



Confirmatory Factor Analysis Of The Medical Outcomes Study – Social Support Survey: Examining The Factor Structure Among Victimized Women On Probation And Parole

By: George Higgins, **Catherine D. Marcum**, Seana Golder, Martin T. Hall, and T.K. Logan

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Confirmatory Factor Analysis of the Medical Outcomes Study – Social Support Survey: Examining the Factor Structure Among Victimized Women on Probation and Parole

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Abstract Women in the justice system are a highly marginalized population that are disproportionately affected by violent victimization and psychological distress. Social support is a key mechanism in understanding these experiences. However, rigorous psychometric testing of existing social support instruments is scant and to date there are no studies specifically testing instruments for use with justice involved women. In order to address this gap, the present study sought to confirm the factor structure of the 12- and 4-item Medical Outcomes Study – Social Support Survey (MOS-SSS), a widely used measure of social support. Confirmatory factor models were estimated via robust weighted least squares and polychoric correlations among a sample of 406 victimized women on probation and parole. Findings supported the use of the 4-item version of the MOS-SSS as a reliable, valid, and extremely parsimonious measure of social support among victimized women on probation and parole.

Keywords Social support · Measurement · Confirmatory factor analysis · Women · Probation and parole

Women represent the fastest growing segment of the criminal justice system with the majority of justice involved women being supervised in the community through probation or parole (Pew Center on the States, 2009). Currently, nearly 1 million women are on probation in the U.S. (Glaze, 2002; Department of Justice, 2001; Maruschak & Parks, 2012). Women in the justice system are a highly marginalized population that are disproportionately affected by violent victimization and psychological distress. Data indicate that 65 to 77 % of justice involved women have experienced some form of physical and/or sexual intimate partner violence (IPV) in their lives

(Browne, Miller, & Maguin, 1999; Lynch, DeHart, Belknap, & Green, 2012). Similarly, in a study of 500 women jailed in rural and urban counties in the U.S., 82 % met the lifetime criteria for a substance use disorder, 53 % met the lifetime criteria for posttraumatic stress disorder (PTSD), and 43 % were diagnosed with a serious mental illness (e.g., major depression; bipolar disorder; schizophrenia; Lynch et al., 2012). Not surprisingly, both victimization and psychological distress have been identified as primary factors contributing to and complicating women's engagement in the justice system.

Social support has been recognized as a potentially malleable factor associated with both victimization and psychological distress; specifically, positive social support can buffer the negative affects of victimization and mitigate psychological distress. Data indicate that increased social support may reduce a woman's risk for IPV as well as revictimization (Dobash & Dobash, 1998; Golinelli, Longshore, & Wenzel, 2009; Logan, Walker, Jordan, & Leukefeld, 2006; Rose, Campbell, & Kub, 2000; Sullivan & Bybee, 1999). For women experiencing IPV, social support may come in the form of instrumental assistance and resources such as temporary housing/ shelter, monetary assistance, and/or a ride to safety. Social support may also be found in relationships that offer victimized women care, affection, and advice, as well as assistance in accessing formal services (i.e., emergency protective orders; shelters). Social support can lessen the negative mental health consequences of IPV by facilitating increased coping skills, higher levels of self-esteem, and greater self-efficacy; as such increased social support is associated with lower levels of depression and PTSD in women experiencing IPV (Anderson, Saunders, Yoshihama, Bybee, & Sullivan, 2003; Carlson, McNutt, Choi, & Rose, 2002; Campbell, Sullivan, & Davidson, 1995; Coker, Watkins, Smith, & Brandt, 2003; Sullivan & Bybee, 1999; Suvak, Goodman, Taft, & Dutton, 2013). Conversely, lack of social support is associated with increased psychological distress (Borelli, Goshin, Joestl, Clark, & Byrne, 2010; Coker, Smith, McKeown, & King 2002; Coker, Watkins, Smith, & Brandt, 2003; Mitchell, Hargrove, Collins, Reddick, & Kaslow 2006); in fact meta-analysis has found that lack of social support is a significant risk factor for PTSD (Brewin, Andrews, & Valentine, 2000).

