



Stressful life transitions and wellbeing: A comparison of the stress buffering hypothesis and the social identity model of identity change



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ARTICLE INFO

Keywords:

Social identity

Depression

Social support

Stress

Multiple group membership

ABSTRACT

The relationship between stressful life transitions and wellbeing is well established, however, the protective role of social connectedness has received mixed support. We test two theoretical models, the Stress Buffering Hypothesis and the Social Identity Model of Identity Change, to determine which best explains the relationship between social connectedness, stress, and wellbeing. Study 1 (N=165) was an experiment in which participants considered the impact of moving cities versus receiving a serious health diagnosis. Study 2 (N=79) was a longitudinal study that examined the adjustment of international students to university over the course of their first semester. Both studies found limited evidence for the buffering role of social support as predicted by the Stress Buffering Hypothesis; instead people who experienced a loss of social identities as a result of a stressor had a subsequent decline in wellbeing, consistent with the Social Identity Model of Identity Change. We conclude that stressful life events are best conceptualised as identity transitions. Such events are more likely to be perceived as stressful and compromise wellbeing when they entail identity loss.

1. Introduction

Life transitions, such as moving cities, starting university, or being diagnosed with a serious illness, can be a source of personal growth and development. At the same time, life transitions can also be viewed as *stressors*, which place people at risk of a range of negative psychological and physiological effects (Baum, 1990). Life transitions are linked to the development of psychological distress and clinically significant major depressive disorders (Hammen, 2005; Paykel, 2003). Studies have also shown that life transitions strongly predict the onset of first and subsequent episodes of depression (Kendler et al., 1999). Major depression is one of the leading causes of disability worldwide (Ferrari et al., 2013) and poses a significant economic burden (Mrazek et al., 2014). Therefore maintaining wellbeing and preventing the onset of depression in response to such life transitions is a public health priority.

1.1. Social support as a buffer

Early stress research made use of standardised schedules of stressors to make predictions about the effect of stress on individuals. For example, the Social Readjustment Rating Scale (SRRS; Holmes and

Rahe, 1967) is an inventory of 43 stressors that have been ranked in terms of their impact and are subsequently used to predict whether an individual is at risk for adverse health outcomes. For example, the SRRS score for receiving a serious health diagnosis (53; 'personal injury or illness') is considerably higher than the SRRS score for moving city (20; 'change in residence'). However, this approach was criticised for overlooking the subjective appraisal process through which a person evaluates stressors (Cohen et al., 1983; Lazarus and Folkman, 1984). Many individuals who experience severe stressors do not develop depression (Lazarus et al., 1952), and so there has been an increasing focus on *perceived* stress and the factors that may facilitate coping. In particular, there has been research on social support as a protective factor (or "buffer") against psychopathology, which people can draw upon during stressful experiences, including life transitions. Indeed, the *stress buffering hypothesis* posits that social support protects individuals from the pathogenic consequences of stressor exposure (Cohen, 2004; Cohen and McKay, 1984; Cohen and Wills, 1985). More specifically, stressors are proposed to increase the risk for depression, particularly when a person has limited rather than substantial social support. This hypothesis is represented in Fig. 1 in the forms that it is most often posited, where social support moderates the effect of a) all stressful life events, b) severe stressful life events, or

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<http://dx.doi.org/10.1016/j.psychres.2016.11.039>

Received 6 June 2016; Received in revised form 14 October 2016; Accepted 26 November 2016

Available online 29 November 2016

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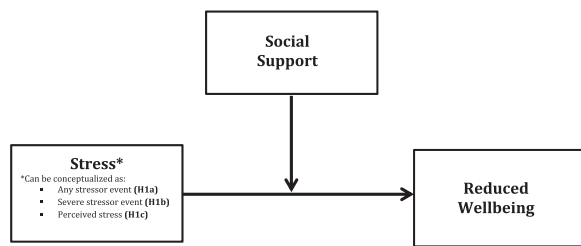


Fig. 1. Three alternative conceptualizations of the stress buffering hypothesis. Note that stress can be operationalised as: experiencing any stressful event (H1a), experiencing a stressor externally rated as more severe than other stressors (H1b) and ratings of perceived stress (H1c).

c) perceived stress, on wellbeing.

However, evidence for the stress buffering hypothesis has been mixed and inconclusive. Both stress and social support have been separately established as direct longitudinal predictors of wellbeing. That is, exposure to negative life events (i.e. stressors) have been found to predict an increase in depressive symptoms (Cohen et al., 1987; Dubois et al., 1992; Lewinsohn et al., 1994; Monroe et al., 1983; Nolen-Hoeksema et al., 1992; Windle, 1992). Similarly, deficits in social support predict an increase in depressive symptoms over time (Dubois et al., 1992; Lewinsohn et al., 1994; Sheeber et al., 1997; Windle, 1992). However, this effect does not appear to be specific to social support. Rather, social relationships more generally are a key protective factor in both prevention of and recovery from mental illness (for a review, see Cruwys et al., 2014a).

While both stress and social support predict wellbeing, evidence for the *interactive* model is less clear, especially when tested longitudinally (Lazarus, 2000; Väänänen et al., 2005; Zimmerman et al., 2000). Cohen et al. (1986) measured stress, social support and depression among American college students over 11 and 22-week intervals, and found little longitudinal evidence for the stress buffering hypothesis. In fact, in a review of 58 longitudinal tests of the stress buffering hypothesis, only 5% of tests found support for the interaction between stress and social support as a significant predictor of depression – a proportion equivalent to the Type I error rate (Burton et al., 2004). Thus, while it is clear that stress and social support are implicated in depression, the direction and nature of this relationship remains in question (e.g., Schwarzer and Leppin, 1991; Semmer et al., 2008). Alternative models are needed to better explain the relationships between stress, social connectedness and depression.

1.2. A social identity model of stressful life transitions

An alternative framework that speaks to the relationships among stress, social connectedness and depression is the social identity approach, which is comprised of social identity theory (Tajfel and Turner, 1979) and self-categorization theory (Turner et al., 1987). *Social identity* refers to that part of the self-concept that is informed by one's social group memberships (Tajfel and Turner, 1979). While initially developed to understand and explain intergroup phenomena such as discrimination and stereotyping, social identity is gaining prominence as a framework for explaining the health benefits of social connectedness, including its relationship with wellbeing (Sani et al., 2012), social support (Haslam et al., 2008) and stress (Haslam et al., 2005; Haslam and Reicher, 2006; Jones et al., 2012). We will address each of these in turn.

