Running on empty: Measuring psychological dependence in close relationships lacking satisfaction

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Abstract
Commitment has often been used to examine why individuals unjustifiably persist in relationships that are lacking in or devoid of satisfaction. However, the practicality of using commitment to examine these situations has been questioned because of its substantial association with satisfaction. Across three studies, we created a measure of nonvoluntary dependence and investigated the validity and reliability of the Nonvoluntary Dependence Scale from an investment model perspective. Exploratory and confirmatory factor analyses revealed evidence of a single factor and reliability analyses revealed good internal reliability for the measure. The new measure also evidenced desirable convergent and discriminant validity with respect to a number of existing individual- and relationship-level constructs. Consistent with hypotheses, nonvoluntary dependence was significantly associated with commitment level, investments, and alternatives but not with relationship satisfaction. Differences in nonvoluntary dependence were also found between individuals in aggressive versus nonaggressive relationships, with no differences found in commitment level. Implications regarding this new measure, as well as directions for future research, are discussed.

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A common belief is that satisfaction is the main driving force behind relationship persistence (see Rusbult, Agnew, & Arriaga, 2012). After all, satisfying relationships contribute to attaining meaningful experiences (Roberts & Robins, 2000), fulfill belongingness needs (Perlman, 2007), and predict greater daily positive affect and subjective well-being (Reis, Collins, & Berscheid, 2000), whereas unsatisfying relationships predict a host of negative outcomes, including increased insecurity (Davis, Shaver, & Vernon, 2003) and emotional distress (Frazier & Cook, 1993; Sbarra & Emery, 2005). Despite the existence of a sizable literature on the benefits of involvement in a satisfying relationship, unsatisfied individuals often remain coupled. Why do individuals persist in a relationship even if they are not particularly satisfied?

Interdependence theory provides a framework for answering this question, suggesting that individuals may persist in a dissatisfying relationship because they rely on their partner to maintain a state that is more desirable than alternative situations (see Drigotas & Rusbult, 1992; Kelley & Thibaut, 1978; Rusbult, 1983; Rusbult et al., 2012; Rusbult, Martz, & Agnew, 1998). Factors that compel a person to continue a relationship and comprise a state of dependence—even when such dependence is devoid of satisfaction—will, in turn, cause people to feel a subjective sense of commitment. For example, a man who is involved with a verbally aggressive and manipulative partner may be unhappy yet also fear that his partner will go through with threats to hurt herself if their relationship ends; his anticipated guilt may be more intolerable than tolerating her occasional verbal aggression. Married partners, also, who long ago stopped feeling satisfied may nonetheless be dependent on each other to complete routine daily activities. In each of these examples, there are factors that override positive affect and contribute to feeling “stuck” in a relationship.

Existing theory has described this as a state of nonvoluntary dependence, in which barriers to leaving a relationship compel individuals to persist in an involvement that is devoid of attraction forces or positive affect (Johnson, 1991; Levinger, 1965, 1976; Thibaut & Kelley, 1959). Individuals whose dependence involves high satisfaction will actively seek out new relationship experiences with their partner and may adopt positive feelings toward desiring their relationship (cf. Aron, Aron, & Smollan, 1992), whereas those who experience nonvoluntary dependence continue their relationship in order to avoid a worse situation (Thibaut & Kelley, 1959). Even individuals who are not satisfied may report subjective feelings of commitment. To date, other variables—commitment, alternatives, investments—are used as empirical proxies to capture a state of nonvoluntary dependence (Arriaga, Capezza, Goodfriend, Rayl, & Sands, 2013), but none of these variables in isolation captures the state. Just as individuals typically have insight into their feelings of satisfaction, they may have insight into feeling “stuck” in a relationship not because the relationship makes them happy (i.e., not because it is satisfying) but rather because they rely on their partner on a daily basis, believe that they will not attain a better relationship, fear how ending a relationship would affect them or their partners, or have a long history together.
Three studies were conducted to develop and validate a scale to capture the construct of nonvoluntary dependence. The current research examines the reliability and validity of the Nonvoluntary Dependence Scale and reveals the utility of this scale in understanding the dynamics of persisting with an aggressive partner.

**Dependence, commitment, and relationship persistence**

We situate our analysis of dependence within interdependence theory, which examines the situational and motivational constraints that direct behavior within dyads and elucidates the conditions of relationship persistence (Kelley & Thibaut, 1978; Rusbult & Van Lange, 2008). Level of dependence describes the extent to which coupled individuals rely on their current partner to best fulfill important needs (i.e., attain desired outcomes or avoid undesirable outcomes) that cannot be fulfilled as well in other alternative relationships (Agnew, Arriaga, & Wilson, 2008; Agnew, Van Lange, Rusbult, & Langston, 1998; Rusbult & Van Lange, 2008; Thibaut & Kelley, 1959).

How does a person become dependent on their partner? The investment model of commitment processes, based on interdependence theory, posits three specific bases of dependence that ultimately fuel feelings of commitment: satisfaction level, quality of alternatives, and investment size (Rusbult, 1983; Rusbult et al., 1998, 2012). Satisfaction level refers to the level of positive affect associated with outcomes experienced in a relationship. An individual is more satisfied to the extent that a relationship is able to gratify important needs. Quality of alternatives refers to outcomes perceived as achievable in the best possible alternative relationship to the current relationship. An individual has better quality alternatives to the extent that his/her important needs can be fulfilled outside of the current relationship (e.g., via other romantic partners, friends, family, being alone). Investment size refers to the magnitude and importance of resources that are attached to the current relationship that would be lost or marred if the relationship were to end. An individual has high investment to the extent that he/she has many tangible and intangible resources (e.g., joint possessions, time, and effort) tied to the relationship, which increases the cost of ending the relationship (cf. Goodfriend & Agnew, 2008). High levels of satisfaction, low quality of alternatives, and high investment size cause greater dependence (Rusbult et al., 1998), and dependence captures reasons and objective conditions that contribute to staying in a relationship.

