CHAPTER 6

Reciprocal Associations Between Perceived Acceptance and Self-Esteem in Daily Life

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ABSTRACT

According to sociometer theory (SMT), the outcome of social experiences influences how valuable we feel in relation to others. Our perceived relational value is experienced as self-esteem. Although SMT has been extensively investigated in experimental and longitudinal studies, studies investigating whether SMT applies to moment-to-moment changes in daily life are scarce. The aim of the current study was to investigate the reciprocal associations between perceived acceptance and state self-esteem, during short-term, moment-to-moment changes in daily life. In addition, we examined whether these associations were moderated by trait self-esteem. Data from 228 college students ($M_{age} = 19.36$, 90% female) collected using the Experience Sampling Method were used in the analyses. For 11 consecutive days, participants completed five questionnaires a day at semi-random time intervals. Dynamic Structural Equation Modeling was used to investigate reciprocal associations between perceived acceptance and state self-esteem and the moderating effect of trait self-esteem. The results showed a small positive significant association between perceived acceptance and state self-esteem at the same measurement moment. In addition there was a significant, but small cross-lagged effect from perceived acceptance on state self-esteem. There was no significant effect in the reverse direction nor were the cross-lagged effects significantly moderated by trait self-esteem. The small effect sizes indicated that perceived acceptance and state self-esteem hardly seem to influence each other from moment-to-moment during the day. Rather both are influenced by stable trait self-esteem. However, we hold it conceivable that measurement issues played an important role in the outcomes of the study. Replication in studies addressing these limitations is therefore needed before substantial conclusions about SMT in daily life can be made.

Key words: self-esteem, social acceptance, sociometer, experience sampling method
What is self-esteem and why do we have it? Sociometer theory (SMT) links self-esteem to the human need to belong (Leary et al., 1995). This need to belong likely has an evolutionary origin. Humans had higher chances of survival and reproduction in groups than alone (Leary & Downs, 1995). To avoid being excluded from the group, humans needed a system that could alarm the individual for risks of exclusion, and alert the individual that inclusion efforts need to be increased. According to sociometer theory, self-esteem is the alarm signal of this social rejection alarm system (Leary & Baumeister, 2000; Leary et al., 1995). In SMT, self-esteem is conceptualized as a marker of one’s relational value to other people (Leary, 2005). Relational value indicates the degree to which individuals perceive themselves as valuable and meaningful in relation to other individuals (Leary, 2005). The higher one’s relational value is perceived by others, the higher the likelihood that someone is accepted and included. Relational value is thus an indication of the perceived likelihood that one will be rejected or accepted. When individuals experience a decrease in social acceptance and relational value, their self-esteem is assumed to lower, triggering an alarm, which in turn motivates behavior that helps regain acceptance (Leary, 1990; Leary & Baumeister, 2000; Leary & Downs, 1995).

SMT can be applied to trait self-esteem as well as state self-esteem (Leary & Baumeister, 2000). Trait self-esteem monitors the degree of perceived relational value in general, whereas state self-esteem monitors momentary social relationships and the degree of relational value in the current situation (Leary & Baumeister, 2000). The sociometer is hypothesized to be particularly sensitive to changes in state self-esteem, but trait self-esteem may impact the relationship between social experiences and state self-esteem (Leary & Baumeister, 2000; Nezlek, Kowalski, Leary, Blevins, & Holgate, 1997). Individuals with low trait self-esteem are theorized to have a more sensitive sociometer than individuals with high trait self-esteem. Just as a person with a full fuel tank will not be too worried when some fuel is lost, a person with high trait self-esteem will likely not be too worried when a temporary loss of acceptance is experienced. But an almost empty fuel tank is reason to worry when additional fuel is lost, and likewise, an individual with low trait self-esteem will likely be worried when experiencing even more lack of acceptance (Leary & Baumeister, 2000).

