

# WOMEN'S PATHWAYS TO SERIOUS AND HABITUAL CRIME

## A Person-Centered Analysis Incorporating Gender Responsive Factors

TIM BRENNAN

MARKUS BREITENBACH

WILLIAM DIETERICH

*Northpointe Institute*

EMILY J. SALISBURY

*Portland State University*

PATRICIA VAN VOORHIS

*University of Cincinnati*

---

---

Qualitative approaches for identifying and characterizing women's pathways to crime are being augmented by quantitative methods. This study applies quantitative taxonomic methods in disaggregating a large sample of women offenders from a prison population to identify diverse pathway prototypes. An array of gender-responsive and gender-neutral factors and full criminal histories was used to characterize each pathway. Cross-sample and cross-method replication tests demonstrated the stable replication of these pathways. The identified prototypes were related to the prior literature, including Daly's pathway models, Moffitt's developmental taxonomy, and several prior taxonomic studies of women's pathways. Eight reliable pathways were identified that were nested within four broad, superordinate pathway categories. Substantial links to the prior pathways literature were noted, although greater complexity was found to exist in the eight identified pathways.

**Keywords:** women prisoners; pattern recognition; person centered; pathways

---

---

The study of "women's pathways" to crime is progressing to a new phase in which an initial exploratory, qualitative phase (Chesney-Lind, 1997; Daly, 1992, 1994; Owen, 1998; Richie, 1996) is being augmented by quantitative studies probing the core definitions of pathways as well as their generality, reliability, and precision. This shift is raising new questions about how to conceptualize, identify, and measure women's pathways (Brennan, Breitenbach, & Dieterich, 2009; Jones, 2011; Reisig, Holtfreter, & Morash, 2006; Salisbury & Van Voorhis, 2009; Simpson, Yahner, & Dugan, 2009). Now, nearly two decades on from early suggestions that women's pathways to crime may differ from men's (Chesney-Lind, 1997; Daly, 1992), the pathways perspective is providing the theoretical impetus for an emerging array of gender-responsive assessments and treatment recommendations for women in correctional settings (e.g., Bloom, Owen, & Covington, 2003; Buell, Modley, & Van Voorhis, 2011; Covington, 1998, 2000).

---

**AUTHORS' NOTE:** Correspondence concerning this article should be addressed to Tim Brennan, Northpointe Institute—R&D, 101 Pat Mell Drive, Peachtree City, GA 30269; e-mail: [tbrennan38@earthlink.net](mailto:tbrennan38@earthlink.net).

CRIMINAL JUSTICE AND BEHAVIOR, Vol. 39 No. 11, November 2012 1481-1508.

DOI: 10.1177/0093854812456777

© 2012 International Association for Correctional and Forensic Psychology

The terms *gender responsive* and *gender neutral* are frequently used in the recent literature on women offenders to reflect salient distinctions between the risk and treatment needs of women and men. Gender responsive (GR) is used throughout this article as an adjective to risk/needs factors that have been identified in samples of women offenders (e.g., abuse and trauma, parental issues, relationship dysfunction, self-efficacy, safety, depression, anxiety, and others), but not men offenders (see, e.g., Andrews & Bonta, 2010; Daly, 1992, 1994; Gehring, 2011; Jones, 2011; McClellan, Farabee, & Crouch, 1997). GR may also refer to programs and services designed for women offenders. Gender neutral (GN) is used with reference to traditional risk/need factors identified in samples of male and female offenders (e.g., antisocial associates, criminal thinking, substance abuse, education employment, housing, criminal history) as well as the programs and services that target these needs.

### WOMEN'S PATHWAYS TO CRIME

The vast literature on crime etiology and its treatment has been widely faulted for devoting insufficient attention to female offenders. Oblivious to this gap, crime and correctional policies traditionally treated men and women alike, as policy makers and practitioners often generalized findings from studies of male populations to females (Blanchette & Brown, 2006; Van Voorhis, 2012). Although the study of women's pathways to offending is at a relatively early stage, significant progress has emerged in several key areas. However, these advances are scattered across various criminological and related subdisciplines, with relatively little integration between them. These diverse research areas include qualitative studies in feminist criminology, theoretical taxonomic work in developmental psychopathology by Moffitt, Caspi, Rutter, and Silva (2001) and others, the life course pathways emerging from criminal careers research, and advances in quantitative methods emerging from developmental psychology (Bergman, Cairns, Nilsson, & Nystedt, 2000; Cairns & Cairns, 1994). These independent versions of women's and girls' pathways to criminal behavior generally emphasize distinct theoretical and methodological approaches, communicate in different journals, and are often aimed at different research audiences. We now briefly review aspects of this research of most significance to the present study.

#### PATHWAY DEVELOPED THROUGH QUALITATIVE RESEARCH

A series of early qualitative studies grounded in feminist criminology produced compelling biographical narratives of women offenders and identified many key psychosocial risks and needs characterizing women's pathways to crime. These factors appeared substantively different from those in the prevailing research on male offenders (e.g., Belknap, 2007; Chesney-Lind & Shelden, 2004; Daly, 1992; Giordano, Deines, & Cernkovich, 2006; Owen, 1998; Richie, 1996). However, these narratives also incorporated some traditional GN factors, such as delinquent peers and a lack of informal social control. As will be seen, this hybrid perspective is not unusual in the pathways literature.

These biographical narratives produced several typified pathways to crime. A *childhood victimization pathway* linked serious child abuse to a common pattern of mental illness, depression or anxiety, and substance abuse (Covington, 1998; Daly, 1992). An *extreme marginalization pathway* (Richie, 2001) identified a pattern of poverty, homelessness, and educational and vocational problems and called attention to the intersection of gender, race,

and class among certain women offenders (Bloom et al., 2003; Richie, 1996). A *relational pathway* identified a combination of dysfunctional intimate relationships that, over time, appeared to erode self-efficacy and were linked to adult victimization, depression and anxiety, and substance abuse (Covington, 1998; Gilligan, 1982). Of course “pathways” in this context were not established through longitudinal research but rather through case studies and in-depth narratives that explicated the temporal context and event sequencing of the identified key factors.

Kathleen Daly's (1992) influential qualitative model identified five prototypical pathways, as follows: (a) *street women—escape and survival* involved women or girls fleeing abuse and violence, entering street life and often engaging in drugs, prostitution, or theft to survive; (b) *drug-connected women* involved a pattern of using and trafficking drugs, often collaborating with intimate partners or family members; (c) *harmed and harming women* were described as experiencing extreme physical and sexual child abuse and neglect, followed by school and delinquency problems and presenting a hostile withdrawn demeanor and chronic adult criminality; (d) *battered women* centrally reflected extreme victimization from violent partners, leading to criminal behavior that was seen as unlikely apart from this relationship; and (e) “*other*” women partly followed an “economic” pathway, often involving fraud, theft, and embezzlement and motives such as a “desire for more money,” survival, greed, or economic gain. Clearly, more research is needed since very few studies have attempted to replicate Daly's qualitative pathways (Brennan, Breitenbach, & Dieterich, 2008; Reisig et al., 2006; Salisbury & Van Voorhis, 2009; Simpson et al., 2009).

#### THEORETICAL PATHWAYS—MOFFITT'S DEVELOPMENTAL TAXONOMY

Moffitt proposed two main pathways (Farrington, 2003; Moffitt, 1993; Moffitt et al., 2001). The *adolescent limited* (AL) was described as a less serious temporary pattern involving a social learning and peer affiliation phase in midadolescence when antisocial behavior peaks and then dissipates in later teenage years. However, certain “snares” were seen as potentially extending the criminal careers of this group (e.g., chronic drug abuse, high school dropout). The *life course persistent* (LCP) pathway was defined by a more complex etiology, involving early childhood problems, abusive or neglectful parents, and neurocognitive deficits leading to lengthy criminal careers. Several replication studies have examined Moffitt's pathways on female offenders, again with mixed results (Aalsma & Lapsley, 2001; Brennan, 2008; Kratzer & Hodgkins, 1999; Moffitt et al., 2001; Simpson et al., 2009; Tibbetts & Piquero, 1999). Several unresolved questions regarding Moffitt's taxonomy in relation to women offenders are as follows.

First, do LCPs really exist among women? Moffitt and associates (2001) reported that LCPs made up fewer than 1% of their female community samples, and thus questions over their existence have been raised.

Second, what are the defining characteristics of the female LCP category? Most prior studies did not have sufficient sample sizes to reliably describe the group profile (Moffitt et al., 2001; Tibbetts & Piquero, 1999). Moffitt has suggested that female and male LCPs should have essentially the same features (Moffitt, 2003).

Third, can AL criminal careers extend into adulthood? Moffitt (1993) has suggested that AL careers may be extended if a young woman falls into certain “snares.”

Fourth, are two developmental pathways enough? Recent studies suggest that additional female pathways may exist (Brennan, 2008; D'Unger, Land, & McCall, 2002; Fergusson &

Horwood, 2002; Francis, Sothill, & Fligelstone, 2004; Stefurak & Calhoun, 2007; White & Piquero, 2004).

#### METHODOLOGICAL ADVANCES FOR IDENTIFYING PATHWAYS

Three methodological advances have also contributed significantly to research on women's pathways. First, new GR instruments have been developed specifically to assess women offenders' psychosocial risks and needs, allowing a more focused assessment of key GR constituents of women's pathways (Salisbury, Van Voorhis, & Spiropoulos, 2009; Van Voorhis, Salisbury, Wright, & Bauman, 2008; Wright, Salisbury, & Van Voorhis, 2007). Second, the "person-centered" holistic paradigm has emerged over the past few years, offering an alternative methodology to identify and study homogeneous pathways. It primarily emerged from the work of several research teams in developmental sciences, for example, the North Carolina Center for Developmental Sciences (Cairns, 2000; Cairns, Bergman, & Kagan, 1998) and the Stockholm group (Bergman et al., 2000; Bergman, Magnusson, & El-Khoury, 2003).

