

When We Say “Perceived Support”, What Do We Mean?

Contexts and Components of Support among People with Serious Medical Conditions

Alannah Shelby Rivers and Keith Sanford

Baylor University

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Shelby_Rivers@Baylor.edu).

Abstract

Perceived social support is important for numerous health outcomes in people with serious medical conditions; however, previous studies have targeted different assessment contexts (including single people or partnered people reporting on either general or relationship-specific support) and different components of perceived support (including positive and negative interactions and support availability). The present study investigated potential functional differences across these contexts and components. A sample of 340 people with serious medical conditions were recruited via market research panels to complete online questionnaires. The sample included three assessment context groups and participants completed scales assessing three components of perceived support along with criterion variables regarding treatment adherence, affect, coping, and aspects of general psychological functioning. Results suggested a high degree of functional invariance across the different assessment contexts, but important distinctions between the different components of perceived support. Following theoretical expectations, each component explained unique variance in different sets of criterion variables. Results suggest that it is meaningful for researchers to generalize across assessment contexts, but important to distinguish between components of perceived support.

Keywords: health, mental health, relationship types, social support, stress

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When people experience serious medical conditions, their perceptions of social support are associated with important outcomes such as treatment adherence, affect, coping, and general psychological functioning (Cohen et al., 2001; DiMatteo, 2004; Uchino, 2006). However, the perceived support literature contains numerous definitions and conceptualizations (Lakey & Cohen, 2000), and it is important to address questions regarding differences in the ways that perceived social support has been defined and conceptualized. One question is whether it is important to distinguish between different *components* of perceived support that have been assessed in research. Specifically, do models of social support need to distinguish between perceptions of general support availability (Cohen et al., 2001; Lakey & Cohen, 2000), and perceptions of positive and negative interactions (Sanford et al., 2016)? A second question is whether there is functional invariance across different *assessment contexts*. Specifically, does social support assessed in the context of intimate partner relationships (Badr & Krebs, 2013; Robles et al., 2014), have the same function as social support assessed across all types of close relationships (Holt-Lunstad et al., 2010; Uchino, 2009a)? To clarify which distinctions represent meaningful functional differences in support for well-being in medical patients, we need first to identify important components and contexts of perceived support that may uniquely influence well-being and then establish a strategy for examining functional differences and similarities between these components and contexts. These findings will inform future models to improve well-being outcomes for people with medical conditions.

Components of Perceived Support

Recent work focusing on perceived support in stress and coping has emphasized two basic components: perceived support availability and perceived interactions (Lakey & Cohen, 2000). In general, perceived social support includes mental representations that people have about close interpersonal relationships that are important for coping with stressful or challenging life situations (Cohen et al., 2001; Uchino, 2006), and these perceptions are distinct from other key social support constructs such as social integration (involving the number and types of social relationships people have) and support communication (involving specific ways helpers provide responses to another's perceived needs; MacGeorge et al., 2011). One key line of research has focused on the component of perceived support availability, which has strong associations with health outcomes (Cohen et al., 2001; Uchino, 2009a, 2009b). This component involves a person's script for typical supportive interactions (Brunson et al., 2015; Lakey & Cohen, 2000; T. Pierce et al., 1997), and is typically conceptualized as a unidimensional construct with support availability versus unavailability as opposite poles of a single dimension (Goodenow et al., 1990; Williamson & O'Hara, 2017).

In contrast to perceived availability, perceived interactions involve a person's memories of past interactions (MacGeorge et al., 2011). Early research in this area focused on "received support," which was limited to perceptions of interactions where the target individual was the support recipient (Lakey & Cohen, 2000), and it was common to distinguish between specific support provisions such as emotional, esteem, informational, and instrumental (Cutrona, 1990; Xu & Burleson, 2001). However, these types of perceptions are often redundant with each other (Xu & Burleson, 2004), and in general, research finds that received support often produces relatively weak effects, and may be highly context-dependent (MacGeorge et al., 2011; Melrose et al., 2015). Another way to conceptualize perceived support involves a presumption that people

experience support from everyday types of affective social interaction that are not limited to receiving specific support provisions (Lakey & Orehek, 2011). Accordingly, a recent line of research has produced promising results focusing more broadly on types of positive and negative interactions that people view as important when they experience stressful life events (Sanford et al., 2016). Positive interactions may involve not only direct provisions of comfort, but also sharing humor and spending quality time together, whereas negative interactions may include a failure to provide expected support, irritability, or withdrawal from communication.

