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LINK

Exploring the mechanisms underlying the social identity – ill-health link: Longitudinal and
experimental evidence

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Data of Study 1 have been partly used in a paper by van Dick et al. (2017). However,
measures of social support and collective-self-efficacy have not been used before and neither
the measures of chronic stress and depression at time 1.

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Abstract

There is strong and consistent evidence that identification with social groups is an important predictor of (ill-)health-related outcomes. However, the mediating mechanisms of the social identification–health link remain unclear. We present results from two studies, which aimed to test how perceived social support and collective self-efficacy mediate the effect of social identification on emotional exhaustion, chronic stress, and depressive symptoms. Study 1 ($N = 180$) employed a longitudinal two-wave design, whereas Study 2 ($N = 100$) used a field-experimental design with a manipulation of participants' social identity. Both studies consistently show that social identification was positively related to perceived social support, which, in turn, was positively associated with collective self-efficacy. Collective self-efficacy, finally, was negatively related to ill-health outcomes.

Keywords: social identity approach; social identity; perceived social support; collective self-efficacy; ill-health

Exploring the mechanisms underlying the social identity–ill-health link: Longitudinal and experimental evidence

Social identification has been found to be an important predictor of health-related outcomes (e.g., Cruwys et al., 2013; Haslam et al., 2008; Haslam, Jetten, Postmes, & Haslam, 2009; Haslam, O'Brien, Jetten, Vormedal, & Penna, 2005; Ketturat, et al., 2016). Thereby, individuals' social identification is not limited to a specific context. Instead, people can experience being part of numerous groups, including their family, friends, colleagues or study peers. These processes lead to positive outcomes, such as improved well-being or less strain (e.g., Mael & Ashforth, 1992; van Dick et al., 2004; see also Steffens, Haslam, Schuh, Jetten, & van Dick, 2017 for a meta-analysis of over 60 studies). Due to these positive effects, social identification has been coined *the social cure* (e.g., Haslam, Jetten, Cruwys, Dingle, & Haslam, 2018).

Explanations for *why* social identification and (ill-)health relate in such a way and, thus, the psycho-social mechanisms underlying the social identity–(ill-)health link, have received substantially less attention. However, some theoretical arguments have been made and preliminary empirical studies have addressed this important question. Greenaway et al. (2015), for instance, showed that social identification enhances perceived personal control which, in turn, has benefits for health and well-being. Likewise, in a study conducted in rural north India, Khan and colleagues (2014) found that self-efficacy mediated the social identification–(ill-)health link. Specifically, participants' identification as a Hindu was associated with better well-being through their perceptions of stress-related self-efficacy. Moreover, individuals who identify with a group report more basic need satisfaction (Greenaway, Cruwys, Haslam, & Jetten, 2016; Pratt, 2001) and they are more likely to attribute negative events to external and unstable causes, which reduces depressive symptoms (Cruwys, South, Greenaway, & Haslam, 2015).

In sum, these approaches propose that group identification amplifies individual perceptions of control, self-efficacy, and basic need satisfaction. Although this is perfectly in line with the reasoning of the social identity approach, these explanations focus primarily on the individual, not accounting for the embeddedness of the individual in the respective group. Van Dick and Haslam (2012) proposed an alternative mechanism taking the other group members into account, namely perceived social support and collective self-efficacy. Individuals who strongly identify with their group perceive their fellow group members as part of an in-group and, thus, are more likely to cooperate and support each other. Levine, Prosser, Evans, and Reicher (2005), for instance, reported that fans of a soccer team (Manchester United) were more likely to help other individuals who supported the same team. Importantly, helping behavior towards fans of a rival team (Liverpool) increased if participants' superordinate social identity as "soccer fans" was made salient (rather than their social identity as fans of a particular soccer club). This finding illustrates that a shared social identity was the foundation of social support. Other research suggests that individuals who share a social identity are more likely to interpret supporting behavior in the positive spirit it is offered rather than distrusting help offered by others. For example, Frisch, Häusser, van Dick, and Mojzisch (2014) found that social support reduced acute hormonal stress reactions (salivary cortisol) in an experimental stress task only if the provider and recipient were members of the same group. Consequently, and according to van Dick and Haslam (2012), we propose that people who strongly identify with a group should be more likely to report receiving support from other group members.

Beyond producing positive effects in its own right, perceived social support may also enhance the development of a collective appraisal of demands. That is, individuals should be more likely to interpret work-, study-, family-, or leisure-related demands as "concerning all of us" instead of "concerning only me." Overcoming such demands should result in higher levels of collective self-efficacy ("we did it"). Thereby, collective self-efficacy can be

understood as “a group’s shared belief in its conjoint capabilities to organize and execute the courses of action required to produce given levels of attainments” (Bandura, 1997, p. 477). A strong sense of collective self-efficacy should, therefore, increase the individual’s persistency in the face of stressors.

Avanzi, Schuh, Fraccaroli, and van Dick (2015) tested this proposed serial mediation of social identity increasing well-being via perceived social support and collective self-efficacy in a study of 192 Italian schoolteachers. They found that the more teachers identified with their schools, the more they felt supported by their colleagues. Levels of support, in turn, were positively related to collective self-efficacy, which was, then, negatively related to teacher burnout. Although the results of Avanzi et al. (2015) support the mechanism proposed by van Dick and Haslam (2012), the study is only cross-sectional, and hence does not rule out the possibility of reversed causality. That is, individuals high in burnout may have perceived less resources (i.e., less social support and less collective self-efficacy) because of feeling drained of energy, which, in turn, might have resulted in less social identification.

With the present research, we aimed to provide more clear-cut evidence for the proposed mechanism. Study 1 was a longitudinal two-wave study among students in which we tested the effects of social identification on chronic stress and depressive symptoms through perceived social support and collective self-efficacy over time. We decided to use a student sample as students typically have relatively low levels of stress at the beginning and higher levels of stress at the end of the academic term (because of the upcoming exams at the time of the second wave of data collection in Study 1). We also believe that the outcomes we have chosen are relevant and important for this sample (see also Cotton, Dollard, & de Jonge, 2002; Janurek, Abdel Hadi, Mojzisch, & Häusser, 2018 for a discussion). In Study 2, we experimentally manipulated social identification, and then measured perceived social support, collective self-efficacy, and emotional exhaustion.

In both studies, we aimed to test whether Avanzi et al.'s (2015) cross-sectional finding of a serial mediation of social identification on emotional exhaustion replicates and extends to other aspects of ill-health (i.e., chronic stress, depressive symptoms, and emotional exhaustion). We focused on these three outcomes as they represent important aspects of mental ill-health and because mental ill-health contributes largely to the European Union's burden of disability (European Commission, 2016).¹ Moreover, we addressed how social identification relates to *residual changes* in chronic stress and depressive symptoms, and whether perceived social support precedes collective self-efficacy, as proposed by van Dick and Haslam (2012). The data used in both studies will be made available upon request from the first author.

Study 1

Method

Participants. Haslam and colleagues (2005) reported a correlation of .55 between social identification and perceived social support. Hence, it is plausible to assume a medium-sized effect for the relationship between these two variables. Avanzi et al. (2015) reported a small- to medium-sized effect of perceived social support on collective self-efficacy and a large effect of collective self-efficacy on emotional exhaustion. Consequently, and assuming medium-sized effects for all relations, a priori power analyses using G*Power (Faul, Erdfelder, Lang, & Buchner, 2007) revealed a required sample size of $N = 81$ (with $\alpha = .05$ and power = .93). We used a power of .93 to detect a single medium-sized effect in each relation so that the overall power of the serial mediation is .80 ($= .93 \times .93 \times .93$).

In Study 1, we invited German undergraduate and graduate students from various disciplines to participate. Two hundred and thirty-five students participated in the first wave,

¹ The studies were part of larger research projects. While the present manuscript focuses on these ill-health-related outcomes, we measured additional dependent variables referring to other research questions. All additional dependent variables used in the questionnaires are described in detail in the supplementary material.

180 of whom also took part in the second wave (77% response rate). Average age was 22.18 years ($SD = 4.72$ years, ranging from 18 to 48 years), 91.7% were female, and 79% were first-year students. Data analyses were conducted after data collection had been concluded. No other stopping rule was applied. We did not exclude any participants in this sample.