The person-centered paradigm has several key characteristics. First, it aims to maintain holistic integrity by explicitly using the "person" as the unit of analysis. This contrasts with the currently more dominant variable-centered paradigm that uses the variable as the unit of analysis to seek global intervariable relationships. Second, the person-centered approach focuses on the search for holistic patterns among mutually similar person profiles by using interpersonal similarities and pattern seeking methods to disaggregate heterogeneous samples into more homogeneous latent developmental patterns. Third, the variable-centered and person-centered approaches emphasize quite different quantitative methods. The prevailing variable-orientated approach uses methods that examine relationships among variables (e.g., correlations, regression, path analysis, factor analysis, structural equation models). The person-centered approach aims to identify latent subgroups of persons who are characterized by highly similar trajectory profiles (e.g., latent class analysis, mixture modeling, growth mixture models, multiple forms of cluster analyses). Space does not permit a more extended discussion here; however, interested readers may refer to several expositions of the person-centered approach (Bergman et al., 2003; Cairns, 2000; Caramani, 2009). Related quantitative developments have also emerged in life course criminology with its focus on criminal career trajectories, aging, turning points, and pathway trajectories across time (Farrington, 2005; Sampson & Laub, 1993; Wikstrom & Sampson, 2006).

#### A SYNTHESIS OF PRIOR PROTOTYPICAL PATHWAYS OF WOMEN OFFENDERS

Although they are far from definitive, prior research studies on women's pathways to crime appear to be identifying several recurring typified pathways. Although typically given different names, identified with different methods, and characterized by different factors, the following broad pathway prototypes might be hypothesized:

1. *A normal or situational female offender*: A recurring pattern often named as "normal" in prior studies is typically characterized by a relative absence of risk factors, later onset, and relatively minor histories of property or drug offenses (Aalsma & Lapsley, 2001; Brennan et al., 2008; Butler & Adams, 1966; Simpson et al., 2009; Stefurak & Calhoun, 2007). This pathway is also characterized by little early abuse, few early school problems, and few psychological abnormalities.

2. *An AL pathway*: A pattern matching Moffitt's AL has emerged in several studies. Consistent with Moffitt's proposals, this prototype is described as mostly avoiding serious offenses and then desisting from crime by early adulthood (Brennan, 2008; Lykken, 1995; Moffitt, 1993; Moffitt et al., 2001; Piquero & Moffitt, 2005).
3. *A victimized, socially withdrawn and depressed pathway*: This pattern is characterized in both quantitative and qualitative pathway studies, by early abuse and trauma leading to social withdrawal, mistrust, hostility, depression, drug abuse, and crime. Examples include Aalsma and Lapsley's (2001) "internalizing cluster," Stefurak and Calhoun's (2006) "depressed cluster," and Brennan's (2008) "abused/internalizing cluster." McClellan et al. (1997) and Salisbury and Van Voorhis (2009) also provide support for this victimized pathway. This pattern does not clearly occur in Moffitt's (1993) taxonomy.
4. *A chronic serious offender*: This recurring pathway reflects a high-risk, complex pattern of early physical and/or sexual abuse, child behavior problems, school and family problems, delinquency, low self-control, an aggressive, hostile personality, and ongoing criminality. This profile is reminiscent of Daly's "harmed and harming" pathway and Moffitt's (1993) LCP. Quantitative studies identifying a similar prototype include Widom's (1978) "primary psychopath," Stefurak and Calhoun's (2006) "externalizing impulsive," and Brennan's (2008) "low self-control serious delinquents."
5. *Socialized offenders and socially marginalized groups*: This pathway identifies poor, marginalized, uneducated women (Owen & Bloom, 1995; Richie, 2001; Salisbury & Van Voorhis, 2009). Other prior studies imply social learning and subcultural socialization themes linked to disorganized families, ineffective parenting, and socialization in subcultural and deprived settings (Butler & Adams, 1966; Felice & Offord, 1972; Widom, 1978). Similar prototypes include Lykken's (1995) "common sociopath," Warren's (1971) "subcultural identifier" and also the high-risk offender as articulated in the risk-need-responsivity (RNR) paradigm (Andrews & Bonta, 2010). This socially oriented pathway does not clearly emerge in the more psychological taxonomies of Aalsma and Lapsley (2001) or Moffitt (1993).

We view the above as hypothetical "common" pathways since most emerged from small-sample qualitative studies or from nonreplicated quantitative taxonomic studies. All require further replication and more precise characterization. This study has three major goals:

1. Identify and describe "common" prototype pathways in a sample of female prison inmates and estimate the sample proportions in each pathway;
2. Test each identified pathway for stability and replication;
3. Explore potential convergences, replications, and differences between the identified pathways and pathways from the prior literature.

## METHOD

### PARTICIPANTS

The sample consisted of soon-to-be-released inmates at the Central California Women's Facility and the Valley State Prison for Women. The overall project was focused on reentry challenges and thus included only women eligible for reentry. Eligible inmates (felons only) were those within 60 to 180 days of their expected parole release date. The sample was restricted to women being released onto parole for the first time on the current term. The sample included women who were serving a new term for a previous parole violation but excluded women temporarily returned to custody for a technical violation. This

constraint occurred because the California Department of Corrections and Rehabilitation (CDCR) did not routinely administer reentry assessments to this group at the time the study was conducted. First, a roster was generated of all women meeting these criteria ( $n = 1,338$ ). Assessments were attempted with all women on the roster. Interviews were successfully completed with 68% of the women on the roster ( $n = 915$ ). We then compared completers to refusers on two important variables that were available for all women. Completers did not differ from refusers on age ( $t = -0.068, p = .964$ , two-tailed) or on a violence risk scale score from a recent assessment ( $t = -1.64, p = .102$ , two-tailed). The assessments were administered by CDCR staff following an intensive training program in the Women's Risk/Needs Assessment (WRNA; Van Voorhis, Wright, Salisbury, & Bauman, 2010) and in the use of the COMPAS Reentry Assessment (Brennan & Dieterich, 2007). The COMPAS, in addition to an interview section, also includes a formal record search in compiling criminal history information. Data collection was completed in the fall of 2007.

The final estimation sample for the current analyses was further limited to the 718 cases that had complete data on all 40 assessment scales as well as official criminal histories. Of the initial 915 completed assessments, approximately 3% of the total item responses were missing. Unfortunately, these were scattered across different scales—which magnified the impact of the relatively small number of missing items. Missing data imputation was conducted at the item level within each scale following the method of Sijtsma and van der Ark (2003). We did not impute values for missing official criminal history items. Following this method, the number of assessments with complete data on all 40 scales was 718 (79%). A set of logistic models regressing a binary indicator of item nonresponse (missing more than 50% of the items on any of the 40 scales in the total survey) on key sample characteristics was used to assess the effects of item nonresponse. No significant effects of age, race, admission status, prior number of arrests, age at first arrest, or index offense were found. Table 1 provides descriptive statistics on the study sample.

## MEASURES

First, formal criminal histories were collected from official records. Second, the WRNA and the COMPAS Reentry assessments and interviews were administered to each participant.

*WRNA.* This instrument includes most of the key GR factors that emerged from the women's pathways literature. It addresses a comprehensive range of family, relationship, economic, and social and psychological factors (Van Voorhis et al., 2010). These GR issues are typically absent from standard GN correctional instruments. The scales in this instrument fall in several domains: (a) Victimization and Abuse: physical abuse as an adult and as a child, sexual abuse as a child, and as an adult; (b) Mental Health: mental illness history, current depression or anxiety, current psychosis; (c) Intimate Relationships: support from significant other, conflict with significant other, dysfunctional relationship (codependency, exploitation, nonsupportive) regarding most recent relationship; (d) Housing Safety: violent or unsafe households; (e) Family of Origin: support conflict; (f) Parenting Issues: parenting stress or anxiety, parenting involvement (children younger than 18); (g) Personal and Psychological Factors: anger and hostility, self-esteem, self-efficacy; (h) Employment/

**TABLE 1: Demographic and Criminal History Characteristics of the Study Sample**

<i>Variable</i>	<i>Statistic</i>
Participants ( <i>n</i> )	718
Age	
<i>M</i>	36.7
<i>SD</i>	9.5
Ethnicity (%)	
Latino(a)	30.1
African American	25.4
White	33.1
Asian	1.9
Native American	3.5
Other	6.0
Admission status (%)	
New admission	72.3
Index offense (%)	
Felony assault	12.4
Age at first arrest	
<i>M</i>	22.3
<i>SD</i>	7.1
Number of prior arrests	
<i>M</i>	11.7
<i>SD</i>	9.5

Financial: poor work or financial history; (i) Education: strengths and achievement, deficiencies. Table 1 lists all 21 GR scales and their respective alpha coefficients. Full details of the instrument have been presented in recent articles (Salisbury et al., 2009; Van Voorhis et al., 2008; Van Voorhis et al., 2010; Wright et al., 2007). Additional psychometric results from validation studies (e.g., reliability, construct validity, predictive validity) may be viewed at [www.uc.edu/womenoffenders](http://www.uc.edu/womenoffenders). Table 1 indicates the sample breakdowns by demographics and Criminal History Characteristics Table 2 provides the number of items, means and standard deviations, and alpha coefficients for all WRNA scales.