As individuals exhibit these conditions of dependence, psychologically they experience commitment, which captures the subjective feelings of desiring or needing to continue a relationship with a current romantic partner (Agnew et al., 1998; Rusbult et al., 1998). Feeling committed is subjectively experienced as the intent to persist with the current romantic partner, being psychologically attached to the current romantic partner, and having a long-term orientation to the relationship (Arriaga & Agnew, 2001), and higher levels of commitment are reliably associated with voluntary continuance in a relationship (Drigotas & Rusbult, 1992; Le & Agnew, 2003; Le, Dove, Agnew, Korn, & Mutso, 2010). Individuals might reflect on their dependence; they may realize why they want or need a relationship to continue (i.e., often referred to as a “structural” state in that there are concrete causal conditions; Drigotas & Rusbult, 1992). This is distinct from reporting a high (or low) level of relationship commitment, which is more indirect and
abstract compared to dependence (Agnew et al., 1998; Rusbult et al., 1998). Thus, dependence and commitment are not synonymous constructs and a precise characterization of dependence is helpful to distinguish it from commitment.

Although the investment model identifies satisfaction, alternatives, and investments as three bases of dependence, not all three are necessary for dependence to occur (Agnew, Besikci, & Tan, in press; Le & Agnew, 2003) nor are they comprehensive in fully accounting for a state of dependence. Indeed, relationships often continue in the absence of one or more of the bases. For example, individuals can be dependent on their partners to fulfill their needs for self-esteem (Murray, Holmes, MacDonald, & Ellsworth, 1998) or be dependent on their partners to the extent that they possess traits that signal high mate value (Ellis, Simpson, & Campbell, 2002). These forms of dependence have been captured in existing measures but are largely concerned with the extent to which individuals are satisfied with their relationship. However, there are also relationships that may persist in the absence of high satisfaction, as when couples sustain an unsatisfying relationship because it has become habitual, or when marriages persist in cultures where divorce is taboo.

**Nonvoluntary dependence**

Most of the research on nonvoluntary dependence has focused on abusive relationships, in which satisfaction may not be directing decisions to remain with a partner (e.g., Bauserman & Arias, 1992; Follingstad, Rogers, & Duvall, 2012; Frye, 2006; Rhatigan & Axsom, 2006; Rusbult & Martz, 1995). However, nonvoluntary dependence, as stated above, is not limited to abusive or aggressive relationships and occurs when people remain committed to their relationship and satisfaction wanes as a determining factor regarding staying in the relationship. Relationships characterized by low satisfaction unambiguously capture a state of nonvoluntary dependence; in contrast, relationships characterized by nonlow levels of satisfaction (moderate, or unstable, or high) nonetheless may capture a state of nonvoluntary dependence in that there are factors other than satisfaction driving the decision to stay in the relationship (i.e., the term “voluntary” would be ambiguous because regardless of the level of satisfaction, they will feel compelled to stay; cf. Johnson, 1991). Moreover, our conceptualization of nonvoluntary dependence includes investments and alternatives, but it also captures unique aspects of psychologically needing a relationship that cannot directly be reduced to these constructs, such as when divorce is considered taboo or if one is just used to being around their partner. Extant research on nonvoluntary dependence from an investment model perspective suggests that commitment is strongly associated with, and at least partially mediates the effects of, quality of alternatives as well as investment size on stay/leave behavior for women in abusive relationships (Rusbult & Martz, 1995).

Commitment can be and has been used as a proxy to examine why individuals in an abusive or aggressive relationship may continue their relationship (e.g., Arriaga, 2002; Arriaga, Capezza, & Daly, 2016). However, using commitment to capture the factors that keep a person in a dissatisfying relationship is problematic for several reasons. First, commitment reflects a strong and broad internal motivation to continue a relationship that often is highly correlated with satisfaction, as indicated by meta-analytic findings.
(r = .68; Le & Agnew, 2003; Le et al., 2010). Second, whereas commitment as a motivation may be more global and abstract (e.g., feeling “attached,” intending to continue), nonvoluntary dependence hones in on the reasons why a person is persisting in a relationship. Third, individuals who persist in dissatisfying relationships, such as aggressive relationships, often feel compelled to continue their relationship and are not driven by satisfaction. Research has revealed, for example, that victims of partner aggression feel less happy, the more aggression they experience (Arriaga et al., 2013). Thus, their state of persistence may be more precisely assessed by measuring nonvoluntary dependence than by measuring commitment.

The current research had two major aims. One was to develop a scale that captures the construct of nonvoluntary dependence, which we posit is distinct from other variables and not fully captured with existing measures of dependence. Studies 1 and 2 addressed this aim. The second aim was to demonstrate the utility of having a nonvoluntary dependence scale. We approached this aim in Study 3 by examining individuals who have aggressive partners and examined how nonvoluntary dependence could differentiate between individuals involved in aggressive versus nonaggressive relationships, hypothesizing that nonvoluntary dependence should be higher among those involved in aggressive relationships, whereas commitment would offer no such differentiation. Furthermore, we also examined if nonvoluntary dependence was a distinct construct beyond alternatives and investments.

**Study 1**

The primary aim of Study 1 was to develop a self-report measure of nonvoluntary dependence. It was hypothesized that nonvoluntary dependence would be associated with quality of alternatives and investment size but not with satisfaction. We also tested the discriminant validity of the new measure by examining its association with an individual-level attribute (self-esteem).

