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Being and feeling liked by others: How social inclusion impacts health

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This study examined the effects of perceived and actual social inclusion on health across and within individuals from a network perspective. During the first semester, 75 freshmen students provided bi weekly ratings on their perceived social inclusion and health. To capture actual social inclusion, each student nominated liked and disliked fellow students. Perceived social inclusion mediated the effect of actual social inclusion on health. Specifically, students with more 'likes' perceived more social inclusion and those with higher perceived inclusion reported a better health status (between person effect). In addition, at time points, when students received more 'likes' they also perceived more social inclusion. They reported better health at times when they felt more included (within person effect). Thus, the perception of social inclusion is rooted in reality and actual social inclusion has an impact on health when passing the filter of perception.

Keywords: perceived and actual social inclusion; self rated health; social relations; social network; between and within person effects

Introduction

What if we could tag a 'like' not only to items in virtual social networks but also to people? How would people with numerous 'likes', that is a high degree of social inclusion and likeability, differ from people with fewer 'likes'? It is likely that people with many 'likes' would possess a high degree of social influence (Cillessen & Rose, 2005). However, would they also be healthier? Previous research suggests that the degree of an individual's social inclusion has a large impact on his or her health (e.g. Berkman & Syme, 1979; Cacioppo et al., 2002; Cohen, Doyle, Skoner, Rabin, & Gwaltney, 1997; Holt-Lunstad, Smith, & Layton, 2010; House, Landis, & Umberson, 1988; Pressman et al., 2005; Seeman, 2000). For instance, Pressman and colleagues (2005) demonstrated that low numbers of social ties were associated with a poorer immune response to a component of the influenza vaccination. A recent meta-analysis of 148 studies even revealed a 50% increased likelihood of survival due to stronger social relations (Holt-Lunstad et al., 2010). Hence, people with many 'likes' would probably be healthier than people with few 'likes'.

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When it comes to the effects of social inclusion on health, previous research has predominantly asked the target person about his or her social inclusion (e.g. Cohen et al., 1997; Pressman et al., 2005). Consequently, positive effects of social integration on health are silent to the question, whether these positive health effects only result from the perception of social inclusion or whether actual social inclusion, captured from the perspective of the social environment is an important underlying factor. Thus, for a more comprehensive understanding of the mechanism underlying social inclusion-based health effects, we need to take both perspectives into account: The actual inclusion of the target individual within the social environment as well as the target individual's perceived inclusion.

It appears likely that perceived and actual social inclusion differ from each other and represent two distinguishable aspects of the phenomenon. For instance, children's perceived loneliness was moderately related to the actual acceptance by their peers (Asher & Wheeler, 1985; Parker & Asher, 1993). Similarly, findings from research on social support show a moderate relationship between the provider's and the recipient's perspectives (Knoll, Burkert, Luszczynska, Roigas, & Gralla, 2011; Luszczynska, Boehmer, Knoll, Schulz, & Schwarzer, 2007; Vollmann, Antoniw, Hartung, & Renner, 2011). Hence, people did perceive acceptance and social support provided by the social environment. However, their accuracy was only moderate.

Assuming that perceived and actual social inclusion are two different aspects of the phenomenon leads to questions regarding their relative importance to health. To date, research has yielded mixed results. Whereas research from Brendgen and Vitaro (2008) or House and colleagues (1988) suggests that actual social inclusion impacts health, studies on social support suggest that perceived inclusion might override actual social inclusion (Scholz, Knoll, Roigas, & Gralla, 2008; Vollmann et al., 2011). For instance, Vollmann and colleagues (2011) found that positive illusions about available social support, that is, perceived support rather than the support actually provided, buffered the negative effect of stress within couples. In addition, Cohen, Gottlieb, and Underwood (2000) suggested the stress-buffering effects of both perceived as well as received social resources. However, instead of assuming that health is directly impacted by either actual or perceived social inclusion, both perspectives could be integrated by assuming that perceived social inclusion mediates, at least in part, the relationship between an individual's actual social inclusion and his or her health-related response to it. Thus, actual social inclusion might exert an indirect influence on health through perceived social inclusion, suggesting that the perception of social inclusion is rooted in reality and that actual social inclusion has an impact on health when passing the filter of an individual's perception.

