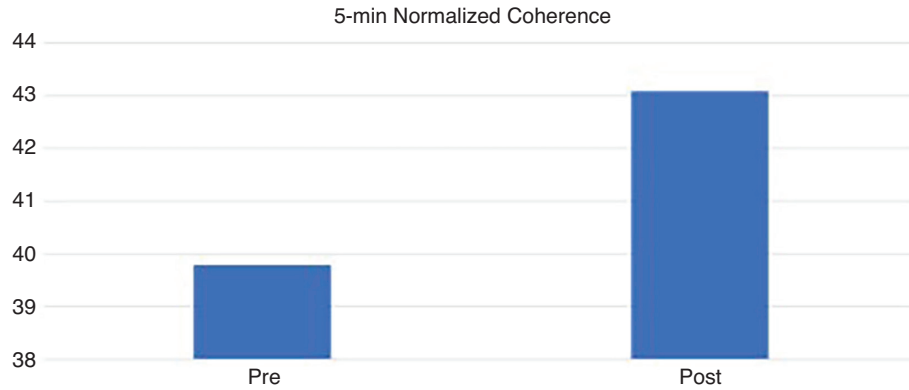


FIGURE 7 Normalized coherence based on 5-minute HRV measurement. HRV, heart rate variability

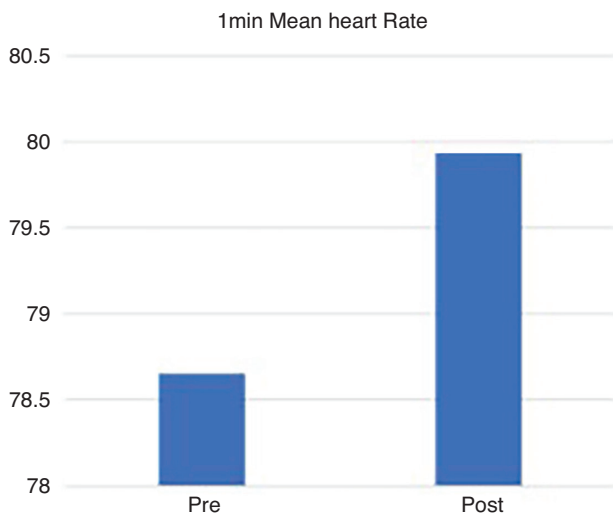


FIGURE 8 Mean resting heart rate based on 1-minute HRV measurement. HRV, heart rate variability

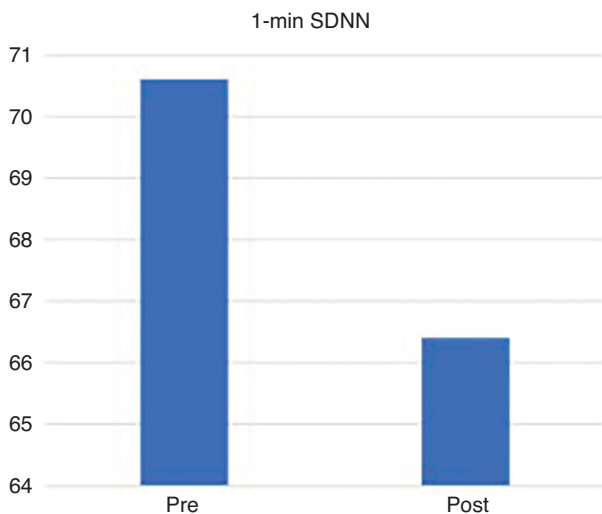


FIGURE 9 Standard deviation of the N-N ratio (SDNN) based on 1-minute HRV measurement. HRV, heart rate variability

Another surprising outcome was the increase seen in normalized coherence, both in the 1- and 5-min measurements. In a yet-to-be published study on tight-knit communities in New Zealand and Saudi Arabia, participants are found to have high degrees of coherence and synchronicity in their HRV patterns (Rollin McCraty, personal communication, November 10, 2023). It is unusual to see such an increase in coherence after a 3-month intervention such as POWER, but we think that the weekly huddles and emphasis on council training create conditions where an increase in participant coherence reflects an increase in social connection. Indeed, surveys showed statistically significant increases in social connection. Anecdotally, in another POWER training with the JSO, we saw a coherent HRV pattern emerge in an individual who was being recorded simply while sitting in a council huddle. In future studies, we hope to simultaneously measure quantitative HRV coherence in participants sitting in council to see whether increased coherence emerges as a function of council participation. Additionally, individual HRV measurement could be adopted by agencies as a method of biofeedback during and after POWER training (Stephenson et al., 2021).

CONCLUSION

Our findings demonstrate quantitative and qualitative changes in biometric indices and psychosocial surveys that suggest improved autonomic health, as well as statistically significant changes in empathy, mindfulness and social connection among officers participating in the POWER program. The measurement of HRV is an easily attained assessment of autonomic health. The finding of increased VLF power across the 12 weeks suggests that the POWER program may lead to decreased risk of early mortality and cardiovascular disease risk. Additionally, statistically significant changes in mindfulness, empathy and social connection indicate that POWER training helps police officers expand their capacity for awareness of themselves and others. The self-facilitated council huddles offer structured opportunities for police officers to listen to and share with each other, which is critical for building empathy and connectedness while reducing feelings of isolation. All these factors work together to improve the physical, emotional and mental health of police officers, equipping them to be more effective and less reactive in stressful situations. These

