

The Development and Initial Validation of Need Satisfaction Scales Within the Psychology of Working Theory

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The psychology of working theory (PWT; Duffy, Blustein, Diemer, & Autin, 2016) provides a framework to understand predictors and outcomes of decent work. Given that basic need satisfaction is hypothesized to be a primary mediator in the link between decent work and well-being, it is essential to have valid and reliable scales that are consistent with the PWT framework. In the current study, we developed the Work Needs Satisfaction Scales, a set of instruments designed to measure satisfaction of survival, social contribution, and self-determination needs from a PWT perspective. In Study 1 ($N = 345$), a pool of items was developed and exploratory factor analysis was conducted, resulting in five 4-item scales representing survival need satisfaction, social contribution need satisfaction, and three components of self-determination need satisfaction (i.e., autonomy, competence, relatedness). In Study 2 ($N = 476$), we used confirmatory factor analysis to test 4 different structural models, finding that there were no significant differences between models. Thus, results offer a flexible 5-factor model, the structure of which may be adapted based on theory and researcher needs. Authors provide theory-driven recommendations on how to best use choice of structural models for PWT research. Finally, we demonstrated convergent, discriminant, and concurrent validity for the structural model most consistent with the PWT. Implications for research and practice are discussed.

Public Significance Statement

Researchers developed and validated a scale measuring survival, social contribution, and self-determination needs. Results provided validity for the scale and supported a flexible five-factor model, which may be adapted based on theory and research question.

Keywords: need satisfaction, psychology of working, instrument development

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According to the [International Labor Organization \(2008\)](#), decent work is believed to be a right that should be afforded to all individuals around the world. Decent work is the centerpiece of the

Psychology of Working Theory (PWT; [Duffy et al., 2016](#)), which was developed to capture the work experiences of all individuals, especially those who experience economic constraints and/or marginalization. Several studies have examined predictors of decent work (e.g., [Douglass, Velez, Conlin, Duffy, & England, 2017](#); [Tokar & Kaut, 2018](#)), yet no known research exists which has examined outcomes of decent work. In the PWT, work fulfillment and general well-being are positioned as the ultimate outcomes of decent work, which occur because decent work optimally allows individuals to meet their needs for survival, social contribution, and self-determination. The lack of research on the latter portion of the PWT model is likely due to limitations in instruments assessing need satisfaction at work, particularly the way needs are conceptualized in the PWT. In the current studies, we seek to address this limitation by developing short, reliable, and valid measures of survival, social contribution, and self-determination need satisfac-

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tion, framed according to a PWT perspective. We intend for these scales to help researchers seeking to understand individuals' experiences in their current jobs and practitioners working with clients seeking greater fulfillment in their work.

Theoretical Framework

The PWT (Duffy et al., 2016) posits that decent work consists of a safe working environment, reasonable working hours, organizational values that support family and social values, adequate compensation, and adequate health care benefits. The PWT recognizes that securing decent work can be more difficult for some, especially people who belong to marginalized groups (e.g., lower social class, racial/ethnic minorities, sexual minorities, immigrants) and people who are generally excluded from attaining the necessary skills and resources needed to compete in the contemporary labor market. The theory proposes that economic constraints and experiences with marginalization hamper an individual's ability to secure decent work, in part due to these leading to decreased *work volition* (i.e., one's perception of choice in job selection) and decreased *career adaptability* (i.e., one's ability to cope with career changes). Initial tests of the model have demonstrated that economic constraints and experiences of marginalization directly—and/or indirectly via work volition—predict the securing of decent work (Douglass et al., 2017; Duffy et al., 2018; Tokar & Kaut, 2018). The PWT further theorizes that attaining decent work leads to increased levels of work-related and general well-being due to work satisfying survival needs, social contribution needs, and self-determination needs.

Need Satisfaction Within the PWT

In their initial scholarship on the psychology of working framework (Blustein, 2006, 2008; Blustein, Kenna, Gill, & Devoy, 2008), Blustein and colleagues proposed that three needs are reflective of what work should provide for all individuals: the need for survival, the need for social contribution, and the need for self-determination. These three needs were further defined and incorporated into the PWT (Duffy et al., 2016); in the following section, we discuss these conceptualizations and provide evidence linking satisfaction of these needs to positive work and well-being outcomes.

Survival needs. Survival needs represent basic human needs for food, water, a safe place to live, and social capital (Duffy et al., 2016). These needs can be met through decent work, given that it offers adequate compensation and a safe working environment. In the only known study which used a PWT framework to link need satisfaction with well-being, Kim, Fouad, Maeda, Xie, and Nazan (2017) found that meeting survival needs was strongly connected to psychological well-being in midlife adults. A number of other studies outside of the work domain have demonstrated that survival need satisfaction is connected with both domain-specific and general well-being (e.g., Sirgy, Efraty, Siegel, & Lee, 2001; Tay & Diener, 2011).

Social contribution needs. In the original article introducing the PWT, Duffy et al. (2016) described what they named “social connection needs.” This set of needs tapped into the basic human desire to feel a sense of belonging within one's community and connection to others (Blustein, 2011; Duffy et al., 2016). Since that

article was published, the construct has been defined further. Given the overlap between social connection and relatedness, an aspect of self-determination, psychology of working founders have defined social connection more narrowly, specifically focusing on connection with one's broader societal network. Blustein (2006) noted that social connection needs may be fulfilled by contributing to the greater social good, which provides an important means of experiencing one's relationship to others. Further, previous literature supports the idea that engaging in work that contributes to social and economic welfare and helping others in some fashion leads to increased work and general well-being in a positive way (e.g., Grant & Berg, 2011). More recently, Blustein (in press) differentiated the direct fulfillment of social connection needs via relationships from the more abstract, yet equally important sense of connecting to the broader social world via contributing to the welfare of communities. In the current study, it is important to note the distinction between this broader sense of social connection and individual-level social connection, which is more accurately captured by relatedness (discussed in the following section). To crystallize this clarification, we have named the set of items capturing the recent developments in more narrowly defining this construct by titling it “social contribution needs.” Working in a job that is decent is proposed to predict greater fulfillment of social contribution needs given that these jobs will offer an avenue to contribute to the greater good.

Self-determination needs. Self-determination theory (SDT; Ryan & Deci, 2000) posits that people are motivated to engage in activities that are intrinsically enjoyable and are also motivated by extrinsic factors, particularly when the outcomes of a given task are consistent with one's values and goals. In addition, SDT proposes three basic psychological needs that, when met, contribute to greater motivation, psychological growth, and overall well-being. These needs are relatedness, competence, and autonomy, and SDT classifies them as fundamental, innate inclinations present in all individuals. When these needs are met in the workplace, workers feel more in control of their work and an authentic connection to it (Broeck, Ferris, Chang, & Rosen, 2016). SDT suggests that all three together must be satisfied for general psychological growth and well-being to occur in the workplace (Broeck et al., 2016).

Relatedness is defined as the need to feel close to others within one's community, to care for, and feel cared for by, others (Ryan & Deci, 2017). Identifying as part of a group, as seen in a healthy and safe working environment, allows personal connections to be formed, thus satisfying relatedness needs. *Competence* is defined as the need to develop relevant skills and a feeling of mastery in one's environment. SDT suggests that we have an innate desire to manipulate our environments in ways that challenge us at an optimal level (Broeck et al., 2016). *Autonomy* is defined as one's need to be able to act freely and with a feeling of ownership and control over choices that are made, which is considered as a crucial to motivation (Sheldon, Osin, Gordeeva, Suchkov, & Sychev, 2017).

A significant body of research supports the relevance of the three basic needs of SDT in the workplace and how meeting these needs links to well-being (Deci, Olafsen, & Ryan, 2017). For example, studies have found moderate to strong links between meeting each of these needs at work and such outcomes as job satisfaction, life satisfaction, and psychological growth (Broeck et al., 2016). Additionally, these needs are specifically positioned as mediators between

workplace context variables and motivation, health, and wellness (Deci et al., 2017), which is analogous to the PWT. In the PWT, *relatedness*, *competence*, and *autonomy* together make up self-determination needs (SDN), and working in a job considered decent is hypothesized to allow individuals to meet these needs.