*COMPAS Reentry Assessment.* This broadband GN inventory includes social, psychological, and criminogenic factors that have emerged in meta-analytic research as significantly linked to the success or failure of the prisoner reentry process. Risk and needs information is compiled from official records, a standardized interview with clients, and a self-report questionnaire. Psychometric details of all scales have been previously published (Brennan & Dieterich, 2007; Brennan, Dieterich, & Ehret, 2009). An unpublished review (Skeem & Laudén, 2007), primarily relying on an early developmental study of COMPAS while acknowledging their inadequate evidence base, nevertheless raised several issues mainly regarding predictive validation. Subsequent research by three independent teams has supported the predictive validity and reliabilities of the COMPAS scales in prison, parole, and jail contexts across several jurisdictions in three separate states (Farabee, Zhang, Roberts, & Yang, 2010; Lansing, 2012; Mann, Gulick, Blomberg, Bales, & Piquero, 2012). Table 2 lists all COMPAS scales and scale alphas achieved in the present study. COMPAS Reentry taps the following broad domains:

Official Criminal History relies on official data to collect a substantial number of items and scaled data. These include age at first arrest and scales measuring early onset of delinquency, overall criminal involvement, history of noncompliance, history of violence,

**TABLE 2: Gender-Responsive Scales: Descriptive Statistics and Alphas**

Valid N = 718 <sup>a</sup>	Items	Min.	Max.	M	SD	Alpha
Housing safety	4	0	4	2.99	1.14	.64
Employment/financial problems	7	0	8	4.04	2.26	.68
Educational strengths/history	4	0	4	1.56	1.29	.68
Anger/hostility	4	0	4	0.86	1.16	.68
History of mental illness	6	0	6	1.91	2.00	.85
Depression/anxiety	6	0	6	1.71	1.87	.79
Psychotic symptoms <sup>b</sup>	2	0	2	0.12	0.39	—
Physical/sexual abuse as child <sup>b</sup>	2	0	2	0.68	0.84	—
Physical/sexual abuse as adult <sup>b</sup>	2	0	2	0.80	0.79	—
Relationship support	7	0	10	3.90	3.71	.85
Relationship conflictual	5	0	5	0.82	1.12	.63
Parental involvement	4	0	4	2.04	1.77	.91
Parental problems	6	0	6	1.27	1.45	.68
Family support	5	0	5	3.27	1.45	.73
Family conflict	3	0	3	0.34	0.60	.25
Self-report scales						
Self-esteem	10	10	30	25.28	3.98	.84
Self-efficacy	17	21	51	42.43	6.34	.88
Relationship problems	6	6	18	9.33	3.40	.81
Parental stress	12	12	41	13.55	12.94	.84
Physical abuse as child (survey)	19	0	38	8.00	10.61	.96
Physical abuse as adult (survey)	15	0	30	9.94	9.63	.96

a. With listwise deletion of missing values among all scales (for both gender responsive and COMPAS Reentry).

b. These 2-item sets are rather screening tools that were not developed as formal scales, and thus scale reliability measures are not applicable.

prison misconduct, substance abuse, and gang affiliation. This domain includes all current charges, prior convictions and incarcerations, and prior parole and probation revocations.

Social and Environmental Context includes scales measuring housing problems (unstable residence), financial problems (poverty), vocational and educational problems, low family support, family crime and drugs, and social environment (residence in high- or low-crime areas).

Psychosocial Risk/Protective Factors assesses antisocial attitudes, antisocial personality, low self-efficacy, empathy, social isolation versus social support, and life goals or aimlessness. Table 3 provides descriptive statistics and alpha reliabilities for the COMPAS reentry scales.

## ANALYSIS

### PATTERN IDENTIFICATION

Our analytical procedures followed the person-centered approach of Magnusson (2000) and Bergman (2000) and the validation designs by Skinner (1981) and Lenzenweger (2004), as follows:

*Step 1—Preliminary scale transformations:* All raw scale scores were first transformed into normalized *z* scores with zero mean and unit standard deviation (see Milligan, 1996).

*Step 2—Assessing metric similarity between holistic person pathways:* A multivariate vector represents each woman's pathway using her complete set of scores on GR and GN factors.



The between-person similarity between person vectors uses unweighted Euclidean distance, the dominant similarity metric in most prior studies (Bergman, 2000; Brennan, 1987; Magnusson, 2000; Milligan, 1996).

*Step 3—Discovering prototypical patterns:* To identify homogeneous pathways, we applied bootstrapped  $K$ -means (bagged  $K$ -means) clustering.<sup>1</sup> This disaggregated the sample into highly homogeneous groups of similar pathways. In this analysis we generated 1,000 random samples with replacement (bags) using the bagged  $K$ -means implementation in R (R Development Core Team, 2005).

*Step 4—Estimating the number of different pathways:* Prior women's pathways studies typically identified at least 3 to 6 latent pathways (Brennan, 2008; Daly, 1992; Fergusson & Horwood, 2002; Moffitt et al., 2001; Stefurak & Calhoun, 2006). Therefore, we repeated our analysis at seven levels from a three-pathway model to a nine-pathway model, that is,  $K = 3, 4, 5, 6, 7, 8,$  and  $9$  ( $K$  is the number of pathways). This range of solutions allows a hierarchical taxonomy to be identified by linking successive  $K$  levels.

*Step 5—Validation and replication analysis:* Three separate tests were used. First, pathway replication was tested at each  $K$  level ranging from  $K = 3$  to  $K = 9$ , using the McIntyre–Blashfield cross-validation method for taxonomic studies (Gordon, 1999; McIntyre & Blashfield, 1980).  $K$  levels with high replication values, as assessed by the kappa coefficient of agreement, were selected for more detailed testing.<sup>2</sup> A second test examined pathway matching across  $K$  levels by computing comparisons between adjacent  $K$ -level solutions using the contingency coefficient. In a third replication test we applied separate clustering methods (Ward's method and  $K$ -means) to the finally selected  $K = 8$  level that had offered both high interpretability and a high kappa value.

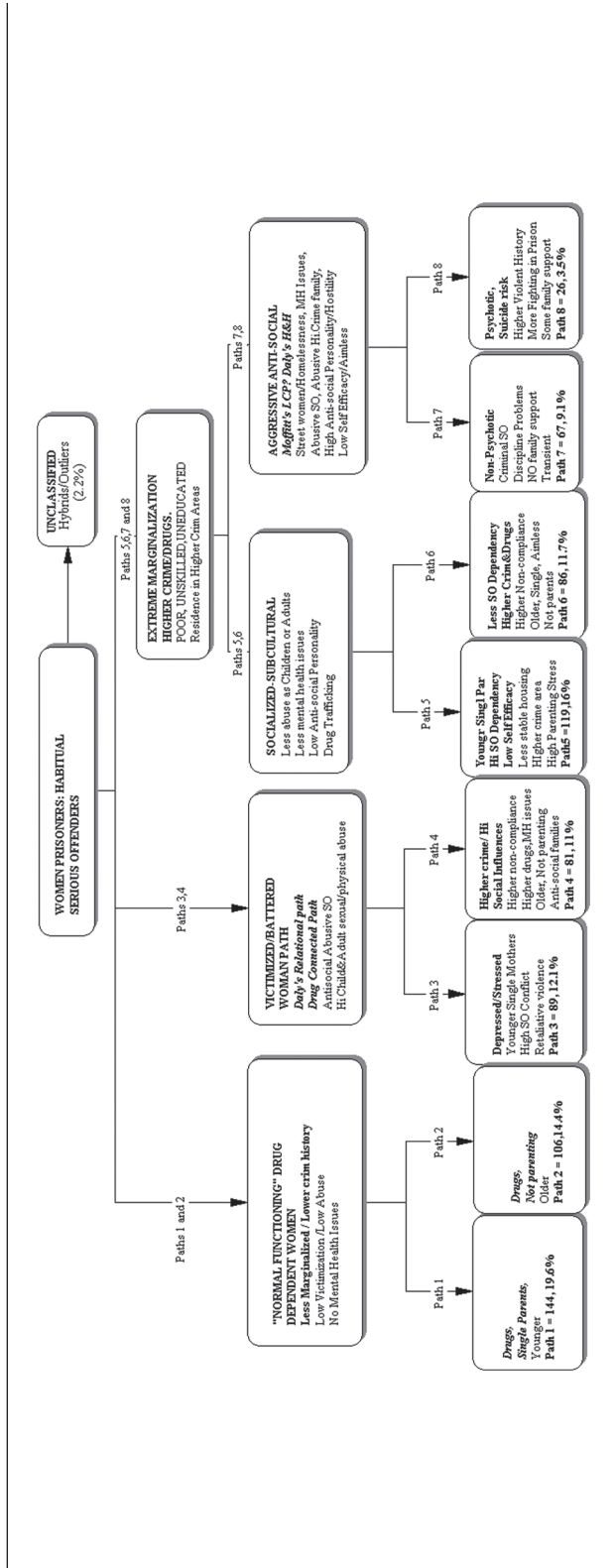
*Step 6—Structural analysis and visualization of the pathway taxonomy:* The pathway linkages and fusions at adjacent  $K$  levels allowed the construction of a taxonomic hierarchy of pathways (Figure 1). Specific pairs of subordinate pathways sequentially coalesce from eight subordinate into four highly meaningful superordinate pathways. We selected levels from  $K = 8$  to  $K = 4$  to fully illustrate the relations between those pathway levels that offered the clearest interpretations. Interpretative labels in Figure 1 were based on the  $z$  scores in Tables 4 and 5.

*Step 7—Approaches to pathway interpretations:* Pathway interpretations in taxonomic studies typically require a standardized metric such as  $T$  scores or  $z$  scores to indicate the extent of pathway deviation from the population mean on each factor (Aldenderfer & Blashfield, 1984; Milligan, 1996). The relevant  $z$  scores are given in Tables 4 and 5 and are used to identify specific features that particularly characterize the profile of each pathway (Costa, Herbst, McCrae, Samuels, & Ozer, 2002; Megargee, Carbonell, Bohn, & Sliger, 2001). A common practice in such studies is to use  $z$  score values that extend beyond  $\pm 0.30$  to identify characteristic features of a category (Costa et al., 2002; Milligan, 1996). We follow this practice in the narrative descriptions below.