Procedure and measures. Participants answered an online questionnaire. All respective scales were presented at Time 1. Respondents answered all items again about 12 weeks later. A 12-week interval between the two surveys was chosen to fit within the academic term times in order to ensure that as many students as possible were still on campus (and not yet on vacation) to participate in the second wave of data collection. We distributed Time 1 surveys at the beginning of the term and contacted students again at the end of the academic term.

We measured participants' *social identification* with their fellow students at Time 1 on a scale from $1 = do not agree at all$ to $7 = fully agree$, with four items adapted from Doosje, Ellemers, and Spears (1995). Cronbach's alpha was .88.

To operationalize *perceived social support by fellow students* at Time 1, we adapted two items from van Dick, Wagner, Petzel, Lenke, and Sommer (1999). Participants were asked to indicate their agreement to the items on a scale from $1 = do not agree at all$ to $7 = fully agree$ (sample item: "My fellow students and I provide emotional support to each other in our group"). The two items highly correlated with each other ($r = .75, p < .001$).

Collective self-efficacy at Times 1 and 2 was operationalized using two items from van Dick et al. (1999) with a scale from $1 = do not agree at all$ to $7 = fully agree$. A sample item is: "We can also achieve difficult goals in this group." The two items highly correlated with each other (Time 1: $r = .83, p < .001$; Time 2: $r = .91, p < .001$).

Chronic stress at Times 1 and 2 was measured by using the 12-item Trier Inventory for the Assessment of Chronic Stress (Schulz & Schlotz, 1999) with a 5-point frequency scale (0

= *never* to 4 = *very often*). A sample item is “I have unnecessary conflicts with others.”

Cronbach’s alphas were .91 at Time 1, and .90 at Time 2.

To operationalize *depressive symptoms* at Times 1 and 2, we used the respective two items of the Patient Health Questionnaire-4 (Löwe et al., 2010). Participants assessed how often the respective statements applied to them on a 4-point frequency scale from 1 = *not at all* to 4 = *nearly every day* (sample item: “Over the last 2 weeks, how often have you been bothered by any of the following: ... feeling down, depressed, or hopeless?”). The two items correlated moderately with each other (Time 1: $r = .50, p < .001$; Time 2: $r = .57, p < .001$).

Means were calculated for social identification, perceived social support by fellow students, and collective self-efficacy. Sum scores were calculated for chronic stress and depressive symptoms (as suggested by the manuals).

Data Analysis

We computed serial mediation analyses using model six of the SPSS macro PROCESS (Hayes, 2012). We first regressed perceived social support at Time 1 on social identification at Time 1. In the next step, collective self-efficacy at Time 2 was regressed on perceived social support and social identification at Time 1. In the third step, ill-health (i.e., chronic stress and depressive symptoms) at Time 2 was regressed on collective self-efficacy at Time 2, perceived social support and social identification at Time 1. We controlled for levels of collective self-efficacy, chronic stress, and depressive symptoms, respectively, at Time 1 during all of these steps. Doing so enables the testing of whether social support leads to *residual changes* in collective self-efficacy which, in turn, relate to *residual changes* in the two ill-health outcomes. All scales were mean-centered prior to conducting the analyses. Bootstrap confidence intervals were used to obtain the 95% confidence intervals (CI) for the direct and indirect effects.

Results and Discussion

Table 1 provides means, standard deviations and correlations for all variables relevant for the analyses. Supplementary Table 1 gives an overview including means, standard deviations and correlations across the entire study. All correlations were in the expected direction. Auto-correlations of the constructs from Time 1 to Time 2 ranged from .53 for collective self-efficacy to .71 for social identification and chronic stress indicating stability of constructs.

Table 1 to be inserted about here

The results of the serial mediation show that the total effect of social identification at Time 1 was not significant for participants' chronic stress at Time 2 (.48, 95% CI [-.05, 1.03]). The residual direct effect was similarly not significant but the two-step serial mediation reached significance, thus supporting our assumptions.² As can be seen in Figure 1, the more participants identified with their fellow students at Time 1, the more social support they perceived at Time 1. Perceived social support at Time 1, in turn, positively predicted collective self-efficacy at Time 2. Finally, the higher participants rated their collective self-efficacy at Time 2, the less chronic stress they reported at Time 2.

Similarly, the total effect of social identification at Time 1 on depressive symptoms at Time 2 was not significant (.05, 95% CI [-.06, .15]). The residual direct effect was also not significant, whereas the two-step serial mediation was significant.³ Similar to the results for chronic stress, the more participants identified with their fellow students at Time 1, the more social support they perceived at Time 1. Perceived social support at Time 1 positively

² Note, however, that the two-step serial mediation was only marginally significant when using the percentile method to obtain the confidence intervals (-.11, 95% CI [-.27, .01]).

³ As for chronic stress, the two-step serial mediation was only marginally significant when using the percentile method to obtain the confidence intervals (-.02, 95% CI [-.05, .00]).

predicted collective self-efficacy at Time 2 and collective self-efficacy at Time 2, in turn, negatively related to depressive symptoms at Time 2.

In addition, we found significant indirect effects of social identification via perceived social support. Notably, this mediation suggested that perceived social support increased chronic stress and depressive symptoms at Time 2 after controlling for social identification. Thus, perceived social support had a detrimental effect on participants' ill-health once social identification was partialled out. We focus on this finding in more detail in our General Discussion. Similarly, the indirect effect of social identification on ill-health-related outcomes via collective self-efficacy was significant. To summarize, perceived social support and collective self-efficacy serially mediated the effect of social identification on chronic stress and depressive symptoms.

Table 2 to be inserted about here

Figure 1 to be inserted about here

To further investigate the proposed serial mediation chain, we also tested a reversed model. In this model, we regressed ill-health at Time 2 on social identification at Time 1 via collective self-efficacy at Time 1 and social support at Time 2. Here, we controlled for social support and the two ill-health outcomes at Time 1. Importantly, the serial mediation for this model was not significant for chronic stress ($-.01$; 95% CI $[-.10, .01]$), nor for depressive symptoms ($-.00$, 95% CI $[-.02, .00]$). This was due to the fact that collective self-efficacy at Time 1 did not predict social support at Time 2 when controlling for the respective values at Time 1 ($b = .08, p = .41$ and $b = .08, p = .42$). This further supports our claim that the

direction of the effect goes from social support to collective self-efficacy (and not the other way around).

In conclusion, the results of Study 1 clearly support our hypotheses and are in line with van Dick and Haslam's (2012) propositions. However, the present longitudinal design does not allow clear-cut causal inferences to be made as third variables may still confound findings in correlational designs (see Spencer, Zanna, & Fong, 2005, for a discussion). In Study 2, we therefore aimed to replicate the proposed mediating mechanisms using an experimental design.

Study 2

Method

Participants. We expected to find larger effects in Study 2 compared to Study 1 because of the experimental manipulation of social identity and the shorter time frame. A priori power analyses using G*Power (Faul et al., 2007), assuming medium-sized effects for all relations, revealed a required sample size of $N = 81$ (with $\alpha = .05$ and power = .93). Again, we used a power of .93 to detect a single medium-sized effect in each relation so that the overall power of the two-step serial mediation is .80. To ensure against potential dropouts and non-sincere responses to our manipulation items, we collected data from 100 participants using social networks and personal contacts. Participants were primarily male (81%), had a degree equivalent to high school (75%), and were predominantly enrolled at German universities (77%). On average, participants were 26.18 years old ($SD = 11.13$, ranging from 18 to 69 years). Data analyses were conducted after data collection was completed. No other stopping rule was applied. All measures and conditions are reported below and in the Supplementary Materials. Again, we did not exclude any participants.

Procedure and measures. As in Study 1, participants answered an online questionnaire. They first rated their current mood with the 20 item PANAS scales from Watson, Clark, and Tellegen (1988). Next, we manipulated participants' social identity. To do

so, we asked participants to think about one of their social groups they had recently been in touch with, such as their family, colleagues, or friends. Participants were randomly assigned to one of two experimental conditions. In the high social identity condition, they were asked to think about what they had in common with other group members, and which goals and values they shared. Thereafter, we asked them to think about the last positive experience they had with their fellow group members and to use this experience to explore how the group added value to them, what they particularly valued in other group members, and why they were happy to be a part of this group.