To verify the SMT, numerous studies have been conducted to investigate the association between social experiences (e.g. perceived acceptance/rejection, social inclusion/exclusion and popularity) and self-esteem on both state and trait level. Most of the evidence for SMT is based on experimental studies, in which researchers manipulate participants’ perceived social inclusion/exclusion and then measure state or trait self-esteem. These experimental studies have shown that perceived social acceptance is positively and rejection negatively associated with trait self-esteem (e.g. Anthony, Wood, & Holmes, 2007; Leary, Terdal, Tambor, & Downs, 1995) and state self-esteem (e.g. Buckley, Winkel, & Leary, 2004; Leary et al., 2003; Leary, Haupt, Strausser, & Choket, 1998; Leary, Terdal, Tambor, & Downs, 1995). Trait self-esteem may indeed moderate the effects of social experiences on state self-esteem (Nezlek et al., 1997), although
null findings have been reported as well (Leary et al., 1998). SMT also postulates that because a warning system should be attuned to signals of danger, rejection should have a stronger effect on self-esteem than acceptance (Leary, 2005). A meta-analyses across experimental studies found exactly the opposite effect: acceptance generally resulted in increases in self-esteem, whereas rejection did not decrease self-esteem (Blackhart et al., 2009). The authors of the meta-analysis speculated that people deploy defensive mechanisms to cope with rejection, therefore mitigating or delaying the negative effects of rejection on self-esteem. People thus seem to savor the positive effects of acceptance and dampen the negative effects of rejection.

An important disadvantage of the experimental studies is their limited ecological validity. As these studies use staged manipulations within a laboratory environment, it is unclear to what extent the findings can be generalized to individuals’ daily lives. Others used longitudinal designs to show that social experiences predict trait self-esteem over time (Reitz, Motti-Stefanidi, & Asendorpf, 2016; Srivastava & Beer, 2005; Stinson et al., 2008, but see Marshall, Parker, Ciarrochi, & Heaven, 2014). These longitudinal studies have the same limitation as the experimental studies: they are unable to describe interactions between state and trait self-esteem and social experiences in daily life. For a better test of SMT, more fine-grained measures in a naturalistic setting are needed.

Some studies have examined SMT in a more naturalistic and fine-grained level using daily diary measures, in which participants reported on their self-esteem and social experiences once every day. Denissen, Penke, Schmitt and Van Aken (2008) found a positive association between self-reported social interaction and state self-esteem at the same time, and between high-quality interactions with a partner on the one day and increased self-esteem the next day. Nezlek (2001) found that the quality of social interactions predicted perceived social skills on the next day. Murray, Griffin, Rose, and Bellavia (2003) found that individuals who chronically did not feel positively regarded by their partner (i.e. perceived low relational value), reacted more negatively to day-to-day signals of rejection by their partner than individuals who felt more positively regarded by their partner. These results, which pertain to effects from day to day, are in line with the SMT hypothesis that individuals with low trait self-esteem have a more sensitive sociometer than individuals with high self-esteem.

Until now, we have primarily discussed how social experiences may influence self-esteem because this is the main focus of SMT. However, it is also conceivable that self-esteem can shape social experiences. If low self-esteem (i.e. low relational value) motivates behavior to regain social acceptance, as assumed in SMT, one would expect episodes of low self-esteem to be followed by increased acceptance, due to increased inclusions efforts. Alternatively, low self-esteem could also be an indication of social defeat, in which case it may be most beneficial to accept the defeat and refrain from attempts to be included because those can result in even
Perceived acceptance and self-esteem in daily Life

more rejection and decrease of relational value. The latter line of reasoning is supported by the avoidance tendencies that have been associated with low self-esteem (Baumeister et al., 1989; Heimpel et al., 2006; Masselink, Van Roekel, et al., 2018).