Limitations in Work-Based Needs Assessment

Although SDT research is widespread, there has been debate over the utility of scales developed to measure basic needs specifically within the work domain (Brien et al., 2012; Broeck et al., 2016; Broeck, Vansteenkiste, Witte, Soenens, & Lens, 2010; Longo, Gunz, Curtis, & Farsides, 2016). In a search for measures of basic needs at work, we identified four existing scales: The Work-Related Basic Need Satisfaction scale (Brien et al., 2012), the Need Satisfaction and Frustration Scale (Longo et al., 2016), the Basic Psychological Needs at Work Scale (BPNWS; Brien et al., 2012), and the Basic Need Psychological Satisfaction at Work Scale (BPNS-W; Deci et al., 2001). There are three primary reasons that we include new SDT needs subscales rather than relying on these existing scales.

First, relying on previously constructed scales may create inconsistency between SDT needs subscales and survival and social contribution subscales. Our intention is to develop a cohesive set of scales measuring three major PWT dimensions. As such, it is important that all subscales demonstrate consistency in format and instructions. Although previous scales may be adequate as stand-alone measures of SDT need satisfaction, a more refined and theory-consistent measure is needed for assessing SDT needs within the PWT framework.

Second, related to consistency across subscales, there is a slight but significant conceptual difference in how the PWT proposes work-related SDT need satisfaction and how previous scales measure it. The PWT suggests that, although decent work allows a pathway for need satisfaction, that doesn't necessarily translate solely to on-the-job activity. Previous work-related SDT need satisfaction scales have used instructions that strictly reflect needs that are met while working. For example, the BPNS-W uses the following instructions:

The following questions concern your feelings about your job during the last year. (If you have been on this job for less than a year, this concerns the entire time you have been at this job.) Please indicate how true each of the following statement is for you given your experiences on this job.

The wording of our item stems is designed to reflect work as a pathway to self-determination rather than strictly reflecting activities performed at work. For example, the following is an item we propose in the Autonomy subscale of the WNSS: "My work allows me to take actions to promote my real needs." Although an individual may be working in a job in which they are not allowed a high degree of autonomy at work, the work may provide a pathway for autonomy generally in that person's life. An example might be a job that provides the employee little say in how their job is performed, but allows for flexible hours to accommodate for family responsibilities such as childcare.

This conceptual distinction is crucial when measuring basic needs within the PWT framework because populations of interest include those in which vocational choice is restricted. Blustein (2008) argued

that individuals from such populations who face barriers to accessing jobs that are inherently intrinsically motivating may still internalize their work as consistent with broader value systems. This argument is core to the psychology of working and, thus, calls for precision of language that is not present in current scales.

Finally, in addition to the above conceptual concerns, we have several pragmatic concerns regarding existing scales. Although this is not our primary reasoning for developing a new scale, in the present study, we used limitations of previous scales to guide development of PWT needs scales. These limitations include wordiness of items, lengthy scales, lack of language precision, overlap of constructs, and lack of face validity. As such, one goal of the current study was to create shorter scales to decrease the likelihood of respondent fatigue and support parsimonious structural equation models. Additionally, we seek to develop scales with a high degree of clarity in language and face validity.

The Present Study

The aim of the present study is to develop and validate a scale of basic needs allowed for by work. In Study 1, we recruited a diverse sample of working adults to whom we administered a preliminary pool of items assessing satisfaction of survival needs, social connection needs, autonomy needs, competence needs, and relatedness needs. Through exploratory factor analysis, we will examine the factor structure of the initial item pool as well as item factor loadings to generate a final measurement scale. In Study 2, we used confirmatory factor analysis to test competing models of factor configuration and to examine convergent and concurrent validity of the scale.

Study 1

Method

Participants. This study consisted of 345 adults with a mean age of 36.76 years ($SD = 11.44$). Participants self-identified as White/European American/Caucasian ($n = 258, 74.8\%$), Black/African American ($n = 39, 11.3\%$), Hispanic/Latina/o-American ($n = 26, 7.5\%$), Asian/Asian American ($n = 23, 6.7\%$), American Indian/Native American, First Nation ($n = 11, 3.2\%$), Arab American/Middle Eastern ($n = 3, 0.9\%$), Asian Indian ($n = 3, 0.9\%$), and other ($n = 3, 0.9\%$). Participants self-identified as female ($n = 207, 60\%$), male ($n = 136, 39.42\%$), transgender ($n = 1, < 1\%$), and gender not identified ($n = 1, < 1\%$). The entire sample was employed, with 82.6% employed full-time and 17.4% employed part-time. Participant's highest level of education completed was as follows: less than high school ($n = 1, < 1\%$), some high school ($n = 2, < 1\%$), high school graduate ($n = 38, 11\%$), trade/vocational school ($n = 22, 6.4\%$), some college ($n = 81, 23.5\%$), undergraduate degree ($n = 150, 43.5\%$), and professional degree ($n = 51, 14.8\%$). Participants reported a broad range of occupations including administrative assistant, health care worker, educator, and IT worker among others.

We assessed participant's social status in a variety of ways. First, the current social class reported by participants was as follows: lower class ($n = 23, 6.7\%$), working class ($n = 117, 33.9\%$), middle class ($n = 175, 50.7\%$), upper-middle class ($n = 27, 7.8\%$), and upper class ($n = 1, < 1\%$). Second, we used MacArthur Scale of Subjective Social Status, in which participants

are given a picture of a ladder and asked to indicate where they fall on a 10-point scale from *worst off* to *best off* relative to other people in the United States (Adler, Epel, Castellazzo, & Ickovics, 2000). The average score on this scale was 5.99 ($SD = 1.66$). Finally, we asked about participant's average yearly household income (in thousands of U.S. dollars), which were the following: less than \$25 ($n = 48, 13.9\%$), \$26 to \$50 ($n = 102, 29.6\%$), \$51 to \$75 ($n = 89, 25.8\%$), \$76 to \$100 ($n = 50, 14.5\%$), \$101 to \$125 ($n = 24, 7\%$), \$126 to \$150 ($n = 15, 4.3\%$), \$151 to \$175 ($n = 5, 1.4\%$), \$176 to \$200 ($n = 3, 0.9\%$), \$201+ ($n = 5, 1.4\%$), and four (1.2%) chose not to answer.

Instrument. As was discussed in the introductory paragraphs, we were interested in developing scales that tapped into need satisfaction through work across three primary domains: survival, social connection, and self-determination needs. We also wanted to ensure that the three components of self-determination (autonomy, competence, and relatedness) were represented through distinct items. As such, our research team constructed unique items for five sets of needs: survival, social connection, autonomy, competence, and relatedness. Following best practice instrument development procedures (Worthington & Whittaker, 2006), we used expert opinion in generation of an initial item pool by including PWT experts on our research team. These experts assisted in developing items and provided feedback on the content validity. The research team consisted of one assistant, one associate, and one full professor in counseling psychology and four doctoral students who were all well versed on the PWT and in scale construction. The team first began by developing specific definitions based on each of the constructs' conceptualizations, aligned with description in the PWT (Duffy et al., 2016), which were as follows:

- Survival needs reflect the ability for work to provide a pathway to survival needs like food, housing and health care.
- Social contribution needs reflect the need to connect to the broader society, feel a part of one's community, connected to something larger than oneself.
- Autonomy needs reflect the need to be causal agent of one's own life and act in harmony with one's integrated self.
- Competence needs reflect the need to have control in navigating one's environment and experience mastery.
- Relatedness needs reflect the need to interact, be connected to, and experience caring for (and from) others.

Using these definitions, the research team collaborated to develop 10 items for each need. Prior to development of the items, each research team member reviewed relevant literature and individually constructed a set of items for each construct. Then, as a team, the researchers examined individually developed items and combined, refined, or discarded items based on group discussion of content validity. Items were retained or discarded based on conceptual representation of the specific construct, length, clarity, and readability. Participants answered each item on a seven-point Likert scale ranging from *strongly disagree* to *strongly agree*, with the item stem of "My work allows me to . . ." being included before each set of 10 items corresponding to the five needs. All items are included in Table 1, which reports the results of the exploratory factor analysis (EFA).

Procedure. Data for this study were collected via Mechanical Turk (MTurk), which is an online platform where researchers can post studies for participants to complete for payment. The benefits of this

platform are that data can be collected from adults around the world in a timely fashion, and samples are often more diverse than those collected via undergraduate subject pools (Casler, Bickel, & Hackett, 2013; Mason & Suri, 2012). In the case of this study, after receiving institutional review board approval, we created a "human intelligence task" in MTurk, which contained a link to the survey as well as requirements for taking the survey. These requirements included (a) being over the age of 18, (b) residing in the United States, and (c) being employed at least part-time. Participants were told they would be paid \$0.50 for completing the survey. For participants who chose to participate, they were directed to a survey hosted on Qualtrics, which contained an initial informed consent page and then the survey itself. At the end of the survey, participants were presented with a code, which they then imputed into the MTurk platform to get compensation for participating.

