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# Gender Differences in Sense of Coherence, Perceived Social Support, and Negative Emotions Among Drug-Abstinent Israeli Inmates

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## Abstract

This study examines gender differences in the sense of coherence, perceived social support, and negative emotions among drug-abstinent Israeli inmates. One hundred nineteen inmates have participated in this study (65 men and 54 women). The findings indicate that among female inmates, abstinence of more than a year is related to a decrease in sense of coherence and to an increase in their perceived friend support. In contrast, among male inmates, abstinence of more than a year is related to an increase in sense of coherence and no change at all in their perceived friend support. In addition, hostility level is lower and sense of coherence is higher when the length of abstinence exceeds a year among male inmates. In contrast, among female inmates hostility level is higher when the sense of coherence is lower, without any connection to the length of abstinence. The implications of these findings to treatment intervention are discussed.



## Keywords

inmates, drug-abstinent, gender differences, sense of coherence, perceived social support, negative emotions


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## Introduction

Drug addicts perceive themselves as lacking personal resources to cope with life's demands, which are manifested, inter alia, in a low sense of coherence and a low perceived social support (Annis, Sklar, & Moser, 1998). Since the 1970s, sense of coherence and perceived social support have been given extensive attention in the literature, as they were recognized as having a positive impact on mental health, well-being, and coping with life's demands (Adams & Bezner, 2000; Chen, 2006a; Dolbier & Steinhardt, 2000). Perceived social support and sense of coherence has been found to significantly moderate the relationship between stressful environments and adjustment (Antonovsky, 1998; Lusting et al., 2000). Moreover, the effects of sense of coherence and perceived social support on recovery from drug and alcohol addiction are now beginning to be appreciated.

Considerable research has documented gender differences in drug addiction (Greenfield et al., 2007; Grella, Scott, Foss, & Dennis, 2008; Haseltine, 2000; Langan & Pelissier, 2001; Pelissier & Jones, 2005; Staton-Tindall et al., 2007). Most studies have focused on gender differences in relation to victims of sexual abuse, patterns of drug use, mental health issues, physical health problems, abstinence, treatment, recovery, and relapse (Grella et al., 2008; Pelissier & Jones, 2005; Zlupko, Kauffman, Dore, & Morrison, 1995). It has been argued that because most substance abuse treatment systems have been designed by and for men, they have not been appropriate to meet the special needs of chemically dependent women. Although gender differences in addiction have been the subject of extensive academic research, far fewer studies, relatively speaking, have focused on gender differences in sense of coherence, perceived social support, and negative emotions during abstinence, particularly as those factors may vary across gender-specific treatment programs. Specifically, two research topics have received insufficient academic attention or have often been overlooked: (a) gender differences in the sense of coherence, perceived social support, and negative emotions among drug-abstinent inmates and (b) practical implications of these gender differences to treatment intervention.

The present research seeks to fill the gaps in our understanding of gender differences in sense of coherence, perceived social support, and negative emotions during drug abstinence. Bettering our knowledge of these topics would significantly enhance the ability to deliver differential and effective treatment to both sexes. This is the purpose of this article's research.

## Literature Review

### *Sense of Coherence, Perceived Social Support, and Drug Addiction*

Sense of coherence (Antonovsky, 1979) is a personality trait that expresses the individual's confidence in his or her ability to cope with life's demands. Antonovsky (1987) identified three main resources that may help facilitate individuals' positive adjustment, dealing with challenges, and coping with difficulties: These resources are revealed by the extent to which one has a pervasive, enduring but dynamic, feeling of confidence that (a) the stimuli derived from one's internal and external environments are *comprehensible*, structured, predictable, and explicable; (b) the sources are *manageable* and available; and (c) demands are *meaningful*, challenging, and worthy of investment and engagement. Sense of coherence is structured by generalized resistance resources that provide the individual with coping skills and serve as a buffer or mediatory factor in neutralizing the negative influences of stress (Antonovsky, 1998; Lusting, Rosenthal, & Haynes, 2000). In her study of drug-addicted male inmates, Chen (2006b) found an association between a higher sense of coherence and lower levels of anxiety and depression. Other studies found a positive correlation of sense of coherence with social support and perceived social support (Adams & Bezner, 2000; Soderfeldt, 2000; Volanen, Lahelma, Silventoine, & Suominen, 2004).

Some researchers maintain that perceived social support influences the individual's health and his or her sense of well-being (Adams & Bezner, 2000; Dolbier & Steinhardt, 2000; Hampton, 2004). Perceived social support is defined as the individual's cognitive and subjective assessment of the degree of accessibility to friend support, of his or her coping abilities, and the degree of his or her confidence in being able to rely on others; it does not reflect the social support he or she actually receives (Lakey & Cassady, 1990; Lakey & Drew, 1997). For example, Wethington and Kessler (1986) found that perceived support is more important than received support in predicting adjustment to stressful life events. Researchers refer to perceived social support as a personality trait based on previous life experiences (Kitamura et al., 2002). Individuals with low perceived social support have a low sense of well-being, a tendency to interpret actions as unsupportive, and a tendency to interpret social conditions in a negative manner (Lakey & Drew, 1997; Thomson, Lutz, & Lakey, 1999). These characteristics are compatible with those found in the drug addict population. Drug addicts perceive themselves as lacking personal resources to cope with stress and typically exhibit high levels of anxiety, dysfunctional development of object relations, and negative attachment and emotional detachment (Schmitz et al., 2000).