The social identity approach has been applied to understand psychological wellbeing (Haslam et al., 2009), and the experience of depression in particular. Social identification has been proposed to be the “active ingredient” in social relationships that provides their protective benefit against depression. Indeed, social identification has been found to be more strongly associated with depression than social contact (Sani et al., 2012, 2015). Joining a social group has been found

to increase the likelihood of depression recovery and prevent relapse (Cruwys et al., 2013), with studies suggesting that social groups are therapeutic only when they are underpinned by social identification (Cruwys et al., 2014b). The reason social identification is theorised to be so powerful is that it can be conceptualised as a psychological resource, that both informs one's self-definition and provides a foundation for meaningful interaction with others (Jetten et al., 2014).

Similarly, the social identity approach suggests that social support is not a free-floating resource that can originate from any social relationship. Instead, social support emerges from group memberships, such that it is both more likely to be given (Drury et al., 2016; Levine et al., 2005; Platow et al., 1999) and received in the manner it was intended (Haslam and Reicher, 2006) within the context of a salient shared group membership. For instance, in one study, Manchester United football club fans were quick to help others wearing Manchester United shirts, but slow to help those wearing rival team shirts. However, when the social identity of those participants was defined more broadly, as *football* fans rather than Manchester United fans, participants were equally likely to help another fan, irrespective of what team shirt that individual was wearing (Levine et al., 2005). Other studies have also shown that perceptions of social support flow from social identification (Haslam et al., 2005), and that only social support that comes from an in-group member buffers against perceived stress (Frisch et al., 2014). The upshot of these findings is that the various benefits provided by social support – instrumental, emotional, material, financial – are more likely to be available and utilised when a salient social identity exists between the provider and recipient of support. However, social support and social identification have never been directly compared in terms of their utility for understanding the relationship between life transitions and mental health. We argue that social support may have more predictive power if conceptualised in terms of the resources received from social group memberships.

Finally, the social identity framework has also been applied in the context of stress. Researchers have established that people experience less perceived stress and are more resilient following stressors in the context of salient social identification (Haslam et al., 2004; Haslam et al., 2005; Haslam and Reicher, 2006). For instance, people who have been reminded of their social identities are more persistent and recover more quickly from physical stressors such as a cold-pressor task (Jones and Jetten, 2011). Similarly, people find public speaking less stressful if they have previously been reminded of a shared social identity with the audience (Häusser et al., 2012), and are more resilient in the face of traumatic experiences when they can draw upon social identification (Bombay et al., 2014; Drury, 2003). It has been argued that a key reason for these findings is that salient social identities determine the degree to which a person perceives a stressor as threatening to the self (Levine, 1999; Levine and Reicher, 1996).

The social identity approach has also examined stressful life transitions in particular, using a framework called the Social Identity Model of Identity Change (Jetten et al., 2009). One proposition of this model, which differs from the predictions of the stress buffering hypothesis, is that one's social networks and sources of support are usually *affected by* a life transition. The social identity approach states that life transitions involve a change from one identity to another – bachelor to husband, or adolescent to adult. The social group memberships and resulting social support that was available prior to the life transition are unlikely to be the same or, perhaps, as rich, after the transition. The social identity model of identity change further posits that it is multiple group memberships that represent the true buffer against poor outcomes in a life transition. These multiple group memberships may be maintained across the transition and provide identity continuity (Haslam et al., 2008; Iyer et al., 2008), or may be new social groups that a person is able to access for the first time after the transition (Beckwith et al., 2015). Evidence for changes in social identity during life transitions has been found in the context of moving to university (Iyer et al., 2009), the transition to motherhood

(Seymour-Smith et al., in press), brain injury (Jones et al., 2012), retirement (Steffens et al., 2016) and in the context of recovery from addiction (Dingle et al., 2015). However, no studies have directly compared the predictive utility of the stress buffering hypothesis and the social identity model of identity change.

The social identity approach makes two predictions about the relationship between life transitions and depression that are not shared with the stress buffering hypothesis. First, we must consider how a person's social resources are *affected by* the transition, rather than viewing social support as a stable variable across the transition period. Thus, it follows that it is primarily those social resources that remain or become available *after* the life transition that could be expected to have a buffering effect. Second, we can predict that life transitions will only be *perceived* as stressful when they entail a significant identity transition, and the loss of social support that this often entails. In this way, perceived stress may be best conceptualised alongside the other subjective psychological outcomes of life stressors, that is, a component of a broader wellbeing construct including depression and life satisfaction.

1.3. The current research

The present research aims to compare the utility of the stress-buffering hypothesis and the social identity model of identity change in predicting the relationships between stress, social support and wellbeing. Although the stress-buffering hypothesis brought attention to the interrelationship between social support, stress and wellbeing, its hypothesised interactive model has received mixed empirical support. We posit that one reason for this is that all of these three variables should be conceptualised as outcomes of *identity transition*.

Study 1 was an experiment that manipulated the nature of a hypothetical stressor, while Study 2 was a longitudinal study of people experiencing a stressful life transition (starting university in another country). Our first hypothesis tested the stress buffering hypothesis. Based on the previous literature, we articulated three possible interpretations for how the stress buffering hypothesis could manifest (see Fig. 1), and tested each of them: (H1a) among people experiencing a stressor, a main effect of social support on wellbeing; (H1b) an interaction between the externally-rated severity of a stressor and social support on wellbeing; and (H1c) an interaction between perceived stress and social support on wellbeing. Second, the social identity approach conceptualises social support not as a variable that is stable across time, but rather as a psychological resource that flows from a person's social *group* networks, which change across the lifespan, including as a result of life transitions. That is, the social identity approach posits that any social “buffering” against stress will be attributable to the social group resources that a person has access to *during* and *after* the life transition in question. Therefore we hypothesised (H2) that the number of meaningful group memberships a person possesses – measured after the transition, controlling for group memberships prior to the transition – would protect wellbeing, such that more group memberships will be associated with greater wellbeing. Third, we tested whether life transitions are only perceived as stressful in the context of social identity loss. More specifically, we hypothesised (H3) that perceived stress is best conceptualised as a part of a latent construct of wellbeing, co-varying with life satisfaction and depression, rather than distinct from them. Further, we hypothesised (H4) that social connectedness does not moderate the effect of stress on wellbeing, but is better conceptualised as a mediator of this relationship – whereby life events only compromise wellbeing when they are associated with a loss in social identities. All four hypotheses were tested both experimentally (Study 1) and longitudinally (Study 2).

2. Study 1

Study 1 was a vignette-based experiment with a diverse community

sample to test these stress buffering and social identity hypotheses. If the social identity model correctly posits that social support is a resource arising from group memberships, then social support and group memberships will be confounded – those with more meaningful group identities will have more social support and vice-versa. In order to address this confound, Study 1 utilised a vignette manipulation that aimed to disentangle the effect of stressors on group memberships versus social support. Specifically, Study 1 presented participants with one of two possible scenarios: (1) receiving a major health diagnosis; or (2) moving to a new city. We expected that, while both scenarios constitute an identity transition, in the context of a major health diagnosis individuals may be unable to forge positive new identities due to physical limitations, but social support may increase as family and friends come to the individual's aid. Conversely, social support is expected to drop when moving to a new city, because interpersonal networks are no longer available, but the ability to forge new identities is not impeded in the same way.