Although scarce, there is indirect evidence that self-esteem indeed affects social processes. Two experimental studies found that, after a non-social threat to the self, individuals with low trait self-esteem were liked more by others than before, whereas individuals with high trait self-esteem were liked less (Heatherton & Vohs, 2000). These results suggest that activation of the sensitive sociometer of individuals with low self-esteem resulted in efforts to increase relational value, whereas the sociometer of individuals with high self-esteem was not activated and they did not attempt to maintain relational value. Also partly supporting the hypothesis that activation of the sociometer can motivate behavior to increase relational value are the results of Murray, Griffin, Rose, and Bellavia (2003), who found that partners who experienced self-doubts on one day, perceived more acceptance and love from their partner on the next day and showed behavior to increase closeness to their partner. However, in contrast to Heatherton & Vohs (2000), this was only the case for partners with high trait self-esteem, partners with low trait self-esteem showed retaliating behavior instead of relational value restoring behavior. Srivastava and Beer (2005) found that over weekly time intervals, positive self-evaluations did not lead to being liked more or less by others. Furthermore, a longitudinal survey with annual intervals (Reitz et al., 2016) found reciprocal relations between trait self-esteem and perceived popularity, but not with peer-reported popularity. Hutteman, Nestler, Wagner, Egloff and Back (2015) found reciprocal associations between state self-esteem and perceived social experiences (i.e., social inclusion) in a survey with a series of monthly assessments. Although the abovementioned results suggest that self-esteem may influence the perception of social experiences rather than the actual social experiences, others failed to find evidence of self-esteem affecting future perceived social experiences from day to day (Denissen, Penke, et al., 2008). It is therefore unclear if and how self-esteem influences perceived social experiences in daily life.

THE CURRENT STUDY

The present study focuses on the association between self-esteem and perceived acceptance and perceived rejection. As mentioned earlier, most studies examining SMT are experimental or longitudinal, and despite some studies investigating SMT on a daily level, there is a lack of studies specifically investigating the association between social acceptance and state self-esteem, during short-term, moment-to-moment changes in daily life. To close this knowledge gap, we examined these associations using the Experience Sampling Method (ESM; Myin-Germeys et al., 2009). This sampling method allowed us to investigate effects in the current moment several times a day, therefore reducing recall bias and increasing ecological validity. The first aim of this study was to examine the reciprocal associations between perceived acceptance and rejection.
and state self-esteem. Additionally, we aimed to investigate whether the reciprocal associations between perceived acceptance and rejection and state self-esteem were moderated by trait self-esteem. We hypothesized that the cross-lagged association between perceived acceptance and rejection and state self-esteem would be stronger for individuals with low trait self-esteem than for those high on trait self-esteem.

METHOD

Participants

247 Psychology and Educational Science students of the Radboud University Nijmegen were recruited for participation in the study ($M_{\text{age}} = 19.62, SD_{\text{age}} = 1.47$, 91% female). The majority (78%) was of Dutch origin, 21% were born in Germany, and the remaining 3% were born in other countries.

Procedure

All participants voluntarily enrolled in this study in 2012, and received 12 course credits if they completed at least 80% of the surveys. Participants who completed less than 80% of the surveys were assigned course credits in proportion of their rate of completion.

The study consisted of two parts: a baseline questionnaire and a momentary data collection using ESM. First, participants were asked to fill out the baseline questionnaire including demographic characteristics and measurements of trait self-esteem. One week after completing the baseline questionnaire, the participants were invited to the lab for an introduction of the second part of the study. Instructions were given regarding the ESM part of the study, in which all items of the assessments were reviewed. At the end of the introduction, informed consent was obtained. The data collected were processed anonymously, and participants were free to withdraw their participation at any moment. Notifications to fill in the ESM questionnaire were sent to an email address that was specifically created for this study for each participant, and could be opened in an email-app on the smartphone of the participants. Perseus Survey Solutions (Perseus Development Corp., Braintree, MA) was used to send out ESM invitations and provided the online environment to fill in the ESM questionnaires. Data were stored on a secure server.

Participants were instructed to interrupt their current activity when they received an email, and fill out the new questionnaire immediately. The importance of responding to as many surveys as possible was emphasized. Using the online survey software, it was monitored whether participants filled out their questionnaires within the stipulated timeframe (within 20 minutes
after receipt). When participants missed at least two sequential surveys, or three on one day, they received an email to encourage participation. Halfway through the study, the participants received an email encouraging them to complete the entire study.