A wave of articles has been published in the last 5 years on the validity of survey data gathered via MTurk (e.g., Buhrmester, Kwang, & Gosling, 2011; Crump, McDonnell, & Gureckis, 2013; Mason & Suri, 2012). Generally, the flaws revolve around the validity of any type of survey data gathered anonymously from online sources, resulting in missing data and responses at random. Additionally, some researchers have found that people taking surveys on MTurk evidence higher levels of mental health concerns (Arditte, Çek, Shaw, & Timpano, 2016). However, a consensus across different studies suggests that gathering data through this route is equally as valid as other Internet data collection methods (Buhrmester et al., 2011; Hauser & Schwarz, 2016), with validity improved if researchers take additional steps in their data collection and analysis (discussed subsequently). One recent study focused specifically on the collection of occupational data (e.g., work engagement, work satisfaction) and found MTurk participants to represent a variety of jobs and that effect sizes on variables were similar to those collected via other survey methods (Michel, Hartman, O'Neill, Lorys, & Chen, 2016), suggesting, overall, that MTurk was a viable way of collecting occupational data.

In the current study, on the MTurk platform, we allowed only those participants who had been approved for 95% or more of the previous surveys they had taken to complete the survey. Additionally, to ensure participants were paying attention and taking the survey seriously, we inserted several items that served as validity checks (e.g., "Please select strongly agree on this statement"). We proceeded to remove participants from our dataset who failed any of the checks. Our initial request via MTurk was for 500 participants, and after removing participants for failed validity checks our final total was 345 employed adults. All of the participants had complete data for the 50-item need satisfaction survey.

Regarding factor analysis results, we used various criteria to guide retention of our final model: These included variance in items explained by factors, retained factors having an eigenvalue of 1.0 or larger, minimum value of factor loadings of .50 (item communalities of greater than .50, and maximum allowable cross-loadings of .15 between items on different factors (Costello & Osborne, 2005; Worthington & Whittaker, 2006).

Results

We conducted an EFA on the 50-item survey using a maximum likelihood extraction method and promax rotation as we assumed the factors would be correlated. Our explicit goal was to extract five factors. Our sample size of 345 participants fell above the

Table 1
 Pattern Matrix of Initial Exploratory Factor Analysis—Study 1 (N = 345)

Item	Factor loadings				
	1	2	3	4	5
My work allows me to					
... have the resources to provide nutritious food for myself and my family.	.923	-.057	.105	-.063	-.032
... have the resources to pay for adequate housing for my family.	.921	-.075	.057	-.043	-.015
... have the resources to pay for utilities, such as water, heating, and electric, on time.	.908	-.011	.079	-.143	.011
... have the resources to buy enough food for myself and my family.	.904	-.090	.101	-.054	-.035
... have the resources to live in a safe neighborhood.	.841	-.042	.103	-.057	.024
... have the resources to maintain the health of myself and my family.	.817	.084	-.019	.036	-.069
... have the resources to see healthcare providers as needed.	.792	.140	-.072	.084	-.144
... have the resources for myself and my family to obtain an adequate education.	.765	.055	-.140	.080	.071
... have the resources for myself and my family to pursue the education that is necessary for future success.	.747	.057	-.187	.126	.060
... have the resources to live where I want.	.725	-.004	-.177	.074	.100
... make a contribution to the greater social good.	.039	.900	.010	-.112	-.019
... feel a part of something greater by helping to sustain our world.	-.066	.848	-.198	.027	.056
... feel like I am doing something important for my community	-.010	.842	-.030	-.019	-.042
... feel like I am making a difference.	-.029	.794	.031	.009	-.032
... relate to broader society.	.008	.775	.072	-.052	-.066
... feel like I am part of something larger than myself.	-.018	.772	.056	.040	-.043
... feel connected to the world around me.	.026	.740	.056	-.028	-.071
... feel connected to society.	.025	.715	.051	.046	-.047
... feel connected to my community.	.075	.691	.008	.054	-.034
... feel connected to the people who benefit from my work.	-.031	.628	.092	.080	.059
... feel like I am good at my job.	-.094	.003	1.007	-.012	-.084
... feel like I am good at what I do.	-.058	-.062	.988	-.021	-.036
... feel competent.	.027	.021	.906	-.027	-.083
... feel like I know what I'm doing.	-.007	.010	.897	-.014	-.111
... use my strengths at work.	-.003	.012	.833	.035	.038
... do things I am good at.	.015	-.010	.778	-.044	.127
... use my skills.	.024	-.010	.746	.035	.053
... feel a sense of mastery.	.028	.175	.559	.038	.122
... feel a sense of control over my environment.	.036	-.014	.484	.037	.271
... better my skills.	.076	.083	.451	.159	.176
... feel like I fit in.	-.005	-.127	.122	1.018	-.143
... feel like I belong.	-.022	-.078	.127	.967	-.141
... feel understood by others.	-.004	.043	-.058	.895	.006
... feel supported by others.	.029	-.020	-.037	.881	.011
... feel close to others.	-.037	.076	-.050	.850	.028
... feel a strong bond with the people I work with.	-.001	.031	.108	.831	-.097
... feel connected to others.	.030	.102	-.070	.794	-.012
... have positive relationships.	.044	.009	.119	.705	.041
... be cared for by others.	-.040	.116	-.223	.623	.135
... do tasks the way I want.	.005	-.193	-.038	-.116	.923
... take actions that promote my real needs.	.004	-.041	-.032	.086	.827
... feel free to do things my own way.	.053	-.187	.027	-.001	.825
... choose whether or not I have to do certain tasks.	-.065	-.014	-.105	-.152	.820
... do what really interests me.	-.035	.145	-.001	-.048	.759
... engage in tasks in which I truly want to put forth effort.	-.044	.112	.171	-.056	.655
... feel a sense of autonomy in my life.	.053	.157	.035	-.016	.636
... engage in behaviors that represent my most important values.	.001	.106	.050	.174	.598
... feel free to express my ideas.	.024	-.042	.111	.234	.565
... engage in behavior that is consistent with who I really am.	.005	.056	.135	.182	.537

Note. Values in boldface type indicate loadings on each respective factor. SDT = self-determination theory.

suggested minimum of 300 participants for EFAs with a small number of expected factors (MacCallum, Widaman, Zhang, & Hong, 1999) and the Kaiser–Meyer–Olkin test of sampling adequacy was .89, which is higher than the suggested .60 threshold (Worthington & Whittaker, 2006). Results of this EFA can be

seen in Table 1. The factor, structure, and pattern matrix all suggested a five-factor solution and five factors had eigenvalues over 2.0, accounting for a cumulative 69.82% of the variance. We also tested the factor structure using parallel analysis (O'Connor, 2000). Parallel analysis is a method for determining the number of

factors that should be extracted from a dataset. The technique creates a number of random data sets with the same number of variables and observations as the original dataset. The random data sets produce a correlation matrix and eigenvalues that are compared to the eigenvalues from the original dataset. The number of eigenvalues from the raw dataset that are larger than the random data eigenvalues indicates the number of factors to be extracted. For this analysis, we generated 1,000 random data sets with 95 percentile values and used principal axis factoring (O'Connor, 2000). Parallel analysis also suggested five factors with raw data eigenvalues ranging from 20.68 to .70 and the random data values ranging from .98 to .68. After this point, eigenvalues from the random data were larger, suggesting the five-factor solution was most appropriate.

As was discussed earlier, we were interested in developing need satisfaction scales that were short and user friendly, analogous to the 15-item Decent Work Scale (Duffy et al., 2017). We consulted with expert recommendation on number of items suggested per scale, with a minimum number suggested being three (Costello & Osborne, 2005). We were also cognizant that these scales will likely be used in structural models, testing core ideas of the PWT and that items will likely be used as observed indicators of the specific latent need constructs. In these cases, minimizing the number of indicators will reduce model complexity.

As such, on the basis of these aims, our team decided that we would select four items from each subscale. For four of the five subscales, the highest loading items from each factor were used as the final version of the scale. For the survival needs subscale, we

decided to retain the first three highest loading items and the sixth highest loading item. This decision was made as we felt it was important to have an item about work supporting health, and we already had one item on food and one item on housing. Additionally, this item (“... have the resources to maintain the health of myself and my family”) still evidenced a strong factor loading. As is presented in Table 2, using this set of 20 items, we conducted a new EFA using maximum likelihood extraction method with a promax rotation, again finding a five-factor solution. In this case, the five factors accounted for 80.49% of the variance and all factors had eigenvalue's over one. Parallel analysis suggested five clear factors with raw data eigenvalues ranging from 7.81 to 1.00 and the random data values ranging from .52 to .26, after which the random dataset eigenvalues were larger.