2.1. Method

2.1.1. Participants and design

Participants were 165 English-speaking adults recruited online using Amazon MTurk from a variety of different countries. Participants received 75c reimbursement for their participation and took an average of 15 min to complete the experiment. Participants were randomly assigned to read one of two vignettes about a stressful life event: either receiving a diagnosis of a serious health condition or moving to a new city for work. Participants were then asked to imagine themselves in this situation and the impact that it would have on their life. There was no information in the vignettes that specified the degree of impact the scenarios might have on social support, identity or wellbeing.

2.1.2. Measures

Materials are listed below in the order participants completed them.

2.1.2.1. Manipulation check. A manipulation check question following the vignette asked participants to indicate which situation they read about. Possible responses included ‘having a baby’, ‘being diagnosed with a serious health problem’, or ‘moving to a new city’. Fifteen additional participants responded incorrectly to this question and were excluded from further analysis.

2.1.2.2. Life satisfaction. The five-item Satisfaction with Life Scale (Diener et al., 1985), which has established reliability and validity in a wide range of countries and samples (Pavot and Diener, 1993), was used to measure anticipated life satisfaction. Items were adapted to reflect expected life satisfaction, for example ‘If I were in this situation, I think that the conditions of my life would be excellent’ ($\alpha=.93$). Responses were on a seven-point scale from ‘strongly disagree’ to ‘strongly agree’.

2.1.2.3. Depression. The seven item depression subscale of the Depression Anxiety Stress Scales (DASS-21) was used to measure anticipated depression. The DASS-21 is a well-validated short form of the 42-item Depression Anxiety Stress Scales (Crawford et al., 2009; Lovibond and Lovibond, 1995). Participants were asked to consider how the vignette scenario would make them feel. Items were adapted to refer to the expected experience of depression symptoms, for example, ‘If I was in this situation, I think I would feel like I wasn't worth much as a person’. Participants responded using a three-point scale, from 0 ‘would not apply to me at all’ to 3 ‘would apply to me very much’ ($\alpha=.92$). To retain comparability with the original scale, responses were

summed and multiplied by two in accordance with recommended practice (Lovibond and Lovibond, 1995). The mean anticipated depression score was 11.69 ($SD=10.80$). This is above the recommended cut-off point of 10 indicating mild clinical depression (Lovibond and Lovibond, 1995).

2.1.2.4. Group memberships. Group memberships were measured using two four-item scales adapted from the Exeter Identity Transition Scales (EXITS). This scale is reliable and has been validated in a variety of samples (Haslam et al., 2008; Iyer et al., 2009; Jetten et al., 2012). Participants were asked to consider, first, how the vignette scenario would affect their group memberships ($\alpha=.91$), and then to report their pre-existing group memberships ($\alpha=.95$). Items were adapted such that participants were asked, “In this situation, I think I would...” versus “Right now, I...”. The four items were: (1) “...belong to lots of different groups”, (2) “...join in the activities of lots of different groups”, (3) “...have friends who were members of lots of groups”, and (4) “have strong ties with lots of different groups”. Participants responded using a seven-point scale from ‘strongly disagree’ to ‘strongly agree’.

2.1.2.5. Perceived stress. The ten-item Perceived Stress Scale (Cohen et al., 1983) was used to assess how stressful participants anticipated that the imagined life event would be for them. This scale is a reliable and valid measure of stress in a wide variety of populations and contexts (Andreou et al., 2011; Ramírez and Hernández, 2007). Response items measure the degree to which situations in an individual's life are appraised as stressful, for example ‘If I were in this situation, I would feel nervous and stressed’. Participants responded using a five-point scale from ‘never’ to ‘very often’ ($\alpha=.85$).

2.1.2.6. Social support. A four-item social support scale was used to assess participants' perceived social support (Haslam et al., 2005). The scale assesses four distinct aspects of social support (House, 1981): (a) emotional support, “If I was in this situation, I think I would get the emotional support I need from other people”; (b) companionship “...I would get the help I need from other people”, (c) instrumental support, “...I would get all the resources I need from other people”, and (d) informational support, “I would get the advice I need from other people”. Participants responded using a seven-point scale from ‘Strongly disagree’ to ‘Strongly agree’ ($\alpha=.90$).

2.1.2.7. Demographics. At the end of the study participants provided their gender, age, language spoken at home, ethnicity, level of education and current employment status.

2.2. Results

2.2.1. Descriptive statistics

Demographic characteristics of the sample are provided in Table 1, with comparison between conditions on key variables presented in Table 2. The sample was relatively diverse, with almost a quarter of the sample aged 45 years of older, slightly more than half Caucasian, 76.6% were employed, and a wide distribution of educational backgrounds.

Being diagnosed with a serious health condition was perceived to be more stressful than moving to a new city, $F(1, 164)=2.58$, $p<.001$, $\eta^2=.11$, 95% CI: .04–.21. Accordingly, being diagnosed with a serious health condition, relative to moving city, was associated with higher depression, $F(1, 164)=18.87$, $p<.001$, $\eta^2=.10$, CI: .03–.20, and lower life satisfaction, $F(1,164)=141.48$, $p<.001$, $\eta^2=.46$, CI: .35–.55.

Table 1
Participant demographic characteristics.

	Study 1 N =165	Study 2 N=79
Gender		
Female	44.6%	68.4%
Male	55.4%	31.6%
Age		
18–24 years	19.9%	83.5%
25–34 years	39.2%	14.0%
35–44 years	17.5%	2.5%
45+ years	23.5%	0%
Language Spoken at Home		
English	83.7%	16.5%
Other	16.3%	83.5%
Ethnicity		
Caucasian	56.0%	2.5%
Asian	31.9%	89.9%
Black/African descent	6.6%	2.5%
Hispanic/Latino/a	2.4%	5.1%
Other	4.2%	0%
Education		
Less than university	31.9%	67.1%
Bachelor's Degree or Above	6.6%	32.9%
Postgraduate Degree	44.6%	0%
Employment		
Full-time Employed	53.6%	^a
Part-Time Employed	23.0%	^a
Not working	15.5%	^a
Full-time student	7.9%	100%

^a data not available.

Table 2
Study 1 Descriptive statistics

Measure	Condition Mean (SD)	
	Moving city(N=79)	Health diagnosis (N=86)
Current		
1. Pre-existing group memberships	3.88 (1.66)	3.71 (1.63)
2. Post-stressor group memberships [*]	4.34 (1.35)	3.91 (1.34)
3. Perceived stress [*]	2.60 (.57)	3.02 (.58)
4. Life satisfaction [*]	4.62 (1.17)	2.49 (1.13)
5. Depression [*]	7.67 (9.07)	15.02 (10.67)
6. Social support [*]	5.10 (1.19)	5.42 (1.00)

^{*} Conditions differ at $p=.062$.