The momentary data collection started within two days after the introduction. Over a period of eleven days, participants received five surveys a day, at random intervals between 10 AM and 11 PM on weekdays, and between 11 AM and 11 PM on weekends (resulting in a total of 11 x 5 = 55 measurement moments). The Ethical Committee of the Faculty of Social Sciences, Radboud University Nijmegen, approved the procedures of the present study.

**Materials**

**Trait Self-esteem.** The Rosenberg self-esteem scale (Rosenberg, 1965) was used to measure trait self-esteem (Cronbach’s α = .87). This scale consists of 10 items (sample item: ‘I take a positive attitude toward myself.’, reverse scored item: ‘I feel that I do not have much to be proud of’), rated on a four-point Likert-type scale ranging from 1 (‘strongly disagree’) to 4 (‘strongly agree’). Five items were reverse scored so that high scores indicated high self-esteem. The scale score of trait self-esteem was calculated by the mean score of the ten items.

**State self-esteem.** State self-esteem was measured with two (‘I like myself’, ‘I am a good person’) of the four items self-esteem item used by Thewissen, Bentall, Lecomte, van Os, & Myin-Germeys (2008). The other two items (‘I am a failure’ and ‘I am ashamed of myself’) were excluded from the scale due to a lack of variance across measurement occasions, making it impossible to calculate the reliability of the scale when these items were included. Responses were indicated on a seven-point Likert scale from 1 (‘strongly disagree’) to 7 (‘strongly agree’). The two items were averaged to create a mean state self-esteem score. The within-person reliability, corrected for dependency of observations, was .34.

**Perceived acceptance.** Perceived acceptance was measured on a seven-point Likert scale ranging from 1 (‘strongly disagree’) to 7 (‘strongly agree’). This scale consisted of the following three items: ‘In this company I feel accepted’, ‘In this company I feel understood’, ‘In this company I feel comfortable’ (derived from Van Roekel et al., 2013). Scores on the three items were averaged to form the perceived acceptance scale. The within-person reliability for this scale, corrected for dependency of observations, was .79.

**Perceived rejection.** Perceived rejection was measured on a seven-point Likert scale ranging from 1 (‘strongly disagree’) to 7 (‘strongly agree’). The scale consisted of the two items ‘In this company I feel threatened’, ‘In this company I feel judged’. Scores on the two items were averaged to form the perceived rejection scale. The within-person reliability for this scale, corrected for the dependency of the observations was .01. This extremely low reliability was due to a lack of variance across measurement moments. Because of this low reliability, the social rejection measure was excluded from the analyses.
Momentary data preparation

Out of the 247 recruited participants, 228 participants ($M_{age} = 19.58$, $SD_{age} = 1.48$, 91% female) actually started with the ESM study. The average compliance rate was 89% ($SD = 10\%$). Following Delespaul (1995), we used a “reliability time-window”, that is, responses filled in later than 20 minutes after the prompt to fill in the ESM questionnaire were excluded from analyses. Delespaul (1995) suggested a 15 minute time window, but due to possible delays in sending and receiving the questionnaire prompts, we extended the time limitation by five minutes (75% of all completed measures were filled in within 20 minutes).

Strategy of analyses

A multilevel modelling approach was used to estimate the within-person internal reliability of the perceived acceptance, perceived rejection and state self-esteem measures (Nezlek, 2017), while accounting for the nested structure of the data and the dependence between measurement moments. Subsequently, Dynamic Structural Equation Modelling (DSEM) in Mplus 8.1 (Muthén & Muthén, 1998-2017) was used to test the lagged reciprocal associations between state self-esteem and perceived acceptance. DSEM allows for testing reciprocal associations in a multivariate way, thus with self-esteem and perceived acceptance included as dependent variables in the same model. The models were estimated with both random slopes and random intercepts. In all analyses we controlled for the dependent variable measured at the previous time point. DSEM incorporates Bayesian estimation with uninformative priors (Asparouhov & Muthén, 2010; Muthén & Asparouhov, 2012) based on two Markov Chain Monte Carlo chains. The potential scale reduction (PSR) factor was used to determine convergence of the chains. The default cut-off for convergence in Mplus is PSR < 1.1, but we applied a stricter cut-off of PSR < 1.02 (Hoofs et al., 2017). To ensure stability of convergence, we examined whether PSR remained below a PSR of 1.02 after 100,000 iterations.

