The Role of Future Time Perspective, Body Awareness, and Social Connectedness in the Relationship Between Self-efficacy and Resilience

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Abstract

Defined as the successful adaptation to dynamic environments, resilience is considered a cornerstone of mental health. However, with the underpinnings of resilience not yet fully understood, this manuscript tests the potential contribution of self-efficacy and embeddedness on resilience (explored through validated measures of future time perspective, body awareness, and social connectedness). The convenience sample of 18-to-77-year-old adults included 297 individuals, of which 36 were men and 171 were female. Participants completed online surveys composed of fifty-two questions in total, measuring self-efficacy, resilience, social connectedness, FTP, and body awareness. Resilience was positively related to self-efficacy, future time perspective, and social connectedness—but not to body awareness—and self-efficacy was positively associated with indices of embeddedness. Considering these correlations, and that only self-efficacy significantly predicted resilience, an exploratory model was proposed to test whether embeddedness directly predicted self-efficacy, and whether self-efficacy directly predicted resilience. Structural Equation Modeling suggested a good fit of this model, elucidating the interplay of psychological mechanisms underlying resilience. Thus, we identify potential variables of interest for clinical interventions aimed at increasing resilience and self-efficacy. Theoretical implications and future research are suggested based on these findings.

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Resilience, the dynamic adaptation to adversity (Luthar 2006; Rutten et al. 2013), is positively associated with mental well-being (Liu et al. 2018b), the ability to cope with stress and depression (Gao et al. 2017), and the absence of psychopathology (Aiello Bowles et al. 2019). The importance of resilience is therefore far-reaching and plays an essential role in strategies targeting social care and support services, such as child welfare (Newman 2002) and adult mental health (Wild 2016). However, research addressing the psychological mechanisms underpinning resilience remains fragmented, with studies isolating discrete constructs such as coping (Campbell-Sills et al. 2006), cognitive reappraisal (McRae et al. 2012), optimism (Thompson et al. 2018), and humour (Southwick and Charney 2012). Moreover, resilience is positively associated with self-efficacy (Liu et al. 2018a; McBride and Ireland 2016; Sagone and De Caroli 2013), an individual's belief in their ability to achieve an outcome (Bandura 1977), making it an essential component in understanding resilience and one's ability to adapt. As such, there is a clear need for a framework that articulates the psychological constructs through which resilience manifests, taking into consideration psychological, physical, and environmental aspects.

In line with the holistic conceptualisation of the self as being socially, physically, and temporally embedded, Siegel (2001) conceives human functioning as arising from the interplay of personal factors (e.g. cognition), behaviour, and the social environment. Such factors conceptualise individuals as self-organising and complex systems with mental activity nested within the body, itself embedded within a social network. Such complex systems are defined not only by their components but also through connections, meaning that behaviour and mental functioning are inextricable from body and social environment. This interactive, reciprocal framework of embeddedness can be applied to resilience, which has also been empirically linked with social (Arewasikporn et al. 2019), temporal (Zheng et al. 2019), and physical (Loizzo 2018) embeddedness. However, the relationship between embeddedness and resilience is not fully understood.

One common and useful approach to understanding resilience is the variable-focused approach (Masten 2001). This has been described as particularly relevant in understanding relationships between risk and protective factors. Although this approach might be weaker at identifying differences at an individual and naturally occurring level, it is statistically powerful enough to identify patterns of relationships between relevant variables to address through intervention. For instance, embeddedness appears to interact with risk and protective factors in predictive models of resilience (Garmezy et al. 1984; Masten 2001). Therefore, protective factors such as social connectedness may buffer risk factors akin to low self-efficacy. Similarly, resilience has been found to operate at a community level (Braun-Lewensohn and Sagy 2014), pointing to social influence over the construct. So much so that social engagement with resilient individuals has been found to increase one's level of resilience, a process referred to as 'vicarious resilience' (Hernandez-Wolfe 2018).

Temporal embeddedness also influences resilience as adaptive behaviour unfolds over time (Harrison and Stergiou 2015). Resilience involves preserving mental health in relation to stress (Chmitorz et al. 2018), with stress found to distort the perception of time (van Hedger et al. 2017). Moreover, temporal impairment is implicated in mental illness (Northoff et al. 2018),

and so together, these findings frame resilience as a major contributor to the maintenance of temporal perception during stress.

Resilience has been associated with hope (Worrell and Hale 2001), future orientation (Seginer 2008), and positive expectations of the future (Wyman et al. 1992). Moreover, the act of increasing one's future orientation has been found to protect against stress (Zheng et al. 2019) and has formed an intervention target as a means of increasing resilience (Li et al. 2017). These findings support the proposed role of temporal embeddedness, operationalised in this research as future time perspective (FTP), in predicting resilience.