Without question, the challenging flip side of this comprehensive approach is the assessment of social inclusion provided by the social environment. To assess the impact of actual social inclusion on health, the inclusion of the target person within their social network needs to be measured. This requires an extension of individual-level data using social environment data. To date, few studies have expanded the view from the individual to the social environment level. For instance, research on social support has taken a dyadic perspective assessing social support within couples (e.g. Bolger, Zuckerman, & Kessler, 2000; Vollmann et al., 2011). Although romantic partners are an important source of social support, social inclusion is typically based on a broader social environment. Smith and Christakis (2008) suggested using a social network perspective to draw

a more complete picture, constituting a new and cutting-edge research approach. Specifically, a network perspective allows assessing social inclusion provided by the environment as both the number of people, indicating that the individual belongs to their network as well as the quality of the social relationship with the individual (e.g. whether the individual is liked or disliked; Smith & Christakis, 2008).

The present study

In this study, we examined perceived and actual social inclusion within freshmen in relation to self-rated health (e.g. Benyamini, 2011). Extending previous research, the trajectory of social inclusion and health was assessed longitudinally during the first semester. Moreover, as indicators of actual social inclusion, we examined both the number of positive and negative social ties (i.e. peer nominated likeability and dislikeability) in order to uncover effects of negative and positive relation quality. In order to assess the effects of social inclusion on health both within an individual as well as across individuals, a multilevel approach was taken.

Method

Procedure

The present data were collected as part of the Social Network Study (SozNet), a larger research project on the antecedents and consequences of network formation and consolidation in a freshmen sample (for other results see Hartung & Renner, 2013). We strictly followed the German Psychological Society's (Deutsche Gesellschaft für Psychologie) guidelines for conducting psychological studies (http://www.dgps.de/dgps/aufgaben/003.php; see paragraph C.III), which are similar to those of the American Psychological Association. Since the study conforms with the Declaration of Helsinki and the ethics guidelines of the German Psychological Society, it did not require any additional ethics approval (see also Huebner & Gegenfurtner, 2012).

Participants were first year, psychology students at the University of Konstanz, Germany. They were invited to participate in a study on 'Social Networks' both during introduction week and by e-mail. Prior to the study, participants were informed about the content and the procedure of the study. When they agreed to participate they filled in the online questionnaires. The first measurement took place one week after the semester began. Participants provided information about themselves and their relationship to other first-year students by filling in an online questionnaire every two weeks throughout their first semester. In total, 10 measurement points are available. As compensation for their participation participants received a 20 EUR book voucher, up to 5 h of course credit, and feedback on the study results.

Participants

All first-year students were contacted ($N = 92$). In total, 80 students participated at least in one measurement point. Of these, 5 participants had to be excluded (see Analytical Procedure). Thus, the final sample comprised 75 participants ($n = 60$ females, 80%) with a mean age of 22 years (17–47 years, $SD = 5.7$).

Measures

All variables were assessed at each measurement point.

Perceived social inclusion

Perceived social inclusion was assessed through five questions ($\alpha = .90$; see Eisenberger, Gable, & Lieberman, 2007; Williams, Cheung, & Choi, 2000). In particular, participants were asked to rate their degree of perceived social inclusion when thinking of their fellow students during the previous week ('Thinking of your fellow students during last week, how much did you …: … belong?, … feel integrated?, … feel ignored?, … feel excluded?, … feel rejected?'). Ratings were provided on 7-point rating scales (1 *not at all* to 7 *very much*). On average, participants reported a high social inclusion across the 10 points of measurement ($M = 5.52$, $SD_{between} = .99$; $SD_{within} = .68$; $ICC = .68$).

Actual social inclusion

Actual social inclusion was measured by assessing the number and quality of participants' social ties. Specifically, we used nomination procedures where participants received a complete grade roster with fellow student names alphabetised by first name. Participants nominated those three fellow students they liked most (likeability) and those three fellow students they liked least (dislikeability). Likeability and dislikeability scores were computed for each participant by counting the nominations received for 'like most' and 'like least', respectively (e.g. Coie, Dodge, & Coppotelli, 1982; LaFontana & Cillessen, 2002). On average, participants were named 2.2 times (range 0–7; $SD_{between} = 1.35$; $SD_{within} = 1.10$; $ICC = .60$) as most liked and 1.1 times (range 0–16; $SD_{between} = 1.90$; $SD_{within} = .92$; $ICC = .81$) as least liked across the 10 points of measurement. There were only two participants who got no dislikeability nomination across the whole time of the semester and one participant who got no likeability nomination.