Perceived support availability and perceived interactions are two especially important components of support because there is reason to expect them to be distinct from each other and uniquely important for well-being in people with serious medical conditions (Uchino, 2009a). Although there is some expected correlation between perceived interaction and support availability (Lakey & Cassady, 1990; Neff & Karney, 2003; Uchino, 2009b), there are also notable conceptual and empirical distinctions between these components. One key theoretical difference involves factor structure. Whereas perceived availability is generally conceptualized as a single, unidimensional construct, perceived positive and negative interactions are not opposites, but two distinct dimensions with a near-zero correlation (Manne et al., 1997; Manne & Zautra, 1989; Rivers & Sanford, 2018; Sanford et al., 2016, 2017). Therefore, when people face stressful life events like serious medical conditions, they may perceive a combination of both positive and negative interactions, along with varying degrees of support availability, and all of these should represent distinct processes important for well-being.

Components Associated with Distinct Outcomes for Medical Patients

If each component involves a distinct process, then there should be differences in the types of outcomes that each component best predicts. For people with medical conditions,

perceived interactions may be especially important for understanding outcomes that involve responding to one's current medical situation, such as a person's adherence to medical recommendations. Presumably, the interactions a person perceives in a given context will be uniquely important for predicting that person's immediate affective and behavioral responses within that context (DeLongis & Holtzman, 2005), and this may occur regardless of how much the person perceives there to be general availability of future support in other contexts. In this way, positive interactions may facilitate greater daily adherence to medical recommendations, whereas negative interactions may discourage commitment (Coppotelli & Orleans, 1985; DiMatteo, 2004).

Similarly, perceived interactions should be uniquely related to affect and coping behavior for people with medical conditions. This is consistent with models like relational regulation theory (Lakey & Orehek, 2011), which suggests that people regulate their affect primarily through daily interactions involving companionship (regardless of broader schemas of expected support availability), and the social cognitive processing model of adjustment to cancer, which suggests strong links between interpersonal interaction, affect, and coping style (Lepore, 2001). Moreover, previous research finds that perceived positive and negative interactions within intimate relationships predict different types of affect and coping behavior (Rivers & Sanford, 2018), including key dimensions of positive and negative affect (Watson et al., 1988), and active engagement and disengagement (Bauer et al., 2016). Specifically, positive interactions may be uniquely associated with positive affect and with active forms of coping, and negative interactions may be uniquely associated with negative affect and with disengaged forms of coping.

Whereas perceived positive and negative interactions may be uniquely important in predicting affective and behavioral responses to one's current medical context, expectations of support availability are still consequential. This may be most evident when investigating outcomes pertaining to general types of psychological functioning such as well-being, quality of life, subjective stress, and psychological distress. These are broad types of functioning involving multiple domains and encompassing more than one's behavioral and affective responses to a specific context (Veit & Ware, 1983); feelings of general well-being may be improved not only by presence of positive interactions (and lack of negative interactions), but also by expectations of stable and reliable support in the future. Previous research suggests that schemas of support availability contribute to generally improved psychological functioning (Goodenow et al., 1990; Turner, 1981; Uchino, 2009a).

Does Perceived Support Have Different Meanings for Partnered and Single People?

One particular challenge to understanding the contributions of different components of perceived support is the fact that previous research has assessed perceived support in different contexts, and it is not clear if these contexts are equivalent. Most notably, research on perceived positive and negative interactions has mostly assessed interactions occurring in marriage or cohabitation relationships, whereas research on perceived availability has assessed perceptions across all types of close interpersonal relationships. There is a possibility that perceived support has different meanings when it is assessed in these different contexts, and this is important because it determines the extent to which findings and theories can generalize across studies and the extent to which different methods and constructs are needed when investigating support in different contexts.

Given the evolutionary importance of mating relationships, Coyne and DeLongis (1986) noted the possibility that perceived support from an intimate partner is qualitatively distinct from perceived support in other types of relationships. For example, they suggest that when people are single, low perceived support may reflect social isolation, whereas when people are partnered, low perceived support may reflect a type of primary relationship distress that is distinctly stressful and cannot be offset by compensatory support from other relationships. Accordingly, studies have found that relationships with intimate partners are often a primary source of support (Coyne & DeLongis, 1986; Xu & Burleson, 2004).

However, the fact that intimate partners are often primary sources of support does not necessarily mean there are functional differences in the *meaning* of perceived support for well-being across different types of relationships. There are two primary reasons to suspect perceived support in couples is not uniformly unique. First, cultural diversity regarding interpersonal relationships raises questions about whether any one type of support relationship has been favored by evolution (see Campos & Kim, 2017, for a review). Second, several studies assessing perceived support have found similar effects across partnered and single people and across contexts examining support from partners or other close family members or friends (e.g., High & Steuber, 2014; Ryan et al., 2014; Walen & Lachman, 2000). Moreover, previous research has also found that even for partnered individuals, other types of relationships may powerfully and uniquely influence well-being (e.g., relationships with adult children; Bisschop et al., 2001). Thus, it is reasonable to speculate that perceived support may function similarly across different types of relationships. This is especially important to test, because if true, it would allow for parsimonious models of perceived support that generalize across types of relationships and across studies using different assessment methods.