The convergence of research strongly suggests that social support is a key mechanism in understanding the experiences of victimization and psychological distress (independently and simultaneously) among justice involved women. However, rigorous psychometric testing of existing social support instruments is scant and to date we are unaware of any studies specifically testing instruments for use with justice involved women (Makarios & Sams, 2013). Accurate assessment of social support is a necessary prerequisite to furthering this area of research and confirming an instrument across various samples is a necessary first step this process (Gjesfjeld, Greeno, & Kim, 2008). Establishing the consistency, or lack thereof, of an instrument's factor structure across varying samples is critical as inconsistent factor structure may result in research that provides biased findings (Ramirez, Ford, Stewart, & Teresi, 2005). Thus, the overall goal of the present study was to examine the factor structure and internal consistency of a widely used measure of social support, the Medical Outcomes Study – Social Support Survey (MOS-SSS; Sherbourne & Stewart, 1991), among a sample of victimized women on probation and parole.

The MOS-SSS: Development and Subsequent Psychometric Testing

The MOS-SSS was originally an 18-item scale that assessed four dimensions of social support: tangible support (i.e., material aid or assistance), emotional-informational support (i.e., emotional support, guidance, or assistance), positive social interaction (i.e., availability of individuals with whom to do fun things) and affectionate support (i.e., expression of love and affection; (Sherbourne & Stewart, 1991). The MOS-SSS was developed by applying exploratory factor analysis to a sample of 2,987 male and female adults, 18 years of age and older, who were patients in a variety of health care practice settings (e.g., HMO; private-practice; Sherbourne & Stewart, 1991). Alpha reliabilities were reported to be greater than .91 for each of the dimensions (Sherbourne & Stewart, 1991).

In 2008, Gjesjeld, Greeno, & Kim provided the first confirmatory factor analysis (CFA) of the MOS-SSS using a sample of 330 mothers whose children were receiving mental health treatment. Gjesjeld et al. (2008) developed a 12- and 4- item versions of the measure that conformed to the four dimensional factor structure of the original 18-item MOS-SSS. Notwithstanding, the important contributions of this research, the CFA employed by Gjesjeld and colleagues (2008) relied on maximum likelihood estimation and the Pearson-product moment correlations. The MOS-SSS as originally developed measures social support as an ordered categorical manifestations of an underlying continuous process (e.g., response options are given on a five-point scale from “none of the time” (0) to “all of the time” (4)). The use of maximum likelihood estimation and the Pearson-product moment correlations effectively categorizes the continuous outcome as measured by the MOS-SSS thus attenuating the correlations among the variables/MOS-SSS items (Flora & Curran, 2004; Nunnally & Bernstein, 1994; West, Finch & Curran, 1995) (see Bollen, 1989; Flora & Curran, 2004 for the complete explanation). In turn, attenuation of the correlations among the items creates a variety of problems (e.g., poor/improper model fit; negative biases in parameter estimates; inflation in error variances) that may result in the extraction of spurious factors therefore yielding results that are potentially misleading and/or incorrect (Bollen, 1989; Flora & Curran, 2004).

In order to address these limitations, the present study sought to confirm the factor structure of the 12- and 4-item MOS-SSS using CFA models estimated with robust weighted least squares and polychoric correlations among a sample of victimized women on probation and parole. Polychoric correlations measure the linear relationships between two observed variables that are the discrete manifestations of normal continuous variables (Flora & Curran, 2004) and have been shown to be appropriate for use when examining Likert-type scales (Flora & Curran, 2004; Olsson, 1979).

Method

Participants and Procedure

The study sample ($N=406$) was drawn from victimized women on probation and/or parole in Jefferson County, Kentucky, an urban area that includes Louisville. Participants were recruited from July, 2010 to January, 2013 through a variety of

methods that included: face-to-face recruitment at all probation and parole offices located within the county; direct mailings to women on probation and parole in Jefferson County; advertisements in the local newspaper, the website *craigslist*, and public access TV; fliers posted in a variety of public locations (e.g., bus stops, convenience stores, apartment complexes), community-based organizations, government agencies, and health care facilities; and community outreach by study personnel.