Self rated health

Participants rated their current health on a 7-point scale ranging from *very poor* (1) to *excellent* (7) with the item 'How was your health last week?'. On average, participants

Table 1. Bivariate correlations between variables (Pearson product moment correlation).

	Within			Between		
	Perceived social inclusion	Likeability	Dis likeability	Perceived social inclusion	Likeability	Dis likeability
Self rated health	.09*	.05	.02	.39*	.05	.06
Perceived social inclusion		.15**	.06		.33**	.05
Likeability			.03			.07

*$p < .05$; **$p < .01$.

reported to be in good to very good health across the 10 points of measurement ($M = 5.07$, $SD_{between} = .85$; $SD_{within} = 1.38$; $ICC = .28$). Previous research has shown that self-rated health is a valid predictor of the actual physical health and mortality (e.g. Benyamini, 2011).

Bivariate correlations between variables are displayed in Table 1.

Analytical procedure

Participants were excluded from data analyses (1) if they did not fill in the baseline questionnaire and (2) if Mahalanobis distance identified them as multivariate outlier with $p < .001$. Missing values were estimated using multiple imputation (Mplus; Schafer & Graham, 2002).

Since observations were nested within persons, the data structure was hierarchical and multilevel modelling (Mplus 7) was used. Multilevel analysis allows for the investigation of associations between constructs at both the within-person (Level 1) and the between-person level (Level 2). As one aim of the study was to examine effects of social inclusion on health both within and across individuals, within- and between-person effects were disentangled using the centering procedure suggested by Bolger and Laurenceau (2013). Specifically, in a first step, raw scores of likeability, dislikeability and perceived social inclusion were grand-mean centred. In a second step, grand-mean centred scores were used to compute the person-mean (i.e. a participant's average value across all 10 points of measurement). The person-mean was then subtracted from the grand-mean centred scores of the respective participant in order to obtain within-person deviations. Whereas the person-mean is used to estimate the between-persons effects, the within deviation score is used to estimate the within-person effects. Time was centred at the first occasion. To account for variability between individuals in initial levels of perceived social inclusion and health as well as within-person change over time, the intercept and the slope of time were allowed to be random and to correlate with each other. To calculate bivariate correlations between variables, we specified the WITH statement on the within- and the between-person level in the command 'model' (MPlus).

For assessing the magnitude of the indirect effect of actual social inclusion mediated through perceived social inclusion on health, the indirect effect was quantified as $a \times b$ (Krull & MacKinnon, 2001; MacKinnon & Fairchild, 2009; Rucker, Preacher, Tormala, & Petty, 2011). Specifically, to calculate indirect effects on the between and within levels, we used the respective effects of actual social inclusion on perceived social inclusion and of perceived social inclusion on self-rated health. Confidence intervals were used to determine significance as in most cases $a \times b$ is not normally distributed (Preacher & Selig, 2012). The Monte Carlo method was used to estimate confidence intervals (Selig & Preacher, 2008) because other methods, such as bootstrapping, are not applicable to Mplus multilevel model estimation.

Results

ICCs varied from .28 to .81, indicating that, for instance, 28% of the variation in *self-rated health* was attributable to stable between-person differences, whereas 81% of *number of like least nominations* was attributable to stable between-person differences.

Actual and perceived social inclusion

Bivariate correlations on the within-person level indicated a small relationship between perceived social inclusion and likeability and a moderate relationship on the between-person level (see Table 1). A multilevel analysis with perceived social inclusion as the dependent variable, likeability and dislikeability nominations on the between and within levels as independent variables revealed significant main effects for likeability on the between and the within level (see Table 2). Specifically, individuals who received more 'likes' from their fellow students felt more socially included (between-person effect), and individuals felt more socially included at time points when they received more 'likes' (within-person effect). Dislike nominations had no significant effect (see Table 2).

Does being and feeling liked relate to being healthy?