^{*}These subscripts are not aligning correctly in the proof. Conditions significantly differ $p<.05$.

As expected, being diagnosed with a serious health condition was also associated with reduced group memberships relative to moving city, $F(1,164)=4.10$, $p=.044$, $\eta^2=.03$, CI: .01–.09), but marginally more social support, $F(1,164)=3.53$, $p=.062$, $\eta^2=.02$, CI: .00–.08.

2.2.2. Evaluation of hypotheses

H1 was assessed in three ways, corresponding to three possible interpretations of the stress buffering hypothesis (see Fig. 1 and Table 3). First, the direct relationship between social support and wellbeing was assessed, to test whether social support was protective for all people experiencing a stressful life event. This was non-significant for depression ($\beta=-.03$, $p=.688$) and life satisfaction ($\beta=-.06$, $p=.428$) – therefore H1a was not supported. Second, two regression analyses were conducted to test the interactive relationship between externally-rated stressor severity (operationalized here as experimental condition) and social support. The interaction was non-

Table 3

Study 1: Regression analyses to assess H1a, H1b, H1c and H2.

Depression					Life satisfaction				
Variable	<i>R</i> ² change	β	<i>SE b</i>	Semi-partial <i>r</i>	Variable	<i>R</i> ² change	β	<i>SE b</i>	Semi-partial <i>r</i>
H1a					H1a				
Step 1 Social support	.00	-.03	.75	-.03	Step 1 Social support	.00	.06	.11	.06
H1b					H1b				
Step 1	.13*				Step 1		.49*		
Social support		-.08	.71	-.08	Social support		.17	.08	.16*
Condition					Condition		.17	.08	.70*
Moving city versus health diagnosis		-.36	1.56	.37*	Moving city versus health diagnosis				
Step 2 Social support x Condition	.00	-.19	.72	-.04	Step 2 Social support x Condition	.02*	-.65	.08	-.13*
H1c					H1c				
Step 1	.44*				Step 1	.22*			
Social support		.09	.57	.09	Social support		-.35	.10	-.02
Perceived stress		.67	1.04	.66*	Perceived stress		-.47	.18	-.46*
Step 2 Social support x Perceived stress	.00	-.23	.92	-.04	Step 2 Social support x Perceived stress	.00	.02	.16	.00
H2					H2				
Step 1	.04*				Step 1	.03			
Social support		-.02	.12	-.02	Social support		-.09	.80	-.09
Pre-existing group memberships		.21	.08	.20*	Pre-existing group memberships		.17	.54	.16*
Step 2 Post-stressor group memberships	.12*	.48	.12	.35*	Step 2 Post-stressor group memberships	.11*	-.46	.79	-.33*

N=95.

Entries are statistics for the step at which they are entered. Condition was coded as -1 = moving city and 1 = health diagnosis.

* $p < .05$.

significant for depression ($\beta = -.19$, $p = .60$). The interaction was significant for life satisfaction ($\beta = -.65$, $p = .018$), however, this was in the opposite direction to that predicted by the stress buffering hypothesis, such that social support was *less* protective of wellbeing under conditions of high stress (diagnosis of a health condition). Therefore, H1b was not supported. Third, two regression analyses were conducted to test the interactive relationship between perceived stress and social support. The interaction was non-significant for depression ($\beta = -.23$, $p = .536$) and life satisfaction ($\beta = .02$, $p = .962$). Therefore H1c was not supported. Overall, H1, which aimed to provide an exhaustive test of the stress buffering hypothesis, was not supported.

Hypothesis 2 stated that important group memberships would be protective for mental health during stressful life events. Regression analyses (see Table 3) were used to assess this hypothesis, where social support and pre-stressor group memberships were entered as covariates (although results were significant with and without covariates). Post-stressor group memberships significantly predicted depression ($\beta = -.46$, $p < .001$, semi-partial $r^2 = .11$, CI: .04–.21) and life satisfaction ($\beta = .48$, $p < .001$, semi-partial $r^2 = .12$, CI: .04–.22). This effect was such that people whose post-stressor group memberships were a standard deviation above the mean expected relatively few depression symptoms, in the normal range at 6.79 points (Lovibond and Lovibond, 1995). By contrast, those whose post-stressor group memberships were a standard deviation below the mean expected to experience depression of moderate clinical severity at 16.21 points. Therefore H2 was confirmed.

To test Hypothesis 3, confirmatory factor analysis was conducted in AMOS (Arbuckle and Wothke, 1999) to determine whether a latent “wellbeing” construct, consisting of depression, life satisfaction, and perceived stress, provided a good fit for the data (see Fig. 2, model 1). Three alternative models were also tested, one in which the three constructs of life satisfaction, depression, and perceived stress were independent (Fig. 2, model 2); one in which depression, life satisfaction and stress were all subsumed within a single construct of wellbeing (Fig. 2, model 3); and one in which perceived stress was a separate construct from latent wellbeing, which consisted of only depression and life satisfaction (Fig. 2, model 4). As can be seen in Table 4, latent wellbeing provided the best model fit, $\chi^2(209) = 545.66$, RMSEA = .100.

Therefore H3 was confirmed: in the context of a stressor event, perceived stress is best conceptualised as a dimension of a wellbeing.

Hypothesis 4 stated that identity loss mediates the relationship between the experience of a stressor and reduced wellbeing (including perceived stress). A mediation model was used to assess H4, in which identity loss (calculated as the difference score of anticipated group memberships and current group memberships) mediated the relationship between stressor event (the independent variable) and the three dependent variables of perceived stress, depression, and life satisfaction. These analyses controlled for pre-existing group memberships and utilised Hayes’ (2013; model 4) PROCESS macro with 10,000 resamples. These relationships are summarised in Fig. 3. Stressor event significantly predicted identity loss, such that participants expected to experience a more substantial drop in group membership in the health stressor condition ($\beta = .15$, $p = .039$). Identity loss in turn significantly predicted perceived stress ($\beta = .22$, $p < .001$), depression ($\beta = .37$, $p < .001$) and life satisfaction ($\beta = -.21$, $p < .001$). The indirect effect was significant for perceived stress ($\beta = .04$; CI: .01–.10), depression ($\beta = .05$; CI: .01–.13) and life satisfaction ($\beta = -.04$; CI: -.09 to -.01), indicating that life events were more likely to impact on all three indicators of wellbeing when a person expected to experience identity loss.