**Method**

**Participants and procedure**

Participants were 443 undergraduates (49.5% male) from a large U.S. research university, who took part in the study in partial fulfillment of course credit in their introductory psychology course. Participants ranged in age from 19 to 29 years (M = 19.05, SD = 1.25). All participants were required to be in romantic relationships at the time of their participation (M$_{\text{months}}$ = 14.70; SD = 15.47). Sample size was based on both availability of participants and recommendations from Wolf, Harrington, Clark, and Miller (2013) so as to have at least 0.8 power to detect loadings of at least 0.5 in factor analyses. Participants completed a battery of items, including measures intended for other projects. The items administered included those created to assess nonvoluntary dependence as well as measures to establish convergent and discriminant validity. Participants also completed items assessing demographic characteristics.
Measures

Nonvoluntary Dependence Scale. A total of 9 items assessing nonvoluntary dependence on a romantic relationship were administered. These items were created by the authors based on the theoretical definition of nonvoluntary dependence. Various sources were consulted during item generation, including the existing literature on dependence (e.g., Johnson, 1999; Rusbult & Martz, 1995; Rusbult et al., 1998; Strube & Barbour, 1983; Thibaut & Kelley, 1959). The items generated related to anxiety of dissolution with the partner, perceptions of lack of alternatives, reliance on a partner, and having a long history together, which we believed tapped into participants’ sense of feeling “stuck” in a relationship. Participants responded to each item on a scale from 1 (do not agree at all) to 7 (agree completely).

Investment Model Scale. Participants completed items from the Investment Model Scale (IMS; Rusbult et al., 1998) to assess commitment and its theorized bases. This scale has four subscales, measuring satisfaction with, alternatives to, investment in, and commitment to a relationship. The satisfaction, alternatives, and investment subscales each contain 5 items, and the commitment subscale contains 7 items, each of which is assessed on a 7-point scale ranging from 1 (strongly disagree) to 7 (strongly agree). Sample items include “I feel satisfied with our relationship,” to tap satisfaction (SAT), “My alternatives are attractive to me (dating another, spending time with friends or on my own, etc.),” to tap alternatives (ALT), “I feel very involved in our relationship—like I have put a great deal into it,” to tap investment (INV), and “I am committed to maintaining my relationship with my partner,” to tap commitment (COM). The internal consistency of each subscale was high (SAT $\alpha = .92$, ALT $\alpha = .83$, INV $\alpha = .85$; COM $\alpha = .95$).

Self-esteem. Participants completed a single-item measure of self-esteem (Robins, Hendin, & Trzesniewski, 2001), “I have high self-esteem,” using a 7-point response scale ranging from 1 (do not agree at all) to 7 (agree completely).

Results

Deriving the Nonvoluntary Dependence Scale

To evaluate the dimensionality and internal reliability of the items administered to assess nonvoluntary dependence, we conducted an exploratory factor analysis (EFA) on the 9 items using a maximum likelihood estimate and varimax rotation. Based on eigenvalue and scree plot analysis, one factor was found to underlie the items, accounting for 37.92% of the variance. We then selected only items with a high loading on that factor (> .40). As shown in Table 1, this yielded 7 items with high internal reliability, $\alpha = .84$.

Convergent and discriminant validity

To assess the convergent and discriminant validity of the derived scale, we computed zero-order correlations and conducted multiple regression analyses predicting commitment and nonvoluntary dependence (see Table 2). Considered independently, as
expected, satisfaction, alternatives, investments, and commitment were significantly correlated with nonvoluntary dependence. Discriminant validity was demonstrated by a nonsignificant correlation with self-esteem, $r = -.07, p > .05$.

In a model predicting nonvoluntary dependence, quality of alternatives exhibited a negative association, $\beta = -.13, t(439) = -3.09, p = .002, CI = [-.23, -.05]$, investment size exhibited a positive association, $\beta = .58, t(439) = 13.55, p < .001, CI = [.49, .65]$, and satisfaction exhibited a nonsignificant association, $\beta = .03, t(439) = .66, p = .51, CI = [-.06, .12]$. As predicted, alternatives and investments were significant predictors of nonvoluntary dependence when considered simultaneously in a multiple regression analysis, whereas satisfaction was not a significant predictor.
In contrast, a parallel regression model predicting commitment revealed a different pattern, in which satisfaction significantly accounted for variation in commitment. Replicating previous research (e.g., Rusbult et al., 1998), satisfaction, alternatives, and investments were significant predictors of commitment when considered simultaneously in a multiple regression analysis. Specifically, satisfaction was positively associated with commitment, $\beta = .45$, $t(439) = 14.20$, $p < .001$, CI = [.45, .59], quality of alternatives was negatively associated with commitment $\beta = -.21$, $t(439) = -6.34$, $p < .001$, CI = [-.30, -.16], and investment size was positively associated with commitment, $\beta = .34$, $t(439) = 10.44$, $p < .001$, CI = [.29, .42].

The combination of these findings suggests that satisfaction has a unique role in predicting commitment but not in predicting nonvoluntary dependence. It should be noted that the current sample was comprised of typical college students who tend to be satisfied with their relationships.

**Study 2**

Study 2 provided a further test of the dimensionality, reliability, and validity of the Nonvoluntary Dependence Scale on an additional sample of participants who completed the new measure along with a number of scales assessing various individual- and relationship-level constructs. As in Study 1, we administered measures assessing the constructs within the investment model, hypothesizing once again that investments and alternatives would significantly predict the new nonvoluntary dependence measure, whereas satisfaction level would not.

An additional aim was to distinguish the new scale from other measures used in past research to tap dependence in different ways. These dependence measures include ones that examine the extent to which individuals depend on their partners for their sense of self (Joel, MacDonald, & Shomotomai, 2011; Murray et al., 1998), need satisfaction dependence (Drigotas & Rusbult, 1992), trait-specific dependence (Ellis, Simpson, & Campbell, 2002), and a general measure of dependence with respect to functioning (Feeney, 2004). We hypothesized that the new measure would be positively and significantly associated with these existing measures. However, given differences in underlying theoretical approaches to the dependence construct, we expected the associations to be moderate rather than high in magnitude. Importantly, because our measure was developed to examine dependence that was nonvoluntary, we then conducted similar investment model analyses with the other dependence measures to determine the extent to which the new measure, versus existing measures, exhibited the desirable characteristic of not being predicted by the level of relationship satisfaction.