## RESULTS

### SELECTING A PREFERRED PATHWAYS MODEL

The McIntyre–Blashfield tests of pathway replications at each hierarchical level ( $K = 3, 4, \dots, 9$ ) produced very high kappa coefficients of .85 and .75, particularly for the  $K = 6$  and  $K = 8$  levels. This indicated strong pathway replication at these levels (for a discussion of kappa levels, see Sim & Wright, 2005). To select a final level for detailed interpretation, we examined the interpretations of these pathways and found that the  $K = 8$  level was both highly interpretable and well replicated. This model was thus chosen for further detailed testing and interpretation, while acknowledging that the 6- and 4-level solutions were also stable. Although the 8-level pathway model was selected for detailed interpretation, the



**FIGURE 1: A Classification of Women's Pathways to Serious Habitual Criminal Behavior (core features and suggested labels within each pathway are in bold)**

**TABLE 3: Summary of COMPAS Reentry Scales: Descriptive Statistics and Alphas**

Valid N = 718 <sup>a</sup>	Items	Min.	Max.	M	SD	Alpha
Early onset	4	0	6	0.50	1.10	.73
Criminal involvement	4	0	14	7.41	2.88	.59
History of noncompliance	5	0	19	7.00	4.93	.75
History of violence	9	0	17	1.78	2.48	.54
Prison misconduct	8	0	7	0.62	1.30	.70
Gang affiliation <sup>b</sup>	3	0	5	0.36	0.92	—
Housing problems	4	0	8	2.31	2.31	.75
Financial problems	6	0	12	4.75	3.23	.78
Vocational/educational problems	9	0	16	5.91	3.93	.71
Life goals/aimless	7	0	14	3.04	2.75	.70
Family crime	6	6	12	8.48	1.86	.74
Low family support	5	0	6	2.38	1.46	.60
Social isolation	5	0	10	2.25	2.30	.74
Criminal attitudes	7	0	7	0.41	0.94	.66
Low empathy	5	0	18	4.35	3.06	.72
Criminal personality	21	0	42	13.52	8.77	.88
Low efficacy	15	0	30	6.21	6.01	.90
Substance abuse	6	0	12	6.37	3.67	.73
Social environment	5	5	13	7.08	1.82	.65

a. With listwise deletion of missing values among all scales (gender responsive and COMPAS Reentry).

b. This item set is an index of gang involvement rather than a unidimensional scale.

meanings of the intermediate levels between the 8-level and the 4-level models were clearly identified by the hierarchical fusions of pairs of nested pathways, as illustrated in Figure 1.

#### REPLICATION TESTING

The first test of replication, the McIntyre–Blashfield cross-sample approach, as noted above, produced a kappa coefficient of .75 for the  $K = 8$  level, indicating strong pathway replication. The second test examined cross-level stability in the taxonomic hierarchy for all adjacent  $K$  levels between 8 and 4 pathways. Although strong continuity characterized each adjacent pair of solutions, the links between the 6 and 8 levels produced a contingency coefficient of 0.903 ( $p < .000$ ) and a Cramer's  $V$  of 0.86, indicating very strong cross-level matching. The stability across the  $K = 8$  and  $K = 6$  levels is shown by an 84% agreement of the same women being jointly classified into similar linked pathways between these two levels. The sequential fusions of each pair of subordinate pathways finally formed four broad, superordinate pathways with clear meanings indicted in Figure 1. For the third cross-method replication test, we examined whether similar pathways would emerge if different pattern-seeking methods were used. We found a kappa coefficient of .60 between two independent analyses using Ward's clustering and bagged  $K$ -means, again indicating substantial similarity (Sim & Wright, 2005).

#### NARRATIVE INTERPRETATIONS OF PATHWAYS

The narratives below describe the core features of each pathway using the  $z$  score profiles in Tables 4 and 5. In many cases these  $z$  scores extend far beyond 0.30 to identify those

**TABLE 4: z Scores for Each Type for COMPAS Scales**

<i>Input</i>	1 (n = 144)	2 (n = 106)	3 (n = 89)	4 (n = 81)
Early onset	-0.0933	-0.0412	0.0482	0.0754
Criminal involvement	-0.1906	<b>-0.4794</b>	-0.2611	0.2319
History of noncompliance	<b>-0.3590</b>	<b>-0.4518</b>	-0.2251	0.2984
History of violence	-0.1802	-0.2146	-0.1170	0.1435
Misconduct	-0.2287	-0.1569	-0.0272	-0.0238
Gang affiliation	-0.0207	-0.0710	-0.0753	0.0081
Housing problems	<b>-0.6507</b>	<b>-0.5665</b>	-0.1047	-0.1642
Financial problems	<b>-0.8697</b>	<b>-0.6060</b>	-0.1023	0.0653
Vocation/education	<b>-0.6574</b>	<b>-0.6582</b>	-0.1864	-0.1064
Family criminality	<b>-0.3845</b>	<b>-0.4993</b>	0.1418	<b>0.3405</b>
Aimless	<b>-0.4401</b>	-0.2827	-0.0677	0.0261
Low family support	<b>-0.3651</b>	<b>-0.4109</b>	-0.2154	0.1046
Social isolation	<b>-0.7015</b>	<b>-0.4617</b>	-0.1233	0.1034
Criminal attitudes	-0.1260	0.0292	-0.1500	0.0541
Low empathy	-0.0436	0.0228	-0.0719	-0.0409
Criminal personality	<b>-0.5377</b>	<b>-0.4744</b>	0.0550	0.1244
Low efficacy	<b>-0.7489</b>	<b>-0.5562</b>	-0.1491	0.1036
Substance abuse	<b>-0.5403</b>	<b>-0.5742</b>	0.1650	<b>0.4740</b>
Social environment	<b>-0.4305</b>	<b>-0.5160</b>	-0.0418	-0.0605
<i>Input</i>	5 (n = 119)	6 (n = 86)	7 (n = 67)	8 (n = 26)
Early onset	0.0058	0.0233	0.1044	0.0372
Criminal involvement	0.0706	<b>0.6187</b>	<b>0.3958</b>	-0.1778
History of noncompliance	0.0272	<b>0.5903</b>	<b>0.5169</b>	<b>-0.3049</b>
History of violence	0.0383	0.1335	-0.0673	<b>0.4050</b>
Misconduct	-0.1354	-0.0517	0.2872	0.2572
Gang affiliation	0.0345	0.0754	0.2839	0.0930
Housing problems	<b>0.4496</b>	0.1551	<b>1.4965</b>	0.0213
Financial problems	<b>0.4630</b>	0.2817	<b>1.2016</b>	<b>0.3613</b>
Vocation/education	<b>0.3949</b>	<b>0.4288</b>	<b>0.9441</b>	<b>0.5977</b>
Family criminality	0.2428	-0.1370	<b>0.5623</b>	<b>0.3568</b>
Aimless	0.0729	0.2348	<b>0.7134</b>	<b>0.6521</b>
Low family support	-0.0100	0.1950	<b>1.0301</b>	-0.2384
Social isolation	0.2069	0.0555	<b>1.3299</b>	<b>0.8622</b>
Criminal attitudes	0.1058	0.0251	0.1907	0.0173
Low empathy	-0.0252	0.0617	-0.2260	0.1406
Criminal personality	0.0718	-0.0952	<b>0.9959</b>	<b>1.2031</b>
Low efficacy	<b>0.3196</b>	0.1133	<b>1.2974</b>	<b>0.7502</b>
Substance abuse	0.1372	<b>0.4617</b>	<b>0.6989</b>	<b>0.3943</b>
Social environment	<b>0.4526</b>	0.1202	<b>0.8342</b>	-0.2526

Note. The bolded text in table 3 identifies the scores that exceeded 0.30 and thus were particularly diagnostic.

factors that particularly characterize each pathway. We selectively report these diagnostically important z scores in parenthesis. We also report the prevalence of specific offenses and life events for each pathway where these form a coherent pattern with the pathway z score profile. Detailed cross-tabulations table are available in Brennan, Breitenbach, & Dieterich) or by request. Racial comparisons between pathways are noted but did not reach statistical significance. This unexpected finding may be the result of the focus of this sample on those women with the most serious and chronic criminal histories. This focus may