To be eligible for participation, women had to: a) be on probation and parole in Jefferson county; b) be at least 18 years of age; c) report that when they had sex they either had sex with men only or with both women and men (women who had been recently incarcerated were asked about the year prior to incarceration); and d) report lifetime experience of physical and/or sexual victimization as a child or an adult from a parent or caretaker, intimate partner, and/or non-intimate partner (e.g., stranger, acquaintance).¹ Screening for eligibility was conducted by telephone (90 %) and in person (10 %). Eighty-one percent of the women screened were eligible to participate. The final study sample represented approximately one-fifth of all women on probation and parole in Jefferson County at the time recruitment was initiated (Kentucky Department of Corrections, Division of Probation and Parole, personal communication, November, 5, 2010.). Women who were screened eligible to participate reported learning about the study from the following sources (participants could identify more than one source): direct mail (33 %); word of mouth (e.g., a probation officer, mother, friend; 33 %); fliers posted in public locations (15 %); community based organization (11 %); direct contact with study personnel (9 %); and newspaper/radio/internet (2 %). The most common reasons for ineligibility were not being on probation or parole, no history of victimization, and reporting only female sexual partners.

All interviews were administered face-to-face by trained female staff using audio computer-assisted interviewing (ACASI; NOVA Research Company, 2003). Participants were debriefed and compensated \$35 for their time. The University of Louisville Institutional Review Board approved the study.

Data Analysis

Mplus 6.12 was used for the analyses presented in this research (Muthén & Muthén, 2010). The analysis followed a step-wise procedure. First, a second-order CFA of the 12-item version of the scale was conducted followed by a single factor CFA using the 4-item version (Figs. 1 and 2, respectively). As previously indicated, polychoric correlations were used to estimate both models (Flora & Curran, 2004). Following recommended procedures, multiple fit indices were used to evaluate the sufficiency of the models (Hu & Bentler, 1999; Muthen and Muthen (2002): non-significant chi-square; comparative fit index (CFI; $\geq .95$); root mean square error of approximation

¹ The study from which these data are taken was designed to elucidate the heterogeneous nature of victimization and the subsequent effects on behavior thus the sample was limited to victimized women only. Similarly, women who reported only having sex with other women were excluded from participation. Intimate partner violence between same gender female partners is an important and understudied issue. The dynamics of violence between same gender partners may be similar to and/or distinct from violence between opposite gender partners; however, this empirical question/issue was outside the focus of the study. These issues are also addressed as limitations.