Additionally, as has been recommended (Costello & Osborne, 2005), the factor loadings for each item were greater than .50 and their communalities also were greater than .50. As is shown in Table 2, all factor loadings were greater than .15 apart. Scores on the five, four item subscales all evidenced strong internal consistency reliability (α s = .85–.95). Of note, the Social Contribution and Relatedness subscales were highly correlated (.55), but not at a level to be considered completely overlapping constructs (van Mierlo, Vermunt, & Rutte, 2009; see Table 3 for all subscale correlations). Additionally, one factor loading for an item on the competence subscale was greater than one. It is likely that this was caused by high correlations between this and other items on this factor rather than a misspecification of the model. Potential model misspecifications were explored by examining factor loadings in structural models in Study 2.

Table 2
Pattern Matrix of Final Exploratory Factor Analysis—Study 1 ($N = 345$)

Item	Factor loadings				
	1	2	3	4	5
My work allows me to					
... have the resources to provide nutritious food for myself and my family.	.928	.041	-.026	-.037	.001
... have the resources to pay for adequate housing for my family.	.928	-.023	-.057	.015	.009
... have the resources to pay for utilities, such as water, heating, and electric, on time.	.902	.001	.004	-.056	.020
... have the resources to maintain the health of myself and my family	.754	-.029	.092	.095	-.068
... make a contribution to the greater social good.	.048	.880	.046	-.080	.008
... feel like I am doing something important for my community.	.011	.859	.030	-.042	-.019
... feel a part of something greater by helping to sustain our world.	-.058	.805	-.124	.063	.038
... feel like I am making a difference	-.004	.714	.063	.073	-.020
... feel like I am good at my job.	-.068	.010	.969	-.003	-.006
... feel like I am good at what I do.	-.022	-.034	.918	-.004	.030
... feel like I know what I'm doing.	.025	.028	.817	.000	-.042
... feel competent.	.078	-.005	.779	.037	.033
... feel like I fit in.	-.021	.022	-.098	1.047	-.050
... feel like I belong.	-.020	.042	-.037	.938	-.024
... feel understood by others.	.008	-.035	.165	.754	.018
... feel supported by others.	.052	-.016	.084	.725	.040
... do tasks the way I want.	-.001	-.053	-.062	-.052	.942
... feel free to do things my own way.	.043	.028	-.053	.025	.846
... take actions that promote my real needs.	.009	.049	.096	.153	.636
... choose whether or not I have to do certain tasks.	-.070	.017	.075	-.078	.616

Note. Values in boldface type indicate loadings on each respective factor. SDT = self-determination theory.

Table 3
Correlations Descriptive Information on Five Need Satisfaction Subscales—Study 1 ($N = 345$)

Subscale	1	2	3	4	5
1. Survival	—				
2. Social Contribution	.26	—			
3. Competence	.32	.34	—		
4. Relatedness	.36	.55	.52	—	
5. Autonomy	.27	.25	.45	.44	—
<i>M</i>	5.72	4.93	6.02	5.35	4.78
<i>SD</i>	1.26	1.53	1.03	1.38	1.36

Note. All correlations are significant at the $p < .01$ level.

Discussion

The results of Study 1 show evidence for a short, user friendly, reliable instrument of need satisfaction at work framed through a PWT perspective, herein labeled the Work Need Satisfaction Scale (WNSS). The EFA suggested five distinct factors that were all significantly correlated. Although these results provide initial evidence of a reliable scale, many questions remain regarding scale validity and utility, questions which will be addressed in Study 2. Specifically, it is important to use confirmatory factor analytic techniques to explore the larger structure of the five subscales. For example, the scales may be best represented by a variety of structures, including five unique, correlated factors, five subfactors that load onto one overarching needs factor, three factors represented by survival, social connection, the three SDNs combined together, and so forth. We will run a number of tests to determine the best-fitting structure. Additionally, it is important to understand how each of these subscales correlate with analogous constructs (convergent validity) and how well the subscales predict key outcomes (concurrent validity). In Study 2, we will compare scores on each of the five scales to other scales that score should be related, but distinct from and examine how well need satisfaction predicts job and life satisfaction. Study 2 will use data from a new sample of working adults to further explore the validity of the needs scales.

Study 2

The aim of Study 2 was to further examine validity of the WNSS, which was developed in Study 1. Specifically, we examined convergent, discriminant, concurrent, and incremental validity. For each WNSS subscale, we selected a corresponding scale that we predicted would positively correlate based on theory. Additionally, we examined correlational data of each WNSS scales with noncorresponding scales to ensure that no artificially inflated correlations were present. Finally, to examine concurrent validity, we ran a structural model using WNSS scales predicting life satisfaction and job satisfaction. We hypothesized that all WNSS scales would positively predict outcome variables and, as such, provide evidence for validity and utility of scales.

Method

Participants. This study consisted of 476 adults with a mean age of 36.22 years ($SD = 10.76$). Participants self-identified as

White/European American/Caucasian ($n = 356, 74.8\%$), Black/African American ($n = 55, 11.3\%$), Hispanic/Latina/o-American ($n = 37, 7.8\%$), Asian/Asian American ($n = 28, 5.9\%$), American Indian/Native American/First Nation ($n = 11, 2.3\%$), Asian Indian ($n = 3, 0.6\%$), Arab American/Middle Eastern ($n = 3, 0.9\%$), Pacific Islander ($n = 1, 0.2\%$), and other ($n = 6, 1.3\%$). Participants self-identified as female ($n = 279, 58.6\%$), male ($n = 192, 40.3\%$), transgender ($n = 4, 0.8\%$), and gender not identified ($n = 1, < 1\%$). The sample was all employed, with 83.2% employed full-time and 16.8% employed part-time. Participant's highest level of education completed was as follows: some high school ($n = 3, 0.6\%$), high school graduate ($n = 42, 8.8\%$), trade/vocational school ($n = 24, 5\%$), some college ($n = 120, 25.2\%$), undergraduate degree ($n = 209, 43.9\%$), and professional degree ($n = 78, 16.4\%$).

We assessed participants' social status in a variety of ways. First, the current social class of participants was as follows: lower class ($n = 20, 4.2\%$), working class ($n = 153, 32.1\%$), middle class ($n = 262, 55\%$), upper-middle class ($n = 36, 7.6\%$), and upper class ($n = 2, < 1\%$). Second, we used of MacArthur Scale of Subjective Social Status (Adler et al., 2000) described in Study 1 (Adler et al., 2000). The average score on this scale was 5.79 ($SD = 1.61$). Finally, we asked about participants' average yearly household income (in thousands of US\$), which were the following: less than \$25 ($n = 46, 9.7\%$), \$25-\$50 ($n = 142, 29.8\%$), \$50-\$75 ($n = 126, 26.8\%$), \$75-\$100 ($n = 85, 17.9\%$), \$100-\$125 ($n = 24, 5\%$), \$125-\$150 ($n = 27, 5.7\%$), \$150-\$175 ($n = 6, 1.3\%$), \$175-\$200 ($n = 8, 1.7\%$), \$200+ ($n = 7, 1.5\%$), and one (0.2%) chose not to answer.

Instruments.

Work Need Satisfaction Scale (WNSS). Participants were given the 20-item WNSS with the prompt, "My work allows me to:." Each item (see Table 2) was answered on a 7-point scale ranging from *strongly disagree* to *strongly agree*. The instrument contains five, four-item subscales corresponding to the five needs established in Study 1. To obtain subscale totals, item scores were averaged. The estimated internal consistency reliability of each of these subscales was as follows: survival ($r = .95$), social connection ($r = .94$), competence (SDN; $r = .93$), relatedness (SDN; $r = .93$), and autonomy (SDN; $r = .82$).