Finally, we included measures of relationship closeness and of dissolution consideration for purposes of convergent validation, hypothesizing that those in relationships characterized by relatively high levels of nonvoluntary dependence would also be high in perceived closeness to their partner and would be low in active consideration of terminating the relationship. In contrast, and to further test discriminant validity, we anticipated that individual difference constructs, such as self-esteem, self-control, need for cognition, and the Big-5 personality dimensions, would largely evidence no association with the Nonvoluntary Dependence Scale. Furthermore, given that autonomy
from a self-determination perspective is concerned with people’s feelings of volition, agency, and initiative as supported by their current relationship, we did not anticipate that those in relationships characterized by high levels of nonvoluntary dependence would evidence a significant association with autonomy.

**Method**

**Participants and procedure**

Participants were 304 undergraduates (37.8% male) from a large U.S. research university who took part in the study in partial fulfillment of course credit in their introductory psychology course. Participants ranged in age from 19 to 29 years ($M = 19.45$, $SD = 1.52$). All participants were required to be in romantic relationships at the time of their participation ($M_{\text{months}} = 27.85; SD = 17.99$). We recruited as many participants as possible based on availability and had 0.99 power to detect multiple regression effects based on a medium effect size of $f^2 = .15$. Participants completed the battery of items detailed below, including demographic characteristics.

**Measures**

*Nonvoluntary Dependence Scale.* Participants responded to the 7 items derived in Study 1, using a response scale from 1 (*do not agree at all*) to 7 (*agree completely*).

*Investment Model Scale.* Participants completed the IMS, measuring satisfaction with, alternatives to, investment in, and commitment to their current romance on a 9-point scale ranging from 0 (*do not agree at all*) to 8 (*agree completely*). The internal consistency of each subscale was high (SAT: $\alpha = .90$, ALT: $\alpha = .86$, INV: $\alpha = .80$, and COM: $\alpha = .92$).

*Other dependence scales*

*Relational dependence.* Participants responded to 5 items that measure how much an individual depends on his/her partner for their sense of self (Joel et al., 2011; Murray et al., 1998; Sample item, “If I couldn’t be in this relationship, I would lose an important part of myself.”), using a 9-point scale ranging from 1 (*not at all true*) to 9 (*completely true; $\alpha = .86$).

*Need satisfaction dependence.* Participants responded to items measuring the importance of the fulfillment of six specific needs in their current relationship (e.g., need for sex, need for companionship) compared to the satisfaction of those same needs in alternative relationships (see Drigotas & Rusbult, 1992, for a thorough description of this measure). Need satisfaction dependence was calculated by first determining the discrepancy between perceived current and alternative need satisfaction. This discrepancy was then multiplied by the self-reported importance of each need. The products of the six need discrepancies by importance were then summed to create a total need satisfaction dependence score.
Trait-specific dependence. Participants completed the 35-item Trait-Specific Dependence Scale designed to measure comparisons between present and alternative romantic partners on six major dimensions of mate value (e.g., physical prowess, emotional stability; Ellis et al., 2002). Participants were asked, “If you and your current partner broke up, how difficult would it be for you to find another partner who is as [adjective]?” on a 5-point scale from 1 (not difficult at all) to 5 (extremely difficult). The internal consistency of each subscale was high (αs ranging between .70 and .91). In addition to conducting analyses with the six separate trait dimensions, we also created a composite score to reflect overall dependence on a current partner from this approach.

Dependent functioning. Participants responded to a measure tapping the extent to which they functioned independently or dependently on others (Feeney, 2004). They rated the extent to which they felt independent (vs. dependent), self-reliant (vs. reliant), self-confident (vs. self-doubting), and capable (vs. incapable) on 7-point scales anchored by the opposing adjectives (α = .75).

Convergent validity measures
Closeness. The Inclusion-of-Other-in-the-Self (IOS) Scale (Aron et al., 1992), a single-item pictorial measure, was used to measure relationship closeness. The IOS Scale presents seven Venn diagrams representing varying degrees of overlap between one circle labeled “self” and another circle labeled “other” (i.e., relationship partner). These seven diagrams range from 1 (complete nonoverlap) to 7 (nearly complete overlap) between the two circles and participants indicate which diagram best describes their current relationship.

Dissolution consideration. Participants completed a 5-item Dissolution Consideration Scale (VanderDrift, Agnew, & Wilson, 2009; Sample item, “I have been thinking about ending our romantic relationship”) to assess the extent to which relationship termination is salient, using a 9-point response scale ranging from 0 (do not agree at all) to 8 (agree completely; α = .94).

Divergent validity measures
Self-esteem. Participants completed the 10-item Rosenberg Self-Esteem Scale (Rosenberg, 1965; Sample item, “On the whole, I am satisfied with myself”), using a 4-point response scale ranging from 1 (strongly disagree) to 4 (strongly agree; α = .86).

Self-control. Participants completed the Brief Self-Control Scale, a 13-item measure assessing individual differences in the extent to which one is able to inhibit and override their impulses (Tangney, Baumeister, & Boone, 2004; Sample item, “I am good at resisting temptation”), using a 5-point response scale ranging from 1 (not at all) to 5 (very much; α = .83).
Need for cognition. Participants completed the 18-item version of the Need for Cognition Scale, which assesses the tendency for the respondent to enjoy thinking (Cacioppo, Petty, & Kao, 1984; Sample item, “Thinking is not my idea of fun”, reverse coded), using a 5-point response scale ranging from 1 (extremely uncharacteristic) to 5 (extremely characteristic; $\alpha = .86$).

