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Upright posture improves affect and fatigue in people with depressive symptoms

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ABSTRACT

Background and objectives: Slumped posture is a diagnostic feature of depression. While research shows upright posture improves self-esteem and mood in healthy samples, little research has investigated this in depressed samples. This study aimed to investigate whether changing posture could reduce negative affect and fatigue in people with mild to moderate depression undergoing a stressful task.
Methods: Sixty-one community participants who screened positive for mild to moderate depression were recruited into a study purportedly on the effects of physiotherapy tape on cognitive function. They were randomized to sit with usual posture or upright posture and physiotherapy tape was applied. Participants completed the Trier Social Stress Test speech task. Changes in affect and fatigue were assessed. The words spoken by the participants during their speeches were analysed.
Results: At baseline, all participants had significantly more slumped posture than normative data. The postural manipulation significantly improved posture and increased high arousal positive affect and fatigue compared to usual posture. The upright group spoke significantly more words than the usual posture group, used fewer first person singular personal pronouns, but more sadness words. Upright shoulder angle was associated with lower negative affect and lower anxiety across both groups.
Limitations: The experiment was only brief and a non-clinical sample was used.
Conclusions: This preliminary study suggests that adopting an upright posture may increase positive affect, reduce fatigue, and decrease self-focus in people with mild-to-moderate depression. Future research should investigate postural manipulations over a longer time period and in samples with clinically diagnosed depression.

1. Introduction

Stooped posture is a feature of psychomotor retardation, and is an attribute of major depressive disorder (MDD) in many diagnostic classification systems (American Psychiatric Association, 2013; World Health Organization, 2009). Psychomotor disturbances were primary diagnostic indicators of depression in the neo-Kraeplin era, where it was noted that depressed patients appeared fatigued, took small steps, adopted a slumped posture, and were somewhat motionless and unresponsive (Kraeplin, 1968). In contemporary literature, psychomotor disturbances remain a method to distinguish melancholia from other depressive subtypes (Parker, 2007). There has been limited research into the role of posture in depressed samples, but work to date suggests a positive cross-sectional relationship between stooped posture and depression severity (Canales, Cordas, Fiquer, Cavalcante, & Moreno, 2010; Nyboe-Jacobsen, Smith Lassen, Friis, Videbech, & Wentzer Licht, 2006). Psychomotor retardation shares a strong relationship with greater functional impairment, disability, and risk of falls in elderly samples (Alexopoulos et al., 1996; Hausdorff, Peng, Goldberger, & Stoll, 2004; Kiosses, Alexopoulos, & Murphy, 2000). Furthermore, in people with severe depression, gait patterns displaying slumped posture and swaying upper body movements are associated with dysphoric mood (Michalak et al., 2009).

Embodied theories of cognition and emotion propose a bidirectional relationship between the physical body and psychological states (Niedenthal, 2007). It is thought that people make rapid, automatic and unconscious inferences from perceptions of their

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posture and expressions (Laird, 2007). This may operate through partial neural reactivation of sensory, motor, and affective systems during high level cognitive processing (such as the use of thought and language). Brain imaging and biochemical research indicates that psychomotor symptoms, cognitive impairment, and depression are associated with abnormalities in the basal ganglia and thalamocorticol circuits (Sobin & Sackeim, 1997).

There is evidence that upright body posture is associated with increased high frequency brain activity (beta and gamma waves) compared to slouched posture (Thibault, Lifshitz, Jones, & Raz, 2014; Zhavoronkova, Zharikova, Kushnir, & Mikhalkova, 2012). Furthermore, the magnitude of beta waves depends on the interaction between posture and the recall of positive or negative events (Tsai, Peper, & Lin, 2016). Specifically, recalling happy events takes longer and is more difficult to do in a slouched posture than in an upright posture, and results in higher magnitude beta waves. This suggests that a slumped body posture can inhibit access to positive thoughts.

Experimental work into how muscular states can affect emotions has largely focused on facial expressions and their relationship with emotions (McIntosh, 1996; Strack, Martin, & Stepper, 1988). To gain further understanding of the effects of muscular movements on emotions, it has been suggested that more attention be paid to general somatic features, such as posture and gait (McIntosh, 1996). A number of recent studies have investigated the effect of posture on emotions. Research has shown that open, expansive postures can lead to elevated testosterone, reduced cortisol, increased perceptions of power and risk-tolerance compared to closed, hunched postures (Carney, Cuddy, & Yap, 2010), although a larger trial failed to replicate the hormonal results (Ranehill et al., 2015). A recent review summarised research on the effects of expansive body posture relative to contracted posture in healthy participants (Carney, Cuddy, & Yap, 2015), with studies showing increased feelings of pride (Stepper & Strack, 1993), confidence in thoughts (Brinol, Petty, & Wagner, 2009), pain tolerance (Bohns & Wiltermuth, 2012), and increased eating (Allen, Gervais, & Smith, 2013), supporting embodiment theory.