Decent work. The degree to which participants' jobs fulfilled the five components of decent work was measured by the Decent Work Scale (DWS; Duffy et al., 2017). The DWS contains 15 items, with five, 3-items scales for each of the decent work components: safe working conditions, access to health care, free time and rest, adequate compensation, and complementary values. Participants were asked to answer items of a 7-point scale ranging from *strongly disagree* to *strongly agree*. Example items include, "I feel emotionally safe interacting with people at work," "I have a good healthcare plan at work," "I am not properly paid for my work," "I have free time during the work week," and "The values of my organization match the values within my community." Duffy et al. (2017) found scores on each scale and the total scale to evidence strong internal consistency reliability, which has also been found in other studies using the instrument (Douglass et al., 2017; Duffy et al., 2018). Additionally, scale scores have been found to correlate with job satisfaction, work meaning, and withdrawal intentions (Duffy et al., 2017). In the current study, we will

use the score from the total scale to correlate with need satisfaction. The estimated internal consistency of scale scores was .89.

Job satisfaction. The degree to which participants were satisfied with their jobs was measured by a 5-item job satisfaction instrument developed by Judge, Locke, Durham, and Kluger (1998). Participants answered items on a 7-point scale ranging from *strongly disagree* to *strongly agree*. An example item is, “I feel fairly well satisfied with my present job.” In the instrument development study, Judge et al. (1998) found scale scores to evidence strong estimated internal consistency reliability and correlate with other measures of job satisfaction. The scale has also been highly correlated with decent work (Duffy et al., 2017). In the current study, the estimated internal consistency reliability of scale scores was .87.

Life satisfaction. The degree to which participants were satisfied with their lives in general was measured by the 5-item Satisfaction with Life scale (SWLS; Diener, Emmons, Larsen, & Griffin, 1985). Participants answered items on a 7-point scale ranging from *strongly disagree* to *strongly agree* with an example item being, “The conditions of my life are excellent.” In the initial study, the scale evidenced good internal consistency reliability (.87) and since its publication has been used in thousands of studies, consistently finding the scale to be reliable and correlate in the expected directions with analogous variables such as positive affect and subjective well-being (Pavot & Diener, 2009). The estimated internal consistency of scale scores in the current study was .91.

Maslow need satisfaction. A scale that measures satisfaction with Maslow’s five needs was used to assess Safety/security needs (Taormina & Gao, 2013). The scale contains five subscales, and we used the 15-item Safety/security subscale as it most closely overlaps with the survival needs subscale from the WNSS. Participants were presented with the prompt, “I am completely satisfied with” and then answered items on a 5-point Likert scale ranging from *strongly disagree* to *strongly agree*. Example items include, “The quality of the house/apartment I am living in,” and “My ability to get money whenever I need it.” In the instrument development study, scores on this scale were found to evidence strong internal consistency reliability (.87) and significantly correlate in the expected directions with self-esteem, family support, anxiety/worry, and life satisfaction (Taormina & Gao, 2013). In the current study, the estimated internal consistency of scale scores was .90.

Prosocial intentions. The degree to which participants intended to engage in prosocial activities over the next 6-week period was measured by a five-item scale developed by Pavey, Greitemeyer, and Sparks (2011). Participants answered these items on a 7-point Likert scale ranging from *definitely will not do this* to *definitely will do this*. Example items include, “Give money to charity,” and “Go out of your way to help a stranger in need.” In the initial study (Pavey et al., 2011), the scale evidenced adequate internal consistency reliability (.70), and the authors found in their experiment that participants primed to feel a sense of relatedness with others were more likely to endorse prosocial intentions. In the current study, the estimated internal consistency reliability of scale scores was .84.

SDT need satisfaction. The degree to which psychological needs were being met at work was measured by the 21-item BPNWS (Deci et al., 2001; Ilardi, Leone, Kasser, & Ryan, 1993; Kasser, Davey, & Ryan, 1992). This scale is an adapted version of

the Basic Psychological Needs Scale (Deci & Ryan, 2000) specifically to the work domain, with “at work” inserted into most items to fit the domain. Participants were given the following prompt:

The following questions concern your feelings about your job during the last year. (If you have been on this job for less than a year, this concerns the entire time you have been at this job.) Please indicate how true each of the following statement is for you given your experiences on this job. Remember that your boss will never know how you responded to the questions. Please use the following scale in responding to the items.

The scale was a seven-point scale ranging from *not at all true* to *very true*. The scale contains three subscales for each SDT need: competence, relatedness, and autonomy. Example items include, “People at work tell me I am good at what I do” (competence), “I get along with people at work” (relatedness), and “I feel I can make a lot of inputs to deciding how my job gets done” (autonomy). The scale has been used in a number of studies (e.g., Deci et al., 2001; Gagné, 2003; Vansteenkiste et al., 2007), with subscale and total scale scores evidencing acceptable internal consistency reliability and significantly correlating in the expected directions with variables such as workplace climate, work engagement, job satisfaction, and self-esteem. In the current study, the estimated internal consistency reliabilities for scale scores were as follows: competence ($r = .74$), relatedness ($r = .86$), and autonomy ($r = .78$).

Procedure. Similar to Study 1, data were collected via MTurk and paid \$.50 for participating. We again restricted our participants to be over the age of 18, from the United States, employed at least part time, and have a 95% or better approval rating on previous MTurk assignments. We also included validity check items and an additional check at the end of the survey where we asked participants if they took the survey seriously, noting they would still be compensated either way. The initial sample was 534 participants which was narrowed down to a final total of 476 after we removed participants for failing any one of the validity check items (56) or answering they did not take the survey seriously (2). The remaining dataset was complete with no missing data.

Results

Preliminary analysis. All variables were inspected for outliers and normality. Job satisfaction, life satisfaction, autonomy needs, relatedness needs, and social connectedness needs all had skewness and kurtosis values ≤ 1 and included no outlier scores. Competence needs, however, had a kurtosis value of 3.08. Upon inspection of the data, there were five outlier scores more than three standard deviations below the mean. These outliers were removed from the dataset, which improved non-normality (kurtosis = .85).

Model testing. Our goal in model testing was twofold. We were primarily interested in identifying a model that fit the data best, both in terms of being parsimonious and evidencing strong fit statistics. Secondly, we were interested in identifying a model that mirrors the conceptualization of needs in the original PWT model (Duffy et al., 2016). In the theory, survival needs and social connection needs are positioned as independent latent constructs while competence, relatedness, and autonomy needs are positioned as indicators of an overall self-determination needs construct. Past

studies have conceptualized autonomy, competence and relatedness in this fashion, including several by the original SDT theorists (e.g., Baard, Deci, & Ryan, 2004; Chen et al., 2015; Deci, Ryan, Gagné, Leone, Usunov, et al., 2001; Ryan & Deci, 2017). Additionally, the original theorists have written conceptually about autonomy, competence, and relatedness as contributing to a unified psychological experience of self-determination (Baard et al., 2004; Ryan & Deci, 2000). However, others (Johnston & Finney, 2010) have argued that autonomy, competence, and relatedness are distinct factors and should not be loaded onto a higher order factor. Given that we are testing this construct from a new theoretical perspective, we defer to model testing to assess which structure is most appropriate for PWT research.

In the following sections, we report the results of a series of confirmatory factor analyses using Mplus (Muthén & Muthén, 2012) that seek to identify the best-fitting model (see Figure 1, Figure 2, and Figure 3). Our sample size of 476 participants falls well within the optimally suggested guideline for scale development within counseling psychology of 10 participants for each observed variable (Worthington & Whittaker, 2006). To assess fit, we used traditional indices of chi-squared, root mean square error of approximation (RMSEA), comparative fit index (CFI), and Tucker–Lewis Index (TLI). Scholars have suggested that RMSEA values below .08 and CFI and TLI values above .95 are representative of good fitting models (Hu & Bentler, 1999).

Note the first three models tested here would be considered nested since they are increasingly constrained iterations of the same factors, and thus comparable using chi-squared difference testing. Although difference in model fit can be tested with a chi-square test, results are often inaccurate due to sensitivity to large sample sizes. Thus, following the recommendation of experts (i.e., Chen, 2007; Cheung & Rensvold, 2002), we assessed for practically significant difference of fit between models using CFI and RMSEA; specifically, we examined fit indexes for differences of greater than 0.01 in CFI and RMSEA values. We also examined differences between Akaike information criterion (AIC) and Bayes information criterion (BIC) values (Tabachnick & Fidell, 2007), although the current literature is unclear regarding a “cut-off” for such indexes indicating significant differences in fit.

