The Structure of Need Fulfillment
Separating Need Satisfaction and Dissatisfaction on Between- and Within-Person Level

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Abstract: Self-Determination Theory predicts that fulfillment of the three psychological needs for autonomy, competence, and relatedness predicts well-being. Fulfillment of these needs has long been considered a uni-dimensional construct consisting of need satisfaction and (reverse coded) need dissatisfaction. Recent research suggests that satisfaction and dissatisfaction should be separated. We tested whether need satisfaction and dissatisfaction can be distinguished psychometrically and whether they have unique effects in predicting well-being. We used data from a daily-diary study of 135 participants over the course of 42 days. A six factor solution (with one satisfaction and one dissatisfaction factor per need) for the Balanced Measure of Psychological Needs scale (BMPN) fitted the data best at both the between-person and the within-person level of analysis. We concluded that (a) the BMPN can be used to reliably assess satisfaction and dissatisfaction of the three needs specified by Self-Determination Theory; (b) need satisfaction and dissatisfaction can and should be separated psychometrically; (c) these findings hold at both the between-person and the within-person level of analysis; (d) all three needs predict well-being at the within-person level, but only competence and relatedness predict well-being at the between-person level; and (e) need satisfaction and dissatisfaction predict unique variance in well-being.

Keywords: psychological needs, self-determination theory, well-being, multilevel structural equation modeling

According to Self-Determination Theory (SDT; Deci & Ryan, 1985, 2000), fulfillment of the three universal human needs for autonomy, competence, and relatedness is an essential predictor for well-being. While this prediction has gained substantial support in cross-sectional (e.g., Vansteenkiste, Lens, Soenens, & Luyckx, 2006), daily-diary (e.g., Reis, Sheldon, Gable, Roscoe, & Ryan, 2000), and experimental research (e.g., Sheldon & Filak, 2008), there is growing awareness that need fulfillment is not a uni-dimensional construct consisting of need satisfaction and (reverse coded) need dissatisfaction for each need. Specifically, Sheldon and Gunz (2009) reported data showing that items assessing need satisfaction (e.g., “I felt close and connected with other people who are important to me.”) and items assessing need dissatisfaction (e.g., “I was lonely.”) differentially predict behavior: Need dissatisfaction predicted motivation to pursue the dissatisfied need, but (lack of) need satisfaction did not. These results could not be explained if need satisfaction and need dissatisfaction were psychometric opposites. In another study, Sheldon, Abad, and Hinsch (2011) focused on the effects of relatedness satisfaction and dissatisfaction on Facebook use. They report the seemingly paradoxical finding that both relatedness satisfaction and relatedness dissatisfaction correlate positively with self-reported amount of Facebook use. Again, if satisfaction and dissatisfaction were psychometric opposites, this pattern would be inexplicable. However, the authors argued that relatedness satisfaction and dissatisfaction operate at different time points: Relatedness dissatisfaction promotes Facebook use to reduce dissatisfaction (lonely people use Facebook to cope with their loneliness), and Facebook use is reinforced with higher levels of relatedness satisfaction (using Facebook enhances feelings of connectedness with others). Sheldon et al. (2011) also provided longitudinal evidence for this hypothesis: In one of their studies, participants’ level of relatedness satisfaction and dissatisfaction as well as their current amount of Facebook use were assessed. After that, they were instructed to cease their Facebook activity for 48 hr, after which these variables were assessed again. Participants could then return to Facebook if they wanted to. Another 48 hr later, they filled in the same questionnaire for a third time. During the Facebook cessation period, relatedness satisfaction decreased while relatedness dissatisfaction remained unchanged – in line with the assumption that Facebook use promotes relatedness satisfaction. Finally, Facebook use at the very end of the study was predicted by change in relatedness dissatisfaction: Those participants who reported increase in relatedness dissatisfaction during the cessation period used Facebook more often, which is in line with the assumption of relatedness dissatisfaction promoting Facebook use.
Thus, it seems that need satisfaction and need dissatisfaction are not mere psychometric opposites but rather function independently in predicting behavior. It is, however, unclear whether need satisfaction and dissatisfaction also differ with regard to their effects on well-being. Within SDT, need fulfillment is mostly operationalized as an aggregate of need satisfaction and (reverse coded) need dissatisfaction separately for each need. One exception is a recent study by Chen et al. (2015): In this cross-sectional study conducted in four different countries, both need satisfaction and need dissatisfaction predicted life satisfaction. These authors further showed that satisfaction and dissatisfaction of the three needs should be separated psychologically. However, when predicting well-being, these authors aggregated across the three needs. It, thus, remains unclear, whether satisfaction and dissatisfaction components of all three needs independently predict well-being (as hypothesized by SDT). In experimental research on the effects of need fulfillment on well-being, there, too, are some data suggesting a dissociation of the effects of need satisfaction and dissatisfaction on well-being: In a study by Sheldon and Filak (2008) well-being was reduced after experimental frustration (vs. fulfillment) of the needs for relatedness or competence, but the effect of need frustration was larger than the effect of need fulfillment: Compared to a neutral control group, need frustration reduced well-being, but need fulfillment did not affect well-being. This “bad-is-stronger-than-good”-pattern (Baumeister, Bratslavsky, Finkenauer, & Vohs, 2001) matches experimental research on social rejection, where, for example, differences in aggression (DeWall, Twenge, Gitter, & Baumeister, 2009) are usually found between a belongingness-thwarting group and a neutral control group, but not between a belongingness-fulfillment group and a neutral control group.