## *Gender Differences Among Incarcerated Populations*

An extensive literature exists on gender differences among samples of incarcerated men and women. These studies suggest that compared with incarcerated men, incarcerated women are more likely to use multiple drugs, more likely to have a lifetime episode of depression, and more likely to have been involved in dysfunctional relationships (Langan & Pelissier, 2001; Messina, Burdon, Hagopian, & Prendergast, 2006; Pelissier & Jones, 2005).

*Gender differences in psychological distress*. Several studies documented a higher intensity of negative emotions among drug-addicted females and more psychological distress compared with drug-addicted males (Grella, 2003; Grella & Joshi, 1999;

Robinson, Brower, & Gomberg, 2001). The noted findings among community samples are consistent for females in the criminal justice system (Messina et al., 2006; Pelissier, Camp, Gaes, Saylor, & Rhodes, 2003), especially when considering psychological issues such as depression, anxiety, and hostility. Lindquist (2000) has observed that female inmates report higher levels of mental health problems than do their male counterparts.

Co-occurring disorders of substance abuse and mental health problems also are common among females in the criminal justice system (Sacks, 2004). Compton and colleagues (2000) found that drug-addicted females have reported higher rates of mood disorders, phobias, panic disorder, and obsessive–compulsive disorder than males. Another study conducted by Petry and Bickel (2000) found a high level of hostility among drug-addicted females undergoing substance abuse treatment compared with drug-addicted males. Drug-abstinent female inmates are characterized by a high level of negative emotions (Widom, Schuck, & White, 2006; Wilke, 2004) as a result of their addiction and subsequent neglect of their children that then intensified their negative emotions (Chen & Timor, 2007; McClellan, Farabee, & Crouch, 1997). The majority of female inmates are single mothers with children under the age of 18 and for whom they are the sole caregivers and providers (Singer, Bussey, Song, & Lunghofer, 1995). Separation from their children causes the most severe type of "imprisonment pains" among female inmates (Faith, 1993; Pollock-Byrne, 1990). Thus, it can be seen that female offenders have specific needs related to their mental stress stemming from separation from their children.

*Gender differences in social support*. Overall, the interpersonal relationships of many offenders have been severely problematic as a result of their addiction, criminal lifestyle, and incarceration (Mumola, 1999). Lack of family support and other deficits in social support are linked to an inmate's psychological distress (Wooldredge, 1999). Singer et al. (1995) found that drug-addicted female inmates report a sense of loneliness, isolation, and perceived minimal social support. It is argued that women are more willing and able to create and maintain interpersonal ties within prison than males are (Zingraff, 1980). In contrast, male inmates are more focused on solving their problems in prison by themselves (Jiang & Winfree, 2006). Therefore, men do not search for support as much as women do inside prison, which implies that male inmates receive less support and more likely feel greater social loneliness (Carcedo, Lopez, Orgaz, Toth, & Fernandez-Rouco, 2008).

*Gender differences in treatment*. Gender differences have likewise been noted in factors associated with substance abuse treatment entry and treatment outcomes among incarcerated samples (Pelissier et al., 2003, 2004). Extensive research has shown that the process of drug addiction, abstinence, and treatment participation differs for males and females (Grella, 1996, 2003; Pelissier & Jones, 2005). Women tend to enter treatment after fewer years of substance abuse, but as such they begin treatment with a more severe clinical profile and more problems related to mental health, physical health, and family and interpersonal relations (Grella et al., 2008; Grella, Scott, Foss, Joshi, & Hser, 2003; McKay et al., 2001). These studies suggest that there are gender differences in psychological distress, differences in receiving social support, and differences in factors associated with abstinence and treatment entry.

Many drug users had come to rely on drugs to cope with negative emotions and life's demands. According to stress theory, individuals' personal and social resources straighten their ability to cope with life's demands (Sarason, Sarason, & Pierce, 1990). Personal coping resources such as sense of coherence and perceived social support were found to play a crucial role in maintaining a sense of well-being, mental health, and in coping with life's demands, and they are also associated with drug addiction, remission, and relapse. The absence of personal coping resources can result in relapse (McCormick & Smith, 1995), whereas the ability to cope contributes to maintenance of abstinence (Moser & Annis, 1996).

These findings support the wisdom of studying gender differences. This was done in the present study by examining gender differences in personal coping resources (sense of coherence and perceived social support) and in examining negative emotions among male and female inmates who had been drug-abstinent over various periods of time without therapeutic intervention.

To the best of our knowledge, there has not been any research on gender differences in sense of coherence, perceived social support, and negative emotions combined or simultaneously present among drug-abstinent inmates. Moreover, most studies were conducted on general populations rather than on drug-abstinent inmates. Generalization of the results of these studies to the prison population must be limited, as it has unique characteristics and needs. In addition, many of these studies, as opposed to the present study, did not deal with gender differences in sense of coherence associated with the various sources of perceived social support. The differential influence of two sources of perceived social support (perceived friend and family support) were thus addressed in this study.

This study's thesis is that (a) a lengthy duration of drug abstinence is related to a high sense of coherence, a high perceived social support, and lower levels of negative emotions among drug-abstinent inmates; (b) a lengthy duration of abstinence would be related to a low sense of coherence, a low perceived social support, and higher levels of negative emotions among female inmates as compared with male inmates; and (c) gender differences in sense of coherence, perceived social support, and negative emotions indicate a need to design a different treatment intervention.