Correlational model. This model (see Figure 1) conceptualizes that the five needs (survival, social contribution, competence, relatedness, autonomy) are best positioned as all distinct, correlated factors. For this model, each of the five latent indicators is made up of the four items from that specific subscale, and each of these latent indicators are correlated with each other. This model would conceptualize the needs as being related, but independent and not represen-

tative of any overall factor. Factor loadings for all factors ranged from .56 to .93. This model fit the data well: $\chi^2(160) = 485.72, p < .001$; CFI = .96, TLI = .95, AIC = 26,834.15, BIC = 27,125.73, and RMSEA = .07, 90% CI [.05, .07].

Higher order model. This model (see Figure 2) conceptualizes that the five needs (survival, social connection, competence, relatedness, and autonomy) are best positioned as indicators of one higher order need satisfaction construct. For this model, each of the five latent indicators is also made up of the four items from that specific subscale, but in this case the five factors are indicators of need satisfaction. Factor loadings for all factors ranged from .56 to .94. Factors loaded onto the higher order needs factor as follow: survival ($r = .44$), social contribution ($r = .58$), autonomy ($r = .63$), competence ($r = .69$), and relatedness ($r = .87$). This model fit the data well: $\chi^2(165) = 493.15, p < .001$; CFI = .96, TLI = .95, AIC = 26,833.55, BIC = 27,104.30, and RMSEA = .07, 90% CI [.06, .07]. Change in AIC and BIC units from the correlational model was minimal ($\Delta\text{CFI} < .01, \Delta\text{RMSEA} < .01, \Delta\text{AIC} = .60, \Delta\text{BIC} = 21.43$).

Higher order SDN model. This model (see Figure 3) more closely ties to the conceptualization of needs within the PWT (Duffy et al., 2016) as well as conceptualization within the SDT literature (Ryan & Deci, 2017). Specifically, competence, relatedness, and autonomy were positioned as indicators of a higher order SDN construct. The three SDN needs were composed of four item indicators for each of these subscales, and these latent constructs were positioned as indicators of a higher order factor of self-determination needs. The survival and social contribution need constructs were again composed of the four-item indicators per subscale. The survival, social contribution, and self-determination factors were allowed to correlate. Factor loadings for all factors ranged from .56 to .94. SDT factors loaded onto their higher order factor as follows: autonomy ($r = .63$), competence ($r = .69$), relatedness ($r = .87$). This model fit the data well: $\chi^2(164) = 492.36, p < .001$; CFI = .96, TLI = .95, AIC = 624.36, and RMSEA = .07, 90% CI [.06, .07]. Change in AIC and BIC units from the correlational model ($\Delta\text{CFI} < .01, \Delta\text{RMSEA} < .01, \Delta\text{AIC} = 1.72, \Delta\text{BIC} = 15.54$) and higher order model ($\Delta\text{CFI} < .01, \Delta\text{RMSEA} < .01, \Delta\text{AIC} = 1.12, \Delta\text{BIC} = 5.89$) was minimal.

Three-factor SDN model. Considering this final, theoretically driven model fit the as well as the first two models, we decided to test a fourth model that was a simplified version. Specifically, in this model survival needs and social contribution needs were again represented by the four item indicators. However, for self-determination needs, we added the four items together respectively from the competence, relatedness, and autonomy scales to create

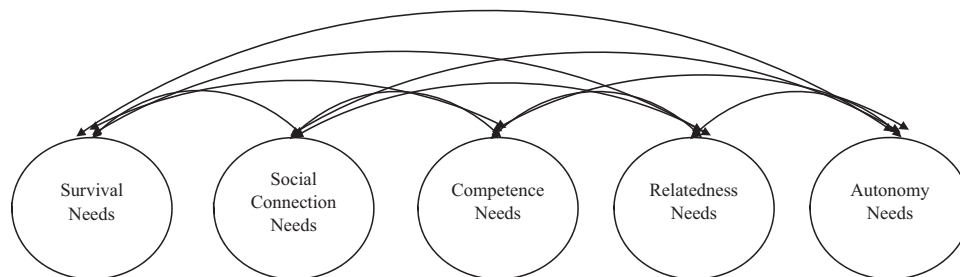


Figure 1. Five-factor correlational model.

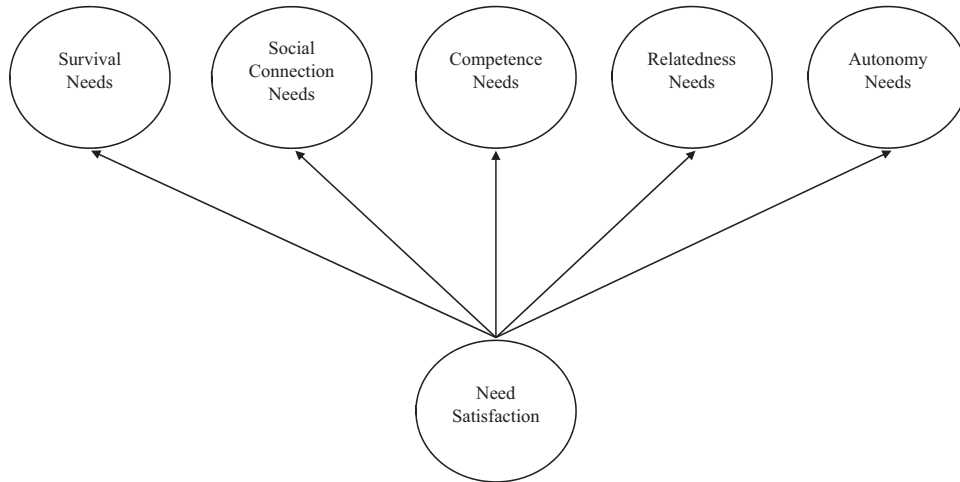


Figure 2. Five-factor higher order model.

three total scale scores for each of the three needs. These total scale scores were then positioned as three indicators of self-determination needs. The structure of this model was no longer higher order and contained 11 total observed indicators versus the 20 observed indicators in the first three model tests. Factor loadings for all factors ranged from .58 to .93. This model fit the data well: $\chi^2(41) = 107.39$, $p < .001$; CFI = .98, TLI = .97, and RMSEA = .07, 90% CI [.05, .08]. However, this model is unable to be compared to the previous three models given that it does not contain identical indicators for the SDT factor (i.e., uses total score rather than individual items).

Incremental validity. Given the existing support for self-determination needs in prediction of job and life satisfaction, we tested the incremental predictive utility of adding survival and

social connection needs to the model. We did this by first testing the higher order SDN model with only self-determination variables and compared total explained variance. Results showed that adding survival and social connection needs to the model added a total of 11.0% explained variance for life satisfaction and 2.2% explained variance for job satisfaction. Similarly, we tested the higher order SDN model using the BPNWS to determine relative utility of the WNSS self-determination subscale. Variance explained was not substantively different between the WNSS (life satisfaction = 31.0% explained variance, job satisfaction = 79.1% variance) and the BPNWS (life satisfaction = 30.6%, job satisfaction = 81.8%). Fit indices, however revealed degradation of fit for the model using the BPNWS, $\chi^2(689) = 2572.52$, $p < .001$; CFI = .85, TLI = .84, and RMSEA = .08, 90% CI [.07, .08].

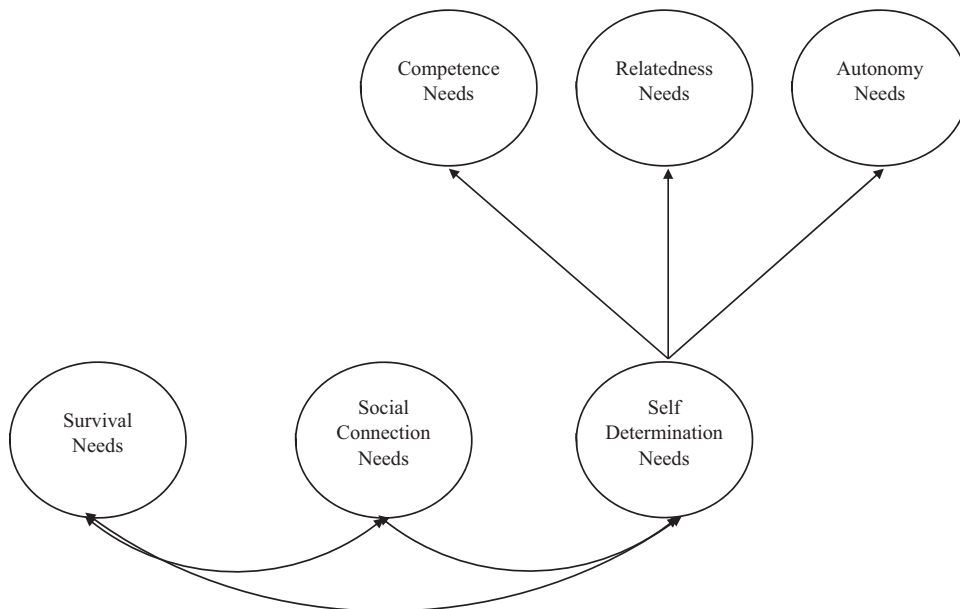


Figure 3. Five-factor higher order self-determination needs model.