The first aim of the present research was to test whether self-reported need satisfaction and need dissatisfaction can be separated using confirmatory factor analysis (CFA). Specifically, internal consistency and factor structure of the Balanced Measure of Psychological Needs (BMPN) scale (Sheldon & Hilpert, 2012) were examined. According to the authors of this scale, the BMPN can be either used to assess need fulfillment of the three needs by six items each or used to assess need satisfaction and need dissatisfaction separately for the three needs by three items each. The second aim was to investigate whether need satisfaction and need dissatisfaction of the three needs have unique effects on well-being or if the bad-is-stronger-than-good pattern can also be found in nonexperimental research. Finally, we aimed to investigate both of these questions at two levels of analysis: within persons and between persons.

### Between- Versus Within-Person Level of Analysis

Dating back at least to Cattell’s (1966) data cube, psychological scholars have been aware of the fact that there are multiple ways to test theories about the structure of psychological phenomena and psychological processes. Historically, however, as Voelkle, Brose, Schmiedek, and Lindenberger (2014) argue, most psychological research has focused on what Cattell (1966) called R-technique, that is, examining relations of various variables between persons at a single point in time. In contrast, the P-technique (relations between variables within persons across time) has received substantially less attention. There would be little harm in this imbalance if between-person structures and within-person structures were identical. As shown by Molenar (2004) this is, however, not necessarily true. Thus, if within-person processes are the focus of empirical research, the within-person perspective should be taken to examine these processes (Hamaker, 2012). This topic has gained increasing attention over the past years. For example, Wilhelm and Schoebi (2009) investigated the structural validity of a modified version of the Multidimensional Mood Questionnaire (MDMQ), a scale constructed to assess three dimensions of mood: valence, calmness, and energetic arousal (Steyer, Schwenkmezger, Notz, & Eid, 1997). The authors showed that a three-dimensional model described the data well at the within-person level (i.e., within participants across up to 44 measurement occasions) but that the dimensions valence and calmness could not be distinguished at the between-person level of analysis (i.e., between participants aggregated across all measurement occasions). That is, mood (as assessed via a modified version of the MDMQ) is best represented as a two-dimensional construct at the between-person level but as a three-dimensional construct at the within-person level. More recently, Brose, Voelkle, Lowden, Lindenberger, and Schmiedek (2015) provided data showing that the measurement structure of the Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988) differed between these two levels. While the authors found a two factor solution for the PANAS at the between-level, factor solutions at the within-level diverged from this between-person pattern, showing that between-person and within-person structure of affect can differ to a substantial degree.

The finding that the factor structure of a given scale can differ between the between-level and the within-level has implications for reliability estimates of psychological scales. If a scale reliably captures a construct at the between-level, this does not necessarily imply that it captures the same construct at the within-level. Reliability does not only depend on the scale used, but also on the context it is used in – and this context includes the level of analysis. In their
aforementioned study, Wilhelm and Schoebi (2007) reported that reliability was substantially higher at the between-level (estimates greater .90) than at the within-level (estimates between .66 and .88). More recently, Geldhof, Preacher, and Zyphur (2014) provided a guide to establish level-specific reliability estimates by means of multilevel CFA. We hence investigated the measurement structure and internal consistency of the BMPN at both the between-person level and the within-person level.