**TABLE 5: z Scores for Each Type for Gender Responsive Scales**

<i>Input</i>	1 (n = 144)	2 (n = 106)	3 (n = 89)	4 (n = 81)
Housing safety	<b>0.4122</b>	0.4035	-0.1595	<b>-0.3699</b>
Employment/financial	<b>-0.5343</b>	<b>-0.7301</b>	-0.0518	0.0636
Educational strengths	0.2027	<b>0.3368</b>	0.0628	0.1101
Anger/hostility	-0.2660	<b>-0.3129</b>	0.1315	0.2819
Mental illness	<b>-0.5876</b>	<b>-0.5825</b>	0.1510	0.2566
Depression/anxiety	<b>-0.5163</b>	<b>-0.4059</b>	<b>0.3778</b>	0.0945
Relationship support	0.2901	0.0205	<b>0.0923</b>	<b>0.3179</b>
Relationship conflict	-0.1331	-0.1857	<b>0.3714</b>	0.2232
Parental involvement	<b>0.9539</b>	<b>-1.1005</b>	0.8293	<b>-1.0766</b>
Parental problems	0.0977	<b>-0.8424</b>	0.7424	<b>-0.7821</b>
Support from family of origin	<b>0.3106</b>	<b>0.3067</b>	0.0921	-0.1081
Family conflict	<b>-0.3158</b>	-0.2835	0.1649	0.0132
Self-esteem	<b>0.4996</b>	<b>0.5640</b>	-0.1698	-0.1823
Self-efficacy	<b>0.5762</b>	<b>0.4885</b>	0.0785	-0.1764
Relationship dysfunction	<b>-0.5950</b>	<b>-0.6062</b>	0.0943	0.2045
Parental stress	<b>0.3138</b>	<b>-0.8592</b>	<b>0.5101</b>	<b>-0.7754</b>
Child abuse survey	<b>-0.5509</b>	<b>-0.4697</b>	<b>0.6966</b>	<b>0.6553</b>
Adult victim survey	<b>-0.4609</b>	<b>-0.5890</b>	<b>0.4431</b>	<b>0.5083</b>
Abused as adult	<b>-0.4033</b>	<b>-0.6176</b>	<b>0.6173</b>	<b>0.5367</b>
Abused as child	<b>-0.6424</b>	<b>-0.5470</b>	<b>1.0381</b>	<b>0.9565</b>
Sexual abuse as adult	<b>-0.4492</b>	<b>-0.4626</b>	<b>0.4587</b>	<b>0.5343</b>
Sexual abuse as child	<b>-0.6188</b>	<b>-0.6013</b>	<b>1.0548</b>	<b>0.9300</b>
Others out to harm you	-0.2133	-0.2310	-0.0447	-0.2194
Currently seeing illusions	-0.2308	-0.1430	-0.2594	-0.2086
Current symptoms of psychosis	-0.2682	-0.2269	-0.1818	-0.2588
Experienced abuse as child	<b>-0.7030</b>	<b>-0.6402</b>	<b>1.1690</b>	<b>1.0536</b>
Experienced abuse as adult	<b>-0.5016</b>	<b>-0.6438</b>	<b>0.6426</b>	<b>0.6336</b>
<i>Input</i>	5 (n = 119)	6 (n = 86)	7 (n = 67)	8 (n = 26)
Housing safety	-0.0977	0.0593	<b>-0.9049</b>	0.0319
Employment/financial	<b>0.3214</b>	<b>0.3275</b>	<b>0.8340</b>	0.4175
Educational strengths	-0.1881	-0.2808	-0.1731	-0.3265
Anger/hostility	0.0678	-0.1437	<b>0.5465</b>	0.7475
Mental illness	-0.2300	-0.0806	<b>1.2256</b>	1.5567
Depression/anxiety	-0.0373	-0.2611	<b>1.0029</b>	1.9200
Relationship support	-0.1283	-0.2437	-0.1399	0.0220
Relationship conflict	0.1188	-0.1513	0.2145	-0.0388
Parental involvement	<b>0.8968</b>	<b>-0.9546</b>	<b>-0.3457</b>	<b>0.3283</b>
Parental problems	<b>0.7142</b>	<b>-0.5338</b>	<b>0.4426</b>	<b>0.8344</b>
Support from family of origin	<b>0.0858</b>	<b>-0.1660</b>	<b>-0.7828</b>	-0.1322
Family conflict	<b>-0.0649</b>	<b>0.0366</b>	<b>0.7566</b>	0.2488
Self-esteem	-0.0177	<b>-0.1673</b>	<b>-0.8869</b>	<b>-1.1309</b>
Self-efficacy	-0.1631	<b>-0.3425</b>	<b>-0.7855</b>	<b>-0.9872</b>
Relationship dysfunction	<b>0.4044</b>	0.0304	<b>0.8399</b>	0.2913
Parental stress	<b>0.7899</b>	<b>-0.4006</b>	<b>0.3252</b>	<b>0.6573</b>
Child abuse survey	<b>-0.3276</b>	<b>-0.5196</b>	<b>1.0643</b>	0.2127
Adult victim survey	0.1700	<b>-0.4716</b>	<b>0.7077</b>	<b>0.3260</b>
Abused as adult	0.1242	<b>-0.5354</b>	<b>0.7231</b>	<b>0.4701</b>
Abused as child	<b>-0.4983</b>	<b>-0.6710</b>	<b>0.8446</b>	<b>0.3798</b>
Sexual abuse as adult	-0.2276	-0.2205	<b>0.9056</b>	<b>0.5483</b>
Sexual abuse as child	-0.4124	<b>-0.6805</b>	<b>0.5784</b>	<b>0.1757</b>
Others out to harm you	-0.2016	-0.1759	<b>0.4455</b>	<b>2.9517</b>
Currently seeing illusions	-0.2248	0.0274	<b>0.4768</b>	<b>2.4283</b>
Current symptoms of psychosis	-0.2575	-0.0916	<b>0.5571</b>	<b>3.2561</b>
Experienced abuse as child	<b>-0.5072</b>	<b>-0.7535</b>	<b>0.7942</b>	<b>0.3102</b>
Experienced abuse as adult	-0.0472	<b>-0.4582</b>	<b>0.9563</b>	<b>0.5995</b>

Note. The bolded text in table 3 identifies the scores that exceeded 0.30 and thus were particularly diagnostic.

perhaps have attenuated the relationship between race and the pathways. In Figure 1, we order the four superordinate pathways from left to right to reflect the seriousness of criminal history and the escalation of risk and need profiles.

*Two Subtypes of Relatively “Normal-Functioning” but Drug-Abusing Female Offenders*

Pathways 1 and 2 suggest relatively “normal functioning” women since compared to all other pathways they have more positive vocational and educational resources, less poverty, minimal abuse either as children or as adults, very few mental health or psychological issues, and minimal homelessness. Yet both pathways show chronic substance abuse problems and multiple arrests.

Path 1 ( $n = 144$ , 20%) contains drug-offending single mothers with above-average functioning. These were mostly single mothers (65%). In all, 32% were married, with an average age of 35.

*Risk/need profile.* A first theme is that this group had more social and personal resources than most other sample members, for example, safer residences (0.41) in lower crime areas (−0.43), fewer educational and vocational deficits (−0.66), fewer financial problems (−0.87), and more residential stability (0.70). Social supports were stronger with more supportive families (0.31) and more offers of help at release (84%). Second, at a personal level, most of these women (93%) had no mental health problems and little evidence of antisocial personalities (−0.54) and most (95%) indicated no sexual or physical abuse as children or as adults. Third, significant other (SO) relations were less conflicted (−0.59) and less abusive (−0.46) than average, and these women mostly avoid SOs who could lead them into trouble (80%).

*Criminal history.* The criminal history coheres with the above profile reflecting a lower criminal history that included mostly nonviolent property or drug offenses. More than half were in prison for the first time (56%). Yet the group averaged 9.7 arrests.

Path 2 ( $n = 106$ , 14.7%) contains older drug-offending women who appeared functional in many areas of their lives and who were not parenting. The average age of this category was 40. In all, 55% were unmarried and 21% were divorced. Most (96%) did not have children younger than 18.

*Risk and need profile.* This profile replicates the higher social and economic functioning of Path 1 and is not elaborated again. For example, it also shows strong job readiness at release (80%), less family crime (−0.50), more family support (0.31), minimal physical (91%) or sexual abuse as children (92%), and less abusive SO relations than other pathways (−0.62).

*Criminal history profile.* The criminal history also replicates Path 1 and is mostly for nonviolent drug or property offenses with below-average criminal involvement (−0.48). The group averages 8 prior arrests.

*How do Pathways 1 and 2 differ? Path 1 women were younger, were still parenting, and had more parenting anxieties than those in Path 2.* Although this difference may appear

trivial in explanatory terms, it can be critical in a prison context given the anxiety and stress over children's welfare, potential loss of legal responsibility, and concern to maintain visitation access to children. The profile differences suggest a developmental transition linked to a shift in parenting role and differences in parenting stress and age between these otherwise similar pathways.

*Two "Battered Woman" Pathways.* Paths 3 and 4 offer two variants of the "battered woman," each reflecting lifelong physical and sexual abuse. Neither pathway reflected mental health problems, psychosis, or antisocial personality. Social marginalization scores matched the sample average and thus were more serious than in the two "normal" more functional pathways.

Path 3 ( $n = 89$ , 12.3%) constitutes stressed single mothers characterized by lifelong abuse, depression, substance abuse, and an abusive SO relationship. Most of these women had never married (55%) or were divorced (22%). The average age was 33. All (100%) had children younger than 18.

*Risk and need profile.* Extreme lifelong victimization was shown by child sexual abuse (1.10), child physical abuse (1.04), adult physical abuse (0.62), and adult sexual abuse (0.46). Social support from families was poor, parenting was stressful (0.74), and SO relationships were conflicted (0.37) and often violent (0.44). The SO was seen as increasing the woman's risk of legal trouble (58%), and many had criminal records (44%). Although they demonstrated above-average depression (0.38), there was no evidence of psychosis or antisocial personality. Socioeconomic indicators reflected the sample average, thus implying substantial marginalization.

*Criminal history profile.* This path had a below-average criminal history (-0.26) with about nine arrests, mostly for property and drug offenses. However, violence was a core feature with atypically high levels of current violence (19%), current family violence (18%), prior family violence convictions (20%), hitting or hurting someone in the past 3 years (36%), and being angry at the current offense (35%). Although most of these women had prior detentions (83%), a high percentage were in prison for the first time (64%).

Path 4 ( $n = 81$ , 11.3%) represents abused older women with conflicted relationships, chronic drug problems, unsafe housing, and chaotic lives. These women averaged 40 years of age. Most did not have children younger than 18 (93%) and were single (51%) or divorced (15%).

*Risk and need profile.* Lifelong abuse also characterized this pathway, for example, child abuse (0.66), child sexual abuse (0.93), adult victimization (0.51), adult sexual abuse (0.53), and unsafe housing (0.37). Their SOs had above-average violence (0.22), and many had criminal records (48%) and were seen as increasing the woman's risk of criminal involvement. Chronic drug abuse (0.47) and crime and drugs in the parental family (0.34) characterized this pathway. These women viewed their lives as "one crisis after another" (69%). They were above average for mental health issues (0.26), for anger and hostility (0.28), and for hitting or hurting someone in the past 3 years (27%). Similar to Path 3, social marginalization matched the sample average.

*Criminal history profile.* Above-average criminal involvement (0.23) and noncompliance (0.30) characterized this group. Drug offenses dominated, as shown by current arrests for drug possession or use (40%) and trafficking (20%) as well as multiple prior arrests for drug trafficking (25%) and possession (72%). Prior prison incarceration was more common (62%) in this group than in Path 3.

*How do Paths 3 and 4 differ? Several differences can be noted.* First, Path 3 was well below Path 4 for criminal history, noncompliance, prior detentions, drug involvement, and having fewer weapons offenses (15% vs. 29%). Second, Path 3 had lower scores for drug abuse and drug offenses. Third, Path 3 had more prior domestic violence convictions (20% vs. 13%), more current domestic violence charges (18% vs. 7%), and more indications of anger in the current offense. Finally, Path 3 as younger single mothers had substantially more stress or anxiety over parenting and more depression than Path 4 ( $z$  scores of 0.38 vs. 0.09).