2.3. Discussion

Study 1 was an experimental test of the stress buffering versus social identity models of the relationships between stress, social support, and wellbeing. Hypothesis 1 tested three different conceptualizations of the stress buffering hypothesis: (a) a main- or direct-effects model of social support on wellbeing among those experiencing a stressor, (b) the interaction between externally-rated stressor severity and social support, and (c) the interaction between perceived stress and social support. In none of these tests were we able to demonstrate evidence for the stress buffering hypothesis. Hypothesis 2 tested an alternative framework, the social identity approach, and found that the maintenance of multiple group memberships following a stressor event protected wellbeing. Hypothesis 3 proposed – and supported – an alternative conceptualization of perceived stress, as one dimension of

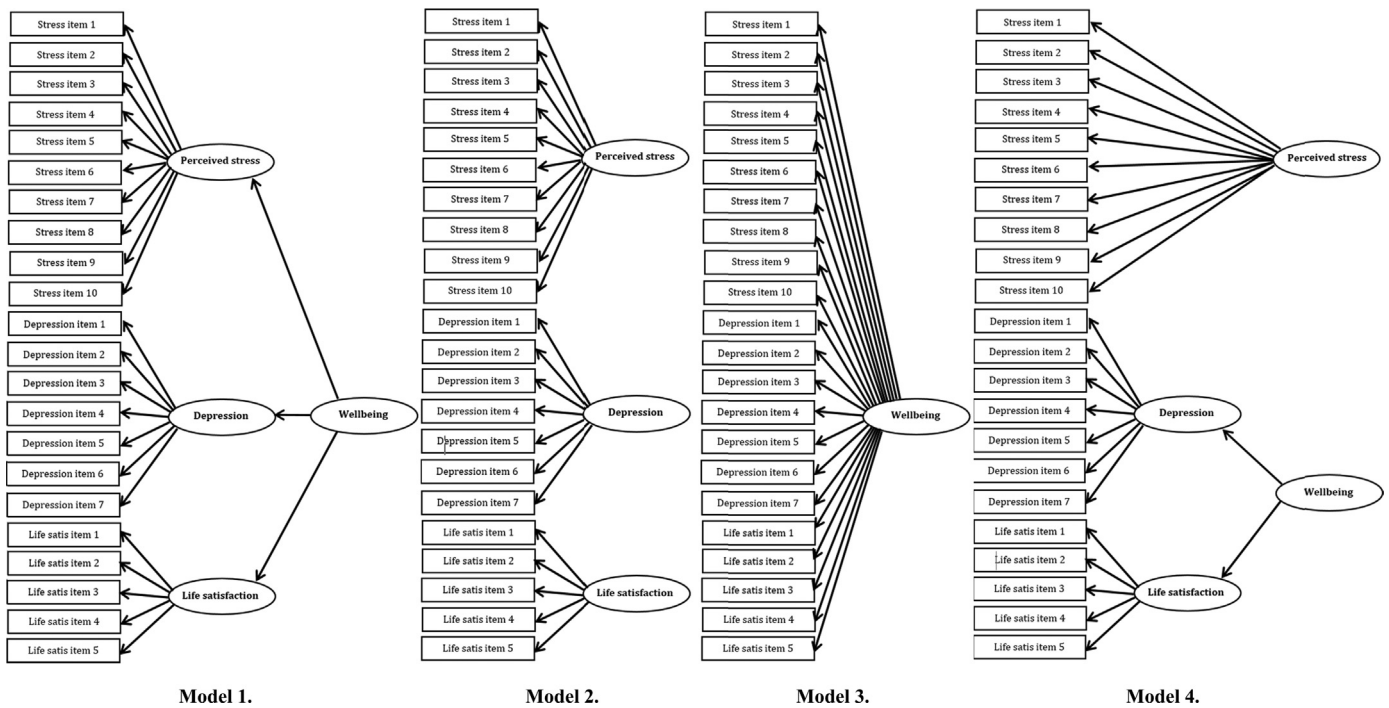


Fig. 2. Competing measurement models of perceived stress, depression, and life satisfaction. 1) One component: Wellbeing; Three dimensions: perceived stress, depression, life satisfaction. 2) Three components: perceived stress, depression, life satisfaction. 3) One component: Wellbeing. 4) Two components: perceived stress and wellbeing (two dimensions: depression, life satisfaction).

Table 4
Model fit statistics for Studies 1 and 2.

	CFI	GFI	NFI	RMSEA	AIC	χ^2
Study 1 (N=165; df=209)						
Model 1	.85	.74	.79	.100	645.66	545.66*
Model 2	.79	.70	.73	.118	776.89	688.89*
Model 3	.55	.50	.51	.174	1336.52	1248.52*
Model 4	.54	.50	.50	.176	1366.52	1274.52*
Study 2 (N=79; df=152)						
Model 1	.91	.77	.79	.086	323.89	235.89*
Model 2	.83	.73	.72	.117	389.80	313.80*
Model 3	.63	.55	.56	.173	587.44	505.44*
Model 4	.62	.50	.54	.176	601.31	521.31*

CFI – comparative fit index; GFI=goodness-of-fit index; NFI=normed fit index; RMSEA=root-mean-square error of approximation; AIC=Akaike's information criterion.
* $p < .05$.

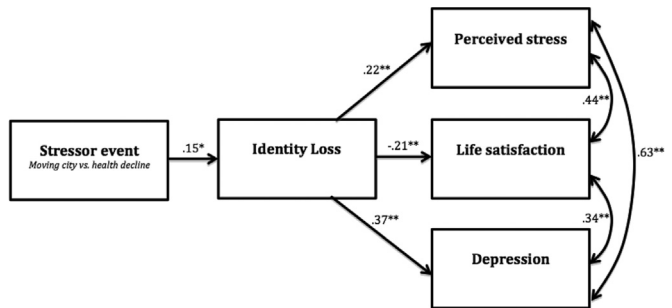


Fig. 3. Study 1 (Experiment): Anticipated identity loss predicts perceived stress, reduced life satisfaction and increased depression. Notes. N=165. Diagram includes standardised beta values. * $p < .05$; ** $p < .01$. The direct effect of the stressor on the three outcomes was significant at $\beta=.27$ for perceived stress; $\beta=-.64$ for life satisfaction and $\beta=.30$ for depression. Identity loss was conceptualised as the difference between pre-existing group memberships and anticipated group memberships following the stressor. Pre-existing group memberships were included as a covariate in the analyses, which significantly predicted anticipated group memberships ($\beta=.36$), perceived stress ($\beta=.23$), satisfaction with life ($\beta=.27$), but not depression ($\beta=.01$, *ns.*).

wellbeing alongside depression and life satisfaction. Model fit indices were not high enough to suggest that optimal fit was achieved, however, the model in which perceived stress was one of three subcomponents of wellbeing consistently had the best fit, compared with the other theoretically determined models. Hypothesis 4 proposed life transitions would be harmful to wellbeing when people anticipated that they would experience identity loss. This was confirmed, in that identity loss mediated the relationship between stressor event and the three dimensions of wellbeing: perceived stress, depression and life satisfaction.