By contrast, in the low social identity condition, participants were asked to think about differences between themselves and other group members. We then asked them to think about a recent negative experience with regard to this group and to use this experience to think about how the group represented a burden to them, what they might criticize, and why they were less happy to be a member of this group.

In both experimental conditions, participants briefly noted down their experiences. Next, they answered three items about their *social identification* (Doosje et al., 1995) on a 7-point Likert scale ($1 = do\ not\ agree\ at\ all$ to $7 = fully\ agree$). Cronbach's alpha was .88. We used the same two items each to operationalize *perceived social support* and *collective self-efficacy* as in Study 1. The two social support items highly correlated with each other ($r = .81, p < .001$) as did the two collective self-efficacy items ($r = .81, p < .001$). We operationalized *emotional exhaustion* using the respective 7-item subscale of the Maslach Burnout Inventory (Maslach & Jackson, 1981). A sample item is "I feel burned out from my work." Participants assessed how often the respective statements applied to them on a 7-point frequency scale ($1 = never$ to $7 = several\ times\ a\ day$). Cronbach's alpha was .89.

A mean score was calculated for all measures. Thereafter, participants answered additional items not used for the present analyses (see Supplementary Materials for more

details). Finally, participants were informed about the main purpose of the study and we ensured them of complete confidentiality. Participation was anonymous and voluntary.

Data Analysis

Similar to Study 1, we computed serial mediation analyses using model six of the SPSS macro PROCESS (Hayes, 2012). Here, we first regressed perceived social support on our experimental manipulation, and then proceeded with the same steps as described in Study 1.

Results and Discussion

Manipulation check. Participants in the high social identity condition identified significantly more strongly with the group they thought about than participants in the low social identity condition ($t(81) = 4.01, p < .001$). Thus, the manipulation had the expected effect on participants' social identification. Thereby, participants most often thought about a situation involving their friends ($N = 16$) followed by their family ($N = 13$), their hobby group ($N = 5$), their fellow students ($N = 3$), their colleagues ($N = 3$), or others ($N = 5$) in the high social identity condition. Similarly, participants in the low social identity condition were most likely to think about a situation involving their friends ($N = 21$), their family ($N = 18$), their colleagues ($N = 6$), their hobby group ($N = 6$), or others ($N = 4$).

Descriptive results. Table 3 provides means, standard deviations, and correlations across the two conditions. An overview of all variables assessed in Study 2 including their means, standard deviations, and correlations can be obtained from Supplementary Table 2. As can be seen in Table 3, participants in the high social identity condition did not differ in mood from participants in the low social identity condition before our experimental manipulation ($t[98] = .12, p > .05$). However, after the manipulation, those in the high social identity condition reported a more positive mood than before ($t[44] = 3.08, p = .004$), while the mood level of participants in the low social identity condition was not affected by our manipulation ($t[54] = .22, p = .823$).

All correlations were in the expected direction. While the correlations from Study 1 did not show a direct effect of social identification on depressive symptoms and chronic stress, social identification negatively related to emotional exhaustion in Study 2. The descriptive results also provide first evidence for the proposed mechanism. Participants in the high social identity condition reported more perceived social support, more collective self-efficacy, and less emotional exhaustion compared to participants in the low social identity condition. Thereby, the association between social identification and perceived social support was significantly stronger among those in the low social identity condition ($r = .80, p < .001$) compared to those in the high social identity condition ($r = .45, p = .002$, Fisher's $z = 2.93, p = .002$). Similarly, the association between social identification and collective self-efficacy was significantly stronger in the low social identity condition ($r = .80, p < .001$) compared to the high social identity condition ($r = .53, p < .001$, Fisher's $z = 2.49, p = .006$), as was the association between perceived social support and collective self-efficacy (low social identity condition: $r = .86, p < .001$ versus high social identity condition: $r = .55, p < .001$, Fisher's $z = 3.29, p < .001$). Finally, the relation between mood before and after the manipulation was stronger among those in the low social identity condition ($r = .78, p < .001$) than those in the high social identity condition ($r = .52, p < .001$, Fisher's $z = 2.31, p = .01$).

Table 3 to be inserted about here

Testing of the proposed serial mediation. Consistent with Study 1, the two-step serial mediation shows that the total effect of the manipulation on emotional exhaustion was not significant ($-.15, 95\% \text{ CI } [-.39, .03]$). Also similar to Study 1, the residual direct effect was not significant ($-.10, 95\% \text{ CI } [-.53, .33]$). In line with our assumption and the results from Study 1, the indirect effect via perceived social support and collective self-efficacy was

significant (-.31, 95% CI [-.75, -.10]).⁴ The manipulation affected perceived social support. Perceived social support positively related to collective self-efficacy, which, in turn, negatively related to students' emotional exhaustion as shown in Figure 2.

In addition, we partially replicated and expanded on the effects of Study 1 in that the indirect path from the experimental manipulation via perceived social support on emotional exhaustion was significant (.26, 95% CI [.04, .70]), whereas the indirect effect via collective self-efficacy on emotional exhaustion was not significant (-.10, 95% CI [-.34, .04]). Again, perceived social support increased ill-health after controlling for social identification.

All effects were unaffected when controlling for residual change in mood.

Figure 2 to be inserted about here

As in Study 1, we also tested a reversed model. In this model, we regressed emotional exhaustion on social identification via collective self-efficacy and perceived social support. Unlike our results from Study 1, the serial mediation for this model was significant (.22, 95% CI [.04, .57]).

In conclusion, we replicated our findings from Study 1 using an experimental design in Study 2. Consequently, Study 2 provides further evidence for the proposed mechanism through which social identification unfolds its negative effects on ill-health.

General Discussion

In two studies, using a longitudinal and an experimental design, we replicated Avanzi et al.'s (2015) cross-sectional findings. That is, social identification related to more perceived social support, which, in turn, increased levels of collective self-efficacy; finally, higher levels of collective self-efficacy related negatively to ill-health. We found evidence for this

⁴ In Study 2, the two-step serial mediation was also significant when using the percentile method to obtain confidence intervals (-.31, 95% CI [-.70, -.09]).

mechanism in both a primarily female (Study 1) and a primarily male sample (Study 2), which provides evidence for the generalizability of these effects. Moreover, we expanded the findings of Avanzi et al. to chronic stress and depressive symptoms and showed that social identification predicted residual changes in these two outcomes. Finally, in Study 1, we provided evidence that perceived social support does indeed precede collective self-efficacy, as suggested by van Dick and Haslam (2012).

Although our studies were conducted among students, Avanzi et al.'s (2015) previous study as well as substantial research on social identity among employees (e.g., Haslam et al., 2005) show similar processes at the workplace. Consequently, exploring ways to reduce emotional exhaustion, chronic stress, and depressive symptoms is especially relevant. Enhancing individuals' social identification with their peer groups is one promising way to do so (see also Haslam, Cruwys, Haslam, Dingle, & Chang, 2016).

From a broader perspective, our findings further emphasize the importance of accounting for group processes to understand well-being, health and ill-health. Specifically, in Study 2, we provided an economical intervention to foster individuals' social identification by focusing on similarities and positive experiences with other group members. Organizations often value and support competition between individuals and groups and, thus, reinforce behavior that might reduce team or organizational identification. As our findings imply, such behavior may only be positive in the short run (such as fostering innovative work behavior) but not in the long run, as their employees' health will eventually suffer and so will their performance. Similarly, the (higher) education system encourages performance comparisons among students and focuses on individual achievements. Teachers and lecturers should, therefore, take care to also provide opportunities that help in developing a group cohesion and feelings of belonging.