#### *Socialized Subcultural Pathways With Less Victimization and Few Mental Health Problems*

Paths 5 and 6 profiles reflect serious social marginalization, educational–vocational deficits, residence in higher crime neighborhoods, and stronger antisocial SO influences. Their drug use and drug trafficking also suggested stronger links to a subcultural crime or drug network. These pathways show little evidence of sexual or physical abuse.

Path 5 ( $n = 119$ , 16.6%) constitutes younger poor marginalized and stressed single mothers with low self-efficacy in conflicted but not violent SO relationships. This pathway had an average age of 34. Most were single (61%) or divorced (17%), and all had children younger than 18 (100%).

*Risk and need profile.* First, extreme marginalization was shown by deficits for vocational/educational failure (0.39), poverty (0.46), and unstable housing (0.45). Second, subcultural influences were suggested by residences in higher crime areas (0.45), above-average crime or drugs in the family of origin (0.24), many reports of legal trouble as a result of a domineering antisocial SO relationship (0.41), and many SOs with criminal records (59%). These women reported high parenting stress (0.71), low self-efficacy (0.32), and relatively poor social supports (0.21). Yet there was little evidence of sexual or physical abuse or of psychological and mental health issues.

*Criminal history profile.* This path had an above-average criminal history, with 11.8 prior arrests, mostly for drugs and property offenses. The pathway had atypically high current arrests for drug possession or use (30%) and trafficking (18%) and a very high percentage (40%) for prior drug trafficking.

Path 6 ( $n = 86$ , 11.9%) contains addicted older isolated women characterized by extreme marginalization, poverty, low self-efficacy, who were mostly not parenting children younger than 18. Most of these women were single (63%) and older ( $M = 40$  years).

*Risk and need profile.* First, extreme marginalization was shown by poverty (0.28), poor employment skills (0.32), and vocational or educational deficits (0.43). Most (61%) expected to have financial problems and a need for temporary housing on release. Second,



social support expectations were low from both family or from an SO. Personal problems included low self-efficacy ( $-0.34$ ), few life goals ( $-0.23$ ), and very high drug problems ( $0.46$ ). Many of these women reported prior drug treatments (63%) and being high or drunk when arrested (67%). There was little evidence of sexual or physical abuse, antisocial personality, depression, or other mental health issues.

*Criminal history profile.* Criminal involvement ( $0.62$ ) and noncompliance history ( $0.59$ ) were far above average. Most of these women had prior probation revocations (95%), parole revocations (57%), and multiple detentions (88%). Current offenses reflected drugs or property offences, for example, current drug possession (47%), property or larceny (27%), and prior drug trafficking arrests (41%).

*How do Pathways 5 and 6 differ? Three themes differentiate these pathways.* First, Path 5 women were younger, were still parenting, and had high anxiety and stress over parenting. Second, Path 6 women felt less SO influences to take antisocial risks (10% vs. 29%) and were less likely to believe their SO would lead them into legal trouble (20% vs. 44%). Third, the co-occurring pattern in Path 5 of a dominant SO, poverty and marginalization, weak social supports, and stressful parenting responsibilities may, in combination, heighten their feelings of low self-efficacy and dependency.

#### *Aggressive Antisocial Women*

Pathways 7 and 8 are characterized by the most extreme risk and need pathway profiles, indicating a further escalation of marginalization. They reflect lifelong sexual and physical abuse, antisocial families, hostile antisocial personality, mental health issues, homelessness, antisocial SO relationships, and so on.

Path 7 ( $n = 67$ , 9.3%) contains abused and aggressive, antisocial women with hostile antisocial personalities, mental health or depression issues, marginalization, and homelessness. This category had an average age of 37. In all, 62% had children. Most were single (49%) or divorced (22%).

*Risk and need profile.* This pathway was first characterized by lifelong abuse, including child physical ( $0.84$ ) and sexual abuse ( $0.58$ ), the highest rate of juvenile out-of-home placements (19%), physical ( $0.72$ ) and sexual abuse ( $0.90$ ) as adults, violent and domineering antisocial SO relationships ( $0.84$ ), and unsafe housing ( $-0.90$ ). Second, extreme marginalization was shown by educational and vocational failures ( $0.94$ ), poverty ( $1.2$ ), unstable housing ( $1.50$ ) in high-crime areas ( $0.83$ ), prior homelessness (90%), and the lowest full-time employment before their incarceration (9%). Third, an extreme psychological pattern was also present, including mental health problems ( $1.22$ ), depression ( $1.00$ ), low self-esteem ( $-0.89$ ), low self-efficacy ( $-0.79$ ), psychotic symptoms ( $0.56$ ), anger ( $0.54$ ), antisocial personality ( $0.99$ ), few life goals ( $0.71$ ), and pessimism ( $1.29$ ). Those with children reported high parental stress and anxiety ( $0.44$ ). Their high-crime and high-drug families ( $0.56$ ) remain extremely nonsupportive ( $1.03$ ).

*Criminal history profile.* This pathway is well above average for criminal history ( $0.40$ ), chronic substance abuse ( $0.70$ ), and noncompliance ( $0.52$ ) and, with Pathways 6 and 8, has the highest number of prior arrests (15). These women had multiple prior detentions (88%),

parole revocations (58%), above-average violent institutional infractions (24%), and institutional misconduct (0.33). Yet their offense patterns again mostly included nonviolent drug and property offenses.

Path 8 ( $n = 26$ , 3.6%) constitutes marginalized abused and addicted single mothers with serious mental health, psychosis, and suicide risks, who are aggressive, violent, and non-compliant. This small pathway had an average age of 35. Most had children younger than 18 (88%). Their marital status was as follows: 23% divorced, 31% single, 35% married.

*Risk and need profile.* Pathway 8 repeats the extreme marginalization and abuse as Path 7. However, psychological factors were even more prominent, including hostility and anger (0.75), antisocial personality (1.2), low self-efficacy (0.75), aimlessness (0.65), and social isolation (0.86). The most defining feature of Path 8 was their extreme mental health profile: suicide risk (3.26), psychosis (3.25), depressed anxious (1.92), fear of harm from others (2.95), and seeing and hearing voices (2.4). It is surprising that their lives had more stability and social supports than those in Path 7, with 1.4 versus 4 address changes over 18 months, safer residential areas ( $-0.25$  vs.  $0.83$ ), more full-time jobs in the year prior to incarceration (31% vs. 9%), higher marriage percentages (35% vs. 19%), more contact with family (92% vs. 59%), less family rejection ( $-0.24$  vs.  $1.03$ ), and more family support at release (81% vs. 34%). These differences may relate to higher parenting in Path 8 than in Path 7 ( $+0.33$  vs.  $-0.35$ ), and their more extreme mental health problems that may evoke more family or social welfare responses.

*Criminal history profile.* Path 8 was the most violent pathway, with the highest rates of prior violence offenses (0.41), prior weapons offense convictions (34.6%), and above-average disciplinary infractions for fighting other inmates (27%). Domestic violence was also prominent, with above-average charges for current domestic violence (23%), current violent felonies (23%), and prior domestic violence charges (42%). It was a close second (to Path 7) for prison misconduct (0.26). Drug abuse (0.39) and drug possession arrests were both above average; however, drug trafficking charges were low.

*How do Pathways 7 and 8 differ?* These paths are first differentiated by the more extreme mental health and violence profiles of Pathway 8. Second, it is surprising that the lives of those in Path 8 appear more stable than the lives of those in Path 7, with fewer address changes, safer residential areas, more full-time jobs, more marriages, and more family support. As noted, this may relate to the larger presence of children among Path 8 women.

## DISCUSSION

This project extends prior pathways work on women offenders in five ways. First, we used a larger and more serious sample of women offenders than was available in most prior studies. Second, our measurement space was more comprehensive than most prior studies and was explicitly designed to assess women's pathways with a comprehensive array of GR and GN measures. Third, we applied quantitative person-centered methods

and cross-validation procedures in identifying eight prototypical pathways of women associated with serious or multiple offenses. These coalesced into four superordinate pathways ("normal" women offenders, battered women, poor subcultural socialized women offenders, and asocial aggressive damaged offenders) in a taxonomic hierarchy of pathways. Detailed narratives of the eight subordinate pathways were provided, and their links were demonstrated to the four superordinate categories. Fourth, we examined similarities and differences among these eight prototypes and several well-known prior pathway profiles from extant literature. Potential replications and overlapping features were noted. Fifth, an operational quantitative method using support vector machine (SVM) was developed to give a mathematical definition of each pathway to allow assignment of new cases into their correct pathway and support replication research. We now explore several implications of this research.

### THE RELEVANCE OF GR FACTORS

Our findings on the characteristic features of each pathway underscore the importance of GR factors in reaching a more complete understanding of each pathway. Several of these pathways differ substantially from prevailing GN explanations of crime. Indeed, GR factors entered six of the eight pathways as key definers in ways that were coherent with each other and with the central narrative of each pathway. Only Type 2 appears free of more obvious GR factors, underlining the importance of GR factors as key constituents of these pathways.

However, several GN factors such as financial problems and poverty, housing problems, antisocial personality, and so forth were also present as key constituents of the narratives. Yet we would be remiss in neglecting to mention the large proportion of female inmates in this study evidencing troubled pasts characterized by far more than the traditional GN factors. It is disturbing to note, for example, that at least 37% of our sample (Pathways 3, 4, 7, and 8) reported lives afflicted by repeated sexual and physical abuse and related factors. In addition, three of these types (3, 7, and 8), composing 25.2% of the sample, also scored high on various forms of mental illness. In one sense, the fact that our sample represented a more serious group of female offenders may explain these prevalence levels. On the other hand, it is fairly well established that the numbers of seriously troubled inmates are by all accounts on the increase, a fact that is viewed to be attributable to mandatory drug sentencing and reductions in spending for community mental health. These increases are thus especially noteworthy for female offenders (Austin, Bruce, Carroll, McCall, & Richards, 2001; Blanchette & Brown, 2006; Mauer, Potler, & Wolf, 1999).