Finally, physical embeddedness is also thought to influence resilience. The hypothesis that the body influences resilience is based on the mind-body feedback loop (Tang and Bruya 2017), which points to an interplay between cognition and mood states. Awareness of one's body, or interoceptive awareness, defined as the perception of internal body states (Khalsa et al. 2018), is necessary for reappraisal of emotional responses (Fuestoes et al. 2013). Therefore, interoceptive awareness has direct bearing on resilience as it is implicated in adaptive behaviour (Perchtold et al. 2019). Conversely, abnormal body perception is implicated in depression (Wiebking et al. 2010) and low body awareness has been associated with low resilience (Haase et al. 2016), with body awareness interventions successfully found to foster resilience (Hwang et al. 2018; Kwak et al. 2019).

Research on the underpinnings of resilience lacks a conceptual framework capable of situating individuals as embedded within an overarching temporal, social, and physical context. As such, this study seeks to address this knowledge gap by exploring the interrelated constructs of self-efficacy, embeddedness, and resilience, and in doing so, propose an explanatory model of resilience. We predict that self-efficacy and social embeddedness (operationalised as FTP; Zimbardo and Boyd 1999) will be positively associated with resilience. The value of the outlined approach is threefold. Firstly, it addresses the current lack of empirical knowledge underpinning the role of embeddedness in the relationship between self-efficacy and resilience. Secondly, it elucidates the psychological processes underpinning resilience, which may subsequently inform predictive studies to identify targets for practical interventions. Thirdly, it breaks with the potentially marginalising effect of earlier research perspectives that has posited resilience as a personality trait (Maltby et al. 2015).

Materials and Methods

Subjects

An a priori power analysis (G*Power; version 3.1.9.3), with an anticipated medium effect size ($f^2 = .15$) and a standard alpha level (.05), indicated a sample size of 141 would be required to have 95% power in our planned analyses as well as practical relevance. An open call for participants from the general population was made through social media platforms LinkedIn, Facebook, and University of Derby's (UK) research participation scheme. In total, 227 participants responded to the online advertisement, with 20 removed due to missing data (> 5%), leaving a final sample of 207 ($M_{\text{age}} = 38.10$, $SD = 13.11$, 82.6% female). All participants were fluent in English, aged 18 years or over, and provided informed consent online in accordance with approved research protocols and the Declaration of Helsinki. Participants were not reimbursed for their time.

Materials

Brief Resilience Scale (BRS; Smith et al. 2008)

The BRS comprises six items measured on a 5-point scale anchored from ‘Disagree Strongly’ to ‘Agree Strongly’ (e.g. I tend to bounce back quickly after hard times). Mean scores are calculated from all items, and higher scores indicate greater levels of resilience.

General Self-efficacy Scale (GSES; Jerusalem and Schwarzer 1992)

The GSES comprises ten items measured on a 4-point scale anchored from ‘Not at all true’ to ‘Exactly true’ (e.g. If I am in trouble, I can usually think of a solution). Mean scores are calculated from all items, with higher scores representing greater self-efficacy.

The Social Connectedness Scale (SCS; Lee and Robbins 1995)

The SCS comprises 20 items and measures one’s experience of social belonging on a 6-point scale from ‘Strongly Agree’ to ‘Strongly Disagree’ (e.g. I feel so distant from people). Mean scores are calculated from all items, with higher scores representing greater social connectedness.

Zimbardo’s Time Perspective Inventory (ZPTI; Zimbardo and Boyd 1999)

To ensure brevity of the participant’s experience only, the 10-item FTP sub-scale of the ZPTI was used to measure positive future orientation on a 7-point scale from ‘Very untrue of me’ to ‘Very true of me’ (e.g. My future is filled with possibilities). Mean scores are calculated from all items, with higher scores indicating a stronger tendency towards the future.

The Body Awareness Questionnaire (BAQ; Shields et al. 1989)

The BAQ comprises 18 items and measures attentiveness toward non-emotive body processes on a 7-point Likert scale from ‘Not at all true of me’ to ‘Very true of me’ (e.g. I know in advance when I’m getting the flu). Total scores are derived from summing all items, and higher scores indicate greater levels of body awareness.

Procedures

Qualtrics survey software was used to present participants with an online questionnaire. After consenting, participants entered their demographic information and completed the questionnaires before being debriefed and thanked for their time. On average, the study took less than 15 min to complete.

Statistical Analysis

Pearson correlations were computed between all variables. A multiple regression was conducted to verify whether self-efficacy, social connectedness, FTP, and body awareness significantly predict resilience. Finally, Structure Equation Modelling (SEM) was conducted to test an exploratory model of the relationship between predictors and the dependent variable. For correlations of interest (i.e.