## Method

### *Participants*

The sample was composed of 119 drug-abstinent inmates (65 men and 54 women) recruited from four of Israel's state penitentiaries (all are maximum-security prisons; three are prisons for males and one is a prison for females—the only one in Israel). The participants met the *Diagnostic and Statistical Manual of Mental Disorders* (4th ed.) (*DSM-IV*; American Psychiatric Association, 1994) criteria for having a drug dependence or abuse problem prior to and during their incarceration according to the Israel Prison Service (2006).

All participants were incarcerated at the time of the current study and had fully abstained from substance abuse (this was confirmed through routine urinalyses conducted by prison wardens). All were kept in drug-free wards in which only abstinent inmates, proven by routine urine tests, reside. The majority of Israeli inmates are kept in wards where drug and alcohol abuse, as well as active trading of illicit drugs, is prevalent. In 2000, the Israel Prison Service assessed the prevalence of substance abuse among offenders to be about 70%.

The majority of inmates were Israeli Jews (92%), and the remaining 8% (males) were Israeli Arabs. Of the males, 41% were married, about 16% were divorced, and about 43% were single. In stark contrast to the males, only about 15% of the female inmates were married, about 37% were divorced, and the remaining were single. Most of the participants (about 64%) had children. Their mean age was about 35 ($SD$ = 8.23). Their mean number of years of schooling was about 9½ ($SD$ = 2.82).

## Measures

A sociodemographic questionnaire was used to obtain data concerning age, family history, drug abuse history, criminal history, and educational background.

*Antonovsky's (1983) Sense of Coherence Scale*. The Sense of Coherence Scale was used to assess the inmates' sense of coherence in their world, expressing thoughts, feelings, and expected behavior regarding their lives. The abbreviated scale consists of 13 items on a 5-point Likert-type scale ranging from *always* (1) to *never* (5), in which a higher score expresses a higher sense of coherence. For example, to express a sense of comprehensibility, the following question was asked: "When you talk to people, do you have the feeling that they don't understand you?" To express the sense of manageability the following question was asked: "When you have a difficult problem, the choice of a solution is . . . ?" (Responses ranged from *always confusing* and *hard to find* to *always completely clear*.) And to express meaningfulness, the following question was asked: "You anticipate that your personal life in the future will be . . . ?" (Responses ranged from *totally without meaning* to *full of meaning and purpose*.) Internal consistency reliability coefficients (Cronbach alphas) have been reported to be between .68 and .90 (Zika & Chamberlain, 1992). In the present study, an internal consistency of .65 was found.

*The Procidano and Heller (1983) Perceived Social Support From Family and Friends Inventory (PSS-FA and PSS-FR)*. The PSS inventory is a 40-item self-report instrument. This self-report questionnaire was designed to assess respondents' perceptions of the support they receive from family and friends. The instrument includes two components: a 20-item friend component and a 20-item family component. The 40 items are measured on a 5-point Likert-type scale ranging from *not at all* (1) to *to a great extent* (5), in which a higher score expresses a higher level of support. Sample family support items include "My family gives me the moral support I need." Sample friend support items include "Most other people are closer to their friends than I am." Simple counts of the number of endorsed items indicate the level of support from family and friends. Internal consistency reliability coefficients (Cronbach alphas) have been reported to be .90 for family support and .88 for friend support. In the present study, an internal consistency reliability coefficient (Cronbach alphas) of .88 was found for family support and .87 was found for friend support.

*The Spielberger (1975) State-Trait Anxiety Inventory (STAI)*. The STAI is a self-evaluation test for anxiety symptoms that includes 40 items, 20 of which report trait anxiety (TAI-T; e.g., "I don't have self-confidence"). The other 20 report state anxiety (STAI-S; e.g., "I feel calm"). The 40 items are measured on a 4-point Likert-type scale ranging from *not at all* (1) to *very* (4) in which a higher score expresses a higher level of anxiety. The questionnaire was translated into Hebrew and was validated by Teichman and Melinick (1979). In this study, internal consistency reliability coefficients (Cronbach alphas) have been reported to be .89 for state anxiety and .83 for trait anxiety.

*The Buss-Durkee (1957) Inventory (BDHI)*. The BDHI includes 75 items referring to various aspects of aggression and hostility (e.g., "Sometimes I can't restrain myself from harming others"). Responses range from *wrong* (0) to *right* (1), in which a higher score expresses a higher level of aggression. Internal consistency reliability coefficients (Cronbach alphas) of all scales (except guilt scale) have been reported to be .82 (Buss, 1961). The questionnaire was validated in Israel by Rabinovich (1972). In this study, internal consistency reliability coefficients (Cronbach alphas) have been reported to be .87.

## *Procedure*

The current research was approved by the Committee of the Israel Prison Service, which instructed prison directors to collaborate with the researchers. First, social workers asked drug-addicted inmates if they were willing to participate in this study. Participants signed up voluntarily and were approached by the researchers, who informed them of the study's purpose. Inmates signed informed consent forms provided by the Israel Prison Service that served as an official agreement. This agreement included a statement from the inmates declaring their voluntary agreement to participate and acknowledging that they could withdraw from the study at any time if they so chose. Participation in the project, withdrawal, or nonparticipation had no effect on inmates receiving any special privileges (monetary or otherwise concrete), benefits, or sanctions.