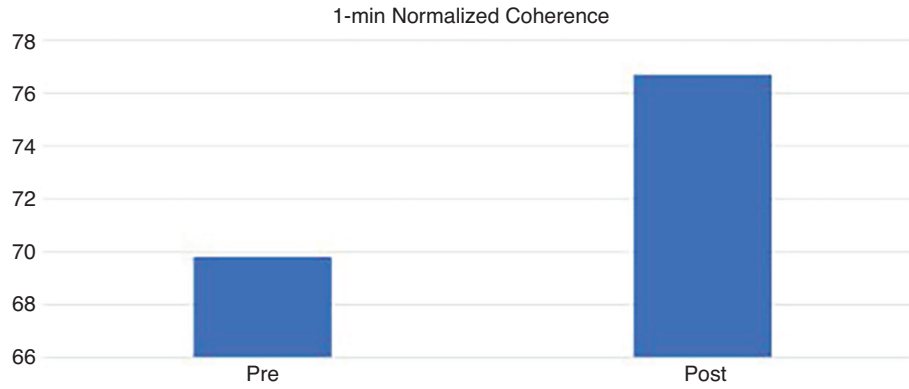


FIGURE 10 Normalized coherence based on 1-minute HRV measurement. HRV, heart rate variability

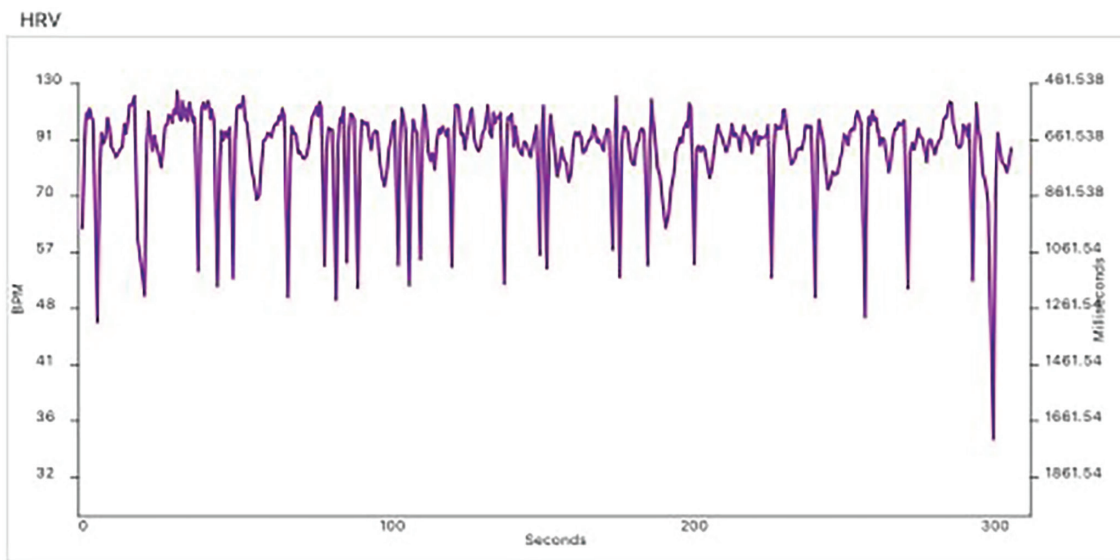


FIGURE 11 One participant's pre-HRV recording. HRV, heart rate variability

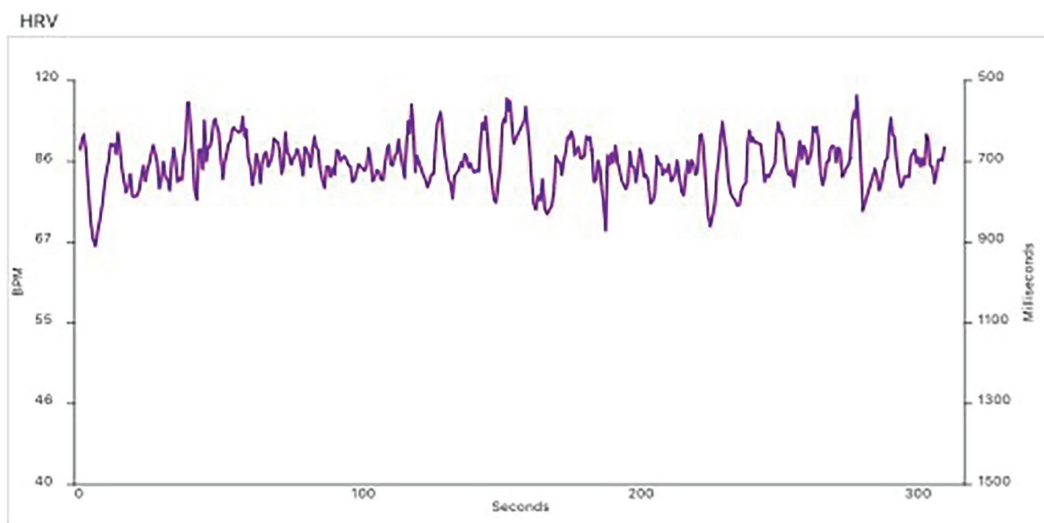


FIGURE 12 One participant's post-HRV recording. HRV, heart rate variability

interventions directly support the 21st century policing model recommendations. We hope that our findings provide more evidence and support for police departments to offer robust training for their officers that encompasses all four quadrants of wellness, as well as recognizing the importance of social connection fostered by council practice.

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CONFLICT OF INTEREST DISCLOSURES

Dr. Ann Seide is a trainer with Beyond Us & Them and helped develop the POWER training.

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