An Approach Toward Determining if Context Matters

In determining whether such a parsimonious model is possible, it is important to clarify that the question at hand is whether there are differences in the *function* of perceived support when it is assessed in these different contexts. In other words, are these perceptions equally meaningful for well-being regardless of assessment context? Notably, this question is not investigating differences between partnered and single people in the *levels* of support they perceive (functional equivalence in support must first be established to make this a meaningful question for improving well-being), nor is it asking whether an assessment of general support is exactly the same thing as an assessment of partner-specific support (relationships with factors like social network size may differ, as explored in the supplemental materials to this paper).

This is fundamentally a question of *invariance*, or the degree to which assigned values (e.g., scores on an assessment) have an equivalent function across groups or contexts, and it can be investigated using models similar to those used for testing psychometric measurement invariance (Meredith & Teresi, 2006; Millsap, 2011). This would involve investigating three groups of participants: single people reporting general support (henceforth “Single”), partnered people reporting general support (“Partnered-General”), and partnered people reporting partner-specific support (“Partnered-Specific”). Then, increasingly stringent types of invariance can be tested using models in which key health outcome variables are regressed on perceived support and comparisons are made across the three different assessment context groups. First and most importantly, weak invariance is when perceived support has the same function and produces the same *magnitude of effect* across all groups. Second, strong invariance is when, in addition to weak invariance, all groups have the same marginal means, meaning that the exact same outcomes are predicted for people reporting the same levels of perceived support regardless

of group membership. Finally, strict invariance is when, in addition to strong invariance, outcome variables have the same residual variances for all groups (which is less important for demonstrating functional equivalence in perceived support, but useful in clarifying the validity of group comparisons on the outcome variables).

The Present Study

Using a sample of people with serious medical conditions, we investigated three different components of perceived support (availability, positive interactions, and negative interactions) across three different assessment contexts (Single, Partnered-Specific, Partnered-General). The decision to target these specific components and contexts was based on the literature outlined above as well as a preliminary study (described in the supplemental materials) which explored some alternate components and contexts and found them to lack distinguishability. The present study investigated the following hypotheses:

H1: Models using perceived support to predict outcome variables should demonstrate at least weak invariance across the three assessment contexts.

H2: Perceived positive and negative interactions should be uniquely important in predicting treatment adherence (controlling for each other and perceived support availability).

H3: Perceived negative interactions should be uniquely associated with negative affect and disengaged coping, whereas perceived positive interactions should be uniquely associated with positive affect and engaged coping (controlling for each other and perceived support availability).

H4: Because support availability, perceived positive and perceived negative interactions are all unique components of perceived support, they should each explain unique variance in

general psychological functioning (well-being, quality of life, subjective stress, and psychological distress).

Method

Participants & Procedure

A total of 340 people (97 men, 240 women, 3 preferred to self-describe) with serious medical conditions were recruited using Qualtrics Panels. Many participants were middle-aged or older ($M_{age} = 53.58$, $SD = 14.29$), reflecting the greater prevalence of serious medical conditions in older populations. The most common conditions included diabetes (16.5%), COPD (8.8%), arthritis (8.2%), depression (7.9%), various cancers (6.8%), and heart disease (5.9%), and 23.5% reported multiple comorbidities. In this sample, 84.8% identified as non-Hispanic White, 6.7% as African-American, 5% as Hispanic or Latino, and 3.5% as other races. The median level of education was 13 years (some college), and the median income was approximately \$30,000. Of the 340 participants, 115 (33%) were unpartnered (49 separated/divorced, 47 single, 19 widowed), and 225 (66%) were partnered (181 married, 44 cohabiting).

All participants were recruited using Qualtrics panels of people who had opted in to receive e-mails about participating in market research and who provided information matching the recruitment profile for the current study. People in dating relationships were excluded to avoid ambiguity in relationship status classification; cohabiting and married individuals were combined based on previous research practices and work suggesting a lack of meaningful difference in support processes between them (Sanford et al., 2016; Soulsby & Bennett, 2015). Preliminary analyses also found equivalent perceived support levels between cohabiting and married individuals. Participants needed to endorse a criterion item stating, “I currently have a

serious medical condition that has caused changes in my life.” This item was imbedded in a set of items including fillers (e.g., “I got a flu shot within the last year”) to obscure the true inclusion criteria, and foils (e.g., “I currently have a diagnosis of heterotopic ossification syndrome”) to identify people dishonestly endorsing medical conditions. The 340 participants included only people who: (a) endorsed the criterion items, (b) denied all foil items, (c) provided a coherent answer to an open-ended prompt describing their experience with a serious medical condition, (d) passed an attention check item near the end of the survey, and (e) passed a speeding check for overly fast responding. For completing the survey, participants were compensated with gift cards or points with an approximate value of \$2.00. The protocol for this study was reviewed and assigned exempt status by the (IRB name redacted).