Therefore, Study 1 found support for a social identity account, but not a stress buffering account, of how social resources protect wellbeing in the context of stressful life events. Specifically, stressors compromise wellbeing because they typically involve the loss of valued social identities. Social identities do protect wellbeing, but are also often compromised by stressors, and this resource is therefore better conceptualised as a mediator, rather than a moderator, of the effect of life transitions on wellbeing.

A strength of Study 1 was in its experimental manipulation of the stressful life event. However, the main limitation of Study 1 was its use of an *anticipated* stressor, in that the vignettes used were hypothetical, and although these vignettes successfully disentangled the effects of a stressor on group memberships versus social support, the scenarios differed in other ways that may have affected the results. Relatedly, a key criticism of the stress buffering hypothesis has been that it does not stand up to longitudinal evaluation (Burton et al., 2004). Thus, a necessary additional step in demonstrating the predictive power of a social identity approach is to test those predictions in an externally valid paradigm that assesses changes in wellbeing across time. The purpose of Study 2 was to provide this test.

3. Study 2

A longitudinal study was conducted to assess the manner by which a stressful life transition can affect social identities and wellbeing. We used a sample of international students who were adjusting to their

first semester of university. Settling into university is a challenging experience, and international students face a number of additional stressors compared to domestic students including cultural differences and difficulty communicating in a second language (Duanmu et al., 2009; Hechanova-Alampay et al., 2002; Zhou et al., 2008). Physical separation from previous group memberships may also increase the likelihood of social identity loss, making this an ideal population to test our hypotheses.

3.1. Method

3.1.1. Participants

Participants were 79 international students enrolled in their first semester at a large university in Australia. Fifty-four were female and the average age of participants was 21.97 ($SD=3.62$) years. Two-thirds of the total number of participants were undergraduate students, the rest were graduate students. Out of the 250 participants recruited at Time 1 (T1), 34% responded to the follow-up study. Independent-samples *t*-tests revealed no significant differences between those who did and did not participate at Time 2 (T2) on wellbeing, social support, stress or demographic characteristics. Participants with fewer important group memberships at T1 were marginally more likely to be lost to attrition, $t(248)=-1.82$, $p=.082$.

3.1.2. Procedure and design

Study 2 employed a longitudinal design with two time points. At the start of the semester (T1), participants were asked to fill a questionnaire either in hardcopy or online. Participants were contacted at the end of the semester (T2; approximately four months later) and asked to complete a follow-up survey online. Participants were offered a \$10 gift voucher for participation at T2.

3.1.3. Measures

3.1.3.1. Social support. As in Study 1, social support was measured using a four-item scale (House, 1981; $\alpha=.90$).

3.1.3.2. Important group memberships. An adapted version of the Groups Listing Task (Haslam et al., 2008) was administered to participants at both time-points, in order to measure social identification with multiple group memberships. Participants were instructed to write up to six groups that they were a part of *prior to the life transition* (T1) and *after the life transition* (T2). For each group listed, participants were also asked to rate the importance of each group to the participant on a 7-point Likert scale ranging from 1 (“not at all important”) to 7 (“very important”). A total score for important

group memberships was calculated by summing the number of groups that had importance ratings of 5 or above on the 7-point Likert scale.

3.1.3.3. Depression. As in Study 1, depression was measured using the depression subscale of the DASS 21 ($\alpha_{T1}=.87$; $\alpha_{T2}=.90$).

3.1.3.4. Stress. Perceived stress was measured using the stress subscale of the Depression, Anxiety and Stress Scales (DASS-21; Lovibond and Lovibond, 1995), for example “I find it difficult to relax”. Participants were asked to report to what extent had they experienced each item in the past week on a 4-point scale, ranging from 0 (“did not apply to me at all”) to 3 (“applied to me very much, or most of the time”). A total score for stress was computed by calculating the sum of each score on stress subscale, multiplied by two in order to retain comparability with the original 42-item scale, in accordance with authors’ recommendations (Lovibond and Lovibond, 1995). The stress subscale was internally consistent at both time points ($\alpha_{T1}=.83$; $\alpha_{T2}=.83$).

In order to assess H1b, we sought to measure how severe the stressor had been for each participant (not subjectively, but in terms of the features of the transition itself). Participants were asked for the date on which they arrived in Australia (coded 0 for more than one month prior to commencing study versus 1 for less than one month prior), and for the country in which they completed high school. The Human Development Index (United Nations Development Programme, 2015) was used to categorise participants’ country of high school completion into high (coded 0), medium (1) and low (2) development countries. We theorised that the transition to university would be a more intense stressor for those participants who were also simultaneously managing the stressors of cultural transition and moving countries. Therefore, the product of these terms was then calculated to create a stressor severity scale where participants received the lowest score (0) if they had arrived in Australia more than a month prior to commencing study and were from a high development country, and received the highest score (2) if they had arrived less than a month prior to commencing study and were from a low development country.

3.1.3.5. Life satisfaction. As in Study 1, we used the Satisfaction With Life Scale (SWLS; Diener et al., 1985; $\alpha_{T1}=.85$; $\alpha_{T2}=.91$).

3.2. Results

Descriptive statistics and intercorrelations for all variables are

Table 5
Study 2: Descriptive statistics and intercorrelations.

Measure	<i>M</i> (<i>SD</i>)	1	2	3	4	5	6	7	8	9
Time 1										
1. Number of important group memberships	2.63 (1.73)	–	–.16	–.14	.05	.05	.35**	–.11	–.05	.22*
2. Depression	8.05 (10.06)		–	.76**	–.40**	–.30**	–.23*	–.49**	.50**	–.45**
3. Stress	11.97 (8.02)			–	–.39**	–.21	–.21	.37**	.54**	–.41**
4. Life satisfaction	5.08 (1.17)				–	.29**	.29**	–.40**	–.39**	.63**
5. Social support	5.13 (1.21)					–	.15	–.21	–.09	.06
Time 2										
6. Number of important group memberships	2.23 (1.58)						–	–.31**	–.35**	.40**
7. Depression	10.06 (9.04)							–	.75**	–.47**
8. Stress	14.54 (8.52)								–	–.45**
9. Life satisfaction	4.88 (1.17)									–

N = 79.

** $p < .01$.

* $p < .05$.

Table 6

Study 2: Regression analyses to assess H1a, H1b, H1c and H2.