### COMPLEXITY OF PATHWAY NARRATIVES AND PERSON-CENTERED ANALYSIS

We recognize that our pathway narrative profiles, in comparison to those from prior research, have a high complexity of co-occurring factors. There are several reasons for this. First, this complexity may directly reflect the higher criminality of our sample. Second, our study used a more comprehensive coverage of GR and GN factors, criminal histories, and other factors than was typically present in most prior studies, and therefore would not be detected by a narrower set of measurements. Third, and perhaps most important, the person-centered holistic approach does not abstract or compress the data into simple global

bivariate relations or limited linear equations but is highly sensitive to the broader contextual patterns in each woman's life. Ragin (2000) and others have contrasted the different forms of data abstraction produced by variable-based as opposed to person-centered methods and noted the relative complexity of the latter in terms of retaining holistic texture, detail, and context of typified case categories. In this regard, we also recall Modell's (1994) criticism of Sampson and Laub's (1993) *Crime in the Making* for its limitation to variable-based methods that could not capture the full inner logic or complexity of their respondents' complex pathways, and the subsequent incorporation by Sampson and Laub of a person-based component into their later research for *Shared Beginnings, Divergent Lives* that allowed them to achieve a broader more complex representation of the whole person (Laub & Sampson, 2003, p. 9).

#### GENERAL THEORIES VERSUS THEORETICAL PLURALISM

A further and potentially profound theoretical implication is that this disaggregation of a large heterogeneous sample of women prisoners to identify a set of replicable distinctive and coherent groups challenges the quest for a single "general" theory of all criminal behavior (Bergman et al., 2000; Cairns et al., 1998; Lykken, 1995). This disaggregation and the substantial diversity of these pathway profiles suggest that several theories may be at work. For example, Pathways 7 and 8 reflect several key elements of Gottfredson and Hirschi's (1990) general theory (e.g., inept and abusive antisocial parents, unstable families, a hostile antisocial personality, and serious or violent crime). Yet this theory is largely exemplified only in Paths 7 and 8, and these account only for a small percentage of the sample (12.9%) and thus do not generalize across all these pathways, particularly to Paths 1, 2, 3, and 4. In addition, other pathways appear to reflect different theories, as when social learning and strain explanations appear jointly present in Paths 5 and 6, further suggesting that alternative explanations can underlie different pathways.

The search for a general theory of crime may also produce some unnecessary debates concerning whether or not GR or GN factors are the most appropriate predictors of future offending (see, e.g., Morash, 2009). Indeed, the existence of latent heterogeneous pathways strongly recommends against eliminating variables in predictive studies based on samplewide main effects when such variables (e.g., abuse or poverty) may actually be critical only for "specific" subgroups of women (e.g., Reisig et al., 2006). For example, in examining "the victimization pathway," Salisbury and Van Voorhis (2009) noted a failure to find the expected direct main effect from child abuse to crime. However, the person-oriented approach of the present study offers a potential answer by showing that the expected link from child abuse to adult antisocial behavior is clearly present only in Pathways 3, 4, 7, and 8 but is not general and that Pathways 1, 2, 5, and 6, forming a substantial proportion of the sample, do not reflect this link.

#### LINKS TO PRIOR RESEARCH: REPLICATIONS OR NEW PATHWAYS

Links to the prior pathways literature are discussed below, although our remarks on replications must remain tentative given the differing set of factors used in different studies. An important caution is that our pathways are likely to be representative only of women offenders with chronic or serious crimes and may not generalize to women offenders with less serious criminal records or those at earlier stages of the criminal justice system.

*The "normal functioning" drug/property offenders.* Paths 1 and 2 appear to reflect two variants of the often identified "normal or situational pathway" described in prior studies as having few childhood problems, below-average risk and need profiles, lighter and non-violent criminal histories, and later onset (Aalsma & Lapsley, 2001; Brennan, 2008; Simpson et al., 2009; Stefurak & Calhoun, 2006). Our two profiles exhibit far lower risk and needs scores and no evidence of abuse or psychological issues. They also match Moffitt's suggestion that certain "snares" (chronic drug use) may serve to extend the criminal careers of her AL pathway. The complex of differences between these two subtypes in parental role, parenting stresses, and age may signal a developmental stage transition or boundary that is clearly linked to the parenting role. Finally, we suggest caution regarding the "normal" label and that this should be viewed as tentative since the normative sample consists of women offenders with particularly chronic or serious offense histories.

*The battered women/victimization pathways.* Pathways 3 and 4 strongly reflect the "victimization pathway" (Salisbury & Van Voorhis, 2009) with both subtypes enduring extreme and lifelong sexual and physical abuse. However, much further complexity enters these paths with their apparent incorporation of Daly's (1992) drug-connected and relational paths with the expected abusive and antisocial SO. The differences in these two paths again suggest a developmental transition linked to the parenting role, parenting stresses, age, and, to some degree, the further criminal involvement of the older Path 4.

*Poor marginalized socialized offenders in antisocial subcultures.* Paths 5 and 6 in many ways match the often-identified "low social capital" or "poor and marginalized" pathway (Belknap & Holsinger, 2006; Chesney-Lind & Shelden, 2004; Owen, 1998; Richie, 1996; Salisbury & Van Voorhis, 2009; Steffensmeier & Allen, 1996). However, our two profiles also appear to contain a social learning component, as suggested by strong links to an antisocial subculture, antisocial SO, higher family crime, residence in higher crime areas, and frequent drug trafficking. These two pathways are reminiscent of the notion of the socialized criminal or "subcultural identifier" (Lykken, 1995; Van Voorhis, 1994; Warren, 1971). They also confirm Lykken's (1995) claim that such socialized subcultural offenders mostly do not have serious mental health or psychological issues. Similarly, our finding of low self-efficacy for these pathways coheres with findings by Salisbury and Van Voorhis (2009) of lower self-efficacy in this pathway. Finally, Path 5 particularly also incorporates Daly's relational and drug-connected themes into its pathway structure, as reflected by a domineering antisocial SO, high drug abuse, and high trafficking.

*Antisocial aggressive women offenders.* Paths 7 and 8 show much overlap with both Moffitt's LCP and Daly's harmed and harming paths by exhibiting many of the features previously reported for these prior pathways. However, highly similar prior profile descriptions also include Butler and Adams (1966) "impulsive aggressive," Stefurak and Calhoun's (2006) "externalizing impulsive," and Brennan's (2008) "serious delinquent/low self-control." Patterns 7 and 8, as noted earlier, also reflect several core features of Gottfredson and Hirschi's (1990) low self-control theory, including inept abusive parenting, school and work failure, extreme antisocial personality, and a continuation of delinquency and crime into adulthood. However, these two paths also reflect the subcultural socialization and social learning processes of Lykken's (1995) "common sociopath." Path 7, particularly

with its antisocial abusive SO relationship, also appears to incorporate three of Daly's pathways (the battered woman, drug-connected, and relational themes) into its complex pathway. Finally, Paths 7 and 8 are clearly differentiated by the extreme mental health, suicidal, and psychotic features of Path 8.

#### IMPLICATIONS FOR CORRECTIONAL TREATMENT

Scholars and policy makers alike have readily observed the relevance of the pathways and GR perspectives for correctional interventions for women that have led to a series of federally funded GR policy initiatives (Buell et al., 2011). These initiatives were partially motivated by the observation of co-occurring GR patterns in women offenders that jointly reflect physical and sexual abuse, trauma, relationship problems, substance abuse, and mental health problems (Covington, 2000). Variations of this pattern are reflected poignantly in our Pathways 3, 4, 7, and 8. The pathways approach, by emphasizing the holistic treatment of integrated patterns of factors, instead of a focus on single factors taken out of context, aligns well with policy and practice recommendations for multimodal and differential correctional interventions for different offender target groups (Hamilton, 2011; Palmer, 1992).

The pathways approach may offer a more precise identification and interpretation of dominant patterns in each specific pathway that, in turn, may help in designing responses that are more sensitive to the overall holistic context of women's lives. These connections may profoundly support the responsivity principle by offering a basis for multimodal and wraparound programs to treat risk factor patterns of separate pathways (e.g., Blanchette & Brown, 2006; Bloom et al., 2003; Covington, 1998, 2000; Van Dieten, 2008; van Wormer, 2002). For example, treatment for offenders evidencing only substance abuse (Pathways 1 and 2) may be quite different from clinical responses to those with a pattern of co-occurring substance abuse, mental health issues, and trauma. Other examples of emerging multimodal programs focus on empowerment, for example, low self-efficacy, dependency, and domineering SO (Gehring, Van Voorhis, & Bell, 2010; Van Dieten & MacKenna, 2001) or, alternatively, on the pattern of abuse, trauma, and related factors (see Covington, 2000; Linehan, 1993; Najavits, Weiss, Shaw, & Muenz, 1998).

An issue noted earlier, with significant policy and practical implications, is that the pathways approach does not assume a single general theory and, in contrast, assumes a theoretical pluralism with multiple pathways to antisocial behavior, each potentially driven by different theoretical processes (Cairns et al., 1998; Lykken, 1995; Moffitt, 1993). In contrast, the currently dominant RNR paradigm has primarily relied on a single theoretical model, social learning theory (Andrews & Bonta, 2007). Thus, the pathways approach helps to clarify which theoretical perspectives, or their combinations, underlie specific pathways so that a broader range of specific theory-guided interventions can be designed for particular pathways. This coupling of theoretical pluralism and its link to differential treatment for different offender categories is likely to enrich responsivity strategies. We note the continuing debate on differential treatment and its link to responsivity in both recent and classic correctional treatment strategies, particularly of Warren and colleagues (e.g., Hamilton, 2011; Lykken, 1995; Palmer, 2002; Quinsey, Skilling, Lalumiere, & Craig, 2004; Warren, 1971; Warren & Hindelang, 1979).