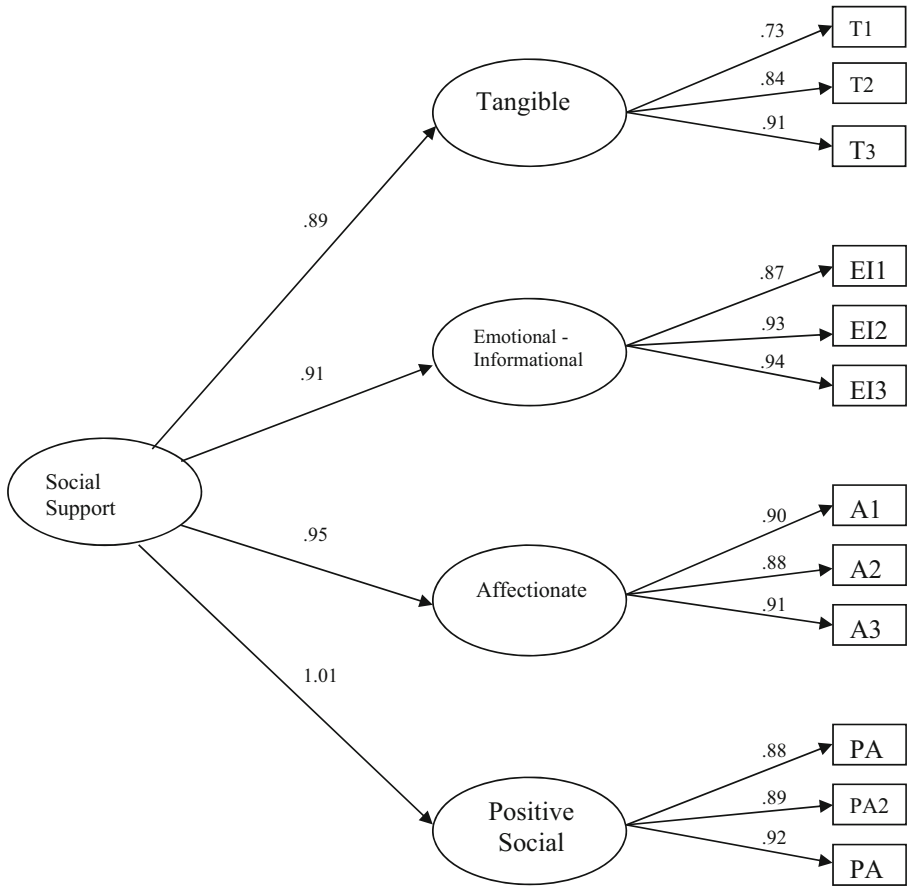


Fig. 1 12-item MOS-SSS. All of the coefficients are standardized factor loadings and are statistically significant at the .05 level. All of the coefficients are standardized factor loadings and are statistically significant at the .05 level

(RMSEA; $\leq .05$); and the weighted root mean square residual (WRMR; ≤ 0.90). The significance and magnitude of the factor loadings were also considered; factor loadings of .50 or higher were assessed as “large” (Kline, 2005). Finally, the power and precision of the factor loadings, standard errors, and inter-factor correlations for the models were examined using the Monte Carlo facility available in Mplus.

Measures

Sample Characteristics Sociodemographic factors were reported in order to describe the sample characteristics. Respondents’ age was provided in years. Race/ethnicity of the participants was described as: Black, non-Hispanic; White, non-Hispanic; and other (Latina, Asian/Pacific Islander, Native American, multi-racial, and other). Intimate partner status was assessed by three categories indicating whether a respondent reported being single, married or cohabitating with a sexual partner of the opposite gender, or being divorced, separated, or widowed at the time of the interview. Five categories

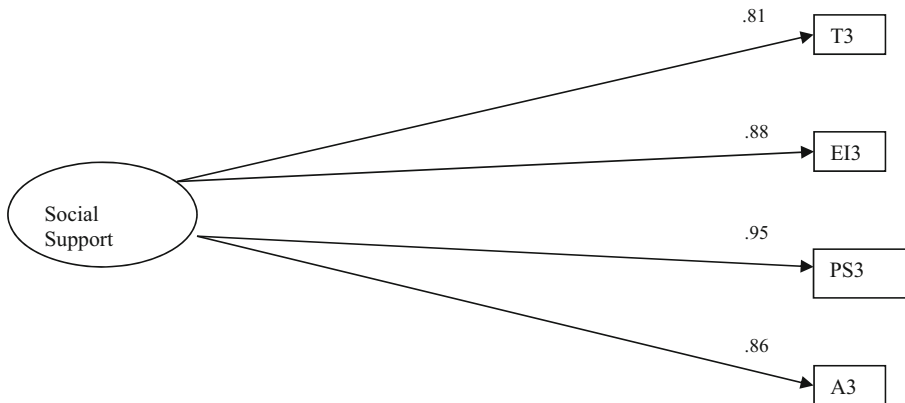


Fig. 2 4-Item Measure of MOS-SSS. All of the coefficients are standardized factor loadings and are statistically significant at the .05 level

described educational attainment: less than a high school diploma/GED; high school diploma/GED; trade/technical training; some college/college graduate; some graduate school/graduate school degree. Current employment status was operationalized as unemployed, employed full or part-time, unemployed due to disability, in school only, or “other.” Women were asked if they considered themselves homeless (yes=1; no=0). Finally, correctional status was assessed by asking women whether they were on probation, parole, or both.