Table 1 Pearson correlations between target variables

Variables	[1]	[2]	[3]	[4]	[5]	[6]
[1] Self-efficacy	—	.55**	.36**	.31**	.18**	.14**
[2] Resilience	—	—	.31**	.30**	.08	.13
[3] Social connectedness	—	—	—	.38**	.16*	.16*
[4] Future time perspective	—	—	—	—	.19*	-.29**
[5] Body awareness	—	—	—	—	—	.10
[6] Age	—	—	—	—	—	—

*Correlation is significant at the 0.05 level (2-tailed). **Correlation is significant at the 0.01 level (2-tailed)

resilience and self-efficacy, future time perspective, social connectedness, and body awareness), Pearson's partial correlations were computed, controlling for age and sex (demeaned).

Results

All the scales used in the current study were classified as reliable ($C\alpha > .7$; George and Mallery 2003) based on Cronbach's alpha tests.

Correlation Analysis

Bivariate Pearson correlations were computed between all variables (see Table 1). We predicted that resilience would positively correlate with social embeddedness. In fact, resilience was positively associated with self-efficacy, social connectedness, and FTP—associations which survived after controlling for age and sex. However, resilience did not significantly correlate with body awareness. Self-efficacy was positively associated with social connectedness, FTP, and body awareness. Social connectedness was also positively associated with body awareness and FTP.

Multiple Regression Analysis (Table 2)

A multiple regression analysis was conducted to verify whether self-efficacy, social connectedness, FTP, and body awareness significantly predicted resilience. Partial and semi-partial correlations were also verified to understand the contribution of each predictor and their intercorrelations in explaining the variance in resilience. A significant model was observed ($F(4, 202) = 24.420$, $p < .001$, $R^2_{adj} = .313$). However, only self-efficacy was a significant predictor of resilience, showing a positive relationship. Regarding partial correlations, after controlling for the influence of social connectedness, FTP, and body awareness on both self-

Table 2 Multiple regression of self-efficacy, social connectedness, future time perspective, and body awareness on resilience

β	<i>SE</i>	<i>t</i>	<i>p</i>	95% CI	Partial Correlation	Semi-partial Correlation
Self-efficacy	.478	.116	7.510	< .001	.643 to 1.101	.467
Social connectedness	.104	.043	1.598	.112	-.016 to .152	.112
Future perspective	.124	.040	1.915	.057	-.002 to .156	.134
Body awareness	-.046	.032	-.781	.436	-.088 to .038	-.055

efficacy and resilience, self-efficacy explained 21.81% of the variance in resilience, out of which 18.84% was the unique contribution of self-efficacy on resilience.

In sum, the results reported in the “[Correlation Analysis](#)” and “[Multiple Regression Analysis](#)” sections indicate that self-efficacy is the most relevant predictor of resilience. Although resilience also correlated with social connectedness and FTP, these were not significant predictors when entered in the multiple regression. Based on the correlation (Table 1) of self-efficacy with all the other predictors and the fact that it was the only significant predictor of resilience, an exploratory model was then tested, considering social connectedness, FTP, and body awareness as predictors of self-efficacy which then predicts resilience.

Explanatory Model of Resilience (Structural Equation Modelling)

Based on the results of the multiple regression analyses, we proposed an explanatory model where social connectedness, FTP, and body awareness predict self-efficacy, and self-efficacy predicts resilience (see Fig. 1). The analysis was performed using AMOS 26 and adopted maximum likelihood estimation. Model fit was assessed by comparative fit index (CFI), goodness of fit index (GFI), Tucker-Lewis index (TLI), root-mean-square error of approximation (RMSEA), and standardised root-mean-square residual (SRMR). For CFI, GFI, and TLI, the cutoff score to indicate good fit was $\geq .90$; for RMSEA $\leq .06$; and for RMR $\leq .08$ (Hu and Bentler 1999).

The results indicated that the data provided an adequate fit to the model: $\chi^2/df = 2.93$; GFI = .984, CFI = .962, TLI = .873, RMR = .038, RMSEA = .097, 95% CI [.025–.174] PCLOSE = .116. In terms of the estimates, all paths had significant regression weights ($p < .05$) except for the path from body awareness to self-efficacy. Modification indexes were verified but there was no suggestion of a significant correlation between the error terms. Excluding the non-significant path produced only a negligible improvement to model fit; thus, this alternative model was discarded at this stage.