All but five inmates consented to participate. Anonymous cross-sectional data were collected from February 2006 through July 2006 for male and female inmates who agreed to participate in the study. Assured anonymity is an important determinant of accuracy in reporting and a means to decrease social-desirability response bias (Thornton & Gupta, 2004).

The sample was composed of 119 drug-abstinent inmates (65 men and 54 women) who were abstinent from drugs for two different time intervals—up to 1 year and for more than 1 year. Participants were divided into those specific groups because, according to *DSM-IV* criteria, abstinence of more than 1 year is considered "sustained full remission," whereas abstinence for up to 1 year is considered "early full remission."

Research assistants received special permits to enter the prison. Security measures were taken to protect the interviewers, in that correctional officers accompanied them to the education centers where inmates were waiting for them. Research assistants distributed the questionnaires to participants. The questionnaires took approximately 90 min to complete. Correctional officers were not present during the interviews. To further ensure their safety, research assistants were not allowed to leave the education centers unaccompanied by prison wardens.

### *Data Analysis Plan*

The analytic approach is threefold. First, analysis included nonparametric procedures (chi-square, Mann-Whitney $U$ test, $Z$ test, and Phi test) for sociodemographic characteristics. Second, a multivariate analysis of variance (MANOVA) was conducted to examine differences in sense of coherence and perceived social support by gender and duration of drug abstinence, with statistical control on education because of significant correlations between education and perceived social support. Third, four multiple regressions were used to predict sense of coherence, trait anxiety, and negative emotions (state anxiety and hostility). Gender and duration of drug abstinence were defined as the independent variables.

## Results

### *Participants' Backgrounds*

Most of the participants (about 65%) had served previous prison sentences ($Z$ = 1.00). Their mean number of times incarcerated was about 4, $SD = 3.09$, $t(66) = 1.02$, n.s. The mean length of imprisonment was 30 months, $SD = 26.16$, $t(64) = 1.37$, n.s. For most of these participants (95%), substance abuse began with cannabis (hashish) and although for most men (80%) it began with alcohol as well, that was the case for only a third of the women ($Z = 5.13$, $p < .001$). Another third of the women began substance abuse with LSD, compared with only 5% of the men ($Z = 4.44$, $p < .001$). Most participants used multiple substances, 1 to 8, $M = 4.40$, $SD = 2.21$, $t(117) = 0.10$, n.s., often including a combination of alcohol, cocaine, and heroin (see Table 1).

Participants, on average, came from large families with a mean number of six children, $SD = 3.40$, $t(114) = 1.85$, n.s. The delinquency rate in their families was about 52% (mainly siblings), and the rate of drug addiction (mainly siblings) was about 61%. Both delinquency and drug addiction rates did not differ by gender ($Z = 0.42$, $Z = 0.84$, n.s., respectively).

Overall, males and females had similar backgrounds except for history of sexual abuse ($Z = 4.64$, $p < .001$) and family status, $\chi^2(2) = 12.33$, $p < .01$. Female inmates

**Table 1.** Gender Differences in Drug Use History

| | Male Inmates[a] | | Female Inmates[b] | | |
|---|---|---|---|---|---|
| | *n* | % | *n* | % | *Z* |
| Alcohol | 36 | 55.4 | 19 | 35.2 | 2.19* |
| Cannabis | 52 | 80.0 | 36 | 66.7 | 1.64 |
| LSD or Ecstasy | 45 | 69.2 | 32 | 59.3 | 1.13 |
| Barbiturates | 21 | 32.3 | 25 | 46.3 | 1.55 |
| Stimulants | 19 | 29.2 | 23 | 42.6 | 1.51 |
| Heroin | 42 | 64.6 | 39 | 72.2 | 0.88 |
| Cocaine or crack | 46 | 70.8 | 40 | 74.1 | 0.40 |
| Mixture | 25 | 38.5 | 17 | 31.5 | 0.79 |
| Tranquilizers | 21 | 32.3 | 21 | 38.9 | 0.75 |
| Number of drugs used | | | | | |
| 1 | 7 | 10.8 | 5 | 9.3 | – |
| 2 | 10 | 15.4 | 6 | 11.1 | – |
| 3 | 10 | 15.4 | 6 | 11.1 | – |
| 4 | 11 | 16.9 | 14 | 25.9 | – |
| 5 | 5 | 7.7 | 6 | 11.1 | – |
| 6 | 5 | 7.7 | 5 | 9.3 | – |
| 7 | 7 | 10.8 | 8 | 14.8 | – |
| 8 | 10 | 15.4 | 4 | 7.4 | – |

Note: The groups in the substance use category are not mutually exclusive; therefore the total exceeds the sample sizes of 65 and 54 (i.e., participants may have used multiple substances).
a. $n = 65$.
b. $n = 54$.
*$p < .05$.

were more likely to report having been victims of sexual abuse during their lifetimes (44%) than males (6.5%). About 37% of the female inmates reported being abused by their fathers, about 16% by their brothers, about 5% by an uncle, and about 42% by an acquaintance. In addition, gender differences in family status were found; about 41% of the male inmates were married in contrast to only about 15% of the female inmates. In addition, no correlation was found between length of current incarceration and length of abstinence: male inmates, $r = .17$; female inmates, $r = .05$ (n.s.). That is, length of abstinence was not a function of length of incarceration.