Recent studies have shown that smiling facial expressions and upright body postures can reduce stress responses in healthy samples. A Duchenne smile has been shown to reduce both affective and cardiovascular stress responses during a stress task (Kraft & Pressman, 2012). Furthermore, adopting an upright posture (compared to a slumped posture) during the Trier Social Stress Test helped to maintain self-esteem, reduced negative mood and increased positive mood, increased speech rate, and reduced the use of singular personal pronouns (Nair, Sagar, Sollers, Consedine, & Broadbent, 2014). The advantage of using the Trier Social Stress Test is that it allows both posture and speech patterns to be measured in a realistic situation. The way in which people with depression speak and use language differs to non-depressed people. Typically, there is increased use of singular personal pronouns, such as "I" (Chung, & pennebaker, 2007; Rude, Gortner, & Pennebaker, 2004). This self-focus may operate via a process of self-regulation (Pyszczynski & Greenberg, 1987). People with depression also tend to have shorter utterances and to pause more often (Schrijvers, Hulstijn, & Sabbe, 2008).

Given the demonstrated effects of upright posture on mood and cognition in healthy groups, there is merit in examining its potential in depressed populations. If postural changes can affect mood, then they are easily applied and could have wide applicability. This aim of this study was to experimentally investigate the effects of upright posture in people with mild to moderate depression using a stress paradigm. It was hypothesized that upright posture would reduce negative affect, fatigue and self-focus, and increase arousal and positive affect.

2. Materials and methods

2.1. Participants

Approval was granted by the University of Auckland Human Participants Ethics Committee. Participants were recruited from the University and wider Auckland community through posters, emails and social media, and told they had the chance to win a $200 shopping voucher. Inclusion criteria were aged over 18 years, fluent in English and screened positive for mild-to-moderate depression using the Beck Depression Inventory-II (score $\geq$ 14 and $\leq$28) (Beck, Steer, Ball, & Ranieri, 1996). Exclusion criteria were: treatment with talking therapy and or pharmacotherapy in the past three months; experience of suicidal ideation or self-harm; had received a psychiatric diagnosis; had sustained a head injury; currently abused drugs or alcohol; or had an intellectual or physical disability. Participants with severe depression scores were excluded because severe depression would require more intensive individual diagnostics and treatment, and were advised to seek appropriate care.

Three hundred and thirty five people completed the screening measure, 114 met inclusion criteria, and 61 signed informed consent and completed the laboratory session. Participants were 43 females and 18 males between 18 and 66 years (M = 26.26, SD = 12.18). Females were asked if they experienced mood fluctuations during menstruation and if so they were scheduled to participate mid-cycle to avoid this confound.

2.2. Measures

2.2.1. Depression

The Beck Depression Inventory-II (Beck et al., 1996) is a 21-item, 4-point (0–3) Likert scale that asks participants to rate how they have been feeling in the last two weeks, each item corresponding to diagnostic criteria for MDD in the DSM-IV. The BDI-II is psychometrically sound, showing high internal consistency (α = 0.91), high test-retest reliability (r = 0.93), and moderate convergent validity. This was used as the screening measure for study eligibility criteria.

2.2.2. Demographics

Participants' age, gender, ethnicity, highest level of education achieved, marital status, and employment status were assessed at baseline.

2.2.3. Affect

The Affect Valuation Index (AVI) (Tsai, Knutson, & Fung, 2006) measures ideal and actual affect. The AVI has eight subscales comprising of arousal state dimensions including: high arousal positive, positive, low arousal positive, low arousal, low arousal negative, negative, high arousal negative, and negative arousal states. For this study, only the actual affect subscale (25 items) was administered, which displays high internal consistency, reliability, and validity (Tsai, 2007).

2.2.4. Fatigue

The Profile of Mood States (POMS) (McNair, Lorr, & Droppleman, 1971) uses a Likert scale comprised of five response points labelled 1 (not at all) to 5 (extremely). This study administered the fatigue-inertia (seven items) subscale, which displays high internal consistency (α = 0.88) (Bourgeois, LeUnes, & Meyers, 2010). It displays good construct, convergent and divergent validity, is sensitive to change over short time periods.

2.2.5. Language use

The Linguistic Inquiry and Word Count (LIWC) program is a text