Participants were divided into three groups: Single ($n = 115$ unpartnered individuals), Partnered-General ($n = 106$ randomly-assigned partnered individuals reporting on all close relationships), and Partnered-Specific ($n = 119$ randomly-assigned partnered individuals reporting on partner relationships). All groups responded to measures of perceived support, affect, coping, treatment adherence, and psychological functioning. For the Single group and the Partnered-General group, perceived support questions referred to all non-professional close interpersonal relationships. For the Partnered-Specific group, perceived support questions were specific to the partner relationship. Demographic differences were tested between groups; although there were no significant differences in race, age, gender, or education, there was a significant difference in income, $F(2, 329) = 17.53, p < .001$). A Scheffé post hoc test revealed that Single participants reported lower average income than Partnered-Specific or Partnered-General.

Measures

Perceived Positive and Negative Interactions

Participants completed either a general or partner-specific version of the 16-item Couple Resilience Inventory (Sanford et al., 2016). Although it was originally developed for use with couples, the Single and Partnered-General groups completed a general version called the Interpersonal Resilience Inventory (Rivers & Sanford, 2019b), which is modified and validated for use in assessing interactions across all types of social support relationships. This general version first defines a “significant adult person” as a mutual, nonprofessional close other of personal importance, and respondents are asked to indicate the number of significant adult people in their life. Respondents then rate the frequency within the past month of 16 different types of interpersonal interactions, including 8 positive interactions (e.g., “You and a significant adult person in your life spent time together doing things as a pair”) and 8 negative interactions (e.g., “In your relationship with a significant adult person in your life, one of you was critical or hostile or blamed the other”), using an 8-point scale ranging from “This definitely did not happen” (0) to “This happened a few times a day” (7). People in the Partnered-Specific group completed a version of this instrument which began with instructions for respondents to think about their marriages or cohabitation relationships. It included the same 16 items, except the term “significant adult person” was replaced with “partner.” The question about the number of significant adult people appeared after all the partner-specific items. Cronbach’s alphas for the positive and negative scales respectively were .89 and .92 (general), and .81 and .92 (partner-specific). McDonald’s omegas for the positive and negative scales respectively were .90 and .92 (general), and .80 and .93 (partner-specific).

Perceived Support Availability

Participants completed either a general or partner-specific version of the 8-item perceived support subscale of the Berlin Social Support Scales (Schwarzer & Schulz, 2003). This instrument assesses a schema of support availability, including emotional support and instrumental support items which are combined to form a single scale. Analyses from a preliminary study, described in the supplemental materials, suggest that this scale is unidimensional. People in the Single and Partnered-General groups completed a general version of this instrument. They were instructed to think about people close to them, and they rated items like “Whenever I am sad, there are people who cheer me up,” on a 4-point scale ranging from “Strongly disagree” (1) to “Strongly agree” (4). People in the Partnered-Specific group were instructed to think about their partners, and items were worded to be partner-specific (e.g., “Whenever I am sad, my partner cheers me up”). Cronbach’s alphas were .95 (general) and .96 (partner-specific). McDonald’s omegas were .96 (general) and .96 (partner-specific).

Treatment Adherence

The 6-item Perceived Behavior subscale of the Treatment Adherence Perceptions Questionnaire (Sanford & Rivers, 2019) assessed perceived adherence to medical advice. Respondents are first asked to identify a set of “recommended actions” advised by a doctor for treatment of the participant’s medical condition (e.g., taking medication, exercising, or following a diet). They then rate their extent of adherence to this treatment plan with items like “How often do you forget to do one of your recommended actions?” (response options vary across items). Total scores range from 6 to 39, with higher scores indicating better perceived adherence. Cronbach’s alpha was .87. McDonald’s omega was .88.

Affect

A 12-item version of the Positive and Negative Affect Schedule (PANAS; Watson et al., 1988) assessed positive and negative affect in the past month. The scale was abbreviated based on previous factor analyses (Rivers & Sanford, 2019a) to include six positive (Interested, Excited, Strong, Enthusiastic, Inspired, Determined) and six negative (Distressed, Guilty, Irritable, Ashamed, Jittery, Afraid) items. Cronbach's alphas were .91 (positive affect) and .86 (negative affect). McDonald's omegas were .91 (positive affect) and .86 (negative affect).