### *Differences in Sense of Coherence and Perceived Social Support by Gender and Duration of Drug Abstinence*

Table 2 shows means and standard deviations for sense of coherence and perceived social support, by gender and duration of drug abstinence (the independent variables). A two-way analysis of variance, controlling for education, indicated a significant main effect for sense of coherence by gender, $F(1, 109) = 7.41$, $p < .01$,

**Table 2.** Means and Standard Deviations by Group for Perceived Family Support, Perceived Friend Support, and Sense of Coherence by Gender and Duration of Drug Abstinence

| | Female Inmates[a] | | | | Male Inmates[b] | | | |
|---|---|---|---|---|---|---|---|---|
| | Drug Abstinence up to 1 Year | | Drug Abstinence More Than 1 Year | | Drug Abstinence up to 1 Year | | Drug Abstinence More Than 1 Year | |
| | *M* | *SD* | *M* | *SD* | *M* | *SD* | *M* | *SD* |
| Perceived family support | 3.58 | 0.90 | 3.24 | 1.07 | 3.71 | 0.71 | 3.55 | 0.78 |
| Perceived friend support | 3.32 | 0.80 | 4.02 | 0.77 | 3.36 | 0.75 | 3.34 | 0.59 |
| Sense of coherence | 2.81 | 0.53 | 2.64 | 0.55 | 2.95 | 0.66 | 3.24 | 0.46 |

a. $n = 49$.
b. $n = 65$.

$\eta^2 = .06$, showing that overall, sense of coherence was higher for men ($M = 3.04$, $SD = 0.60$) than for women ($M = 2.77$, $SD = 0.54$). A significant Gender by Duration of Abstinence interaction was found for friend support, $F(1, 109) = 5.54$, $p < .05$, $\eta^2 = .05$, showing that females who abstained from drug abuse for more than a year had significantly more friend support than females who abstained for less than a year, $F(1, 109) = 7.94$, $p < .01$, $\eta^2 = .07$, yet no parallel difference was found for males, $F(1, 109) = 0.02$, n.s., $\eta^2 = .001$.

Although the interaction of gender by duration of abstinence was not significant for sense of coherence, $F(1, 109) = 1.84$, $\eta^2 = .02$, n.s., sense of coherence among male inmates was higher when the duration of abstinence exceeded 1 year ($r = .30$, $p < .05$), whereas sense of coherence among female inmates was lower when the duration of abstinence exceeded 1 year ($r = -.32$, $p < .05$).

In Figure 1, which shows perceived friend support by the interaction of gender and duration of abstinence, it is clear that among female inmates perceived friend support was higher when the length of abstinence exceeded 1 year.

## *Gender Differences in the Prediction of Sense of Coherence by Perceived Social Support*

Table 3 presents results of two multiple regressions of sense of coherence on perceived support from family and friends, by gender. Education and duration of abstinence were entered at Step 1 and perceived support from family and friends at Step 2. Findings show that a higher sense of coherence was predicted by higher perceived friend support ($\beta = .38$, $p < .01$) among male inmates and by higher perceived family support ($\beta = .41$, $p < .01$) among females. The change in $R^2$ was significant in both cases: males, $\Delta R^2 = .13$, $p < .05$, and females, $\Delta R^2 = .19$, $p < .01$—showing that

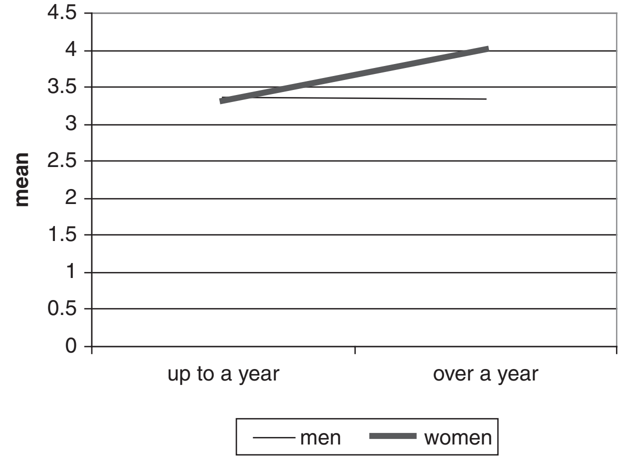


**Figure 1.** Friend Support by Gender and Drug Abstinence

perceived social support predicted sense of coherence beyond education and duration of drug abstinence.

## *Gender Differences in the Prediction of Negative Emotions*

Two multiple regression analyses were conducted to predict negative emotions (state anxiety and hostility). Predictors were duration of abstinence, entered at Step 1; perceived social support, entered at Step 2; and sense of coherence, entered at Step 3.

*State anxiety*. Table 4, which presents results of a multiple regression of state anxiety on perceived social support from family and friends and sense of coherence by gender, shows that among male inmates it was possible to predict state anxiety by perceived friend support ($\Delta R^2 = .16$, $p < .01$) and sense of coherence ($\Delta R^2 = .17$, $p < .001$). Among male inmates, a higher level of state anxiety was predicted by a lower level of perceived friend support, beyond duration of drug abstinence, and by a lower sense of coherence beyond perceived social support. Sense of coherence had a significant contribution to state anxiety beyond perceived social support among males. Among female inmates, it was possible to predict state anxiety by perceived support from friends and family ($\Delta R^2 = .42$, $p < .001$), beyond duration of abstinence, yet sense of coherence did not have any further significant contribution. That is, among female inmates a higher level of state anxiety was predicted by a lower level of perceived support from friends and family.