Autonomy. Participants completed the autonomy subscale derived from self-determination theory, which assesses the extent to which participants feel support from their partners for their need to be volitional and to experience psychological freedom (La Guardia, Ryan, Couchman, & Deci, 2000; Sample item, “When I am with my partner, I feel free to be who I am”). The 3-item measure used a 7-point response scale ranging from 1 (not at all true) to 7 (very true; $\alpha = .74$).

Personality. Participants completed the Five-Factor Model Rating Form, which is a brief instrument for assessing ratings of personality as proposed by the five-factor model (Mullins-Sweatt, Jamerson, Samuel, Olson, & Widiger, 2006). The measure is comprised of 30 items, with 6 items designed to measure each of the five personality dimensions of neuroticism, extroversion, openness, consciousness, and agreeableness, using a 5-point response scale ranging from 1 (extremely low) to 5 (extremely high). The internal reliabilities of the subscales ranged from .52 to .75.

Results

Replication of Study 1

To evaluate the dimensionality and internal reliability of the Nonvoluntary Dependence Scale, we conducted an EFA on the 7 items using a maximum likelihood estimate and varimax rotation. Based on eigenvalue and scree plot analysis, one factor was found to underlie the items, accounting for 35.22% of the variance. The internal reliability of the scale was reasonable ($\alpha = .78$), consistent with the findings from Study 1.

A multiple regression model assessed the simultaneous association of investment model predictor variables with commitment and with dependence. As shown in Table 3, alternatives and investments were significant predictors of the Nonvoluntary Dependence Scale but satisfaction was not. In contrast and replicating previous research, satisfaction, alternatives, and investments each exhibited a unique association with commitment (see Table 3). Thus replicating Study 1, these findings suggest that satisfaction has a unique role in predicting commitment but not in predicting nonvoluntary dependence.

Comparison with other measures of dependence

Next, we assessed the convergent and discriminant validity of the scale, by computing zero-order correlations between the Nonvoluntary Dependence Scale and other measures of dependence. As expected, the Nonvoluntary Dependence Scale was significantly and positively correlated with existing scales: relational dependence ($r = .62$, $p < .001$), need
satisfaction dependence, \( r = .11, p = .04 \), the six factors that make up trait-specific
dependence and its composite total \( rs \) ranging from .14 to .29, \( ps \) from .001 to .02, and
dependent functioning \( r = .20, p < .001 \).

We then ran multiple regression analyses predicting the various dependence scales
using investment model predictor variables. Although satisfaction did not predict scores
on the Nonvoluntary Dependence Scale, as expected, satisfaction was a significant
predictor of dependence as measured by other scales. Satisfaction, \( \beta = .11, t(300) = 
2.42, p = .02, CI = [.03, .24], \) alternatives, \( \beta = -.25, t(300) = -5.30, p < .001, CI = 
[−.33, −.15] \), and investments, \( \beta = .52, t(300) = 11.24, p < .001, CI = [.48, .69] \),
were significant predictors of relational dependence (Murray et al., 1998). Similarly,
satisfaction, \( \beta = 52.47, t(300) = 5.25, p < .001, CI = [32.80, 72.14], \) alternatives, \( \beta = 
−26.92, t(300) = −3.26, p = .001, CI = [−43.17, −10.68] \), but not investments, \( \beta = 
−11.33, t(300) = −1.20, p = .23, CI = [−29.88, 7.21] \), were significant predictors of
need satisfaction dependence (Drigotas & Rusbult, 1992). Satisfaction, \( \beta = .19, t(300) = 
3.23, p = .001, CI = [.03, .14], \) alternatives, \( \beta = −.21, t(300) = −3.66, p < .001, CI = 
[−.12, −.04] \), and investments, \( \beta = .20, t(300) = 3.47, p = .001, CI = [.04, .14] \), were
significant predictors of the composite measure of trait-specific dependence (Ellis et al.,
2002). Finally, satisfaction, \( \beta = −.24, t(300) = −3.72, p < .001, CI = [−.25, −.07] \),
alternatives, \( \beta = −.16, t(300) = −2.45, p = .02, CI = [−.16, −.02] \), but not investments,
\( \beta = .10, t(300) = 1.50, p = .14, CI = [−.02, .14] \), were significant predictors of
dependent functioning (Feeney, 2004). Thus, only the Nonvoluntary Dependence Scale
was not significantly predicted by relationship satisfaction in models including all
investment model variables.

Finally, we computed zero-order correlations to assess the broader validity of the new
measure by examining it along with other relationship-related and individual-level
variables. As expected, the Nonvoluntary Dependence Scale was positively associated
with closeness \( r = .43, p < .001 \) and negatively associated with dissolution

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**Table 3. Correlations and multiple regression analyses predicting nonvoluntary dependence and commitment, Study 2.**

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<thead>
<tr>
<th>Variable</th>
<th>Simple correlation</th>
<th>Multiple regression</th>
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<tr>
<td></td>
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<td>( \beta )</td>
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<tr>
<td>Dependence</td>
<td>.38**</td>
<td>.38**</td>
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<tr>
<td>Commitment</td>
<td>.27**</td>
<td>.05</td>
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<tr>
<td>Satisfaction</td>
<td>-.33**</td>
<td>-.17**</td>
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<tr>
<td>Alternatives</td>
<td>.47**</td>
<td>.39**</td>
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<tr>
<td>Investment</td>
<td>.65**</td>
<td>.42**</td>
</tr>
<tr>
<td>Commitment</td>
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<td>-.32**</td>
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<tr>
<td>Satisfaction</td>
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<td>.28**</td>
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<td>Alternatives</td>
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**p < .01; *p < .05.**
consideration ($r = -.18, p = .002$). The new measure was not significantly associated with self-esteem ($r = .01, p = .92$), self-control ($r = .04, p = .66$), need for cognition ($r = -.08, p = .30$), or autonomy ($r = .03, p = .55$). Furthermore, it exhibited a small, positive correlation with neuroticism ($r = .12, p = .04$) but was not significantly associated with the other four Big 5 personality factors ($r$s ranging from $-.006$ to $.07$, $p$s ranging from $.26$ to $.99$). In summary, the Nonvoluntary Dependence Scale was significantly (and appropriately) associated with other relationship-relevant constructs and generally unassociated with individual-level constructs.