Depression (T2)					Life satisfaction (T2)				
Variable	R ² change	β	SE b	Semi-partial r	Variable	R ² change	β	SE b	Semi-partial r
H1a					H1a				
Step 1 Depression (T1)	.24*	.49	.11	.49*	Step 1 Life satisfaction (T1)	.40*	.39*	.63	.09
Step 2 Social support	.00	-.07	.78	-.06	Step 2 Social support	.02	-.04	.09	-.14
H1b					H1b				
Step 1 Depression (T1)	.24*	.49	.11	.49*	Step 1 Life satisfaction (T1)	.40*	.63	.09	.63*
Step 2	.04				Step 2	.03			
Social support		-.03	.78	-.03	Social support		-.13	.09	-.13
Stressor severity		.18	1.61	.18*	Stressor severity		.08	.18	.08
Step 3 Social support x Stressor Severity	.03*	-.80	1.36	-.18*	Step 3 Social support x Stressor Severity	.00	.11	.16	.02
H1c					H1c				
Step 1 Depression (T1)	.24*	.49	.11	.49*	Step 1 Life satisfaction (T1)	.40*	.63	.09	.63*
Step 2	.35*				Step 2	.07*			
Social support		-.11	.58	-.10	Social support		-.14	.09	-.13
Perceived stress		.68	.09	.59*	Perceived stress		-.24	.01	-.22*
Step 3 Social support x Perceived stress	.01	-.46	.06	-.11	Step 2 Social support x Perceived stress	.01	-.29	.01	-.07
H2					H2				
Step 1 Depression (T1)	.24*	.49	.11	.49*	Step 1 Life satisfaction (T1)	.40*	.63	.09	.63*
Step 2 Pre-existing group memberships	.00	-.03	.53	-.03	Step 2 Pre-existing group memberships	.04*	.19	.06	.19*
Step 3 Post-stressor group memberships	.05	-.23	.61	-.22*	Step 3 Post-stressor group memberships	.03*	.19	.07	.17*

N = 79.

Entries are statistics for the step at which they are entered.

* $p < .05$.+ $p < .10$.

outlined in Table 5. Participants reported marginally fewer important group memberships at T2 than at T1, $t(78)=1.90$, $p=.061$, $\eta^2=.04$, CI: .00–.16. Depression scores were also higher at T2 compared to T1, $t(78)=-2.06$, $p=.042$, $\eta^2=.05$, CI: .01–.17. The mean level of depression at T2 was above the clinical cut-off score for mild depression. Similarly, participants had higher levels of perceived stress at T2 compared to T1, $t(78)=-2.88$, $p=.005$, $\eta^2=.10$, CI: .01–.23.

3.2.1. Evaluation of hypotheses

To investigate whether social support would directly predict change in wellbeing among a sample experiencing a stressor (H1a), regression analyses were conducted (see Table 6). Step 1 included T1 measures of the relevant wellbeing construct and Step 2 included social support. Social support did not significantly predict depression ($\beta=-.07$, $p=.537$) or life satisfaction ($\beta=-.04$, $p=.124$). Therefore, H1a was not supported.

To assess whether stressor severity and social support interacted to predict T2 wellbeing (H1b), two regression analyses were conducted. Step 1 added the corresponding T1 measure of wellbeing, Step 2 added the main effects of social support and stressor severity, and Step 3 added the interaction between stressor severity and social support. The interaction was non-significant for life satisfaction ($\beta=.11$, $p=.783$) and marginally significant for depression ($\beta=-.80$, $p=.070$). Therefore, H1b received limited support.

To assess whether the extent to which the event was perceived as stressful (measured at T2) and social support interacted to predict T2 wellbeing (H1c), two regression analyses were conducted. These models were equivalent to the regression analyses above, but replaced stressor severity with perceived stress. The interaction was non-significant for depression ($\beta=-.46$, $p=.151$) and life satisfaction ($\beta=-.29$, $p=.428$). Therefore, H1c was not supported. Hence, no evidence was found in support of any of the three operationalisations of the stress buffering hypothesis (see Fig. 1).

To investigate whether multiple group memberships protected wellbeing in the context of a life transition (H2), we conducted two hierarchical multiple regression analyses (see Table 6) with T2

depression and T2 life satisfaction as dependent variables. Step 1 added the T1 measure of the relevant dependent variable. Step 2 added the number of important group memberships prior to the transition. Critical to the test of the hypothesis was Step 3, which added the number of important group memberships participants reported at T2 (post-transition). Number of important groups at Time 2 (which can also be conceptualised as the change in group memberships following transition) was found to explain a significant amount of additional variance in both T2 depression ($\beta=.23$, $p=.031$, semi-partial $r^2=.06$, CI: .01–.19) and life satisfaction ($\beta=.19$, $p=.044$, semi-partial $r^2=.05$, CI: .001–.17). Those who lost one or more important group memberships following the life transition had a 23% higher chance of meeting the clinical cut-off for depression at T2, compared to those who gained one or more group memberships following the transition. Taken together, these results suggest that the loss of important group memberships after a life transition contributes to increased depression and decreased life satisfaction, in support of H2.

Hypothesis 3 was assessed using a confirmatory factor analysis identical to Study 1 (see Fig. 2 and Table 4), although the stress measure included seven items in Study 2. Consistent with H3, latent wellbeing provided the best model fit, $\chi^2(152)=235.89$, RMSEA=.086. Therefore, H3 was confirmed: in the context of a stressor event, perceived stress is best conceptualised as a dimension of a wellbeing.

Given these findings across both studies, in Study 2 we assessed H4 using a structural equation model to summarise the key results, whereby the impact of a stressor on T2 wellbeing was mediated via identity loss (see Fig. 4). Wellbeing was calculated as the factor score weighting from the measures of depression, life satisfaction and perceived stress as in Fig. 2, Model 1. Results showed that, as in Study 1, identity loss was a significant mediator of the relationship between stressor event and wellbeing. The indirect effect of the stressor event on wellbeing was mediated by identity loss ($\beta=-.08$, CI: -.23 to -.01).

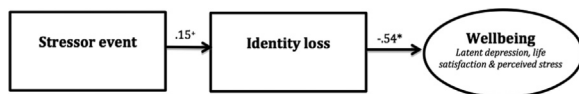


Fig. 4. Study 2 (Longitudinal): In the context of a stressful life transition, identity loss predicts reduced wellbeing. *Notes.* N=79. Diagram includes standardised beta values. * $p < .10$. * $p < .01$. Identity loss was conceptualised as the difference between pre-stressor group memberships and post-stressor group memberships. Pre-stressor group memberships was included as a covariate in the analyses. The indirect effect was significant, $\beta = -.08$; CI: $-.22$ – $-.01$.