Social Support Participants completed the original 18-item MOS-SSS. Directions asked the participant to “rate how frequently the following kinds of support have been available to you in the past year if you needed it. If you didn’t need this kind of support, imagine if you had, would it have been there for you?” Response options were rated on a five-point scale from “none of the time” (0) to “all of the time” (4).

Results

Sample Characteristics

Women were on average 37 years old (SD: 10.23); 41.9 % were Black, non-Hispanic, slightly more than half were White, non-Hispanic (50.5 %) and the remainder fell within the other racial/ethnic category (7.6 %). The majority of participants reported being single (44.6 %), 16.7 % said they were married or cohabitating with someone of the opposite gender, and 38.7 % were separated, divorced or widowed. Slightly more than 27 % reported less than a GED or high school diploma, 36 % of women had earned a GED or high school diploma, and about 32 % reported some college or more. Approximately 29 % of the women worked part- or full-time; the remaining 71 % reported not working for a variety of reasons. Thirty-four percent of the women reported they were homeless. The majority of women in the study were on probation (75.6 %), while 22.7 % were on parole, and a small percentage (1.7 %) reported being

on both probation and parole (For a detailed description of the sample characteristics see, Golder, Hall, Logan, Dishon, Renn, & Winham 2014).

CFA: 12-Item and 4-Item Models

Means and standard deviations for the questions for the 12- and 4-item version of the scale, respectively, are presented in Tables 1 and 2. Standardized factor loadings for the 12-item model are presented in Fig. 1. While all the factor loadings were above .50, the standardized path from positive social interaction to social support was above 1.00 indicating that there were problems within the model. Assessment of the fit indices further supported that the model did not provide a good fit to the data: chi square=222.04 ($p=0.00$); RMSEA=0.14; CFI=0.96; WRMR=1.08.

In contrast to the 12-item model, the 4-item model did provide a good fit to the data. The standardized factor loading were between .81 and .95 ($p \leq .05$). Fit indices were as follows: chi square=1.12 ($p < 0.57$); RMSEA=0.00; CFI=1.00; WRMR=0.12. Based on these data, the single factor, 4-item version of the MOS-SSS was supported for use with victimized women on probation and parole.

Table 1 Descriptive statistics for the sample

Characteristics	Mean/Percentage
Race	
African American	40.9 %
White	51.6 %
Other	7.5 %
Age	37.3 (10.8)
Partner status	
Single	44.7 %
Married/living with a partner of the opposite sex	16.3 %
Divorced/separated/widowed	39.0 %
Educational attainment	
Less than a HS diploma/GED	27.5 %
GED/HS diploma	35.8 %
Trade school	3.7 %
Some college to College degree	29.9 %
Some graduate school to Graduate degree	2.9 %
Work status	
Unemployed	41.4 %
Working	27.8 %
Disabled	21.1 %
In school	3.5 %
Other	6.2 %
Homeless	33.1 %

Table 2 Means and standard deviations of items

Item	Mean	S.D.
12-Item Model:		
Tangible support		
1. Someone to take you to the doctor if you needed it. (T1)	2.55	1.36
2. Someone to prepare your meals if you were unable to do it yourself. (T2)	2.52	1.38
3. Someone to help with daily chores if you were sick. (T3)	2.42	1.33
Emotional-informational support		
4. Someone to confide in or talk to about yourself and your problems. (EI1)	2.72	1.24
5. Someone to share your most private worries and fears with. (EI2)	2.46	1.40
6. Someone to turn to for suggestions about how to deal with a personal problem. (EI3)	2.53	1.27
Affectionate support		
7. Someone who shows you love and affection. (A1)	2.93	1.21
8. Someone who hugs you. (A2)	2.86	1.26
9. Someone to love and make you feel wanted. (A3)	2.70	1.29
Positive social interaction support		
10. Someone to have a good time with. (PS1)	2.84	1.18
11. Someone to get together for relaxation. (PS2)	2.48	1.30
12. Someone to do something enjoyable with. (PS3)	2.66	1.23
4-Item Model:		
1. Someone to help with daily chores if you were sick. (T3)	2.42	1.33
2. Someone to turn to for suggestions about how to deal with a personal problem. (EI3)	2.53	1.27
3. Someone to do something enjoyable with. (PS3)	2.66	1.23
4. Someone to love and make you feel wanted. (A3)	2.70	1.29