Coping Strategies

Coping strategies were assessed using selected items from the Brief COPE (Carver, 1997) previously identified through factor analyses (Prado et al., 2004; Rivers & Sanford, 2018; Snell et al., 2011) as comprising two key subscales of active engagement (6 items; "I've been taking action to try to make the situation better") and disengagement (4 items; "I've been giving up trying to deal with it"). Participants were instructed to think specifically about coping with their medical conditions. Items are rated on a 4-point scale ranging from "I haven't been doing this at all" (1) to "I've been doing this a lot" (4). Cronbach's alphas were .84 (active engagement) and .77 (disengagement). McDonald's omegas were .84 (active engagement) and .77 (disengagement).

Well-being

The WHO-5 (Bech et al., 2003) assessed subjective well-being. Participants rated the perceived frequency of well-being over the past month using items like "I feel active and vigorous," which is rated on a 6-point scale from "All of the time" (6) to "At no time" (1). Cronbach's alpha was .88. McDonald's omega was .88.

Quality of Life

The 7-item version of the Quality of Life Inventory (Frisch et al., 1992) assessed quality of life. This version included only items assessing “self-oriented quality of life,” excluding items assessing “social quality of life” that could overlap with perceived support (McAlinden & Oei, 2006). Participants rated their satisfaction with different domains over the past month using items like “How satisfied are you with your HEALTH? Definition: HEALTH is being physically fit, not sick, and without pain or disability,” rated on a 6-point scale from “Very dissatisfied” (1) to “Very satisfied” (6). Cronbach’s alpha was .87. McDonald’s omega was .88.

Subjective Stress

The 10-item Perceived Stress Scale (Cohen et al., 1983) assessed subjective stress. Participants responded to items like “In the last month, how often have you felt that you were unable to control the important things in your life?” using a 5-point scale from “Never” (1) to “Very often” (5). Cronbach’s alpha was .93. McDonald’s omega was .93.

Psychological Distress

The K6 Distress Scale (Kessler et al., 2003) assessed symptoms of serious mental distress (e.g., depression and anxiety). Participants responded to items like, “During the past 30 days, about how often did you feel hopeless?” using a 5-point scale from “None of the time” (1) to “All of the time” (5). Cronbach’s alpha was .93. McDonald’s omega was .93.

Results

Preliminary Analyses

First, preliminary analyses were conducted to investigate differences in means across groups. Table 1 provides means, standard deviations, and test statistics. One-way ANOVAs indicated significant omnibus differences in positive interactions, negative interactions, support availability, positive affect, quality of life, and psychological distress. Scheffé post hoc tests

indicated that the Single group reported lower levels of support availability and positive interaction than either of the partnered groups, lower levels of negative interaction than the Partnered-General condition, and lower positive affect and quality of life than the Partnered-Specific group. No pairwise differences could be detected for psychological distress. Then, for each group, bivariate correlations were computed between the three types of perceived support. These are listed in Table 2. Generally, correlations between positive and negative interaction were small, whereas correlations between perceived interaction and support availability were moderately large.

Approach to Analysis

A series of multi-group SEM regression models were estimated using the lavaan package in R (Rosseel, 2012). Prior to analysis, all variables were standardized into z-scores based on grand means before subdividing into groups. In each model, an outcome was regressed on perceived positive interactions, negative interactions, and support availability. Separate models were estimated for each of nine outcomes: treatment adherence, affect (positive and negative), coping (engagement and disengagement), well-being, quality of life, subjective stress, and psychological distress. Each model included three context groups: Single, Partnered-Specific, and Partnered-General.

The analytic approach for testing Hypothesis 1, regarding invariance across the context groups, was modeled after factorial invariance procedures used to test psychometric instruments (Meredith & Teresi, 2006; Millsap, 2011). This involved imposing constraints on models to test varying levels of invariance. Specifically, constraints were placed on each multi-group regression model in the following order, stopping when good fit was achieved: first, a strict model where intercepts, residual variances, and betas were fixed to be equal across groups; second, a strong

model where only intercepts and betas were fixed to be equal; and finally, a weak model where only betas were fixed to be equal. Fit criteria were specified according to a two-index criterion ($CFI > .95$, and $SRMR < .09$; Hu & Bentler, 1999). Well-fitting models were also expected to have a nonsignificant chi-square. Hypotheses 2 through 4, regarding the extent to which components of perceived support predicted different types of outcomes, were tested using the beta weights from these models.

Results for Study Hypotheses

The first hypothesis was that models should demonstrate at least weak invariance across the three assessment contexts. Table 3 lists the highest level of invariance that was supported (producing a good fit and non-significant chi-square) for each multi-group regression model. Eight of the nine models met criteria for at least weak invariance; therefore, H1 was partially supported. Specifically, two models (positive affect and active engagement coping) demonstrated only weak invariance, indicating that each perceived support dimension had the same magnitude of effect in predicting the model's outcome variable regardless of group. One model (treatment adherence) demonstrated strong invariance, indicating that, in addition to weak invariance, if two people have the same levels of perceived support, the same level on the outcome variable is predicted regardless of group membership. Five models (negative affect, well-being, quality of life, subjective stress, and psychological distress) demonstrated strict invariance, indicating that, in addition to strong invariance, outcome variables have similar residual variances across groups. The only model failing to demonstrate invariance was disengaged coping. Follow-up analyses indicated that perceived support availability only predicted disengaged coping for the groups completing the general version of the questionnaire; thus, the beta for support availability needed

to be freed across groups for this model to fit. In sum, out of 27 parameter estimates reported in Table 3, only one needed to be freed and allowed to vary across assessment context groups.