Perceived acceptance was only measured when participants indicated that they were not alone. We therefore excluded assessments when participants were not in company of others, in total 36% of the data. One participant was never in the company of others during the measurements, and was thus completely excluded from the analyses, leaving a sample of 227 participants in the main analyses. Results of the analyses without excluding the measurements in which participants were alone are presented in the Supplemental Materials.

The TINTERVAL option was used to account for unequal time interval between measurements. Unequal time intervals between measurements were caused by the semi-random measurement design, the longer time interval between evening and morning measures and missed measurements. With the TINTERVAL function, a desired time interval between measurements is indicated. All available data points are subsequently placed on this time interval. If more than one measurement falls into the same time interval, one measurement
is transferred to the nearest empty bin. Points on the time interval without data are indicated as missing (Asparouhov, Hamaker, & Muthén, 2017). In our analyses we selected the average time between assessments of which participants were in company, which was 278 minutes. All level 1 predictors were within-person centered. The level 2 between-person moderator trait self-esteem was grand-mean centered.

To control for multiple testing we applied a false discovery rate (FDR) correction (Benjamini & Hochberg, 1995). To calculate the corrected significant threshold an alpha was set (.05) and all \( p \)-values were ranked from low to high. For each ranked test, a FDR threshold was calculated using the formula:

\[
\text{FDR threshold} = \frac{\text{p-value}}{\text{rank}}
\]

The FDR threshold belonging to the lowest ranked significant \( p \)-value which had a \( p \)-value below its FDR threshold was used as the new cut-off to determine significance. The FDR corrected significance threshold was \( p < .033 \).

**TABLE 1.** Descriptive Statistics and Correlations Between Measures

<table>
<thead>
<tr>
<th>Descriptives</th>
<th>Descriptives</th>
<th>Correlations within-persons</th>
<th>Correlations between-persons</th>
</tr>
</thead>
<tbody>
<tr>
<td>M</td>
<td>SD</td>
<td>SD</td>
<td>1</td>
</tr>
<tr>
<td>1. State self-esteem</td>
<td>5.29</td>
<td>1.07</td>
<td>0.65</td>
</tr>
<tr>
<td>2. Perceived acceptance</td>
<td>5.93</td>
<td>1.14</td>
<td>0.95</td>
</tr>
<tr>
<td>3. Perceived rejection*</td>
<td>1.5</td>
<td>0.8</td>
<td>0.62</td>
</tr>
<tr>
<td>3. Trait self-esteem</td>
<td>3.11</td>
<td>0.5</td>
<td>0.49</td>
</tr>
</tbody>
</table>

*Measure excluded from analysis

**RESULTS**

**Reciprocal associations between perceived social acceptance and state self-esteem**

The descriptive statistics and within-person and between-person correlations are presented in Table 1. The DSEM model converged well, after 8900 iterations the PSR value was below 1.02 and remained below 1.02 until the last iteration (100000).

The results showed small autoregressive effects for state self-esteem (\( \beta = 0.21, 95\% \text{ CI} [0.18, 0.25], p < .001 \)) and perceived acceptance (\( \beta = 0.23, 95\% \text{ CI} [0.19, 0.26], p < .001 \)), as well as a small significant association between perceived acceptance and state self-esteem at the same time point, (\( \beta = 0.10, 95\% \text{ CI} [0.07, 0.13], p < .001 \)). In addition, we found a small significant cross-lagged effect of perceived acceptance on state self-esteem (\( \beta = 0.04, 95\% \text{ CI} [0.00, 0.08], p = \).
.03), but no significant cross-lagged effect of state self-esteem on perceived acceptance (β = 0.03, 95% CI [-0.01, 0.07], p = .16). The level 2 predictor trait self-esteem significantly predicted concurrent state self-esteem (β = 0.48, 95% CI [0.36, 0.57], p < .001) and perceived acceptance (β = 0.29, 95% CI [0.15, 0.41], < .001), but did not moderate the relation between the cross-lagged effect of perceived acceptance on self-esteem (β = 0.15, 95% CI [-0.15, 0.46], p = .34) or from self-esteem to acceptance (β = 0.17, 95% CI [-0.01, 0.33], p = .07).