Invariance models. Given that the higher order SDN model was the closest to theoretical assertions of the PWT and was as good a fit to the data as the other models we tested, we performed analyses to test invariance of this model across racial, gender, social class, and income groups. Here the goal was to understand whether model structure is similar across different populations. Following the procedure of Duffy et al. (2017), we created two categories for each group. For race, we compared white versus nonwhite participants. Despite the limitations of grouping nonwhite racial groups together, we used this procedure because we did not have enough participants from nonwhite racial groups to make any meaningful comparisons. Similarly, for gender we lacked enough nonbinary participants to compare across multiple genders and thus compared the model between men and women, with an acknowledgment of the limitations of not including other gender identities. For income and subjective social class, we split the variables at the mean to create two categorical groups each. For income, we divided the sample into two groups at greater than and less than \$50,000 in average yearly household income. For social class, we categorized using responses of MacArthur Scale of Subjective Social Status (Adler et al., 2000). The sample mean for this scale was 5.76. Thus, we divided the sample into two groups: those for whom the response was ≤ 5 and those for whom the response was ≥ 6 . These analyses were exploratory in nature and intended to be a point from which future researchers might begin to look more closely into the role of race, gender, income, and subjective social class in the utility of this scale.

After creating comparison groups, we successively constrained parameters across groups in three models: the configural, metric, and scalar models. In the configural model, only the model structure is held constant across groups. Poor fit here suggests that the organization of model indicators is different across groups. In metric invariance, the model structure and all factor loadings are held constant across groups. A reduction in fit between the metric and configural models suggests that, though organization of indicators is the same across groups, the strength of the factor loadings is different. Finally, in scalar invariance, the model structure, factor loadings, and the indicator intercepts are constrained to be the same for each group. A reduction in fit here suggests that

indicators have different intercepts across groups (Little, 2000). As with nested models described in the preceding text, we examined degradation of fit by examining CFI, RMSEA, AIC, and BIC values. Analyses showed that model configuration, factor structure, and indicator intercepts were maintained across racial, gender, income, and social-class groups (for specific fit indices, please refer to the online supplemental material).

Convergent and discriminant validity. We sought to demonstrate the validity of the five need scales by examining how well they converged with analogous constructs and correlated with decent work. First, as seen in Table 4, all five needs were shown to moderately to strongly correlate with decent work ($r_s = .37-.55$). Second, we paired each need scale with an analogous instrument. Survival needs was found to moderately correlate with Maslow's safety/security needs ($r = .47$) and social contribution needs were found to moderately correlate with prosocial intentions ($r = .37$). Scores on the three self-determination need scales were correlated with scores from the widely used BPNS-W (Deci et al., 2001; Iardi et al., 1993; Kasser et al., 1992). The three subscales were found to correlate with one another at the following levels: competence ($r = .70$), relatedness ($r = .70$), and autonomy ($r = .67$). To examine discriminant validity, we inspected relative strength of correlation of variables with their associated convergent scales versus their nonassociated scales. All variables, with the exception of social contribution, correlated more strongly with their associated scales than with nonassociated scales.

Concurrent validity. The PWT model proposes that the three sets of needs (survival, social contribution, self-determination) each uniquely predict indicators of work fulfillment and well-being. Considering that the higher order SDN model (Model 3) fit the data equally to the other tested models and that it was more theoretically justified, we used this configuration to examine the concurrent validity of the needs scales. Specifically, survival and social contribution needs were each represented by their four observed item indicators and self-determination needs was a higher order factor represented by competence, relatedness, and autonomy, which were themselves represented by their four observed item indicators. As seen in Figure 4, we tested a structural model where survival,

Table 4
Correlations Descriptive Information of Work Need Satisfaction Scale (WNSS) and Validity Instruments—Study 2 ($N = 476$)

Measure	1	2	3	4	5	6	7	8	9	10	11	12	13
1. WNSS—Survival	—												
2. WNSS—Social contribution	.21	—											
3. WNSS—Competence	.35	.36	—										
4. WNSS—Relatedness	.33	.51	.59	—									
5. WNSS—Autonomy	.26	.34	.41	.52	—								
6. Decent work	.45	.44	.37	.55	.39	—							
7. Job satisfaction	.32	.54	.56	.67	.54	.60	—						
8. Life satisfaction	.40	.34	.24	.36	.30	.40	.39	—					
9. Maslow needs	.47	.24	.30	.28	.24	.50	.30	.53	—				
10. Prosocial intentions	.16	.37	.21	.24	.18	.25	.27	.32	.26	—			
11. SDT competence	.34	.44	.70	.60	.39	.43	.65	.26	.27	.17	—		
12. SDT relatedness	.23	.42	.51	.70	.37	.55	.64	.30	.29	.24	.65	—	
13. SDT autonomy	.31	.39	.57	.64	.67	.51	.70	.31	.32	.20	.65	.61	—
<i>M</i>	5.72	4.93	6.02	5.35	4.78	73.61	24.58	23.33	55.64	22.33	31.49	39.78	32.57
<i>SD</i>	1.26	1.53	1.03	1.38	1.36	17.35	7.07	7.52	10.66	7.37	3.02	3.87	3.80

Note. All correlations are significant at the $p < .01$ level. SDT = self-determination theory.

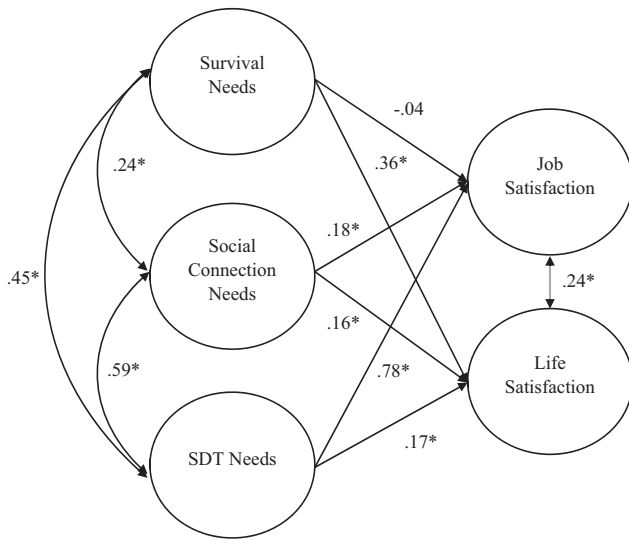


Figure 4. Predictive validity test of three psychology of working needs on job satisfaction and life satisfaction. SDT = self-determination theory. * $p \leq .05$.

social contribution, and self-determination needs were each positioned as predictors of job satisfaction (an indicator of work fulfillment) and life satisfaction (an indicator of well-being). We chose to test this model as a more stringent concurrent validity test, examining how well each of these needs predicted job and life satisfaction while accounting for their prediction of the other outcome. Job satisfaction and life satisfaction were represented by the five items, respectively, from each instrument and the three needs were allowed to correlate.

This model fit the data well: $\chi^2(392) = 1113.64$, $p < .001$; CFI = .94, TLI = .93, and RMSEA = .06, 90% CI [.06, .07]. Figure 4 depicts the standardized path coefficients. Five of the six predictive paths were found to be significant, ranging from small (social contribution to life satisfaction, .15) to large (self-determination to job satisfaction, .77) effects, and only the path from survival needs to job satisfaction was found to be nonsignificant. The model accounted for 31% of the variance in life satisfaction and 79% of the variance in job satisfaction.

Discussion

The results of Study 2 offer further insights into the structure and validity of the Work Need Satisfaction Scales (WNSS). Like Study 1, scores from each scale were found to evidence strong internal consistency reliability. The five need scales were also shown to correlate with their respective analogous validity instruments. Those more likely to see their work benefiting others were also more likely to endorse prosocial intentions, and those whose work helped them meet survival needs were more likely to endorse meeting Maslow's safety/security needs. Importantly, although the self-determination needs scales did strongly correlate with self-determination needs as measured by a different instrument, these correlations ($r = .67-.70$) were not large enough to be considered overlapping constructs (van Mierlo et al., 2009). This suggests that the way these needs are measured within a

PWT framework are meaningfully different from how self-determination needs at work were measured by similar instruments. Furthermore, with the exception of social contribution needs, all scales correlated more strongly with their associated scale than other convergent scales, providing evidence of discriminant validity.