The second hypothesis was that perceived positive and negative interactions would predict treatment adherence. As seen in the first row of Table 3, betas for both positive and negative interactions were significant, whereas the beta for support availability was not. Therefore, H2 was supported.

The third hypothesis was that perceived negative interactions should be uniquely associated with negative affect and disengaged coping, whereas perceived positive interactions should be uniquely associated with positive affect and engaged coping. The betas testing these hypotheses are listed in rows 2 through 5 in Table 3. In line with hypotheses, negative affect and disengaged coping were predicted by negative (and not positive) interactions, whereas positive affect and engaged coping were predicted by positive (and not negative) interactions. Therefore, H3 was supported.

Finally, the fourth hypothesis was that all three types of perceived support (positive interactions, negative interactions, and support availability) would explain unique variance in outcomes regarding psychological functioning (well-being, quality of life, subjective stress, and psychological distress). Betas testing this hypothesis are in the last four rows of Table 3. In line with hypotheses, both negative interaction and support availability were significant in predicting all four of these outcomes. However, betas for positive interaction were significant in predicting only two (well-being and quality of life). Therefore, H4 was partially supported.

Follow-up Analyses

As a follow-up analysis to account for multiplicity, adjusted Bonferroni corrections (Smith & Cribbie, 2013) were applied to the coefficients in Table 3. This procedure, which

corrects for dependencies between variables in the model as well as number of tests, has greater power than the unadjusted procedure without inflating the familywise error rate. This correction did not result in any change to conclusions about the statistical significance of any parameters.

Because only two of the four betas for positive interaction were significant in predicting outcomes involving psychological functioning, it raised questions of whether the effects for positive interaction on these outcomes are mediated by perceived support availability. This would be consistent with theories suggesting that positive interactions may be especially likely to be mediated by schemas like support availability (Neff & Karney, 2003; Taylor, 1991). Accordingly, we tested mediation SEMs for all four general psychological functioning outcomes in which the effects of positive interactions were mediated by support availability (combining all groups and controlling for negative interactions). Models were estimated in lavaan (Rosseel, 2012), and standard errors were estimated using 5,000 bootstrap draws. Standardized coefficients are reported in Table 4. All four indirect effects were significant.

In addition, other follow-up analyses found that: (a) the magnitude of the correlation between positive and negative interaction differed between partnered and non-partnered people, (b) support network size correlates more strongly with general than partner-specific measures of support, (c) relationship satisfaction correlates more strongly with partner-specific than general measures of support, and (d) controlling for income and gender did not change conclusions about invariance across groups. These follow-up analyses are detailed in the supplemental materials.

Discussion

The present study extends previous research showing that perceived support is associated with a range of outcomes for people with serious medical conditions (Cohen et al., 2001; DiMatteo, 2004; Uchino, 2006), and addresses questions regarding differences in the ways that

perceived support has been defined and conceptualized. Specifically, this study clarifies the extent to which models of perceived support should distinguish between different *assessment contexts* and between different *components*. The analyses suggest that perceived support generally has the same function regardless of whether it is assessed in single or partnered people, and for partnered people, regardless of whether it is assessed as general or partner-specific. In contrast, the results suggest important distinctions between different *components* of perceived support; specifically, between perceptions of support availability, positive interaction, and negative interaction. Each of these components explained unique variance in key health and well-being variables after controlling for the others, and the pattern of significant effects was different for each component. The results of the current study concerning assessment contexts and components of perceived support are especially important for informing future models and interventions that may meaningfully improve health and well-being in people with serious medical conditions.

Implications for Assessment Contexts

The current results suggest that, for a notable range of health outcomes, the source of perceived support (within or outside intimate relationships) does not change its function. Only one model (disengaged coping) failed to demonstrate at least weak invariance (the most relevant level of invariance because it indicates that the magnitude of effect is the same across groups); as this was due to one parameter estimate out of 27, it is not clear if this result is sampling error or a meaningful effect. These findings are similar to recent work suggesting that, despite differences in average levels of support, the function of perceived support on relationship satisfaction is similar across same-sex and other-sex intimate relationships (Ellis & Davis, 2017). This research is important for determining circumstances in which isolating certain assessment contexts may

obstruct the creation of effective and parsimonious models of perceived support. For example, interventions aimed at improving health and well-being within serious medical conditions often specifically target support from intimate partners, to the exclusion of other significant support people (Badr & Krebs, 2013). If perceived support has the same function across relationships, similar interventions could be designed to maximize well-being for all people with serious medical conditions.