Sensitivity Analyses

To check for the robustness of our findings, we have conducted additional analyses in which we varied the time interval used in the TINTERVAL option, and included assessments during which the participants were alone (i.e. provided data on state self-esteem but not on perceived acceptance). The results of these analyses are reported in the supplemental analyses (Table S1). When the TINTERVAL option is not used (i.e. unequal time intervals between measures are not accounted for), most estimates are similar to the final model we selected. An exception is the stronger and significant interaction effect of trait self-esteem on the association from perceived acceptance to state self-esteem. This interaction effect indicates that individuals with high trait self-esteem had a stronger association from acceptance to self-esteem than individuals with low trait self-esteem. However, even for those with the highest trait self-esteem levels, the effect of perceived acceptance on state self-esteem remained small (Figure S1). Changing the time intervals used in the TINTERVAL option to 240 and 180 minutes resulted in similar effect sizes for all effects. While the effect from self-esteem to perceived acceptance was significant in the model with 240 minutes, it was not in the model with 180 minutes. Including measurements during which participants were alone led to smaller cross-lagged effects, but a significant interaction of trait self-esteem on the cross-lagged association from perceived acceptance of state self-esteem. Considering that differences in effect sizes only differed slightly across models, the conclusions were not highly dependent on the selected model.

DISCUSSION

We investigated the association between self-esteem and social experiences in daily life, from moment to moment. By doing so we investigated this association on a much more fine-grained level than previous research. We approached the association between self-esteem and perceived acceptance from the perspective of sociometer theory (SMT). According to SMT, self-esteem is a marker of one’s relational value. That is, it indicates the degree to which an individual perceives him of herself as valuable and meaningful in relation to another individual or individuals (Leary, 2005). Relational value on its turn can be seen as an indication of the likelihood that someone will be accepted or rejected by others.
The results of our study are only partly in line with SMT. We found that individuals who reported higher levels of acceptance also reported higher levels of state self-esteem, although the effect size was small. This is comparable to the results of a daily dairy study conducted by Denissen and colleagues (2008), who found that social interaction quality was associated with self-esteem. Cross-lagged effects between self-esteem and perceived acceptance give insight in the temporal effects predicted by SMT. In line with what would be predicted by SMT, we found that feeling more accepted at one measurement moment was associated with an increase in state self-esteem at the next measurement moment. Thus, in terms of SMT, experiencing an increase in acceptance predicted an increase in perceived relational value at the next moment. Again, however, the effect size was small, suggesting that changes in acceptance during daily life have relatively little influence on state self-esteem. We also investigated the reverse temporal association, from self-esteem to acceptance. If, as implied by SMT, self-esteem functions as an alarm system that activates individuals to increase efforts to be included, one expects perceived acceptance to increase after instances of lower self-esteem, due to the increased efforts for inclusion. Alternatively, if low self-esteem is a sign of social defeat, it may lead to social withdrawal and, through that, lower perceived acceptance. Our results did not provide evidence for any positive or negative temporal effect of state self-esteem on acceptance. This is similar to the results of Denissen and colleagues (2008), who also did not find significant temporal effects of self-esteem on social quality and quantity. Murray et al., (2003), however, did find that partners with high trait self-esteem experienced more acceptance and love from their partner on subsequent days after feeling doubtful about the self. This suggests that the effect may be present among partners only, but Denissen and colleagues (2008) study did not find a similar effect among partners, so further research is needed to determine if and under which conditions self-esteem influences social experiences.