*Hostility*. Table 5, which presents results of a multiple regression of hostility on perceived support from family and friends and sense of coherence by gender, shows that among male inmates it was possible to predict the level of hostility by duration

**Table 3.** Multiple Regression of Sense of Coherence on Perceived Family Support and Perceived Friend Support, by Gender

| | Female Inmates[a] | | | Male Inmates[b] | | |
|---|---|---|---|---|---|---|
| | β | *SE* | *B* | β | *SE* | *B* |
| Step 1 | | | | | | |
| Education | .10 | .04 | .03 | .06 | .02 | .01 |
| Duration of drug abstinence | −.08 | .19 | −.11 | .13 | .14 | .15 |
| Step 2 | | | | | | |
| Perceived family support | .41** | .08 | .24 | −.04 | .12 | −.03 |
| Perceived friend support | .12 | .09 | .08 | .38** | .12 | .33 |

Note: Female inmates: Step 1, $R^2 = .02$, n.s.; Step 2, $\Delta R^2 = .19$, $p < .01$; total $R^2 = .21$, $F(4, 44) = 3.00$, $p < .05$. Male inmates: Step 1, $R^2 = .02$, n.s.; Step 2, $\Delta R^2 = .13$, $p < .05$; total $R^2 = .15$, $F(4, 59) = 2.69$, $p < .05$.
a. $n = 49$.
b. $n = 64$.
**$p < .01$.

**Table 4.** Multiple Regression of State Anxiety on Perceived Family and Friend Support, and Sense of Coherence, by Gender

| | Female Inmates[a] | | | Male Inmates[b] | | |
|---|---|---|---|---|---|---|
| | β | *SE* | *B* | β | *SE* | *B* |
| Step 1 | | | | | | |
| Duration of drug abstinence | −.01 | .20 | −.01 | .01 | .14 | .01 |
| Step 2 | | | | | | |
| Perceived family support | −.29* | .09 | −.20 | .18 | .11 | .15 |
| Perceived family support | −.50*** | .09 | −.40 | −.28* | .12 | −.27 |
| Step 2 | | | | | | |
| Sense of coherence | −.16 | .15 | −.20 | −.46*** | .13 | −.50 |

Note: Female inmates: Step 1, $R^2 = .01$, n.s.; Step 2, $\Delta R^2 = .42$, $p > .001$; Step 3, $\Delta R^2 = .02$, n.s.; total $R^2 = .45$, $F(4, 46) = 9.39$, $p > .001$. Male inmates: Step 1, $R^2 = .01$, n.s.; Step 2, $\Delta R^2 = .16$, $p > .01$; Step 3, $\Delta R^2 = .17$, $p > .001$; total $R^2 = .34$, $F(4, 58) = 7.44$, $p > .001$.
a. $n = 51$.
b. $n = 63$.
*$p > .05$. ***$p > .001$.

of abstinence ($R^2 = .15$, $p < .01$) and by sense of coherence ($\Delta R^2 = .16$, $p < .001$), beyond perceived social support. That is, among male inmates, when the duration of abstinence exceeded 1 year, and for a higher sense of coherence, the level of hostility was lower. Among female inmates, the overall model of multiple regression was not significant: $R^2 = .13$, $F(4, 48) = 1.83$, n.s. However, hostility level was predicted by sense of coherence ($\Delta R^2 = .12$, $p < .05$) but not by duration of abstinence, as opposed to male inmates. This means that among female inmates the hostility level was lower

**Table 5.** Multiple Regression of Hostility on Perceived Family and Friend Support, and Sense of Coherence, by Gender

| | Female Inmates[a] | | | Male Inmates[b] | | |
|---|---|---|---|---|---|---|
| | β | *SE* | *B* | β | *SE* | *B* |
| Step 1 | | | | | | |
| Duration of drug abstinence | –.10 | .04 | –.03 | –.33** | .03 | –.09 |
| Step 2 | | | | | | |
| Perceived family support | .11 | .02 | .02 | .08 | .02 | .02 |
| Perceived friend support | –.03 | .02 | –.01 | –.08 | .02 | –.02 |
| Step 3 | | | | | | |
| Sense of coherence | –.39* | .04 | –.09 | –.43*** | .03 | –.10 |

Note: Female inmates: Step 1, $R^2$ = .003, n.s.; Step 2, $\Delta R^2$ = .01, n.s.; Step 3, $\Delta R^2$ = .12, $p > .05$; total $R^2$ = .13, $F(4, 48)$ = 1.83, n.s. Male inmates: Step 1, $R^2$ = .15, $p > .01$; Step 2, $\Delta R^2$ = .05, n.s.; Step 3, $\Delta R^2$ = .16, $p > .001$; total $R^2$ = .36, $F(4, 59)$ = 8.24, $p > .001$.
a. $n = 53$.
b. $n = 64$.
*$p > .05$. **$p > .01$. ***$p > .001$.

when sense of coherence was higher. For both males and females, perceived social support did not have a significant contribution to hostility beyond duration of abstinence (males, $\Delta R^2$ = .05; females, $\Delta R^2$ = .01, n.s.), yet sense of coherence had a significant contribution for both beyond duration of abstinence and perceived social support.