In both studies, perceived supportive behavior increased ill-health after controlling for social identification and collective self-efficacy. This result is consistent with findings by

Frisch et al. (2014), who showed that social support reduced participants' hormonal stress levels only if their social identity was salient but not in a personal identity condition. Frisch et al. (2014) argued that social support in the absence of a shared social identity might even backfire and increase strain, as it might be perceived as less benevolent and as implicit criticism. In a similar vein, Thompson and Bolino (2018) recently identified five reasons why individuals may be reluctant to accept help from others and thus not interpret help offered as supportive, such as fear of being perceived as incompetent, or the need to reciprocate. Taken together, these findings highlight that support may not always be attributed to good intentions but may be interpreted negatively if received from someone who is not part of one's in-group ("I receive support because they think I cannot manage alone").

Besides the positive relation of social support and ill-health after controlling for social identification, the missing total effect of social identity on ill-health in both studies is particularly noteworthy. Although the beneficial effects of social identity on health and ill-health are, overall, well documented (see Steffens et al., 2017), a few studies have reported null-effects (e.g., Bizumic, Reynolds, Turner, Bromhead, & Subasic, 2009; Häusser, Kattenstroth, van Dick, & Mojzisch, 2012) or even detrimental effects before (e.g., Galang & Jones, 2014). From our point of view, it would be worthwhile to investigate the factors that may account for these differences. One idea would be to take a closer look at the norms and values associated with the respective group, with which the individual identifies. One of the basic assumptions of the social identity approach is that the more individuals identify with a given group, the more they adopt the group's norms and values (e.g., Terry & Hogg, 1996). Consequently, individuals should benefit less from social identification if the respective group adopts undesirable or health-impairing norms.

In Study 2, we found that the manipulation of social identity had a positive short-term effect on self-reported emotional exhaustion. At first glance, this result might be surprising, since emotional exhaustion is generally considered as a phenomenon that does not develop or

can be treated overnight. Note, however, that Bakker, Demerouti, and Sanz-Vergel (2014) recently pointed to the importance of also investigating burnout from a state perspective and of assessing causes of within-person fluctuation in experiencing burnout. The findings from Study 2 support the assumption that salience of one's social identity (and as a consequence perceived social support and collective self-efficacy) represents an important situational factor that accounts for such variability in emotional exhaustion as one component of burnout (Maslach, Schaufeli, & Leiter, 2001). Hence, we state that our intervention predominately affects the subjective perception of emotional exhaustion rather than “curing” burnout. That is, letting individuals reflect on their similarities with other group members immediately activates additional resources, which support individuals in feeling less chronically stressed. Building on this finding, a promising path for future research would be to develop daily interventions in addition to more longitudinal programs such as the G4H (Groups for Health) project (Haslam et al., 2016) to prime social resources. These short-term interventions might particularly be useful when individuals face acute stressors such as an important exam or a tight deadline.

Finally, when looking at the descriptive differences of the correlations between study variables separately for the low and the high social identity condition in Study 2, we found reliable stronger relations for the low social identity manipulation. There may be two reasons for this: (1) It might be that participants paid more attention to this condition because of the general negativity bias (Rozin & Royzman, 2001) and read the instructions more closely. Or (2) because of the need to belong, a priming of a loss of social identity has stronger effects than the emphasis of a positive social identity, which might be seen as the default. A similar effect was found among the guards in the BBC prison study (Haslam & Reicher, 2006). Future studies may want to explore this further.

Limitations and Future Research

The present research has some limitations, which should be considered when interpreting the results. First, our focus rested on perceived support and not on actual support provided by other group members. Consequently, an important next step would be to investigate whether social identification affects a) team members' actual mutual social support, and b) the interpretation of the support they receive, such that highly identified members might evaluate actual support more favorably compared to less identified members.

Second, the manipulation used in Study 2 had an effect on positive mood (with more positive mood in the high social identity as compared to the low social identity condition). Importantly, however, the results did not change after controlling for participants' mood in the analyses, that is, confounding is rather unlikely. Nonetheless, it would be interesting to use alternative experimental manipulations that do not affect mood (e.g., the manipulation used by Häusser et al., 2012).

Third, we did not include a control group in Study 2 so we could not compare the results from our two experimental groups to the effects of a group without a manipulation. We decided not to do so as this was the first experimental study examining the proposed causal chain. Therefore, we considered it to be important to produce a maximum difference between experimental conditions (i.e., high versus low social identity) and to test this difference with adequate test power (see Häusser et al., 2012, for a similar approach). This approach does not allow us to fully disentangle whether increasing social identity has a beneficial effect or whether implementing a personal identity has a negative effect. Using a control condition can provide this additional information and we see this as an interesting question for future studies.

Fourth, both studies used student samples and relied on self-reported data, thus facing the risk of common-method bias (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). Therefore, we can only infer carefully from these results to the working context, even if students were asked about *real* groups they belonged to and not about ad hoc laboratory

groups and also about *real* experiences of emotional exhaustion, chronic stress, or depressive symptoms.

Fifth, the design of the present studies does not yet allow conclusions to be drawn about the complete proposed causal mechanism. Ideally, future studies would involve four points of measurement with an assessment of all variables at all four points to test the cross-lagged effects of each of the predicted processes (e.g., from social identity at Time 1 on social support at Time 2 on collective self-efficacy at Time 3 on [ill-]health at Time 4). This is especially important as we also found partial evidence for a reversed mechanism in which collective self-efficacy preceded perceived social support in Study 2 but not in Study 1, in which we assessed these two variables at different measurement points. More generally, the results of the traditional measurement-of-mediation designs should be interpreted with caution (cf. Fiedler, Schott & Meiser, 2011; Kline, 2015; Spencer et al., 2005). In particular, mediational analyses that focus on one or a few presumed mediators (neglecting countless other variables) are unable to rule out that alternative theoretical models provide an equivalent or even better account. For a clear-cut test of a proposed causal chain, experimental mediator tests are indispensable.

These limitations, however, are balanced by the fact that we found very consistent evidence for a complex two-step serial mediation across two studies using different research designs. Moreover, the findings of our longitudinal and experimental studies are in line with the cross-sectional study reported by Avanzi et al., 2015. In conclusion, our research suggests that perceived social support and collective self-efficacy play a crucial role in explaining the relationship between social identity and ill-health.

References

- Avanzi, L., Schuh, S. C., Fraccaroli, F., & van Dick, R. (2015). Why does organizational identification relate to reduced employee burnout? The mediating influence of social support and collective efficacy. *Work & Stress, 29*, 1–10.
<https://doi.org/10.1080/02678373.2015.1004225>
- Bakker, A. B., Demerouti, E., & Sanz-Vergel, A. I. (2014). Burnout and work engagement: The JD-R approach. *Annual Review of Organizational Psychology and Organizational Behavior, 1*, 389–411. <https://doi.org/10.1146/annurev-orgpsych-031413-091235>
- Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York: W. H. Freeman and Company.
- Bizumic, B., Reynolds, K. J., Turner, J. C., Bromhead, D., & Subasic, E. (2009). The role of the group in individual functioning: School identification and the psychological well-being of staff and students. *Applied Psychology, 58*, 171–192.
<https://doi.org/10.1111/j.1464-0597.2008.00387.x>
- Cotton, S. J., Dollard, M. F., & de Jonge, J. (2002). Stress and student job design: Satisfaction, well-being, and performance in university students. *International Journal of Stress Management, 9*, 147–162. <https://doi.org/10.1023/A:1015515714410>
- Cruwys, T., Dingle, G. A., Haslam, C., Haslam, A. S., Jetten, J., & Morton, T. A. (2013). Social group memberships protect against future depression, alleviate depression symptoms and prevent depression relapse. *Social Science & Medicine, 98*, 179–186.
<https://doi.org/10.1016/j.socscimed.2013.09.013>
- Cruwys, T., South, E. I., Greenaway, K. H., & Haslam, A. S. (2015). Social identity reduces depression by fostering positive attributions. *Social Psychological and Personality Science, 6*, 65–74. <https://doi.org/10.1177/1948550614543309>