Our results also did not support the hypothesis that individuals with low trait self-esteem have a more sensitive sociometer; there was no significant moderation effect of trait self-esteem on the cross-lagged effects. It has to be noted that the interaction effect was significant in some of the sensitivity analyses, but this interaction effect suggested a more sensitive sociometer in individuals with higher trait self-esteem, instead of for individuals with lower trait self-esteem as expected bases on SMT (i.e. the effect of acceptance on self-esteem was larger for those with high trait self-esteem). However, further inspection of the largest interaction effect showed that even for those with the highest trait self-esteem, the effect of acceptance on state self-esteem remained small. The results did consistently show that individuals with higher trait self-esteem also experienced higher state self-esteem and perceived acceptance.

Overall, our results indicate that perceived acceptance and state self-esteem have a negligible influence on each other when measured at the same time during the day or over 4.5 hour time intervals. It is possible that only prolonged and repeated experiences of perceived decrease in acceptance over several days may bring about substantial changes in state self-
esteem. Although our results might mean that the sociometer is not as sensitive as originally postulated (Leary, 2005), there are other methodological limitations that can explain the modest findings as well.

Because acceptance was only measured when participants were in company of others, measurement moments in which participants were alone (36%) were excluded from the analyses, which decreased the power to detect effects. A lack of power may explain why some effects were not significant, but does not explain why effects were very small, which is more likely due to reasons explained next. Our participants tended to vary little from moment to moment on their state self-esteem, leaving little variance to explain. Another possibility is that our self-esteem measure was not well tailored to measure state levels of self-esteem. Two self-esteem items had to be removed due to having almost no variance, while the remaining two items had modest variation at most. This lack of variance may have influenced the reliability of the state self-esteem items as well. The reliability of the two state self-esteem items was .34, which is well below what is generally considered acceptable (> .60; Shrout, 1998). Although the common recommendations for minimum reliability may be too strict for ESM measures (Nezlek, 2017), low reliability is a concern since it can bias estimates upwards or downwards (Brakenhoff, Van Smeden, Visseren, & Groenwold, 2018; Shrout, 1998). Another issue regards the validity of the item “I am a good person” as indicator of self-worth. This item may also be interpreted as the extent to which one does good things (e.g. give to charity, being polite, etc.) and no bad things (e.g. lie, steal, misbehave, etc.), which does not necessarily has to be in line with evaluations of self-worth. Items better tailored to measure state self-esteem are therefore needed. Another reason for the lack of substantial effects may be that our participants generally indicated feeling highly accepted in the ESM measurements. Small drops in perceived acceptance may have been insufficient to worry about a lack of relational value, and the need to belong may have still been fulfilled sufficiently. Only enduring perception of substantially lowered acceptance may lead to feelings of lowered relational value and thus self-esteem. This perhaps explains why reciprocal effects were found in studies with monthly (Hutteman, Nestler, Wagner, Egloff, & Back, 2015) and yearly intervals (Reitz et al., 2016). Experimental studies (e.g., Leary et al., 1995) do show almost immediate effects of acceptance and rejection on self-esteem, but the blatant situations of acceptance and rejection in laboratory studies may be rarely encountered during daily life. Although the sociometer has been proposed to be particularly sensitive to moderate changes in acceptance (Leary et al., 1998), moment-to-moment changes in perceived acceptance are possibly too subtle to bring about immediate change in state self-esteem. Another possible reason why we did not find a significant association from self-esteem to perceived acceptance, is that the time interval between the measures could have been too narrow to find temporal effects of self-esteem on perceived acceptance. It takes time to change behavior aimed at restoring relational value, probably more time than the on average 4.5 hours between assessments in
our study. Related, it is conceivable that the reciprocal effects between state self-esteem and perceived acceptance operate on different time scales; we suspect longer time intervals for the association from self-esteem to perceived acceptance than vice versa.

Additional limitations concern the generalizability of the results. The majority of respondents in our studied sample was female; only 9% was male. Although there were no theoretical reasons to presume sex differences in associations (possibly only in mean level), generalizability to the male student population would be improved with a larger proportion of males. Furthermore, because we relied on a student sample, it is unknown how the results generalize to the general population. As a final point, next to acceptance, rejection plays a central role in SMT. We had to exclude the rejection measure from analyses due to insufficient reliability. This omission may not be too severe, because, contrary to earlier reports (Leary, 2005), a meta-analysis (Blackhart et al., 2009) found that across studies, acceptance was significantly associated with self-esteem, while rejection was not. However, the nature of the association between self-esteem and rejection from to moment-to-moment in daily life is unknown, so ESM studies including both rejection and acceptance are necessary to gain insight into how both acceptance and rejection are associated with self-esteem in daily life.