Monte Carlo Analysis

As the 12-item model failed to yield an adequate fit, a Monte Carlo analysis was conducted for the 4-item model only. The full sample size of 406 was utilized and estimates from the 4-item model were used as population values, with 1,000 replications. Following procedures established by Muthén and Muthén (2002), bias in factor loading and standard error were below 5 % indicating a satisfactory finding. Confidence intervals around the factor loadings were all in the acceptable range (0.90–1.00; Muthén & Muthén, 2002); Cohen (1988) indicates that statistical power estimates should be at the 0.80 level or above. The Monte Carlo analysis confirmed that the factor loadings and standard errors in the 4-item model were stable and that the CFA had sufficient power.

Discussion

The present study sought to address a gap in research by providing rigorous psychometric testing of an existing and widely used social support instrument, the MOS-SSS,

specifically among victimized women on probation and parole. The present study addressed limitations present in prior research through the use of robust weighted least squares and polychoric correlations (Flora & Curran, 2004). Unlike other estimation procedures, these methods do not inflate standard errors or produce biased estimates when using Likert-type data. The findings of this study supported the use of the 4-item version of the MOS-SSS as a reliable, valid, and extremely parsimonious measure of social support among victimized women on probation and parole.

Failure to validate an instrument, particularly for use with a population that differs in significant ways from the populations upon which the instrument was originally developed, can lead to profoundly biased findings. As evidence, results of the present study indicated that the 12-item version of the MOS-SSS was not a reliable and/or valid measure of social support among victimized women on probation and parole. This finding underscores the importance of establishing the consistency, or lack thereof, of an instrument's factor structure across different samples.

Approximately one out of every 89 women in the U.S. is involved in the criminal justice system and over 85 % are sanctioned within the community (e.g., probation, parole) (Glaze & Bonczar, 2011; Greenfeld & Snell, 2000; Greenfeld & Snell, 1999; Sabol & Couture, 2008; Shilton, 2000). A growing body of scholarship strongly suggests that social support is a key mechanism in understanding factors that contribute to and complicate women's engagement in the justice system. The confirmation of a 4-item measure of social support that provides a reliable and valid assessment of the four central domains of social support (tangible; emotional/informative; positive social interaction; and affectionate) among justice involved women addresses a significant gap in this area. The 4-item measure provides service providers and researchers with a concise and statically reliable method of empirically measuring social support among this population. Valid and reliable measures are a necessary prerequisite for building an understanding of the relationship among social support, partner violence and psychological distress among justice involved women.

There are several limitations to this research. These results are not generalizable to all women on probation and parole. Only victimized women were included in this sample; similarly, women who reported only having sex with other women were excluded from participation. As these data are cross-sectional, the factor structure may change in longitudinal data. Another limitation is the relatively modest sample size. Notwithstanding these last two limitations, the Monte Carlo results demonstrate that the factor structure is robust and that a sample size of over 1000 observations is needed to change the results of the 4-item structure.

Conclusions

Given the trauma that victimization causes and the social support that is necessary to overcome this trauma, a measure of social support that is valid and reliable yet succinct is necessary. Despite these limitations of the present study, the results showed the psychometric properties of a social support measure. While consistent with Gjesfjeld

et al. (2008), this study was the first to validate a 4-item version of the MOS-SSS among victimized women on probation or parole. The brevity of the 4-item measure makes it optimal for use in both practice and research with this population.

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