- Doosje, B., Ellemers, N., & Spears, R. (1995). Perceived intragroup variability as a function of group status and identification. *Journal of Experimental Social Psychology, 31*, 410–436. <https://doi.org/10.1037/0022-3514.58.1.60>
- European Commission (2016). *European framework for action on mental health and well-being*. Retrieved from https://ec.europa.eu/research/participants/data/ref/h2020/other/guides_for_applicants/h2020-SC1-BHC-22-2019-framework-for-action_en.pdf
- Faul, F., Erdfelder, E., Lang, A. G., & Buchner, A. (2007). G*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods, 39*, 175–191. <https://doi.org/10.3758/BF03193146>
- Fiedler, K., Schott, M., & Meiser, T. (2011). What mediation analysis can (not) do. *Journal of Experimental Social Psychology, 47*, 1231–1236. <https://doi.org/10.1016/j.jesp.2011.05.007>
- Frisch, J. U., Häusser, J. A., van Dick, R., & Mojzisch, A. (2014). Making support work: The interplay between social support and social identity. *Journal of Experimental Social Psychology, 55*, 154–161. <https://doi.org/10.1016/j.jesp.2014.06.009>
- Galang, M., & Jones, S. E. (2014). *Workplace bullying and job satisfaction: The mediating role of social identity*. Unpublished manuscript, Oxford Brookes University, UK.
- Greenaway, K. H., Cruwys, T., Haslam, S. A., & Jetten, J. (2016). Social identities promote well-being because they satisfy global psychological needs. *European Journal of Social Psychology, 46*, 294–307. <https://doi.org/10.1002/ejsp.2169>
- Greenaway, K. H., Haslam, S. A., Cruwys, T., Branscombe, N. R., Ysseldyk, R., & Heldreth, C. (2015). From “we” to “me”: Group identification enhances perceived personal control with consequences for health and well-being. *Journal of Personality and Social Psychology, 109*, 53–74. <https://doi.org/10.1037/pspi0000019>

- Haslam, C., Cruwys, T., Haslam, S. A., Dingle, G., & Chang, M. X. (2016). Groups 4 Health: Evidence that a social-identity intervention that builds and strengthens social group membership improves mental health. *Journal of Affective Disorders, 194*, 188–195. <https://doi.org/10.1016/j.jad.2016.01.010>
- Haslam, C., Holme, A., Haslam, S. A., Iyer, A., Jetten, J., & Williams, W. H. (2008). Maintaining group membership: Identity continuity and well-being after stroke. *Neuropsychological Rehabilitation, 18*, 671–691. <https://doi.org/10.1080/09602010701643449>
- Haslam, C., Jetten, J., Cruwys, T., Dingle, G. A., & Haslam, S. A. (2018). *The new psychology of health: Unlocking the social cure*. New York, NY: Routledge.
- Haslam, S. A., Jetten, J., Postmes, T., & Haslam, C. (2009). Social identity, health and well-being: An emerging agenda for applied psychology. *Applied Psychology: An International Review, 58*, 1–23. <https://doi.org/10.1111/j.1464-0597.2008.00379.x>
- Haslam, S. A., O'Brien, A., Jetten, J., Vormedal, K., & Penna, S. (2005). Taking the strain: Social identity, social support, and the experience of stress. *British Journal of Social Psychology, 44*, 355–370. <https://doi.org/10.1348/014466605X37468>
- Haslam, S. A., & Reicher, S. (2006). Stressing the group: Social identity and the unfolding dynamics of responses to stress. *Journal of Applied Psychology, 91*, 1037–1052. <https://doi.org/10.1037/0021-9010.91.5.1037>
- Häusser, J. A., Kattenstroth, M., van Dick, R., & Mojzisch, A. (2012). “We” are not stressed: Social identity in groups buffers neuroendocrine stress reactions. *Journal of Experimental Social Psychology, 48*, 973–977. <https://doi.org/10.1016/j.jesp.2012.02.020>.
- Hayes, A. F. (2012). *PROCESS: A versatile computational tool for observed variable mediation, moderation, and conditional process modeling* [White paper]. Retrieved from <http://www.afhayes.com/public/process2012.pdf>

Janurek, J., Abdel Hadi, S., Mojzisch, A., & Häusser, J. A. (2018). The association of the 24-hour distribution of time spent in physical activity, work, and sleep with emotional exhaustion. *International Journal of Environmental Research and Public Health*, *15*, 1927. <https://doi.org/10.3390/ijerph15091927>

Ketturat, C., Frisch, J., Ullrich, J., Häusser, J., van Dick, R., & Mojzisch, A. (2016). Disaggregating within- and between-person effects of social identification on subjective and endocrinological stress reactions in a real-life stress situation. *Personality and Social Psychology Bulletin*, *42*, 147–160. <https://doi.org/10.1177/0146167215616804>

Khan, S. S., Hopkins, N., Tewari, S., Srinivasan, N., Reicher, S. D., & Ozakinci, G. (2014). Efficacy and well-being in rural north India: The role of social identification with a large-scale community identity. *European Journal of Social Psychology*, *44*, 787–798. <https://doi.org/10.1002/ejsp.2060>

Kline, R. B. (2015). The mediation myth. *Basic and Applied Social Psychology*, *37*, 202–213. <https://doi.org/10.1080/01973533.2015.1049349>

Levine, M., Prosser, A., Evans, D., & Reicher, S. (2005). Identity and emergency intervention: How social group membership and inclusiveness of group boundaries shapes helping behavior. *Personality and Social Psychology Bulletin*, *31*, 443–453. <https://doi.org/10.1177/0146167204271651>

Löwe, B., Wahl, I., Rose, M., Spitzer, C., Glaesmer, H., Wingenfeld, K., . . . Brähler, E. (2010). A 4-item measure of depression and anxiety: Validation and standardization of the Patient Health Questionnaire-4 (PHQ-4) in the general population. *Journal of Affective Disorders*, *122*, 86–95. <https://doi.org/10.1016/j.jad.2009.06.019>

Mael, F., & Ashforth, B. E. (1992). Alumni and their alma mater: A partial test of the reformulated model of organizational identification. *Journal of Organizational Behavior*, *13*, 103–123. <https://doi.org/10.1002/job.4030130202>

- Maslach, C., & Jackson, S. E. (1981). The measurement of experienced burnout. *Journal of Organizational Behavior*, 2, 99–113. <https://doi.org/10.1002/job.4030020205>
- Maslach, C., Schaufeli, W. B., & Leiter, M. P. (2001). Job burnout. *Annual Review of Psychology*, 52, 397–422. <https://doi.org/10.1146/annurev.psych.52.1.397>
- Podsakoff, P. M., MacKenzie, S. B., Lee, J.-Y., & Podsakoff, N. P. (2003). Common method bias in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology*, 88, 879–903. <https://doi.org/10.1037/0021-9010.88.5.879>
- Pratt, M. G. (2001). Social identity dynamics in modern organizations: An organizational psychology/organizational behavior perspective. In M. A. Hogg, & D. J. Terry (Eds.), *Social identity processes in organizational contexts* (pp. 13–30). Philadelphia, PA: Psychology Press.
- Rozin, P., & Royzman, E. B. (2001). Negativity bias, negativity dominance, and contagion. *Personality and Social Psychology Review*, 5, 296–320. https://doi.org/10.1207/S15327957PSPR0504_2
- Schulz, P., & Schlotz, W. (1999). Trier Inventar zur Erfassung von chronischem Stress (TICS): Skalenkonstruktion, teststatistische Überprüfung und Validierung der Skala Arbeitsüberlastung [The Trier Inventory for the Assessment of Chronic Stress (TICS): Scale construction, statistical testing, and validation of the scale work overload]. *Diagnostica*, 45, 8–19. <https://doi.org/10.1026//0012-1924.45.1.8>.
- Spencer, S. J., Zanna, M. P., & Fong, G. T. (2005). Establishing a causal chain: Why experiments are often more effective than mediational analyses in examining psychological processes. *Journal of Personality and Social Psychology*, 89, 845–851. <https://doi.org/10.1037/0022-3514.89.6.845>
- Steffens, N. K., Haslam, S. A., Schuh, S. C., Jetten, J., & van Dick, R. (2017). A meta-analytic review of social identification and health in organizational contexts.

Personality and Social Psychology Review, 21, 305–335.