## *Gender Differences in the Prediction of Trait Anxiety*

From Table 6, which presents a three-step multiple regression of trait anxiety on perceived support from family and friends and sense of coherence by gender, we can see that among male inmates it was possible to predict trait anxiety by sense of coherence and by perceived family support ($R^2$ = .31, $p < .001$). That is, among male inmates, a higher level of trait anxiety was predicted by a lower sense of coherence and lower perceived family support. Duration of abstinence was not significant ($\Delta R^2$ = .03), and although the contribution of perceived social support beyond it was not significant either ($\Delta R^2$ = .03), perceived family support was found to be a significant predictor of trait anxiety. Sense of coherence had a significant contribution ($\Delta R^2$ = .20, $p < .001$) to trait anxiety beyond duration of abstinence and perceived social support. Among female inmates, it was possible to predict trait anxiety by sense of coherence and by perceived friend support ($R^2$ = .37, $p < .001$); that is, among female inmates a higher level of trait anxiety was predicted by a lower sense of coherence and lower perceived friend support. Duration of abstinence was not significant ($\Delta R^2$ = .01) and perceived social support had a significant contribution to trait anxiety beyond it ($\Delta R^2$ = .25, $p < .001$). For females, sense of

**Table 6.** Multiple Regression of Trait Anxiety on Perceived Family and Friend Support, and Sense of Coherence, by Gender

| | Female Inmates[a] | | | Male Inmates[b] | | |
|---|---|---|---|---|---|---|
| | *B* | *SE* | β | *B* | *SE* | β |
| Step 1 | | | | | | |
| Duration of drug abstinence | .07 | .15 | .08 | –.14 | .10 | –.12 |
| Step 2 | | | | | | |
| Perceived family support | –.17 | .07 | –.09 | –.27* | .07 | –.16 |
| Perceived friend support | –.30* | .08 | –.18 | .21 | .08 | .14 |
| Step 3 | | | | | | |
| Sense of coherence | –.37** | .13 | –.35 | –.47*** | .09 | –.35 |

Note: Female inmates: Step 1, $R^2$ = .01, n.s.; Step 2, $\Delta R^2$ = .25, $p$ < .001; Step 3, $\Delta R^2$ = .11, $p$ < .01; total $R^2$ = .37, $F(4, 46)$ = 6.63, $p$ < .001. Male inmates: Step 1, $R^2$ = .03, n.s.; Step 2, $\Delta R^2$ = .08, n.s.; Step 3, $\Delta R^2$ = .20, $p$ < .001; total $R^2$ = .31, $F(4, 57)$ = 6.52, $p$ < .001.
a. $n$ = 51.
b. $n$ = 62.
*$p$ < .05. **$p$ < .01. ***$p$ < .001.

coherence had a significant contribution ($\Delta R^2 = .11, p < .01$) to trait anxiety beyond duration of abstinence and perceived social support.

## Discussion

The purpose of this study was to examine gender differences in sense of coherence, in perceived social support, and in negative emotions among drug-abstinent Israeli inmates.

### *Gender Differences in Duration of Abstinence*

The present findings indicate a relationship among gender differences in sense of coherence, perceived social support, and level of hostility in connection to length of abstinence. Sense of coherence was lower when the duration of abstinence exceeded 1 year among female inmates, whereas it was higher when the duration of abstinence exceeded 1 year among male inmates. Perceived friend support was higher when the duration of abstinence exceeded 1 year among female inmates, as compared to that perceived by male inmates. Last, level of hostility was higher whereas sense of coherence was lower, unrelated to the duration of abstinence among female inmates. Among male inmates, however, the level of hostility was lower and sense of coherence was higher when the duration of abstinence exceeded 1 year.

The study's results are open to alternative explanations. Developmental theorists argued that abstinence is a behavioral change that occurs at a specific stage of the dynamic recovery process—a starting point beyond which other changes still occur on both personal and interpersonal levels (Prochaska, DiClemente, & Norcross, 1992; Stall & Biernacki, 1986). Several studies have shown that early success in achieving drug abstinence over an extended time period is an important factor in maintaining positive outcomes like self-confidence (Mckay, Merikle, Mulvaney, Weiss, & Koppenhaver, 2001; Vielva & Iraurgi, 2001), a higher sense of coherence, a higher meaning in life, and a gradual reduction in the intensity of negative emotions (Adams & Bezner, 2000; Kairouz & Dube, 2000). Chen (2006b) found that Israeli male inmates who had been drug-abstinent for 6 to 24 months exhibited a higher sense of coherence, a greater sense of meaning in life, lower levels of anxiety and depression, and better behavior compared to male inmates who had been drug-abstinent for 6 months or less. The present findings indicate gender differences in sense of coherence, perceived social support, and in negative emotions linked to duration of abstinence.