While prior research suggests that measurement structure (Brose et al., 2015; Wilhelm & Schoebi, 2007) and reliability (Geldhof et al., 2014; Wilhelm & Schoebi, 2007) need to be estimated separately for the within- and between-person level, we as well as others (Shrout & Lane, 2012) argue that interrelations among study variables should also be assessed at both levels. Specifically, we tested the prediction of SDT (all three needs independently predict well-being) at both the between- and the within-level. In prior research, Taylor and Stebbings (2012) showed that all three needs predicted positive affect at the between-level, but only competence and relatedness predicted positive affect at the within-level. Since these authors did not differentiate between need satisfaction and need dissatisfaction, we tested the effects of satisfaction and dissatisfaction of the three SDT needs on well-being at both levels of analysis.

Research Aims

The aims of the present study are to (a) investigate the factor structure of the BMPN (including the question if this scale reliably measures satisfaction and dissatisfaction of the needs for autonomy, competence, and relatedness); (b) explore if satisfaction and dissatisfaction of the needs for autonomy, competence, and relatedness uniquely predict well-being; and (c) investigate the research questions (a) and (b) at both the between- and the within-person level of analysis. In accordance with prior cross-sectional research (Chen et al., 2015; Neubauer & Voss, 2016) we expect that need satisfaction and dissatisfaction can be differentiated at both levels. In other words, we predict superior fit for a model with six latent factors at each level compared to alternative models. With regard to well-being, we expect that all three needs independently predict well-being at both levels. We also predict that need satisfaction and dissatisfaction exhibit unique influence in predicting well-being.

Method

Participants and Procedure

One hundred thirty-five participants (103 female; M_age = 22.6 years, SD_age = 3.2) were included in this study. Participants were recruited by distributing flyers on the campus of a large German university. Consequently, most (97.8%) of the participants were students, enrolled in a wide range of majors (3.7% psychology; 63.7% social sciences/humanities; 22.2% natural sciences; 8.2% others). They signed up for the study by sending an e-mail to the first author of this article. Participants were then sent an e-mail containing the link to an online questionnaire each day at 6 pm for 21 consecutive days. After that, there was a break of two weeks before the study continued for another 21 days. On average, participants filled in the daily questionnaires on 35.6 out of 42 days (SD = 4.9; median = 38), corresponding to an average response rate of 84.8% (median = 90.5%).

Measurements

In addition to items about the daily stress level (which will not be reported here), participants filled in the BMPN and the MDMQ. All questionnaires were administered in German.

Need Fulfillment

The BMPN (Sheldon & Hilpert, 2012) consists of 18 items assessing the degree to which participants experienced satisfaction and dissatisfaction of the three basic needs for autonomy, competence, and relatedness. Participants were instructed to indicate to what extent they agree with these items with regard to the present day; responses ranged from 1 (”completely disagree”) to 7 (“completely agree”). Six items were measuring fulfillment of the need for autonomy, half of which were satisfaction items (e.g., “I was free to do things my own way.”), while the other half were dissatisfaction items (“I had to do things against my will.”). Similarly, there were six items measuring the need for competence (three satisfaction items, e.g., “I did well even at the hard things.” and three dissatisfaction items, e.g., “I struggled doing something I should be good at.”) and six items measuring the need for relatedness (three satisfaction items, e.g., “I felt close and connected with other people who are important to me.” and three dissatisfaction items, e.g., “I was lonely.”).

Well-Being

The MDMQ (Steyer et al., 1997) was used to assess participants’ current level of well-being. We used a short version of this measure which consists of 12 items assessing three dimensions of current mood (good-bad, awake-tired, calm-nervous) by four items each. Only the dimension good-bad is relevant for the current work. Participants were instructed to rate for each of the four words (content, bad, good, uncomfortable) to what degree they experienced this mood right now, ranging on a scale from 1 (“not at all”) to 7
The ratings for “bad” and “uncomfortable” were recoded prior to the analyses.