<https://doi.org/10.1177/1088868316656701>

Terry, D. J., & Hogg, M. A. (1996). Group norms and the attitude-behavior relationship: A role of group identification. *Personality and Social Psychology Bulletin*, 22, 776–793.

<https://doi.org/10.1177/0146167296228002>

Thompson, P. S., & Bolino, M. C. (2018). Negative beliefs about accepting coworker help:

Implications for employee attitudes, job performance, and reputation. *Journal of*

Applied Psychology, 103, 842–866. <https://doi.org/10.1037/apl0000300>

Van Dick, R., Christ, O., Stellmacher, J., Wagner, U., Ahlswede, O., Grubba, C., . . .

Tissington, P. A. (2004). Should I stay or should I go? Explaining turnover intentions with organizational identification and job satisfaction. *British Journal of Management*,

15, 351–360. <https://doi.org/10.1111/j.1467-8551.2004.00424.x>

Van Dick, R., & Haslam, S. A. (2012). Stress and well-being in the workplace: Support for key

propositions from the social identity approach. In J. Jetten, C. Haslam, & S. A. Haslam

(Eds.), *The social cure: Identity, health, and well-being* (pp. 175–194). London & New

York: Psychology Press.

Van Dick, R., Ketturat, C., Häusser, J. A., & Mojzisch, A. (2017). Two sides of the same coin

and two routes for improvement: Integrating resilience and the social identity approach to

well-being and ill-health. *Health Psychology Open*, 4, 1–6. Retrieved online from

<http://journals.sagepub.com/doi/full/10.1177/2055102917719564>

Van Dick, R., Wagner, U., Petzel, T., Lenke, S., & Sommer, G. (1999). Arbeitsbelastung und

Soziale Unterstützung: Erste Ergebnisse einer Untersuchung von Lehrerinnen und

Lehrern. [Job strain and social support: First results of a study among schoolteachers].

Psychologie in Erziehung und Unterricht, 46, 55–64.

Watson, D., Clark, L.A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology*, *54*, 1063–1070. <https://doi.org/10.1037//0022-3514.54.6.1063>

Table 1

Means (M), standard deviations (SD) and correlations of variables at Time 1 and Time 2 in Study 1 (N = 180)

Scale	<i>M (SD)</i>	1	2	3	4	5	6	7
1 Social identification with peers (Time 1)	4.56 (1.33)							
2 Perceived social support by peers (Time 1)	4.72 (1.46)	.70**						
3 Collective self-efficacy (Time 1)	4.56 (1.38)	.63**	.78**					
4 Chronic stress (Time 1)	29.18 (9.69)	-.15*	-.16*	-.14*				
5 Depressive symptoms (Time 1)	3.75 (1.34)	-.19**	-.20**	-.21**	.60**			
6 Collective self-efficacy (Time 2)	4.64 (1.53)	.55**	.59**	.53**	-.20**	-.24**		
7 Chronic stress (Time 2)	31.53 (9.00)	-.12	-.05	-.14	.71**	.55**	-.21**	
8 Depressive symptoms (Time 2)	4.20 (1.42)	-.03	-.01	-.13	.46**	.54**	-.18*	.63**

Note. * = $p < .05$.

** = $p < .01$.

Table 2

Direct and specific indirect influences of social identification on chronic stress and depressive symptoms in Study 1 (N = 180)

	Chronic stress at Time 2		Depressive symptoms at Time 2	
	Direct influence	Indirect influence	Direct influence	Indirect influence
Social identification (Time 1)	-.29 [-1.29, .71]		.10 [-.09, .30]	
→ perceived social support (Time 1)		.81 [.37, 1.39]		.11 [.03, .23]
→ CSE (Time 2)		-.23 [-.61, -.02]		-.05 [-.13, -.00]
→ perceived social support (Time 1) → CSE (Time 2)		-.11 [-.30, -.01]		-.02 [-.06, -.00]

Note. CSE = collective self-efficacy.

Analyses were controlled for collective self-efficacy, chronic stress, and depressive symptoms, respectively, at Time 1.

Numbers in square brackets represent the 95% confidence intervals.

Table 3

Means (M), standard deviations (SD) and correlations of variables in Study 2 (N = 100)

Scale	<i>M (SD) in</i>	<i>M (SD) in</i>	1	2	3	4	5	6
	low SI	high SI						
	(<i>N</i> = 55)	(<i>N</i> = 45)						
1 Mood_before	4.68 (1.06)	4.65 (.85)						
2 Manipulation	-----	-----	.01					
3 Social identification	5.32 (1.46)	6.21 (.70)	.00	.36**				
4 Perceived social support	5.36 (1.51)	6.21 (.96)	-.14	.31**	.75**			
5 Collective self-efficacy	5.12 (1.65)	6.04 (.84)	-.04	.33**	.78**	.81**		
6 Emotional exhaustion	2.79 (1.17)	2.54 (.95)	-.47**	-.12	-.31**	-.11	-.29**	
7 Mood_after	4.70 (1.13)	5.08 (1.01)	.67**	.17	.24*	.14	.29**	-.53**

Note. low SI = low social identity condition; high SI = high social identity condition;

mood_before = mood assessed before manipulation; mood_after = mood assessed after manipulation.

* = $p < .05$.

** = $p < .01$.

SUPPLEMENTARY: EXPLORING THE MECHANISM OF THE SOCIAL IDENTITY–HEALTH LINK

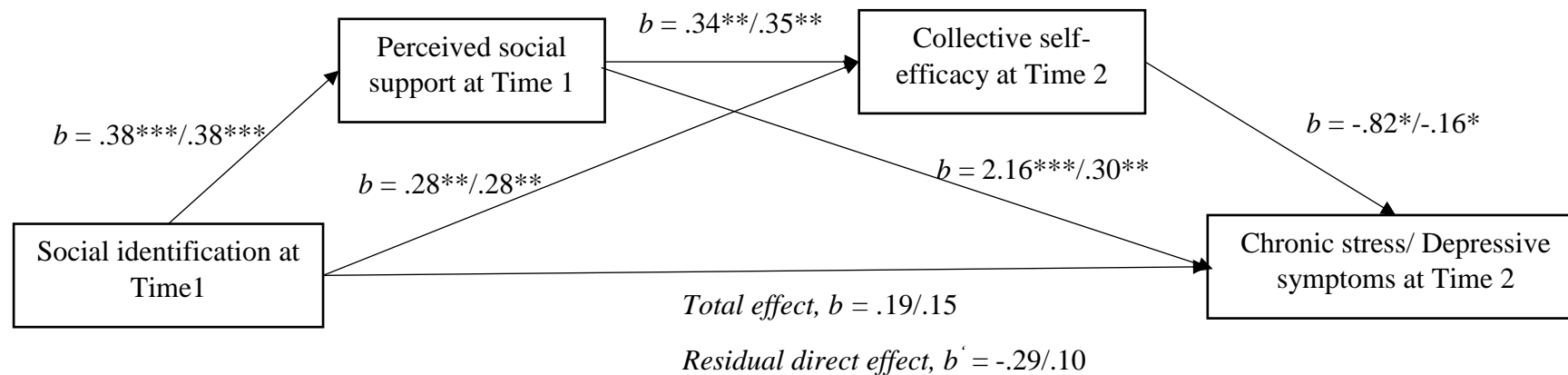


Figure 1. Overview of results in Study 1.

Note. The first regression weights are the effects in the serial mediation analysis of social identification on chronic stress, the second for the effect of social identification on depressive symptoms. For ease of presentation we do not present the paths including collective self-efficacy and chronic stress/depressive symptoms at Time 1.

* = $p < .05$.