Bivariate correlations on the within-person level indicated a small relationship between perceived social inclusion and self-rated health, whereas the relationship was moderate to high on the between-person level (see Table 1). In a next step, the effect of perceived and actual social inclusion on health was examined by conducting a multilevel analysis with self-rated health as the dependent variable. Perceived social inclusion, likeability and dislikeability nominations were included on the between and the within level as independent variables (see Table 3). The factor time was included in order to consider potential time effects.

The analysis revealed a significant main effect of perceived social inclusion on the between-person level for self-rated health, indicating that individuals who felt more socially included reported better current health. In addition, the main effect of perceived social inclusion on the within-person level reached significance, indicating that individuals also reported better health at time points when they felt more socially included. Neither main effects of likeability nor dislikeability reached significance[1] (see Table 3).

Table 2. Fixed and random effects of multilevel analysis testing the effect of likeability and dislikeability (IVs) on perceived social inclusion (DV).

	b (SE)	*z* value
Fixed effects		
Intercept	5.50 (.12)	47.84***
Time	.00 (.01)	.35
$\text{Likeability}_{\text{within}}$	.09 (.03)	2.85**
$\text{Dislikeability}_{\text{within}}$	.03 (.03)	.82
$\text{Likeability}_{\text{between}}$	.24 (.07)	3.59***
$\text{Dislikeability}_{\text{between}}$	.03 (.03)	.86
Random effects	Estimates (SE)	*z* value
Variance of intercepts	.81 (.16)	4.97***
Variance of *time* slope	.01 (.00)	2.66**
Covariance between intercepts and slopes	.01 (.01)	.47
Residual variance	.39 (.04)	9.58***

Notes: Interaction terms crossing likeability and dislikeability on the between and within level, respectively, were not significant. Including these did not change the results. On the between-person level: *Pseudo* R^2 .18; on the within-person level: *Pseudo* R^2 .15 (Singer & Willett, 2003).
**$p < .01$; ***$p < .001$.

Table 3. Fixed and random effects of multilevel analysis testing the effect of perceived social inclusion, likeability and dislikeability (IVs) on health (DV).

	Health		
	b	(SE)	*z* value
Fixed effects			
Intercept	5.07	(.13)	39.20***
Time	.00	(.02)	.04
Perceived social inclusion$_{within}$	.18	(.08)	2.17*
Likeability$_{within}$	.04	(.05)	.82
Dislikeability$_{within}$	.05	(.06)	.78
Perceived social inclusion$_{between}$	.35	(.14)	2.56**
Likeability$_{between}$	.06	(.07)	.82
Dislikeability$_{between}$	.02	(.03)	.83
Random effects	Estimates	(SE)	*z* value
Variance of intercepts	.55	(.28)	1.92
Variance of *time* slope	.00	(.01)	.47
Covariance between intercepts and slopes	.00	(.04)	.01
Residual variance	1.86	(.13)	14.14***

*$p < .05$; **$p < .01$; ***$p < .001$.

Also, the non-significant effect of time indicates that, on average, individuals' health did not vary systematically with time.

No interindividual differences in initial levels of health or in within-person changes over time in health were observed. The initial level of health was not related to the course of health over time.

In total, 25% of the between-person variation in self-rated health were explained by the model (Pseudo $R^2 = .25$; Singer & Willett, 2003). Of the within-person variation, 3% were explained by the model (Pseudo $R^2 = .03$). The significant residual effect indicates a substantial unexplained variance on the within-person level.

To calculate indirect effects[2] on the between and within levels, we used the respective effects of likeability on perceived social inclusion (*a*) and of perceived social inclusion on self-rated health (*b*), as reported above (between: .24 × .35; within .09 × .18).

On the between-person level, the indirect effect of $a \times b_{between} = .08$ reached significance (95% CI [.01–.18]). In contrast, on the within-person level, the indirect effect of $a \times b_{within} = .02$ did not reach significance (95% CI [.00–.04]).

Control analyses

In addition, we calculated both multilevel models allowing the slopes of all within variables to be random (Barr, Levy, Scheepers, & Tily, 2013). Adding random slopes for likeability and dislikeability in the first model did not change the size and significance of the fixed effects (likeability$_{within}$ $b = .09$, $SD = .03$, $p = .003$; dislikeability$_{within}$ $b = .03$, $SD = .03$, $p = 42$; likeability$_{between}$ $b = .21$, $SD = .07$, $p = .001$; dislikeability$_{between}$ $b = .02$, $SD = .03$, $p = 44$). The random slope for *time* remained significant ($b = .01$, $SD = .00$, $p = .008$); random slopes for likeability and dislikeability were not significant ($ps \geq .08$).