Findings in the present study indicated that indeed, there was a high prevalence of sexual abuse in the lives of female offenders. Approximately 44% of participants were victims of sexual abuse. These findings are not surprising. Several researchers documented a high rate of sexual abuse among addicted females (Brems, Johnson, & Freemon, 2004; Langan & Pelissier, 2001; Westermeyer & Boedicker, 2000). Females use drugs primarily as a coping strategy to deal with negative emotions and for self-medication (Haseltine, 2000; Khantzian, 1991; Langan & Pelissier, 2001; Zlupko et al., 1995). Abstinence exposes victims of sexual abuse to traumatic recurring memories. Inability to cope with these traumatic events could cause a relapse (Wilke, 2004). Therefore, it is possible that among drug-addicted females, abstinence intensifies the emotional traumas and the level of negative emotions and lowers confidence in their ability to cope, which is manifested, inter alia, in a low sense of coherence and a high level of hostility. Similarly, several studies have found that women in substance abuse treatment scored significantly higher on measures of hostility when compared to men (Petry & Bickel, 2000; Robinson et al., 2001). These studies found hostility as predictor of early treatment termination in drug-addicted females but not in males (Petry & Bickel, 2000).

In addition, this research's findings indicate that perceived friend support was higher when the duration of abstinence exceeded 1 year among female inmates compared to male inmates. Similarly, Lemieux (2002) found that female offenders perceived higher levels of social support than did men. Women in particular may perceive greater psychological distress during incarceration than men because of their isolation from their family and children (Faith, 2003; Pollock-Byrne, 1990). It is argued that women are more willing and able to create and maintain interpersonal ties within prison than males are (Zingraff, 1980). This is consistent with relational theory that emphasizes the significant impact of relationships in women's lives (Gilligan, 1982; Miller, 1976). Interpersonal relationships can alleviate incarceration distress for both genders, because of their possible buffering effects (Sarason, Sarason, & Pierce, 1990).

The present findings indicate a common denominator between sense of coherence and perceived social support and their significance with regard to drug addiction, remission, and relapse (Grey, Osborn, & Reznikoff, 1986; Rice & Longabaugh, 1996). Sense of coherence and perceived social support, both personal coping resources, may constitute a measure for examining personality changes among drug addicts, just as the concept of self-efficacy is associated with drug addiction, remission, and relapse (Bandura, 1977). The absence of personal coping resources can result in relapse (McCormick & Smith, 1995), whereas the ability to cope contributes to a continuation and preservation of abstinence (Moser & Annis, 1996). Studies have shown that when starting treatment, drug addicts have lower sense of coherence and lower perceived social support. Following treatment, however, patients report a higher level of perceived social support and sense of coherence (Chen, 2006a, 2006b; McMahon, 2001).

## *Implication and Treatment*

The results presented here may have some clinical implications. Gender differences in duration of abstinence require separate gender-oriented therapeutic intervention (Grella, Scott, & Foss, 2005; Pelissier & Jones, 2005). It may be that among male prisoners therapy needs to focus on maintaining the period of abstinence that brings positive outcomes and strengthens one's sense of coherence and decreases negative emotions (Adams & Bezner, 2000; Chen, 2006b). In contrast, duration of abstinence decreases the sense of coherence and increases hostility among drug-abstinent female inmates. Therefore, intervention among drug-abstinent females with a history of sexual abuse needs to provide an immediate therapeutic solution for emotional traumas even before achieving a drug-free state. Abstinence without immediate supportive therapy may result in a relapse and reversion to drug use because of an inability to cope with emotional traumas and the intensity of negative emotions (Brady, Grice, Dustan, & Randall, 1993). In the past it was commonly thought that initial treatment of drug-addicted females should focus on maintaining abstinence and only then to focus on their coping with emotional traumas. Findings in the present study negate this perception.

In addition, based on the present findings that show a positive relationship between duration of abstinence and perceived friend support, it is recommend to place female inmates in a social support network, such as a 12-step program. Several studies show that, indeed, drug-abstinent females tend to participate more than men in self-help groups following treatment (Humphreys, Mavis, & Stofflemayr, 1991; Moos, Moos, & Timko, 2006; Timko, Finney, & Moos, 2005), which may influence the course of recovery following treatment. Grella and colleagues (2008) found that for women, participation in self-help groups and treatment was associated with moving from substance use to recovery. Participation in treatment and self-help groups was related to more reductions in drug use and criminal behavior among females as compared with males (Hser, Huang, Teruya, & Anglin, 2004).

A couple of limitations of the present investigation should be mentioned. This study was conducted on a prison population, which is a unique population, and therefore the generalization of its findings is relatively limited with regard to the drug-abstinent population. Therefore, it would be appropriate to examine whether it is possible to generalize the findings of this study and apply them to other drug-abstinent populations. In addition, generalizability to the larger population of male and female clients in prison may be limited because the social workers asked the participants if they were willing to participate. It should be noted, however, that technically, this is standard research procedure in Israel's prisons and that using a sample of volunteers is very common in field studies. It is also important to point out the limitation that data were self-reported, and that of course participant honesty in responding to the questions is always a concern. One other limitation of this study worth mentioning is that the results are based on cross-sectional data. Because longitudinal data were unavailable, causal influences could not be addressed.

## Conclusion

Despite these limitations, the researcher believes that the results of this study may add to the existing knowledge base regarding gender differences in duration of abstinence related to personal coping resources (sense of coherence and perceived social support). Knowledge about gender differences is significant in delivering effective treatment to both genders. This research's findings may have practical implication, which requires planning differently focused therapeutic intervention that would meet the specific needs and characteristics of both genders.

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