These results also have important implications for addressing health disparities between single and partnered people. Previous research suggests that single people with serious medical conditions often report poorer health and well-being (Leung et al., 2016), which has been attributed to lower social support (Sherbourne & Hays, 1990; Soulsby & Bennett, 2015). Establishing invariance for social support across assessment contexts suggests that these differences are meaningful; support perceived by single people has the same meaning as support perceived by partnered people, and improving these levels of support among single adults can potentially lead to better health outcomes.

Implications for Components

The current study supports two important assertions about components of perceived support. First, as previous work and theory suggest (Manne et al., 1997; Manne & Zautra, 1989; Sanford et al., 2016), perceived positive and negative interactions are distinct constructs relevant for health and well-being. Moreover, as in previous work, the relationship between positive and negative interactions was small (Rivers & Sanford, 2018; Sanford et al., 2016, 2017); however, in a novel finding, this correlation was actually significant and positive in the single group (presumably because both perceptions depend on the degree of overall social interaction), providing further evidence that these constructs are not opposites. Taken together, these findings

suggest that attempting to provide positive support to those coping with chronic medical conditions is necessary, but not sufficient, for health and well-being. This aligns with previous work finding it is especially crucial to avoid negative interactions (including unwanted or unhelpful types of support) when attempting to support those coping with serious medical conditions (Ray et al., 2020; Ray & Veluscek, 2017).

Second, perceived interactions are distinct from (and, in some cases, more consequential than) perceived support availability. Support availability was a robust but not sole predictor of psychological functioning outcomes, whereas only perceived interactions had unique contributions to treatment adherence and active engagement. This is especially noteworthy given the popularity of the support availability approach to assessing perceived support (Lakey & Cohen, 2000; Uchino, 2009a), and suggests that future research should assess both perceived interactions and support availability as key variables. Furthermore, a follow-up analysis indicated that perceived positive interactions are often mediated by support availability. This was not specifically hypothesized, but is consistent with research suggesting that perceived positive interactions may boost perceptions of support availability (Neff & Karney, 2003; Uchino, 2009b). In addition, mobilization-minimization theory (Taylor, 1991) suggests that positive events may have more lasting relevance by contributing to positive psychological resources (like schemas of support availability), whereas negative events are more likely to fade in relevance over time. This perspective is also consistent with research finding that patterns of support characterized by increases in negative interactions and reliably low positive interactions may be the most harmful in the long term (Birditt & Antonucci, 2008). Therefore, despite the role of perceived recent positive interactions, a foundation of support perceived as reliable and stable may be a unique protective factor for promoting well-being.

Limitations

This was a cross-sectional, self-report study using online panel participants. Confidence about participant honesty may be bolstered by the stringent validity checks, which has been effective in previous online research investigating medical conditions (Arch & Carr, 2016). However, conclusions cannot be drawn about longitudinal relationships or objective physical health outcomes; previous research suggests changes in perceived support often precede changes in objective health (Goodenow et al., 1990; Helgeson et al., 2016), but this cannot be tested here. The role of demographic variables also remains unclear; follow-up analyses (detailed in the supplemental materials) controlling for income and gender continued to support hypotheses, but such analyses may be biased given the low median income and the overrepresentation of women and non-Hispanic White participants in the sample.

Future Directions

Because a limited number of assessment contexts and components of perceived support were included in the current study, this is an area of development for future studies. Selected assessment contexts focused on couple relationships due to previous work examining positive and negative interactions, but future research should examine these components within other consequential relationships (including relationships with adult children; Okabayashi et al., 2004). The supplemental materials accompanying this paper detail a preliminary investigation of this type of question which found no unique effects across these types of assessment contexts, but further research across different samples would be beneficial to test the robustness of these findings. Notably, the preliminary and main studies did not recruit geriatric samples, and most participants were at life stages when partners may be more important sources of support and adult children may be less common or less important sources of support. Moreover, accounting for

further contextual information, including individual differences as well as recognizing how dyads are embedded in a larger social network context (e.g., Hedberg, 2017), may be especially important in developing and testing comprehensive models. It may also be useful to expand the current approach to examine other components, including more specific support provisions (Cutrona, 1990; Xu & Burleson, 2001). Finally, the current study modeled perceived support components as linear predictors of health outcomes, but a growing body of literature suggests these relationships may sometimes be counterintuitive or characterized by curvilinear or contextual effects (Birditt & Antonucci, 2008; Ray & Veluscek, 2017; Rivers & Sanford, 2018).