**Study 3**

The primary purpose of Study 3 was to test the utility of the Nonvoluntary Dependence Scale. We sought to examine whether commitment and dependence differed by comparing responses obtained from participants involved in nonvoluntary dependent situations, where satisfaction should not determine whether one stays in relationships, with those in voluntary dependent situations. To that end, we compared individuals who were involved in aggressive versus nonaggressive relationships. We hypothesized that there would be no difference in commitment level between participants involved in aggressive versus nonaggressive relationships. However, there would be higher levels of nonvoluntary dependence in aggressive compared to nonaggressive relationships. Furthermore, we wanted to show that our measure of nonvoluntary dependence was empirically distinct from the investment model constructs of alternatives and investments. Beyond providing known group validation and showing the utility of the Nonvoluntary Dependence Scale, we also wanted to confirm the factor structure of the Nonvoluntary Dependence Scale and conducted a confirmatory factor analysis (CFA) of the scale items to determine whether the single-factor structure detected in Study 1 and Study 2 provided an adequate fit to the data from a third sample.

**Participants and procedure**

Participants were 299 undergraduates (92% female) from a large U.S. research university who took part in the study in partial fulfillment of course credit in their introductory psychology course and recruited for a study on aggression in relationships. Participants ranged in age from 17 to 24 years ($M = 18.94, SD = 1.22$). We recruited as many participants as available and had 0.99 power to detect effects based on a medium effect size of $d = 0.5$. Participants completed items tapping nonvoluntary dependence, relationship quality, aggression in their relationships, and demographic characteristics.

**Measures**

**Nonvoluntary Dependence Scale.** Participants responded to the 7 items derived in Studies 1 and 2, using a response scale from 1 (do not agree at all) to 7 (agree completely) ($M = 3.59, SD = 1.38; \alpha = .83$).
**Investment Model Scale.** Participants completed a modified version of the IMS measuring satisfaction with, alternatives to, investment in, and commitment to their current romance on a 7-point scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). The internal consistency of each subscale was high (SAT: $\alpha = .92$, ALT: $\alpha = .81$, INV: $\alpha = .81$, and COM: $\alpha = .94$).

**Partner aggression.** Participants completed a modified version of the Conflict Tactics Scale 2 (Straus, Hamby, Boney-McCoy, & Sugarman, 1996), a 78-item measure that assesses self- and partner-reported physical and psychological conflict and violence within a romantic relationship as well as negotiation techniques to deal with conflict. In the current study, partner aggression was measured with 12 items, with self-reported minor psychological aggression and minor physical assault subscales used to determine whether individuals were in an aggressive relationship or not. Participants indicated how many times their current partner had done each of the following aggressive acts to them: “insulted or swore at you,” “belittled you in front of others,” “said that someone else would be a better partner,” “threatened to hit you or threatened to throw something at you,” “said you’ll never get away from me in an angry or threatening way,” “intentionally destroyed your belongings,” “slapped you,” “push or shoved you,” “hit you with a fist or with something that hurts,” “beat you up,” “used physical force against you,” and “did something during a fight that physically injured you.” Individuals who reported experiencing at least one instance of minor psychological aggression or minor physical assault were classified as being in an aggressive relationship ($n = 194$).

**Results**

**Confirmation of factor structure**

We conducted a CFA to confirm the factor structure suggested by Studies 1 and 2. Following guidelines provided by Hu and Bentler (1999), acceptable model fit should meet the following criteria: comparative fit index (CFI) and Tucker–Lewis index (TLI) $> 0.95$, and root mean square error of approximation (RMSEA) $< 0.06$. Consistent with these conventions, the single-factor, 7-item Nonvoluntary Dependence Scale showed good model fit, $\chi^2(10) = 17.62, p = .06$, CFI = .99, TLI = .97, RMSEA = .05.

**Associations among measures**

As in Studies 1 and 2, we ran multiple regression models predicting nonvoluntary dependence across all study participants (see Table 4). Importantly, satisfaction was once again not a predictor of nonvoluntary dependence, whereas alternatives (marginally) and investments significantly predicted nonvoluntary dependence. Specifically, quality of alternatives was marginally negatively associated with nonvoluntary dependence, $\beta = .08, t(295) = -1.72, p = .08$, CI $= [-.02, .01]$, and investment size was positively associated with nonvoluntary dependence, $\beta = .61, t(295) = 12.05, p < .001$, CI $= [.54, .75]$, whereas there was no significant association of satisfaction with nonvoluntary dependence, $\beta = -.04, t(295) = -.73, p = .47$, CI $= [-.15, .07]$. Just as in
previous research, satisfaction, alternatives, and investments were significant predictors of commitment. Specifically, satisfaction was positively associated with commitment, $\beta = .36$, $t(295) = 8.40$, $p < .001$, CI = [.29, .46], quality of alternatives was negatively associated with commitment, $\beta = .26$, $t(295) = -6.04$, $p < .001$, CI = [−.36, −.18], and investment size was positively associated with commitment, $\beta = .36$, $t(295) = 8.38$, $p < .001$, CI = [.28, .45].