3.3. Discussion

Study 2 tested the stress buffering hypothesis and the social identity model of identity change among a sample of students undergoing transition to university and to a new country. Hypothesis 1, which tested three alternative versions of the stress buffering hypothesis, was not supported. Instead, evidence was more consistent with the social identity model of identity change, in that depression and life satisfaction were predicted by identity loss (H2); perceived stress was best conceptualised as a latent component of wellbeing (H3), and identity loss mediated the relationship between a stressor and reduced wellbeing (H4). The main weakness of Study 2 was that the index of stressor severity used to assess H1b, based on the amount of time since moving countries and the relative development of their country of previous education, was relatively crude. However, the results are in line with Study 1, which used an experimental design to manipulate stressor severity. Furthermore, the longitudinal design of Study 2 addressed the limited external validity of Study 1, and thus provided a more ecologically valid test of the hypotheses.

4. General discussion

In this manuscript we present two studies aimed at further understanding the relationships between stress, social connectedness, and wellbeing. To date, the predominant model has been the stress buffering hypothesis, which posits that social support buffers the effect of stress on mental health (Cohen, 2004; Cohen and McKay, 1984; Cohen and Wills, 1985). Unfortunately, even after three decades of research, evidence for the stress buffering hypothesis remains mixed. Here, we replicated previous findings (Burton et al., 2004; Väänänen et al., 2005; Zimmerman et al., 2000) which have failed to find consistent evidence for the stress buffering hypothesis (H1).

Instead, what was empirically supported in these two studies was a re-conceptualization of social support in terms of social identity (H2). First, Study 1 *experimentally* manipulated exposure to a (hypothetical) stressor event. Consistent with the social identity model of identity change, it was found that maintaining group memberships following a stressor was protective against the decline in wellbeing. Second, because the research question is concerned with change over time, Study 2 adopted a *longitudinal* design in a sample of international students adjusting to their first semester of university. Here we were able to demonstrate longitudinal evidence for the social identity model among people experiencing a significant life stressor, such that participants were protected from depression and had greater life satisfaction if they maintained or increased their group memberships over the course of the semester.

These findings indicate that regardless of one's degree of social support prior to the stressful life event, maintaining multiple group memberships is protective against a subsequent decline in wellbeing. However, we also took this argument one step further, positing (H3) that perceived stress is better conceptualised not as an *antecedent* of a decline in wellbeing (as typically conceived by the stress buffering hypothesis), but rather as another psychological symptom of reduced wellbeing in the context of a stressor. Through a confirmatory factor analysis, both studies provided evidence that perceived stress is best conceptualised alongside depression and life satisfaction as an indi-

cator of wellbeing, rather than as a separate construct.

Finally, both studies tested the proposition that it is the experience of identity loss that leads people to experience a life event as deleterious to their wellbeing (H4). Specifically, Study 1 found that people anticipated that a diagnosis of a serious health condition would lead to more stress, more depression, and reduced life satisfaction relative to moving cities. However, this effect was mediated by an anticipated decline in the social identity resources available to them in the context of such a diagnosis. Study 2 corroborated this finding by showing that people undergoing the transition to university were more likely to experience reduced wellbeing (conceptualised here as a latent factor of depression, life satisfaction and perceived stress) when the transition entailed identity loss.

In making sense of these results, we return to the notion that social identities are psychological resources which protect wellbeing (Greenaway et al., 2016). When life is running smoothly, such resources may be varied and readily available. However, life events, such as moving cities, getting divorced, or starting a new job, rarely leave our social worlds unscathed. One implication of the social identity model of identity change, borne out by the results presented here, is that we cannot understand stressful life events without considering their impact on social identities, as it is this very impact that causes such events to be perceived as stressful.

However, an important point to make here is that the social identity model of identity change does *not* propose that social identities are only protective (or 'buffering') in the context of stressful life events. By contrast, there is now a wealth of evidence that multiple group memberships, and the social identities arising from them, are protective in a wide range of contexts, and for both vulnerable and less vulnerable populations (Crabtree et al., 2010; Gleibs et al., 2011; Khan et al., 2014; Sani et al., 2015; Steffens et al., 2016). Instead, we can infer from the social identity model that there are two reasons why our studies, along with previous research, have found limited evidence for the stress buffering hypothesis – both relating to the measurement of social support. The first is that, in previous research, social support has not been measured in terms of social identity resources, that is, as one of the many psychological benefits that people derive from their social group network. Those few studies that have measured social identity-based social support have found it to be protective against health decline in times of stress (e.g., Frisch et al., 2014; Haslam et al., 2008, 2016; Jones et al., 2012). The second reason we can posit for the inconsistent evidence for the stress buffering hypothesis is that social support has typically been conceptualised as a static, almost trait-like, resource that is independent of both time and the stress experience. By contrast, we argue that life transitions typically lead to *identity change*, consistent with the data presented in this manuscript. It is this change in identity, and more specifically, the loss of social identity following the transition, that precipitates decline in wellbeing.

A practical implication of these findings is that supporting people in times of stress is not simply a matter of ensuring pre-existing social support. In fact, social support prior to the onset of a stressor may be of little benefit if a person is rendered unable to access such support due to an identity transition. Instead, the social identity analysis brings our attention to the importance of maintaining identity continuity over time as well as facilitating the development of new social identities following a transition (see also Haslam et al., 2008). This reframing also speaks to why so many life events are *not* perceived as stressful at all, but rather as exciting opportunities for growth and fulfilment – because people subjectively experience such events as facilitating identity *gain* rather than identity loss. Along these lines, social identity interventions have recently been developed that assist people in developing their social group relationships (Haslam et al., 2016; Tarrant et al., 2016), which may be particularly appropriate for people whose mental health is vulnerable in the context of life transitions.

These studies are not without limitation. However, the two-pronged approach we used has the advantage that the strengths of Study 2

correspond to the weaknesses of Study 1, and vice versa. For example, Study 1 focused on an anticipated stress scenario and, thus, had less external validity. Study 2 aimed to address this external validity concern by examining the effect of a major life event across time. However, a limitation of this was that differences between participants in stressor severity, initial mental health, and social support were not experimentally manipulated or controlled, thus limiting internal validity. Study 1 addresses the limitation of the non-experimental nature of Study 2 by manipulating the stress scenario between participants. Therefore, despite the limitations of each study, the fact that the results correspond so closely across different methodologies and populations increases our confidence in our conclusions.

In sum, previous research has shown a relationship between stressful life events, social connectedness, and wellbeing, but the dominant theoretical model for explaining these relationships (the stress buffering hypothesis) has not been supported by the majority of longitudinal research. Here we provide further non-supportive evidence for the stress buffering hypothesis. However, we also propose and provide evidence in support of an alternative model of these relationships: the social identity model of identity change. While it is clear that both stress and social support are important determinants of wellbeing, this research demonstrates that stressful life events are best conceptualised as social identity transitions.

Acknowledgement

We are grateful for the assistance of Joshua Jacob, who assisted with data collection for Study 1.

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