Regarding model testing, the three primary measurement model tests all yielded similar fit with regard to the structure of the five subscales. Given this finding, depending on their interests, researchers may appropriately use each subscale as a stand-alone factor or one that correlates with other needs. However, given the similarity across models, if researchers are interested in using the need scales within a larger PWT structural model test, we recommend that the third model tested—the higher order SDN model—be used. This is for two primary reasons. First, the model is a theoretical match for how self-determination needs are typically structured within the PWT and SDT theorists. Second, having three primary need indicators rather than five will make structural model tests much more parsimonious and user-friendly. Finally, for researchers seeking an even more parsimonious model, perhaps due to sample size concerns, we demonstrated that a model using autonomy, competence, and relatedness subscale totals as the indicators of a higher-order SDN factor had excellent fit to the data. Thus, results suggest that, depending on the needs of the researcher, any of the models we tested may be appropriate for future use if consistent with their specific research aims.

It is important to note that SDT literature (Johnston & Finney, 2010) provides valid arguments for conceptualizing autonomy, competence, and relatedness as three distinct factors rather than loading them onto a higher order factor (i.e., loading onto a higher order factor suggests three needs are satisfied in concert). We acknowledge the importance of delineating each of these needs when answering certain research questions (e.g., unique contribution of each SDT need to overall well-being). However, given that the PWT is interested in the composite experience of psychological need satisfaction, SDT empirical and conceptual literature describing needs through this lens, and the results of the current study that support loading psychological needs onto a higher order factor, we argue that the higher order SDT model is most appropriate for researchers examining general need satisfaction. We recommend that those who use this model also report correlations and factor loadings of autonomy, competence, and relatedness indicators to provide insight into how each of these may individually impact a given model. Further, in the case that researchers are specifically examining unique contribution of autonomy, competence, or relatedness, it may be appropriate for them to use the five-factor model, given that it was virtually identical in terms of fit.

Invariance testing of the needs model indicated no significant differences when administered across racial, gender, social class, and income groups, which suggests the model may be equally applicable across these groups. It is important, however, for future researchers to interpret these results with caution; for each of these models, the sample was divided into two groups, which provides only a rough sketch of invariance across population groups. This may be particularly problematic when considering race, a complex identity that needs to be studied beyond the binary of white and nonwhite. Similarly, we tested invariance by splitting the sample into two groups above and below the mean for social class and above and below \$50,000 for annual income. Although this was the most practical way to analyze the data in the current study, this method was somewhat

crude, and future studies may benefit from a more sophisticated examination of this scale across different identity groups.

Regarding concurrent validity, the five need satisfaction subscales accounted for a substantial percentage of variance in outcome variables as predicted by the PWT. Additionally, all direct paths—except for the path from survival needs to job satisfaction—were significant. Nonsignificance in the path from survival needs to job satisfaction may be attributed to a number of factors. It may be that satisfaction of survival needs is more salient for one's general life satisfaction (e.g., by impacting how one spends time outside of work) rather than one's experience on the job. This idea is supported by the moderate, positive prediction of life satisfaction by survival needs. Another possibility may be related to the fact that the current scale only taps into need satisfaction and does not address need frustration. That is, it may be that frustration of survival, rather than low levels of satisfaction of survival needs, has a greater impact on job satisfaction. Of particular note is the large effect size of the path from SDN to job satisfaction. One interpretation of this a high degree of overlap between these two scales and, thus, a lack of discriminant validity; however, given the difference face content between items, we are doubtful that this is the case. Instead, we believe this suggests that of all the variables in the model, SDN may be particularly essential for explaining one's experience of satisfaction at work.

General Discussion

Building from the PWT (Duffy et al., 2016), in the present studies we developed a theoretically driven and practically useful measure of need satisfaction demonstrating reliable and valid scores. After generating five, four-item subscales—survival need satisfaction, social contribution need satisfaction, autonomy need satisfaction, competence need satisfaction, and relatedness need satisfaction—in Study 1, we tested four different structural models in Study 2. Given that there were no significant differences between models, results offer a flexible five-factor model, the structure of which may be adapted based on theory and researcher needs. For the purposes of the PWT, we suggest a model in which autonomy need satisfaction, competence need satisfaction, and relatedness need satisfaction are loaded onto a higher order self-determination needs factor (SDN), which is correlated with survival need satisfaction and social contribution need satisfaction. Initial tests of convergent and concurrent validity indicate that the scale is valid and reliable, and thus may be useful in measuring need satisfaction as well as predicting related variables.

Implications for Practice

Although future research is needed to further explore how the WNSS might be used in practice, current findings support use of scales in the context of understanding working adults' experience of job and life satisfaction. Results indicated that survival need satisfaction may be particularly important in predicting life satisfaction. The PWT was developed with concepts of power and privilege at the forefront. Given that satisfaction of basic survival needs is inherently intertwined with sociocultural privilege and access to power, this subscale may be particularly useful in practice with marginalized populations. Usage of the survival needs satisfaction subscale may be helpful not only in assessing clients'

access to basic needs like food, shelter, and health care, but may also be helpful in generating discussion about such topics. From a PWT perspective, understanding and talking about clients' current access to basic needs may act as a potential starting point for overcoming barriers related to such needs. In addition, the WNSS may be useful for clients who do have access to resources and privilege in that it may provide some external indices of the impact of access to opportunity in relation to work. Using the WNSS may promote critical consciousness among a wide array of client populations by documenting the impact of access to power, thereby facilitating conversations that may foster growth in social and political awareness.

Another important finding regarding practice implications is the predictive power of SDN in predicting job satisfaction. This finding is preliminary and future researchers should continue testing for discriminant validity to ensure the large effect size is not a product of conceptual overlap. However, it can offer insight into potential practical implications. As with survival needs, assessment of SDN allows for understanding and explicit discussion of clients' current level of need satisfaction. Doing so may offer insight to clients about their current level of need satisfaction and which self-determination needs may be unfulfilled. In identifying SDN that are unsatisfied, counselors may engage clients in interventions to increase satisfaction of those specific needs in an effort to help clients achieve increased levels of overall job satisfaction. Although future research is needed on SDN interventions, career development professionals may draw from SDT intervention literature in the fields of school (Eisenman, 2007) and organizational (e.g., Deci et al., 2017) psychology when working with clients.

Limitations and Future Directions

Results of the current studies should be considered in light of a number of limitations. First, although results demonstrating validity for the WNSS are promising, subscales will need to be continuously examined over time. Future testing of the WNSS should include continued examination of predictive power. Additionally, because variables represented in the WNSS are positioned as mediators between decent work and job and life satisfaction in the PWT model, this relation should be tested. It is also important to note that the current study used cross-sectional data; future studies should employ longitudinal methods to confirm hypothesized placement of WNSS variables within the PWT model.

Second, although the current study included rough preliminary findings that responses to the WNSS did not vary across race, gender, social class, or income groups, this will need to be further tested in future studies. Specifically, it will be important to recruit larger and more diverse samples so that invariance testing may be conducted across more specific groups (e.g., across several racial groups rather than simply white and nonwhite). Third, although most of our subscales correlated most strongly with their associated convergent scale, social contribution need satisfaction correlated more strongly with self-determination needs than with prosocial intentions. It is likely that this may have occurred for two reasons. First, self-determination and social connection need scales prompt respondents to answer in the present tense, whereas the prosocial intentions scale asks respondents to indicate their future plans. Second, the prosocial intentions scale taps into specific behaviors, whereas the social contribution scale taps into one's

general experience of feeling connected their community. Thus, it is likely that the general nature of the social contribution scale, along with its focus on one's present experience, results in stronger concurrence with one's broader perception of self-determination; however, it is important that future researchers further explore this finding in continued validity testing. Finally, it is important to note that the current scale only measured need satisfaction and did not tap into need frustration. An interesting direction for future research may be to develop a corresponding need frustration scale to be used along with the WNSS.

In closing, we believe that the development of WNSS provides an important resource for scholars working within the PWT paradigm, but also for other researchers and practitioners who are interested in understanding the predictors and outcome of need satisfaction. We hope that this scale will be used in a wide array of research endeavors that seek to unpack how psychological need satisfaction interfaces with broader social and contextual factors both at work and in nonwork contexts.

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