Data Analysis

Data were analyzed using multilevel structural equation modeling (MSEM). First, all 22 manifest variables (18 BMPN items and 4 MDMQ items) were entered into the model and covariances among all variables were specified at both the between- and the within-level. These variances and covariances were used to estimate Cronbach’s α separately for the two levels (Geldhof et al., 2014). Next, three models were fitted to analyze the measurement structure of the BMPN (see Figure 1). We started with a model with three correlated factors (relatedness, competence, autonomy) at each level (between and within; Model 1). In Model 2, two additional latent method factors were introduced at each level: a satisfaction factor (with loadings from all nine satisfaction items) and a dissatisfaction factor (with loadings from all nine dissatisfaction items). Method factors were uncorrelated with each other and with all other latent variables in the model. Finally, in Model 3, six factors were introduced at each level (relatedness satisfaction, relatedness dissatisfaction, competence satisfaction, competence dissatisfaction, autonomy satisfaction, autonomy dissatisfaction). Model fit was evaluated via the comparative fit index (CFI), the root mean square error of approximation (RMSEA), and the standardized root mean square residual (SRMR). The latter index is computed separately for the between- and the within-level, while CFI and RMSEA evaluate the overall model fit (across the two levels). Models were compared via the Akaike Information Criterion (AIC) and the Bayesian Information Criterion (BIC), with lower AIC and BIC values indicating better model fit (since Model 3 is not nested within Model 1 or Model 2, Δχ² difference tests cannot be computed). Additionally, McDonald’s

\[
\alpha = \frac{n \cdot \sigma_i}{\sigma^2_x}
\]

where \(n\) is the number of items belonging to one scale, \(\sigma_i\) is the average covariance of the items belonging to one scale, and \(\sigma^2_x\) is the variance of the scale score, computed as the sum of the item variances plus two times the item covariances. For this analysis, dissatisfaction items were recoded.

1 In fact, these factors can be seen as “content” factors rather than “method” factors, because different facets of need fulfillment are measured using similar methods. We nonetheless denote them as method factors to employ the conventional terminology for these kinds of models in the multitrait multimethod literature.

2 On a theoretical account, the method factors could be correlated. However, assuming correlated method factors often makes the model estimation instable or impossible (Eid, Lischetzke, & Nussbeck, 2006). In principle, it would be possible to estimate a model with correlated method factors (for satisfaction vs. dissatisfaction) and uncorrelated content factors (for the three needs). Although this model yielded good model fit - \(\chi^2(232) = 1,796.37, \text{CFI} = .920, \text{RMSEA} = .037, \text{SRMR within} = .046, \text{SRMR between} = .089\) - we will not report results from this model here in detail, because (a) Self-Determination Theory does not provide a theoretical basis for this type of model and (b) there were several nonsignificant factor loadings in this model, indicating that the items used here are not ideal for this approach.

3 Currently, there are no established guidelines regarding cutoffs indicating acceptable model fit in the MSEM framework. In lack of better alternatives, we therefore used conventional cutoff values from cross-sectional SEM research (CFI > .90, RMSEA < .06, SRMR < .08) as indicative of acceptable model fit, while at the same time cautioning against overly strong reliance on these values.
\( \omega \) was computed as an alternative estimate for the scales’ reliabilities.5

Lastly, we predicted well-being by need fulfillment on both the within- and the between-person level of analysis. Data were analyzed using Mplus version 7.11; parameters were obtained via robust maximum likelihood estimation (MLR).

### Results

#### Internal Consistency

Reliability estimates can be found in Table 1. These estimates suggest that reliability at the between-level was high, with all estimates greater than .80. This was true for the MDMQ, the three need fulfillment scales, the three need satisfaction subscales, and the three need dissatisfaction subscales. At the within-level, results were mixed but showed that the three need fulfillment scales showed adequate reliability. Regarding autonomy, Cronbach’s \( \alpha \) was reduced after separating the three scales into their satisfaction and dissatisfaction components, while regarding competence, internal consistency increased for both subscales. Concerning the need for relatedness, results suggest that the satisfaction component can be assessed very reliably, whereas the dissatisfaction subscale showed lower internal consistency. The reliability estimates obtained via McDonald’s \( \omega \) were in a very similar range as Cronbach’s \( \alpha \).

In a next step, we performed multilevel CFA to investigate the factor structure of the BMPN.