Comparing commitment and nonvoluntary dependence in aggressive and nonaggressive relationships

We conducted two independent samples $t$ tests comparing the mean levels of commitment and nonvoluntary dependence among individuals in aggressive versus nonaggressive relationships. Consistent with our hypothesis, individuals in aggressive ($M = 5.93$, $SD = 1.38$) and nonaggressive ($M = 6.04$, $SD = 1.19$) relationships did not differ significantly in terms of their commitment level, $t(295) = .64$, $p = .51$, CI = [−.21, .42]. However, individuals in aggressive ($M = 3.75$, $SD = 1.31$) and nonaggressive ($M = 3.32$, $SD = 1.44$) relationships differed significantly in terms of their nonvoluntary dependence, $t(295) = -2.56$, $p = .01$, CI = [−.75, −.09], with those involved in aggressive relationships reporting significantly greater dependence. We also computed a logistic regression model to examine whether the Nonvoluntary Dependence Scale predicted who was in an aggressive versus nonaggressive relationship. In the logistic regression model, controlling for satisfaction, alternatives, investments, and commitment, nonvoluntary dependence significantly predicted the odds of being in an aggressive relationship ($\beta = .25$, $p = .04$). Satisfaction ($\beta = -.56$, $p = .001$) was negatively associated with the odds of being in an aggressive relationship, but alternatives ($\beta = .10$, $p = .41$), investments ($\beta = .20$, $p = .15$), and commitment ($\beta = .06$, $p = .71$) were not significant predictors.$^2$

Table 4. Correlations and multiple regression analyses predicting nonvoluntary dependence and commitment, Study 3.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Simple correlation</th>
<th>Multiple regression</th>
<th>$\beta$</th>
<th>$R^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commitment</td>
<td>.50**</td>
<td>.50**</td>
<td>.25</td>
<td></td>
</tr>
<tr>
<td>Satisfaction</td>
<td>.23**</td>
<td>-.04</td>
<td>.40</td>
<td></td>
</tr>
<tr>
<td>Alternatives</td>
<td>-.33**</td>
<td>-.08$^</td>
<td>$</td>
<td></td>
</tr>
<tr>
<td>Investment</td>
<td>.64**</td>
<td>.61**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Commitment</td>
<td>.61**</td>
<td>.36**</td>
<td>.57</td>
<td></td>
</tr>
<tr>
<td>Satisfaction</td>
<td>-.57**</td>
<td>-.26**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alternatives</td>
<td>.60**</td>
<td>.36**</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

$^{**}p < .01; ^{p} < .08.$
Finally, to determine whether scores on the Nonvoluntary Dependence Scale were sufficiently and empirically distinct from levels of alternatives and investments, we ran another two independent samples t tests comparing mean levels of alternatives and investments among individuals in aggressive versus nonaggressive relationships, hypothesizing that there would be no differences between aggressive versus nonaggressive relationships. As expected, there were no significant differences in means for either alternatives, $t(295) = -1.04, p = .30, CI = [-.47, .15]$, or investments, $t(295) = -1.69, p = .10, CI = [-.57, .04]$. Thus, only nonvoluntary dependence as assessed by the new scale distinguished people in aggressive versus nonaggressive relationships.

**General discussion**

Nonvoluntary relationship dependence refers to persistence in relationships that are lacking in or devoid of satisfaction. Importantly, this article aims to clarify and extend concepts from interdependence theory, proposing an emphasis on using the construct of nonvoluntary dependence instead of commitment to theoretically represent such relationships. To that end, we created a measure of nonvoluntary dependence and conducted three studies to investigate the validity and reliability of the Nonvoluntary Dependence Scale from an investment model perspective. Exploratory and confirmatory factor analyses revealed evidence of a single factor and reliability analyses revealed good internal reliability for the scale. Consistent with hypotheses, nonvoluntary dependence was significantly associated with commitment level, investments, and alternatives but not with relationship satisfaction. Moreover, individuals in aggressive relationships reported more nonvoluntary dependence than individuals in nonaggressive relationships, but the two groups did not differ in their level of commitment.

Interdependence theory has delineated important distinctions between the concepts of satisfaction and dependence in close relationships, where satisfaction is the extent to which outcomes exceed expectations for the current relationship, and dependence is the extent to which outcomes exceed expectations that one can get from an alternative relationship. However, readers might have noticed that the zero-order correlations show that satisfaction is positively associated with nonvoluntary dependence. Indeed, there may be elements of satisfaction in nonvoluntarily dependent relationships, such that lesser dissatisfaction leads to greater commitment and nonvoluntary dependence (e.g., Rusbult & Martz, 1995). However, satisfaction should not be a primary ingredient in nonvoluntary dependence, as shown in our multiple regression analyses. If an individual is satisfied, it is unlikely they are thinking about nonvoluntarily dependence (as opposed to commitment), and we believe that in this instance, nonvoluntary dependence will not be salient in decisions of relationship stability. Thus, the Nonvoluntary Dependence Scale also captures the notion that relationships may persist due to rewards, but even rewarding relationships may persist due to barriers or obligations that prevent relationship dissolution. Consequently, this dimension of relationship constraint at times drives relationship stability (Johnson, 1991; Levinger, 1965, 1976).

Thus, when relationships that are characterized by unhappiness and low satisfaction persist, one should take into account the nature of dependence on a partner to measure the extent to which one feels entrapped in the relationship. However, the persistence of
relationships has long been conceptualized as a reflection of the level of commitment to the relationship. Thus, an individual might report continuing to feel committed to continuing their relationship, in spite of the relationship going poorly. However, it would not be entirely accurate to consider this person as committed to the relationship. If the same individual was asked whether their current relationship is such that they feel compelled to remain in it—as tapped by the nonvoluntary dependence measure presented here—the individual may report that it is indeed the case. The new measure should prove useful in assessing and elaborating on situations of nonvoluntary dependence and represents a method for capturing beliefs about how one feels that they ought to and have to continue in their current relationship, regardless of their feelings of satisfaction. Furthermore, the new measure helps circumvent the problem of the high empirical association between satisfaction and commitment. Thus, the use of the Nonvoluntary Dependence Scales allows both individuals and researchers alike to gain more accurate insight into the state of a given relationship.