Similarly, adding random slopes for likeability, dislikeability and perceived social inclusion in the second model did not change the size of the fixed effects substantially. However, by adding the random slopes, the fixed effect of perceived social inclusion$_{within}$ became insignificant (perceived social inclusion$_{within}$ $b = .16$, $SD = .13$, $p = .23$; likeability$_{within}$ $b = .03$, $SD = .24$, $p = .91$; dislikeability$_{within}$ $b = -.06$, $SD = .12$, $p = 62$; perceived social inclusion$_{between}$ $b = .35$, $SD = .15$, $p = .02$; likeability$_{between}$ $b = -.06$, $SD = .16$, $p = .71$; dislikeability$_{between}$ $b = .03$, $SD = .15$, $p = .85$). The random slope for *time* remained insignificant (.01, $SD = .01$, $p = .57$); random slopes for likeability, dislikeability and perceived social inclusion were not significant ($ps \geq .82$).

On the basis of these analyses, we again calculated the indirect effect on the between level. We used the respective effects of likeability on perceived social inclusion (a) and of perceived social inclusion on self-rated health (b), as reported above (i.e. 21 × .35). On the within level, however, the relationship between independent variable and mediator (i.e. likeability and perceived social inclusion) as well as between mediator and dependent variable (i.e. perceived social inclusion and self-rated health) were allowed to be random. Therefore, the covariance between the random slopes needs to be taken into account (Bolger & Laurenceau, 2013). Consequently, we conducted the mediation analysis as described by Bolger and Laurenceau (2013).

On the between-person level, the indirect effect of $a \times b_{between} = .07$ reached significance (95% CI [.01–.17]). In contrast, on the within-person level, the indirect effect was not significant ($b = .02$, $SD = .03$, $p = .59$).

Discussion

The present study examined effects of perceived and actual social inclusion on health both within and between university freshmen during their first semester. Extending previous research, we measured both perceived social inclusion and actual social inclusion/exclusion by asking each student to nominate their three most and three least liked fellow students. The results show that perceived social inclusion translated the effect of actual social inclusion on health. Thus, a person's inclusion in social networks is an important determinant of their health. Or to put it differently: If we could tag a 'like' to people in virtual social networks, individuals with many 'likes' would be healthier than individuals with less 'likes'.

As in previous studies (e.g. Cohen et al., 1997; Pressman et al., 2005), social inclusion captured from the target's perspective was associated with health (significant between-persons and within-person effect). However, by taking a more comprehensive view and considering simultaneously actual social inclusion provided by the social network, we showed that actual and perceived social inclusion are distinguishable, yet related, aspects. Specifically, we found moderate accuracy between actual likeability and perceived social inclusion (within-person and between-persons level), which is in line with research on the relationship between provided and perceived social support (Knoll et al., 2011; Luszczynska et al., 2007; Vollmann et al., 2011).

Answering the question about the relative importance of actual compared to perceived social inclusion for health, we found that although actual social inclusion did not exert a direct influence on health, perceived social inclusion mediated the effect of likeability on health. This result integrates previous research, suggesting that both perceived

social resources (Scholz et al., 2008; Vollmann et al., 2011) as well as provided social resources (Brendgen & Vitaro, 2008; House et al., 1988) affect health. Thus, actual social inclusion had an effect on health when passing the filter of an individual's perception. It is important to note that we found a significant mediation effect between-persons but not within individuals. A reason for this might be that, although we chose a newly forming social network of first-year students to increase intra-individual variability in social inclusion, this variability was smaller than the variability between individuals. This might have limited the power to detect an effect within individuals (Bolger & Laurenceau, 2013). Given the observed effects of actual social inclusion, measured as the number of positive social ties in a social network (i.e. likeability), it is interesting to note that actual social inclusion, measured as the number of negative social ties (i.e. dislikeability) affected neither perceived social inclusion nor health. There are several reasons why this might have been the case.