CONCLUSION

Our findings suggest that the extent to which individuals feel accepted and their state self-esteem correlate only weakly during everyday life. Changes in perceived acceptance seem to bring about only very small changes in state self-esteem from moment to moment. Rather, perceived acceptance and state self-esteem are strongly affected by stable trait levels of self-esteem. Trait self-esteem did not consistently moderate the effect of social experiences on state self-esteem. If anything, the sensitivity analyses suggested a more sensitive sociometer for those with high trait self-esteem, instead of for those with low trait self-esteem as would be predicted by SMT. Although our findings question the validity of SMT when investigated in daily life, more research in which the limitations encountered in this study are addressed are needed before substantial conclusions can be made. These challenges include the use of valid measures better able to capture small changes in state self-esteem, perceived acceptance and rejection, and the determination of the most suitable, possibly separate, timeframes to investigate the dynamic associations between social experiences and state self-esteem.
### TABLE S1. The Different Tested Models With Time Interval specified in Minutes

<table>
<thead>
<tr>
<th>Model</th>
<th>t-interval</th>
<th>N</th>
<th>PSR</th>
<th>SE-&gt;SE</th>
<th>ACC-&gt;ACC</th>
<th>ACC-&gt;SE</th>
<th>SE-&gt;ACC</th>
<th>ACC - SE on TSE</th>
<th>SE-&gt;ACC on TSE</th>
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</thead>
<tbody>
<tr>
<td><strong>Models using data when participants were in company</strong></td>
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</tr>
<tr>
<td>Model 1: No time interval included</td>
<td></td>
<td>227</td>
<td>1.002</td>
<td>0.26</td>
<td>0.22</td>
<td>0.03</td>
<td>0.03</td>
<td>0.14</td>
<td>0.29</td>
</tr>
<tr>
<td>Model 2: Selected model</td>
<td></td>
<td>278</td>
<td>1.002</td>
<td>0.21</td>
<td>0.23</td>
<td>0.04</td>
<td>0.03</td>
<td>0.10</td>
<td>0.17</td>
</tr>
<tr>
<td>Model 3: Alternative time interval</td>
<td></td>
<td>240</td>
<td>1.008</td>
<td>0.20</td>
<td>0.22</td>
<td>0.04</td>
<td>0.05</td>
<td>0.10</td>
<td>0.14</td>
</tr>
<tr>
<td>Model 4: Alternative time interval</td>
<td></td>
<td>180</td>
<td>1.004</td>
<td>0.20</td>
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<td>0.04</td>
<td>0.01</td>
<td>0.10</td>
<td>0.17</td>
</tr>
<tr>
<td><strong>Models using all available data</strong></td>
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<td>Model 5: No time interval included</td>
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<td>0.02</td>
<td>0.124</td>
<td>0.19</td>
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<tr>
<td>Model 6: Time interval included</td>
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<td>0.01</td>
<td>0.02</td>
<td>0.115</td>
<td>0.17</td>
</tr>
</tbody>
</table>

Note: t-interval = time interval; PSR = potential scale reduction; SE = self-esteem; ACC = perceived acceptance; TSE = baseline trait self-esteem; "->" indicates temporal direction of effect; "-" indicates concurrent association. Values in bold indicate significant effects.
**FIGURE S1.** Unstandardized slope of the temporal effect of acceptance on state self-esteem (y-axis) indicated for levels of trait self-esteem (x-axis). The upper and lower lines indicate the 95% confidence interval around the estimates. The figure is based on model 1, which had the largest moderation effect of trait self-esteem. 40000 iterations were run instead of 100000, due to an error that occurred above 40000 iterations when simple slopes were added.