** = $p < .01$.

*** = $p < .001$.

SUPPLEMENTARY: EXPLORING THE MECHANISM OF THE SOCIAL IDENTITY-HEALTH LINK

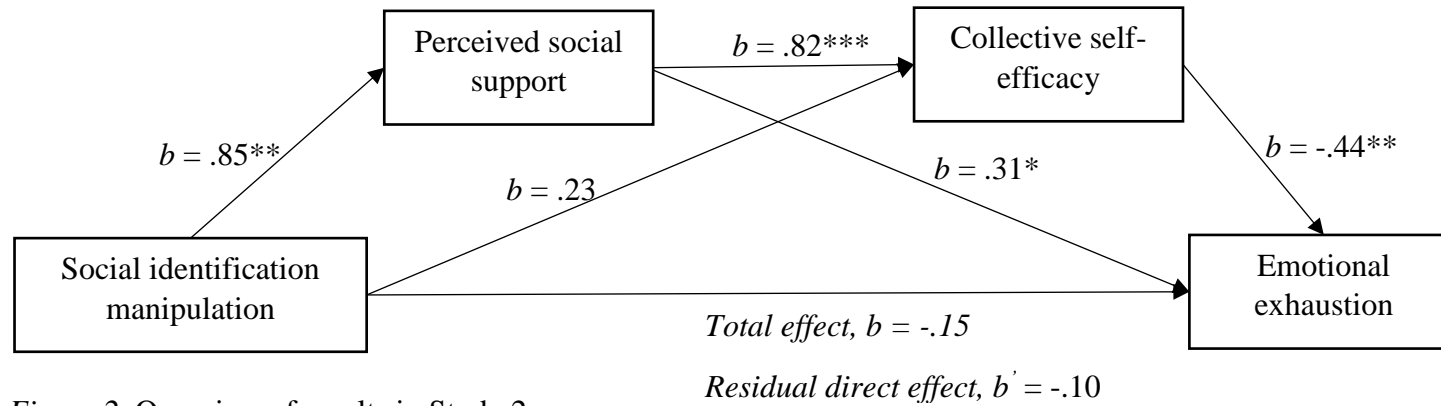


Figure 2. Overview of results in Study 2.

* = $p < .05$.

** = $p < .01$.

*** = $p < .001$.

Supplementary Materials

A. Additional dependent variables in Studies 1 and 2

B. Means, standard deviations and correlations of all variables used in Studies 1 and 2

A. Additional dependent variables in Studies 1 and 2

The studies described in this paper were supported by an undergraduate student from Goethe University and a PhD student from the University of Hildesheim. The PhD student had additional hypotheses, which were published in van Dick, Ketturat, Häusser, and Mojzisch (2017). However, measures of perceived social support and collective-self-efficacy have not been used before and neither the measures of chronic stress and depression at time 1 in Study 1. For educational purposes only, the undergraduate student chose additional variables to be included in Study 2.

A1: Description of additional dependent variables in Study 1

In addition to the variables described in this manuscript, participants answered items on resilience, life satisfaction, and current mood.

Resilience was operationalized using ten items adapted from Schumacher, Leppert, Gunzelmann, Strauß, and Brähler (2005) as well as from the Brief Resilience Scale by Smith and colleagues (2008). Participants stated to which extent they agreed to the respective statements on a 7-point Likert scale, such as “It does not take me long to recover from a stressful event.” Cronbach’s Alpha of this scale was .91.

To operationalize *life satisfaction*, we employed the respective subscale of the Work-related Behavior and Experience Patterns questionnaire developed by Schaarschmidt and Fischer (1997) using a 7-point Likert scale. A sample item is: “So far, I have been satisfied with my life.” Cronbach’s Alpha was .87 for life satisfaction.

SUPPLEMENTARY: EXPLORING THE MECHANISM OF THE SOCIAL IDENTITY–HEALTH LINK

Self-efficacy was similarly operationalized with four items from the Work-related Behavior and Experience Patterns questionnaire developed by Schaarschmidt and Fischer (1997) using a 7-point Likert scale (sample item: “I’m able to accomplish most of my problem.”). Cronbach’s Alpha was .85.

Mood was operationalized with the complete Positive and Negative Affective Schedules questionnaire developed by Watson, Clark, and Tellegen (1988) before presenting our manipulation and with a subset of six items after presenting the manipulation. Participants indicated to which extent they currently experienced ten positive and ten negative feelings (e.g., “uncertain,” “satisfied”) on a 7-point answering scale. The items representing negative mood were recoded so that all items could be collapsed into a single indicator of mood with higher levels indicating more positive mood. Cronbach’s Alpha was .91.

A2: Description of additional dependent variables in Study 2

In addition to the variables described in the manuscript, we assessed study satisfaction, resilience, study engagement, own and peers’ health behavior, and anxiety.

Study satisfaction was operationalized with five items adapted from Holm-Hadulla and Hofmann (2007). This scale encompasses different aspects of study motivation including study conditions and individuals’ own study situation. Participants indicated on a 5-point scale how satisfied they were with the respective aspects.

To operationalize *resilience*, the 6-item Brief Resilience Scale by Smith et al. (2008) was used with a 7-point answering scale from 1 = *completely agree* to 7 = *completely disagree*. A sample item is “I tend to bounce back quickly after hard times.”

Study engagement was operationalized using the 17-item Utrecht Work Engagement Scale developed by Schaufeli and colleagues (2006), adapted to the study background of participants. A sample item is: “Time flies when I am studying.” and participants indicated how often these statements applied to them on a 7-point frequency-scale.

SUPPLEMENTARY: EXPLORING THE MECHANISM OF THE SOCIAL IDENTITY–HEALTH LINK

Own and peers' health behavior was operationalized with nine and seven items, respectively, adapted from Vickers, Conway, and Hervig (1990) using a 7-point Likert scale. Sample items are: “I do not smoke.” and “My peers take care of their health.”

We used four items from the Patient Health-Questionnaire-4 (Löwe et al., 2010) to operationalize *anxiety* (sample item: “Over the past two weeks, I felt nervous, anxious or on edge.”). Participants indicated how often they had felt the respective symptoms on a 4-point frequency scale.

Internal consistencies of all scales were good to very good and ranged from .70 for study satisfaction to .92 for study engagement.

B. Means, standard deviations and correlations of all variables used in Studies 1 and 2.

Supplementary Table S1 shows the descriptive analyses and correlations of all variables used in Study 1 and Supplementary Table S2 displays the respective results for Study 2.

SUPPLEMENTARY: EXPLORING THE MECHANISM OF THE SOCIAL IDENTITY–HEALTH LINK

Table S.1

Means (M), standard deviations (SD) and correlations of all variables at time 1 (_1) and time 2 (_2) in Study 1 (N = 180)

Scale	<i>M (SD)</i>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1 SI_1p	4.56 (1.33)															
2 SI_1c	3.86 (.97)	.78**														
3 SSU_1p	4.72 (1.46)	.70**	.56**													
4 SSU_1c	4.05 (1.14)	.63**	.66**	.86**												
5 CSE_1	4.56 (1.38)	.63**	.52**	.78**	.71**											
6 Stress_1	29.18 (9.69)	-.15*	-.12	-.16*	-.23**	-.14*										
7 Depr_1	3.75 (1.34)	-.19**	-.22**	-.20**	-.30**	-.21**	.60**									
8 SAT_1	3.15 (.47)	.35**	.31**	.34**	.36**	.32**	-.35**	-.42**								
9 RES_1	4.31 (.97)	.18*	.15*	.21*	.22**	.21**	-.52**	-.41**	.23**							
10 SE_1	4.32 (.87)	.31**	.38**	.29**	.37**	.27**	-.26**	-.45**	.41**	.29**						
11 OHB_1	41.46 (8.56)	.06	.17*	.16*	.15*	.14	-.03	.00	.11	.11	.17*					
12 PHB_1	33.72 (6.23)	.20**	.23**	.31**	.29**	.30**	-.09	-.08	.23**	.03	.11	.37**				
13 ANX_1	3.65 (1.48)	-.08	-.08	-.13	-.23**	-.17*	.62**	.57**	-.21**	-.39**	-.15*	.01	-.02			