First, according to research on the process and accuracy of personality judgments, traits differ in their visibility and, consequently, show differential accuracy (e.g. Funder & Dobroth, 1987; Hartung & Renner, 2011; John & Robins, 1993). One might speculate that individuals openly communicate their positive feelings towards others, but that negative feelings are less openly communicated due to social norms and regulations (e.g. Blumberg, 1972; Kramer & Hess, 2002). Therefore, likeability and dislikeability might differ in visibility, and people might lack valid information about their dislikeability, whereas valid information about their likeability is easily accessible in their social environment.

Second, whereas individuals appear to be sensitive towards information about their likeability within their social environment, they might have a 'blind spot' when it comes to information about their dislikeability within their network. In line with this reasoning, past research has shown that individuals selectively attend to signs of social acceptance (DeWall, Maner, & Rouby, 2009) and accept negative feedback less than positive feedback (Renner, 2004). Hence, dislikeability might not have had an effect due to cognitive or motivational processes which favour positive information.

Third, dislikeability might not have affected health because of the sample and it's respective social environment: whereas a relationship between actual social inclusion and health was found in a study on children and adolescents (Brendgen & Vitaro, 2008), our sample was composed of university students. In comparison with children and adolescents, university students generally choose the courses they attend and teaching takes place in various, differently composed groups. Consequently, students have the possibility of avoiding potentially negative situations. Thus, university students are probably less frequently exposed to episodes of exclusion than children and adolescents and, consequently, actual dislikeability may have less impact on university students' health than on children's and adolescents' health.

The strengths of the present study are that it extends previous research through the comprehensive assessment of both perceived and actual social inclusion in a real life setting, ensuring high ecological validity. Furthermore, the present study took the challenge of assessing actual inclusion in a social network by asking each network member about positive as well as negative ties to each target. Additionally, we uncovered both within- and between-persons effects by repeatedly questioning university freshmen during the first semester.

Given these strengths, some limitations need to be considered. First, effects have been shown in a young, healthy and predominantly female student sample. Future research needs to investigate whether the results can be replicated in other social networks differing in age, gender, education and health status (e.g. in schools, different work contexts, or senior citizen centres). A further interesting question for future research is whether, given the growing importance of virtual realities, not only inclusion in real life networks but also inclusion in virtual social networks affects health. Second, we have shown that social inclusion affects self-rated health, which is a significant predictor of mortality (e.g. Benyamini, 2011). As self-rated health is a rather stable construct (Miilunpalo, Vuori, Oja, Pasanen, & Urponen, 1997) which is not supposed to vary much from day to day, we chose a time interval of two weeks between measurement points. However, the investigation of other health measures which might vary on a daily basis, such as symptoms (e.g. Stadler, Snyder, Horn, Shrout, & Bolger, 2012), or vary as a function of interaction partners, such as blood pressure (Holt-Lunstad, Uchino, Smith, Olson-Cerny, & Nealey-Moore, 2003), would allow to capture faster processes and might add to a further understanding of the mechanisms how social inclusion exerts its positive influence. Third, as the mediational models in the present paper tested concurrent associations, experimental approaches are needed to further investigate causal as well as within-person mediation effects of actual and perceived social inclusion on health, given the naturally occurring stability in social inclusion within individuals. Fourth, to comprehensively understand the effect of actual and perceived social inclusion on health, additional mediators (i.e. social control promoting health behaviours, multiple sources for health-relevant information; Cohen et al., 2000) need to be considered simultaneously in future research.

Next to these directions for future research, the present study has important implications for practice. The results demonstrate the adaptiveness of forming and maintaining social networks and relationships as central human tasks (Pickett, Gardner, & Knowles, 2004). Hence, health promotion programmes should support individuals to become highly included in social networks. These networks could be a peer group at school, at work, in communities, such as a sports club, or, for older individuals, in a senior citizen centre. The aim should be to procure many ‘likes’ to secure the path to health.

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Notes

1. Interaction terms crossing likeability, dislikeability and perceived social inclusion on the between and within level, respectively, were not significant. Including these did not change the results.
2. Rucker et al. (2011; also MacKinnon & Fairchild, 2009) argue that the effect of one variable can be mediated through another variable without an initial relationship between independent and dependent variable. Hence, it was examined whether perceived social inclusion mediated the effect of actual social inclusion (i.e. likeability) on health. The effect of likeability on self rated health before adding perceived social inclusion is b .03 (SE .07), p .71 on the between level, and b .06 (SE .05), p .26 on the within level.

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