Conclusion

The current study supports the assertion that perceived support from different sources can be equally meaningful for health and well-being. This provides new pathways for future research into perceived support, including more nuanced investigations of disparities between single and partnered people. For example, in the current study, single adults perceived less positive support but also fewer negative interactions. Similarly, in line with current findings regarding the unique importance of negative interactions, previous research suggests that outcomes during stressful situations may be worse for people in low-quality intimate relationships than for single people (e.g., Bilszta et al., 2008). Positive support from other sources may help compensate for these negative outcomes, particularly if they contribute to stable psychological resources. The current study provides a necessary foundation for future research investigating health disparities that considers distinct roles of components of perceived support and allows for parsimonious models not constrained by assessment context.

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Table 1

Means and standard deviations across groups

Variable	<i>M(SD)</i>			Omnibus test for group differences	
	Single	Partnered-General	Partnered-Specific	F	η^2
Positive interactions	26.26 (11.68) ^a	36.46 (9.32) ^b	36.88 (8.91) ^b	40.87***	.20
Negative interactions	18.40 (11.87) ^a	22.72 (11.24) ^b	21.44 (12.20) ^{ab}	3.96*	.02
Support availability	22.63 (6.99) ^a	25.71 (5.73) ^b	26.97 (6.14) ^b	14.41***	.08
Treatment adherence	27.83 (6.70) ^a	27.15 (7.21) ^a	28.59 (6.31) ^a	1.28	.01
Positive affect	15.52 (5.15) ^a	15.96 (5.76) ^{ab}	17.41 (6.08) ^b	3.54*	.02
Negative affect	14.43 (6.16) ^a	14.40 (5.38) ^a	12.95 (5.62) ^a	2.53	.01
Active engagement	16.11 (4.52) ^a	16.28 (4.63) ^a	17.16 (4.44) ^a	1.80	.01
Disengagement	6.73 (2.78) ^a	6.53 (2.59) ^a	6.11 (2.83) ^a	1.57	.01
Well-being	15.22 (5.59) ^a	15.53 (5.39) ^a	16.85 (5.64) ^a	2.85	.02
Quality of life	23.39 (8.43) ^a	25.76 (7.99) ^{ab}	27.41 (8.67) ^b	6.92**	.04
Perceived stress	30.78 (8.86) ^a	30.30 (8.36) ^a	28.59 (8.47) ^a	2.12	.01
Psychological distress	20.28 (7.09) ^a	20.25 (6.31) ^a	22.09 (6.11) ^a	3.05*	.02

Note. Scores were calculated by summing items. Means sharing the same superscript letter do not significantly differ from each other in a Scheffé post-hoc test.

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

Table 2

Correlations between support variables across groups

Support variable	Support availability			Negative interactions		
	Single	Partnered-Gen eral	Partnered-Spe cific	Single	Partnered-Gen eral	Partnered-Spe cific
Positive interactions	.52***	.53***	.55***	.19*	-.18	-.13
Negative interactions	-.27**	-.39***	-.55***			

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

Table 3

Standardized beta weights and fit indices for final structural equation models

Outcome	Level of invariance	Standardized betas			Fit indices		
		Positive interactions	Negative interactions	Support availability	χ^2	CFI	SRMR
Treatment adherence	Strong	.16*	-.26***	-.03	8.23	.99	.03
Positive affect	Weak	.28**	-.10	.32***	9.64	.97	.03
Negative affect	Strict	-.003	.36***	-.32***	11.09	.99	.05
Active engagement	Weak	.31***	-.10	.08	8.21	.95	.04
Disengagement	None	-.04	.30***	Free ^a	4.53	.99	.03
Well-being	Strict	.23***	-.21***	.25***	8.09	1	.03
Quality of life	Strict	.21***	-.23***	.34***	8.10	1	.03
Perceived stress	Strict	-.07	.38***	-.34***	9.71	1	.03
Psychological distress	Strict	-.04	.30***	-.37***	10.22	1	.05

Note. Hypothesized relationships are bolded. Cutoffs for good fit included a nonsignificant χ^2 , CFI > .95, and SRMR < .09.

^a(Single = -.34***, Partnered-General = -.37***, Partnered-Specific = -.03)

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

Table 4

Standardized coefficients for follow-up mediation analyses

Outcome	Direct			Indirect ^a
	Positive int.	Negative int.	Support availability	Positive int.
Well-being	.23***	-.21***	.25***	.15***
Quality of life	.21***	-.23***	.34***	.20***
Perceived stress	-.07	.38***	-.34***	-.20***
Psychological distress	.04	.30***	-.37***	-.21***

Note. Standard errors for indirect effects were derived from 5,000 bootstrap draws.

^aThe indirect effect is the effect of perceived positive interaction on the outcome mediated by perceived support availability.

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