#### Predicting Well-Being From Need Satisfaction and Dissatisfaction

In the prediction of well-being, we performed manifest regression analysis in a MSEM framework. The reason for this was that a latent regression model would not have been identifiable (there would have been 152 free parameters

### Measurement Model

In the first measurement model tested, there were three latent factors each at the between- and the within-level, respectively. The factor loadings of the first indicator per factor were fixed to one to scale the latent factors. No other model constraints were imposed. Model fit indices revealed insufficient fit of this model (see Table 2; Model 1). We therefore tested whether – analogous to cross-sectional results (Sheldon & Hilpert, 2012) – model fit could be improved by introducing a latent satisfaction and a latent dissatisfaction factor at each level. Model fit indices (Table 2; Model 2) suggested better model fit. In a final model we tested whether a model with six correlated factors (relatedness satisfaction, relatedness dissatisfaction, competence satisfaction, competence dissatisfaction, autonomy satisfaction, autonomy dissatisfaction) at each level fitted the data better than the previous models. This model (Model 3) yielded better fit than the previous models. The latent factors explained between 21% and 73% of the item variance at the within-level (median = .45%), and between 49% and 99% at the between-level (median = .87%; see Table 3). Intercorrelations of the latent factors can be found in Table 4.6

### Table 1. Internal consistencies of the scales

<table>
<thead>
<tr>
<th>Scale</th>
<th>Cronbach’s ( \alpha ) Within</th>
<th>Between</th>
<th>McDonald’s ( \omega ) Within</th>
<th>Between</th>
</tr>
</thead>
<tbody>
<tr>
<td>MDMQ (good-bad)</td>
<td>.86</td>
<td>.95</td>
<td>.86</td>
<td>.94</td>
</tr>
<tr>
<td>Relatedness</td>
<td>.76</td>
<td>.90</td>
<td>.76</td>
<td>.89</td>
</tr>
<tr>
<td>Satisfaction subscale</td>
<td>.87</td>
<td>.98</td>
<td>.87</td>
<td>.98</td>
</tr>
<tr>
<td>Dissatisfaction subscale</td>
<td>.58</td>
<td>.88</td>
<td>.62</td>
<td>.87</td>
</tr>
<tr>
<td>Competence</td>
<td>.68</td>
<td>.85</td>
<td>.66</td>
<td>.83</td>
</tr>
<tr>
<td>Satisfaction subscale</td>
<td>.80</td>
<td>.94</td>
<td>.81</td>
<td>.94</td>
</tr>
<tr>
<td>Dissatisfaction subscale</td>
<td>.69</td>
<td>.96</td>
<td>.70</td>
<td>.96</td>
</tr>
<tr>
<td>Autonomy</td>
<td>.77</td>
<td>.88</td>
<td>.77</td>
<td>.88</td>
</tr>
<tr>
<td>Satisfaction subscale</td>
<td>.68</td>
<td>.89</td>
<td>.69</td>
<td>.90</td>
</tr>
<tr>
<td>Dissatisfaction subscale</td>
<td>.69</td>
<td>.83</td>
<td>.70</td>
<td>.83</td>
</tr>
</tbody>
</table>

Notes. MDMQ = Multidimensional Mood Questionnaire. *Dissatisfaction items were recoded for these analyses.

### Table 2. Model fit indices for the measurement models

<table>
<thead>
<tr>
<th>Model</th>
<th>( \chi^2(\text{df}) )</th>
<th>Scaling factor</th>
<th>AIC</th>
<th>BIC</th>
<th>RMSEA</th>
<th>SRMR (within)</th>
<th>SRMR (between)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model 1</td>
<td>6,651.14 (264)</td>
<td>1.321</td>
<td>290,924.7</td>
<td>285,156.77</td>
<td>0.071</td>
<td>0.045</td>
<td>0.058</td>
</tr>
<tr>
<td>Model 2</td>
<td>2,412.45 (228)</td>
<td>1.222</td>
<td>285,156.77</td>
<td>284,715.40</td>
<td>0.071</td>
<td>0.045</td>
<td>0.058</td>
</tr>
<tr>
<td>Model 3</td>
<td>2,039.98 (240)</td>
<td>1.240</td>
<td>285,492.77</td>
<td>284,715.40</td>
<td>0.071</td>
<td>0.045</td>
<td>0.058</td>
</tr>
</tbody>
</table>

Notes. df = degrees of freedom; AIC = Akaike information criterion; BIC = Bayesian information criterion; CFI = comparative fit index; RMSEA = root mean square error of approximation; SRMR = standardized root mean square residual.