SUPPLEMENTARY: EXPLORING THE MECHANISM OF THE SOCIAL IDENTITY–HEALTH LINK

Table S.1 – continued

Scale	<i>M (SD)</i>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
14 SI_2p	4.53 (1.38)	.71**	.60**	.50**	.48**	.48**	-.15*	-.13	.31**	.10	.31**	.15*	.23**	-.06		
15 SI_2c	3.68 (.99)	.54**	.74**	.37**	.50**	.33**	-.14	-.17*	.23**	.10	.42**	.22**	.20**	-.06	.77**	
16 SSU_2p	4.91 (1.52)	.60**	.51**	.61**	.58**	.54**	-.15*	-.16*	.31**	.13	.31**	.18*	.28**	-.05	.77**	.62**
17 SSU_2c	4.89 (1.52)	.59**	.50**	.60**	.58**	.53**	-.18*	-.18*	.32**	.15	.32**	.16*	.27**	-.07	.76**	.61**
18 CSE_2	4.64 (1.53)	.55**	.50**	.59**	.58**	.53**	-.20**	-.24**	.31**	.13	.32**	.14	.27**	-.07	.71**	.60**
19 Stress_2	31.53 (9.00)	-.12	-.10	-.05	-.17*	-.14	.71**	.55**	-.30**	-.46**	-.32**	-.05	.04	.45**	-.14	-.14
20 Depr_2	4.20 (1.42)	-.03	-.05	-.01	-.10	-.13	.46**	.54**	-.20**	-.39**	-.27**	-.14	-.05	.29**	-.08	-.14
21 SAT_2	3.41 (.72)	.23**	.29**	.17*	.26**	.23**	-.45**	-.46**	.51**	.26**	.42**	.10	.06	-.21**	.33**	.36**
22 RES_2	4.36 (1.03)	.01	-.05	.10	.07	.10	-.42**	-.29**	.13	.68**	.22**	.16*	.03	-.21**	.05	-.00
23 SE_2	4.13 (.95)	.17*	.29**	.16*	.27**	.17*	-.25**	-.32**	.29**	.24**	.70**	.22**	.13	-.08	.31**	.48**
24 OHB_2	41.58 (8.95)	-.01	.05	.09	.10	.08	-.12	-.09	.18*	.19*	.15*	.68**	.34**	-.01	.14	.19*
25 PHB_2	34.31 (6.32)	.11	.16*	.20**	.19*	.14	-.09	-.05	.21**	.03	.13	.27**	.72**	.01	.26**	.26**
26 ANX_2	4.17 (1.62)	.06	.02	.03	-.07	-.05	.47**	.43**	-.10	-.38**	-.20**	-.06	.02	.41**	-.00	-.04

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Table S. 1 - continued

Scale	16	17	18	19	20	21	22	23	24	25
17 SSU_2c	.99**									
18 CSE_2	.86**	.86**								
19 Stress_2	-.17*	-.20**	-.21**							
20 Depr_2	-.16*	-.17*	-.18*	.63**						
21 SAT_2	.35**	.37**	.37**	-.53**	-.50**					
22 RES_2	.12	.10	.11	-.47**	-.38**	.27**				
23 SE_2	.33**	.35**	.33**	-.33**	-.36**	.54**	.18*			
24 OHB_2	.19*	.17*	.21**	-.11	-.23**	.15*	.23**	.27**		
25 PHB_2	.32**	.33**	.31**	.01	-.05	.10	.04	.19**	.41**	
26 ANX_2	-.04	-.06	-.11	.66**	.64**	-.33**	-.39**	-.19*	-.20**	-.05

Note. SI_p = social identification with peers, SI_c = social identification using composite score, SSU_p = perceived social support from peers, SSU_c = perceived social support using composite score, CSE = collective self-efficacy, Depr = depressive symptoms, SAT = study satisfaction, RES = resilience, SE = study engagement, OHB = own health-behavior, PHB = peers' health behavior, ANX = anxiety.

Items in bold represent the items used in our main analyses.

* = $p < .05$.

** = $p < .01$.

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Table S.2

Means (M), standard deviations (SD) and correlations of all variables in Study 2 (N = 100)

Scale	<i>M (SD) in</i> low SI (<i>N</i> = 55)	<i>M (SD) in</i> high SI (<i>N</i> = 45)	1	2	3	4	5	6	7	8	9
1 Mood_1	4.68 (1.06)	4.65 (.85)									
2 MAN	-----	-----		-.01							
3 SI	5.32 (1.46)	6.21 (.70)	.00	.36**							
4 SOSU	5.36 (1.51)	6.21 (.96)	-.14	.31**	.75**						
5 CSE	5.12 (1.65)	6.04 (.84)	-.04	.33**	.78**	.81**					
6 EE	2.79 (1.17)	2.54 (.95)	-.47**	-.12	-.31**	-.11	-.29**				
7 RES	4.86 (1.11)	4.96 (1.10)	.48**	.05	.07	-.04	.14	-.41**			
8 LS	4.41 (1.36)	4.91 (1.11)	.35**	.20	.45**	.36**	.49**	-.54**	.57**		
9 Mood_2	4.70 (1.13)	5.08 (1.01)	.67**	.17	.24*	.14	.29**	-.53**	.48**	.66**	
10 SE	5.46 (1.15)	5.67 (1.07)	.36**	.09	.33**	.24*	.36**	-.47**	.72**	.71**	.58**

Note. low SI = low social identity condition, high SI = high social identity condition, mood_1 = mood assessed before manipulation, MAN = manipulation (positive condition = 1, negative condition = 2), SI = social identification, SOSU = perceived social support, CSE = collective self-efficacy, EE = emotional exhaustion, RES = resilience, LS = life satisfaction, mood_2 = mood assessed after manipulation., SE = self-efficacy.

Items in bold represent the items used in our main analyses.

* = $p < .05$.

** = $p < .01$.

References in Supplementary Materials

- Holm-Hadulla, R., & Hofmann, F. H. (2007). Lebens- und Studienzufriedenheitsskala [Life- and study satisfaction scales]. In: Tagungsband zur Fachtagung Beratung. Berlin: Deutsches Studentenwerk.
- Löwe, B., Wahl, I., Rose, M., Spitzer, C., Glaesmer, H., Wingenfeld, K., Schneider, A., & Brähler, E. (2010). A 4-item measure of depression and anxiety: Validation and standardization of the Patient Health Questionnaire-4 (PHQ-4) in the general population. *Journal of Affective Disorders, 122*, 86–95.
<https://doi.org/10.1016/j.jad.2009.06.019>
- Schaarschmidt, U., & Fischer, A. W. (1997). AVEM - ein diagnostisches Instrument zur Differenzierung von Typen gesundheitsrelevanten Verhaltens und Erlebens gegenüber der Arbeit. [AVEM – An instrument for diagnosing different types of work- and health-related behavior and experience]. *Zeitschrift für Differentielle und Diagnostische Psychologie, 18*, 151–163.
- Schaufeli, W. B., Bakker, A. B., & Salanova, M. (2006) The measurement of work engagement with a short questionnaire: A cross-national study. *Educational and Psychological Measurement, 66*, 701–716. <https://doi.org/10.1177/0013164405282471>
- Schumacher, J., Leppert, K., Gunzelmann, T., Strauß, B., & Brähler, E. (2005). Die Resilienzskala – Ein Fragebogen zur Erfassung der psychischen Widerstandsfähigkeit als Personmerkmal. [Resilience scale—a questionnaire to assess psychological resilience as personality trait]. *Zeitschrift für Klinische Psychologie, Psychiatrie und Psychotherapie, 53*, 16–39.
- Smith, B. W., Dalen, J., Wiggins, K., Tooley, E., Christopher P., & Bernard, J. (2008). The Brief Resilience Scale: Assessing the ability to bounce back. *International Journal of Behavioral Medicine, 15*, 194–200. <https://doi.org/10.1080/10705500802222972>

SUPPLEMENTARY: EXPLORING THE MECHANISM OF THE SOCIAL IDENTITY–HEALTH LINK

Van Dick, R., Ketturat, C., Häusser, J. A., & Mojzisch, A. (2017). Two sides of the same coin and two routes for improvement: Integrating resilience and the social identity approach to well-being and ill-health. *Health Psychology Open*, *4*, 1–6.

<http://journals.sagepub.com/doi/full/10.1177/2055102917719564>

Vickers, R. R., Conway, T. L., & Hervig, L. K. (1990). Demonstration of replicable dimensions of health behaviors. *Preventive Medicine*, *19*, 377–401.

Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology*, *54*, 1063–1070. <https://doi.org/10.1037//0022-3514.54.6.1063>