Discussion

This study aimed to develop knowledge around the underpinning role of embeddedness in the relationship between self-efficacy and resilience. In doing so, we have proposed an exploratory model addressing these complex relationships, and so provide an initial step in articulating a psychological framework of resilience. Our results indicate that, although indices of

Fig. 1 Explanatory model of resilience based on self-efficacy, social connectedness, body awareness, and future time perspective

embeddedness are associated with resilience, their relationship might not be direct and instead may act through self-efficacy.

Associations between self-efficacy and resilience are well-established (e.g. Driver et al. 2016; Sagone and De Caroli 2016). In line with theoretical frameworks of agentic perspectives (Bandura 2001), which posit that a loss of goal-orientated behaviour may ultimately predict a failure of adaptive behaviour (conceptualised through low resilience), our results indicate strong, positive associations between self-efficacy and resilience. Such results are important as, if deficits of goal-orientated behaviour are present, it follows that resilience could be fostered by improving self-efficacy, a theory supported by a meta-analysis corroborating a bidirectional relationship between these two constructs (Yu et al. 2019).

Of interest, this study also identified additional positive associations between indices of embeddedness (social connectedness and FTP, but not body awareness) and resilience. On the whole, such findings were expected, given previous empirical evidence linking resilience to social (Arewasikporn et al. 2019) and temporal (Zheng et al. 2019) embeddedness. One surprising finding, however, was the absence of an association between body awareness and resilience, a hypothesis derived from evidence of the role of interoception in appraisal and adaptive behaviour (Haase et al. 2015) and success in its use as an intervention target for improving resilience (Kwak et al. 2019). There may be two potential reasons for this disparity in this research. First, we measured body awareness via the BAQ (Shields et al. 1989), which may not have successfully measured the targeted construct due to its unidimensionality, which, unlike the underlying construct, excludes attention to pain and fails to differentiate between adaptive and maladaptive body awareness (Mehling et al. 2009). Second, self-report scales may have measured interoceptive sensibility rather than accuracy of body awareness. This distinction is important because, while accurate body awareness supports resilience by maintaining homeostasis and guiding adaptive behaviour, inaccurate body awareness may decrease resilience (Strigo and Craig 2016). As such, validation of these findings is imperative in future research.

The unique contribution to knowledge here, however, is that, although indices of embeddedness are related to resilience, our models suggest that this variance is largely accounted for by self-efficacy. As a means of moving towards a framework of embeddedness in predicting resilience, our model examples a more integrative approach of embeddedness as an antecedent to self-efficacy, especially, and resilience more broadly. In fact, it corroborates previous literature which has shown that separate aspects of embeddedness (i.e. social connectedness, FTP, and body awareness) have directly predicted self-efficacy, and have directly and indirectly predicted mental health-related outcomes. Brown et al. (2012) found self-efficacy to moderate the relationship between volunteering (related to social connectedness) and well-being. Their subsequent path analysis indicated the best fit considered social connectedness as a direct predictor of self-efficacy. Moreover, although there exists weak evidence to suggest a relationship between body awareness and self-efficacy (Landsman-Dijkstra et al. 2006) and inconsistent associations between FTP and self-efficacy (Arian Far et al. 2019; Shafikhani et al. 2018), our findings support the idea that interventions on self-efficacy should take into consideration embeddedness as a means of promoting change in resilience.

Limitations of this study are as follows. First, data reported here is correlational in nature and self-reported, and so does not allow for causation between the variables to be inferred and may be subject to participant bias. Second, due to the cross-sectional nature of the study, it remains to be seen whether variation in situational stressors, which were not captured or controlled for here, plays a modulatory role in these relationships. This may be important with previous research highlighting the role of chronic stress in disrupting information processing pathways (Schulz and

Vögele 2015). Finally, we appreciate that models proposed here do not consider the multitude of other potential population variables which might play a role, based on previous research, such as sexual identity (Bariola et al. 2015), ethnicity, education (Bonanno et al. 2007) personality traits such as neuroticism (Shiner and Masten 2012), and coping styles (Innes 2017; Wu et al. 2013). We, therefore, endorse future research in this area to develop wider understanding. Despite these limitations, this research does nonetheless have the potential to underpin future clinical interventions targeted at increasing self-efficacy (via manipulating embeddedness), which could then increase resilience.

In conclusion, this novel empirical study examined the role of embeddedness (i.e. social connectedness, FTP, and body awareness) in predicting resilience via self-efficacy. Correlational findings reported here suggest that FTP, social connectedness, and body awareness predict resilience as a function of their association with self-efficacy. These results shed light on the interplay of the psychological mechanisms underlying resilience and represent an initial necessary step in identifying variables that may have an applied potential impact by identifying targets for future clinical interventions.

Compliance with Ethical Standards

Conflict of Interest The authors declare no conflict of interest.

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