5 Specifically, the estimates were computed for Model 1 and Model 3 applying the formula:

\[
\omega = \frac{1 - \frac{\sum b_i^2}{\sum b_i^2 + \sum e_i}}{1}
\]

where \( b_i \) is the unstandardized factor loading of item \( i \) and \( e_i \) is the corresponding residual variance (see Geldhof et al., 2014).

6 We also assessed the assumption of essential tau equivalence in the measurement model by constraining the factor loadings of each indicator within a construct to equality. This resulted in a statistically significant deterioration of model fit, \( \chi^2(24) = 287.16, p < .001 \). Hence, this assumption was not tenable.
Discussion

In the present study, we were targeting three questions: First, we investigated whether the BMPN reliably captures satisfaction and dissatisfaction of the three basic needs postulated by Self-Determination Theory – autonomy, competence, and relatedness. Second, we examined whether need satisfaction and dissatisfaction of these three needs independently predict well-being. And finally, we investigated both of these questions at both the within- and the between-level.

Reliability and Factor Structure of the BMPN

Our results support the notion that the BMPN reliably measures need fulfillment for the three needs for autonomy, competence, and relatedness at both the within- and
the within-level of analysis. Cronbach's α’s were in a high range for assessing need fulfillment at the between-level (.88, .85, and .90 for autonomy, competence, and relatedness, respectively), and in an acceptable to good range at the within-level (.77, .68, and .76). These results extend prior cross-sectional research on the BMPN (Sheldon & Hilpert, 2012) to a daily-diary context. We also examined the internal consistency for the satisfaction and dissatisfaction subscales. Again, the estimates for the between level suggested good internal consistency for the six scales, with all estimates greater .80. At the within-level, results were somewhat mixed but for five out of six subscales, Cronbach's α was greater than .60; solely the internal consistency of the relatedness dissatisfaction subscale was somewhat lower, suggesting that future adjustments of this subscale might be called for. Specifically, for the item “I was lonely,” explained variance at the within-level was markedly lower (21%) than for all other items. Our results suggest that replacing this item by an alternative relatedness dissatisfaction item (e.g., “I was excluded or ostracized”; Neubauer & Voss, 2016) might improve utility of the BMPN.

These results so far suggest that the BMPN can be used to assess either need satisfaction and need dissatisfaction as separate constructs or need fulfillment as a combination of satisfaction and dissatisfaction, thus supporting Sheldon and Hilpert’s (2012) claim. This was true for both the between- and the within-person level. We next assessed whether one of these two solutions actually fitted the data better and concluded that a six factor solution (i.e., separate assessment of need satisfaction and need dissatisfaction at both the between- and the within-person level) was clearly superior to a three factor solution. In addition to previous research showing that need satisfaction and need dissatisfaction have differential effects on subsequent behavior (Sheldon et al., 2011; Sheldon & Guz, 2009), we showed that these two dimensions can and should be separated psychometrically in the BMPN. While similar results have already been reported for cross-sectional designs (Chen et al., 2015; Neubauer & Voss, 2016) the present results show that this separation occurred both at the between- and the within-person level. In contrast to previous research that has repeatedly found differences in measurement structure between the between- and within-level (Brose et al., 2015; Voelkle et al., 2014; Wilhelm & Schoebi, 2007), the BMPN exhibits evidence for configural measurement invariance across these two levels.

The dissociation into satisfaction and dissatisfaction components is in line with a prediction made by Sheldon’s (2011) two process model. According to this account, need dissatisfaction promotes behavior aiming at restoring the dissatisfied need, while lack of need satisfaction does not (Sheldon, 2011; Sheldon & Guz, 2009). Need satisfaction and dissatisfaction, hence, are postulated to operate at different time points in a behavioral sequence: Need dissatisfaction is hypothesized to increase the motivation for behaviors that restore the need; if this restoration is successful, it results in need satisfaction. However, Sheldon (2011) notices one caveat to this prediction: If need dissatisfaction is chronic, this restoration process is hypothesized to be disrupted. That is, while acute dissatisfaction should promote ameliorative behavior, chronic dissatisfaction should not. In terms of the differentiation of between- and within-level, this would predict that satisfaction and dissatisfaction should be separated on both levels, but that dissatisfaction should predict motivation to pursue this need on the within-level, but not (or at least to a lesser extent) on the between-level. While the former prediction was a target question of the present study, the second question remains a promising question for future research. Fine-grained temporally spaced data collection (e.g., five times per day over the course of several days) and including markers of motivation to restore the needs would allow for testing the temporal dynamics proposed by the two process model.