We also sought to demonstrate convergent and discriminant validity of the new scale. Following from investment model predictions, our research replicated past meta-analytic findings showing that satisfaction level, quality of alternatives, and investment size predict commitment to a relationship (Le & Agnew, 2003). More importantly, however, the current research provides support for our hypotheses regarding investment model predictions about nonvoluntary dependence. Results from all three studies showed that individuals reported greater dependence when their quality of alternatives was low and their investment size was high. Moreover, there were significant associations between the new dependence measure and other extant dependence measures, closeness, and dissolution consideration. However, unlike the other measures of dependence, there were no significant associations between satisfaction level and the new measure of nonvoluntary dependence within the context of the investment model. There was also no pattern of associations between individual-level constructs and the new scale.

Study 3 provided evidence that the scale differentiates between groups that should differ in their level of nonvoluntary dependence. Individuals in aggressive versus non-aggressive relationships did not differ in their level of commitment, level of investments, or level of alternatives but did differ in their level of nonvoluntary dependence. It should be noted, of course, that aggression manifests along a continuum and includes both relatively minor and quite severe forms and can be both psychological and physical in nature. The measure used here captured minor forms of psychological and physical aggression. Moreover, the sample of participants was primarily female. Thus, the extent to which the present findings are generalizable within the context of more severe forms of aggression and with respect to males remains an open empirical question. With the current samples, however, nonvoluntary dependence can be seen as distinct from commitment by effectively eliminating satisfaction from the construct and thereby more accurately describing the structure of dependence between two individuals in an unsatisfying relationship (Rusbult & Martz, 1995).

The implications of being able to distinguish between nonvoluntary dependence and commitment might be especially important in terms of partner perceptions. Knowing that a partner is nonvoluntarily dependent, as opposed to committed, can influence expectations with respect to one’s enactment of subsequent relationship maintenance.
behaviors. For example, perceiving that one’s partner is nonvoluntarily dependent rather than committed might create a power imbalance in the relationship, wherein one perceives oneself as having relatively more power over the partner, which could lead to one being less accommodating in or willing to sacrifice for the relationship. It might also be distressing to realize that your partner is with you because they feel compelled to be, rather than because they want to be. In short, because of the differences in motivation to continue a relationship between nonvoluntary dependence versus commitment, perceiving that your partner is nonvoluntarily dependent as opposed to committed might be associated with decisions on whether or not to enact relationship maintenance behaviors, which might ultimately be harmful to relationship well-being (Agnew & VanderDrift, 2015).

Limitations and future directions

Although the results presented in the current studies were consistent with our hypotheses, they should be interpreted with appropriate caution. For example, our scale consisted of items that tapped into different aspects of nonvoluntary dependence, such as reliance on a partner, beliefs regarding the inability to attain a better relationship, fear of the consequences regarding relationship dissolution, or having a long history together. Future refinement to the scale could benefit from the inclusion of multiple items that more fully tap our conceptualization of nonvoluntary dependence. Furthermore, we did not directly test the predictive validity of nonvoluntary dependence against commitment prospectively to examine stay/leave behavior. Hence, future research should assess the associations between nonvoluntary dependence, commitment, and relationship maintenance behaviors as well as relationship stability among couples. Future research could also test different contextual moderators that may influence the predictive validity of nonvoluntary dependence (e.g., relationship length and culture). Nonvoluntary dependence might predict relationship maintenance behaviors better for individuals in more established relationships compared to less established relationships because the costs of ending more established relationships would be larger compared to less established relationships. It might also predict relationship maintenance behaviors better for individuals in interdependent cultures compared to independent cultures, as cultural norms might dictate that social networks in interdependent cultures work to make leaving a relationship more difficult compared to independent cultures.

As evidenced by past research, there has been strong emphasis on satisfaction in most studies focused on persistence in close relationships. Even though satisfaction remains as one of the most important predictors of relationship well-being and persistence, we believe that situations of nonvoluntary dependence represent an important type of close relationship that deserves greater empirical attention. Many individuals persist in relationships characterized by low satisfaction, boredom, and habitual routines, or uncertainty and anxiety regarding life without a current partner, and such factors can cause individuals to persist, even in abusive relationships (Arriaga et al., 2013; Rusbult & Martz, 1995). In the presence of such broad and varied concerns, satisfaction should be less relevant to understanding whether individuals remain in or end their relationships.
Thus, we hope the current findings and resultant scale serve as a launch point for further investigations of these kinds of relationship dynamics.

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**Notes**
1. Other measures administered included the revised Dyadic Adjustment Scale (Busby, Christensen, Crane, & Larson, 1995), the Brief Symptom Inventory (Derogatis, 1993), Subjective Well-Being (Cohen, Kamarck, & Mermelstein, 1983), relationship norms, affective forecasting in relationships, and reasons for ending a relationship.
2. We employed variety scoring to score CTS-2 as a continuous scale and found that nonvoluntary dependence correlated with continuous CTS-2 scores, $r = .18, p < .001$. A regression analysis on continuous CTS-2 scores showed that nonvoluntary dependence positively predicted CTS-2, $\beta = .21, p = .003$, controlling for satisfaction ($\beta = -.36, p < .001$), alternatives ($\beta = .06, p = .32$), investments ($\beta = .17, p = .03$), and commitment ($\beta = -.06, p = .48$).

**References**
Arriaga, X. B., Capezza, N. M., Goodfriend, W., Rayl, E. S., & Sands, K. J. (2013). Individual well-being and relationship maintenance at odds: The unexpected perils of maintaining a