**Predicting Well-Being From Need Satisfaction and Dissatisfaction – The Level of Analysis Matters**

Finally, when predicting well-being from need satisfaction and dissatisfaction, we expected that all three needs would independently predict well-being at both levels of analysis. At the within-level, we found strong support for this hypothesis: Day-to-day fluctuations in all six variables predicted intra-individual variability in well-being. At the between-level, only competence and relatedness, but not autonomy predicted interindividual differences in well-being. Thus, as in previous studies (Taylor & Stebbings, 2012) we found differences for the effects of need fulfillment between the two levels of analysis. Our results suggest that what makes for a happy day is not entirely congruent with what makes for a happy person: Persons who have – aggregated across the 42 days – higher well-being are characterized by high levels of relatedness and competence across this observation period, while high autonomy does not explain...
well-being above and beyond relatedness and competence at the between-level. That is, a happy person feels close to and cared for by other people as well as competent in one’s actions. However, every person profits from all three needs as evidenced by our results at the within-level: Days that are characterized by more relatedness, competence, and autonomy (compared to days with average fulfillment of these needs) are days with higher well-being. This finding provides strong support for SDT in that it shows that everybody profits from a boost in all three needs. But why does autonomy not predict unique variance in well-being at the between-person level? One explanation might be statistical power: There are fewer observations at the between-person level than at the within-person level, which leads to reduced power at the former. However, although speculative, there is also one possible psychological mechanism that might explain this discrepancy: Competence and autonomy might overlap to a stronger degree at the between-person level, thus capturing very similar variance in predicting well-being: Persons who feel more competent over the course of the study also experience high levels of autonomy (note that the intercorrelations of the autonomy and competence factors are also somewhat higher at the between-person level than at the within-person level; Table 4). In terms of the ideas put forth by SDT, feeling effective in one’s actions (high competence satisfaction/low competence dissatisfaction) might lead to increases in the motivation to perform these actions more often via introduced regulation (Ryan & Deci, 2000), and – over time – these actions might become internalized into one’s self and their execution be perceived as autonomous. On the other hand, there are days at which people have to do things against their will (autonomy dissatisfaction) at which they can still perform well (competence satisfaction). Competence and autonomy could therefore be more decoupled at the within-person level than at the between-person level, leading to incremental validity in predicting well-being at the former but not at the latter level.

**Limitations and Conclusions**

Some limitations of the present research should be acknowledged: First, results of this study were obtained from a nonrepresentative sample which largely consists of students. Additionally, sample size was – although fairly large for a daily-diary study – not sufficient to estimate the latent relationships among the three needs and well-being without further constraining the model. Thus, future research should investigate the research questions of this study with larger and more heterogeneous samples. A larger sample size is particularly necessary to improve the precision for the estimates in the between-part of the MSEM. The estimates for this part are based on a sample size of 135 which can be considered rather small in the structural equation modeling framework. Schönbrodt and Perugini (2013) argue that sample sizes of at least 250 participants are required for stable estimates of correlation coefficients. However, results from a larger (total N = 460) cross-sectional study (Neubauer & Voss, 2016) also support a six-dimensional measurement model of the BMPN which strengthens the conclusion drawn in this study. Furthermore, all data were based on self-report measures of well-being and need fulfillment. Using additional measures such as observer ratings could provide more detailed insights into the interplay of need satisfaction, need dissatisfaction, and well-being.

Despite these limitations, our results provide evidence that the BMPN is a useful tool to assess need satisfaction and need dissatisfaction for the three basic psychological needs for autonomy, competence, and relatedness. This study suggests that need satisfaction and need dissatisfaction should be separated psychometrically and be considered correlated but distinct constructs. These findings held at the within-person and the between-person level of analysis. Finally, we showed that at the between-level, relatedness and competence (both split up into their satisfaction and dissatisfaction components) were uniquely related to well-being and that at the within-level, all three needs (again split up into satisfaction and dissatisfaction components) exerted unique effects on well-being. We interpret the latter finding as strong support for SDT – humans profit from satisfaction and suffer from dissatisfaction of the needs for autonomy, competence, and relatedness.

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