## LIMITATIONS

Several limitations in our study should be noted. First, although our prison sample was large enough and sufficiently heterogeneous to allow meaningful identification of several pathways, it may be representative of only more serious or chronic women offenders. Thus, we caution that the identified pathways may not generalize to offenders with less serious criminal histories, those convicted only of misdemeanors, or those at the earliest stages of their criminal careers. However, most of our sample had prior episodes of probation and incarceration in local jails and thus are likely to be present in samples from probation and jails. The design also excluded women with life sentences, although these may constitute a fairly small segment of the prison population. Second, although our coverage of biographical, GR, and life stage factors is broader than that of most prior studies, our cross-sectional design does not permit detailed study of micro-level sequences, for example, cyclical events, recurring “flares,” undulations in stressors, and so on. A different study design would be required to address these issues. A third limitation is the inability to use quantitative methods to match our pathway profiles to those from prior studies. Although our present pathways are precisely quantitatively defined using SVM technology, most prior studies lack sufficient precision in conceptual or empirical identification of their pathways to allow unambiguous matching. A further difficulty in matching was the diversity of methods used in prior studies (factor analysis, regression, path analyses, cluster analysis) as well as diverse samples and variables. Thus, our suggested matches to prior pathways remain tentative. Fourth, our project was not designed as a predictive study but rather was designed to address the taxonomic descriptive task of identifying and verifying latent complex pathways. It will be for later research to empirically examine how these pathway categories play out in future offending patterns, for either correctional outcomes (serious misconducts) or new offenses (see Brennan, Breitenbach, & Dieterich 2009; Van Voorhis et al., 2010).

## CONCLUSION

A first broad conclusion is that this study offers evidence of the existence of diverse pathways among women offenders. It also exemplifies the value of the person-centered approach in identifying such pathways. A second important finding is that most of these pathways exhibit higher complexity of GR factor combinations that allow a more comprehensive description and understanding of the co-occurring processes that may differentiate these from male pathways. Yet it is noteworthy that several GN factors are also key defining constituents of these pathways.

We also tentatively conclude that our pathways reflect partial replications of several prior pathways. Paths 1 and 2 are reminiscent of the previously named “normal pathway” and of Moffitt’s AL with lower risk and needs profiles and the same “snares” mentioned by Moffitt (1993). Our “battered women” of Paths 3 and 4 largely match prior battered or victimized pathways, while also incorporating several of Daly’s themes into their profiles. The “socialized subcultural and marginalized” offenders of Paths 5 and 6 appear to be more complex versions of the poor, marginalized, uneducated women offenders pathway, while

also reflecting social learning and subcultural themes. The “aggressive antisocial damaged women” of Paths 7 and 8 may offer more precise descriptions of Moffitt’s LCP, Daly’s harmed and harming type, and similar prior exemplars of this pathway.

Finally, the multiple distinctions between each subordinate pair of pathways, particularly of the “normal” and “battered women” pathway pairs, appear to reflect a developmental transition jointly defined by changes in parenting role, parenting anxiety or stress, and age differences. This distinction may also partially apply—although less clearly—to the socialized/subcultural offenders of Paths 5 and 6, but not to Paths 7 and 8. The differences in latter pair appear to be linked to the extreme mental health features of Path 8.

## NOTES

1. The bootstrapped aggregation form of *K*-means avoids two well-known problems in such analyses: (a) convergence on nonoptimal taxonomic categories, often resulting from the choice of the initial *K* starting seed points, and (b) distortions resulting from the presence of outliers (Breiman, 1996; Dolnicar & Leisch, 2000). Using standard *K*-means on each sample, we produced 1,000 classification models. The procedure then aggregated these into a final stable model using a *K*-means analysis applied to the cluster centers of these 1,000 models. This approach has been found to identify highly replicated pattern structures and to be fairly robust to noisy data and initial starting solutions (Breiman, 1996; Brennan, Breitenbach, & Dieterich, 2009). We used the bagged *K*-means implementation in R (R Development Core Team, 2006).

2. In the split-half validation test at each *K* level, we applied the four steps outlined by McIntyre and Blashfield (1980), as follows: First, split the total sample at each hierarchical level (*K* level) into two random subsamples (S1 and S2). Conduct bagged *K*-means analysis on sample S1 to give the reference taxonomic model M1. Second, create an independent taxonomic model (M2) in sample S2 by again using bagged *K*-means. Third, reclassify S2 cases to the original M1 prototype clusters using a pattern matching technique to give a taxonomic model M3. Fourth, compare partitions M2 and M3. Cohen’s kappa was used to assess the replication strength between M2 and M3 at each hierarchical level ( $K = 3-9$ ). For this automated pattern matching purpose (Step 3), we used a support vector machine procedure (Vapnik, 1999; Witten & Frank, 2005), which assigns new pathway labels to those S2 cases that can match the nearest neighbor “fit” criteria to the M1 model prototypes. This step aims to recover or replicate the M1 model on the second sample S2 giving a new partition M3. Cases that do not fit are assigned to an unclassified category.

## REFERENCES

- Aalsma, M. C., & Lapsley, D. D. (2001). A typology of adolescent delinquency: Sex differences and implications for treatment. *Criminal Behaviour and Mental Health, 11*, 173-191.
- Aldenderfer, M. S., & Blashfield, R. K. (1984). *Cluster analysis*. Beverly Hills, CA: Sage.
- Andrews, D. A., & Bonta, J. (2007). *The psychology of criminal conduct* (4th ed.). Cincinnati, OH: LexisNexis.
- Andrews, D. A., & Bonta, J. (2010). *The psychology of criminal conduct* (5th ed.). Cincinnati, OH: LexisNexis.
- Austin, J., Bruce, M. A., Carroll, L., McCall, P. L., & Richards, S. C. (2001). The use of incarceration in the United States: American Society of Criminology National Policy Committee. *Critical Criminology: An International Journal, 10*, 17-41.
- Belknap, J. (2007). *The invisible woman: Gender, crime, and justice* (3rd ed.). Belmont, CA: Thompson Wadsworth.
- Belknap, J., & Holsinger, K. (2006). The gendered nature of risk factors for delinquency. *Feminist Criminology, 1*, 1-24.
- Bergman, L. R. (2000). The application of a person-orientated approach: Types and clusters. In L. R. Bergman, R. B. Cairns, L. Nilsson, & L. Nystedt (Eds.), *Developmental science and the holistic approach* (pp. 137-154). Mahwah, NJ: Lawrence Erlbaum.
- Bergman, L. R., Cairns, R. B., Nilsson, L., & Nystedt, L. (Eds.). (2000). *Developmental science and the holistic approach*. Mahwah, NJ: Lawrence Erlbaum.
- Bergman, L. R., Magnusson, D., & El-Khoury, B. M. (2003). *Studying individual development in an interindividual context: A person-oriented approach*. Mahwah, NJ: Lawrence Erlbaum.
- Blanchette, K., & Brown, S. L. (2006). *The assessment and treatment of women offenders: An integrative perspective*. Chichester, UK: Wiley.
- Bloom, B., Owen, B., & Covington, S. (2003). *Gender-responsive strategies: Research practice and guiding principles for women offenders*. Washington, DC: National Institute of Corrections.



- Breiman, L. (1996). Bagging predictors. *Machine Learning*, 24, 123-140.
- Brennan, T. (1987). Classification: An overview of selected methodological issues. In D. M. Gottfredson & M. Tonry (Eds.), *Prediction and classification in criminal justice decision making* (pp. 201-248). Chicago, IL: University of Chicago Press.
- Brennan, T. (2008). Explanatory diversity among female delinquents: Examining taxonomic heterogeneity. In R. T. Zaplin (Ed.), *Female offenders: Critical perspectives and effective interventions* (pp. 197-232). Sudbury, MA: Jones and Bartlett.
- Brennan, T., Breitenbach, M., & Dieterich, W. (2008). Explanatory taxonomy of adolescent delinquents: Identifying several social-psychological profiles. *Journal of Quantitative Criminology*, 24, 179-203.
- Brennan, T., Breitenbach, M., & Dieterich, W. (2009). *Women's pathways to serious and habitual crime—Technical report*. Traverse City, MI: Northpointe Institute for Public Management.
- Brennan, T., & Dieterich, W. (2007). *COMPAS Reentry pilot study: Psychometric report for the Michigan Department of Corrections*. Traverse City, MI: Northpointe Institute for Public Management.
- Brennan, T., Dieterich, W., & Ehret, B. (2009). Evaluating the predictive validity of the COMPAS risk and needs assessment system. *Criminal Justice and Behavior*, 36, 21-40.
- Buell, M., Modley, P., & Van Voorhis, P. (2011). Policy developments in the USA. In R. Sheehan, G. McIvor, & C. Trotter (Eds.), *Working with women offenders in the community* (pp. 45-71). Plymouth, UK: Willan.
- Butler, E., & Adams, S. N. (1966). Typologies of delinquent girls: Some alternative approaches. *Social Forces*, 44, 401-407.
- Cairns, R. B. (2000). Developmental science: Three audacious implications. In L. R. Bergman, R. B. Cairns, L. Nilsson, & L. Nystedt (Eds.), *Developmental science and the holistic approach* (pp. 49-62). Mahwah, NJ: Lawrence Erlbaum.
- Cairns, R. B., Bergman, L. R., & Kagan, J. (Eds.). (1998). *Methods and models for studying the individual*. Thousand Oaks, CA: Sage.
- Cairns, R. B., & Cairns, B. D. (1994). *Lifelines and risks: Pathways of youth in our time*. Cambridge, UK: Cambridge University Press.
- Caramani, D. (2009). *Introduction to the comparative method with Boolean Algebra*. Thousand Oaks, CA: Sage.
- Chesney-Lind, M. (1997). *The female offender: Girls, women, and crime*. Thousand Oaks, CA: Sage.
- Chesney-Lind, M., & Shelden, R. G. (2004). *Girls, delinquency, and juvenile justice* (3rd ed.). Belmont, CA: Thompson Wadsworth.
- Costa, P. T., Herbst, J. H., McCrae, R. R., Samuels, J., & Ozer, D. J. (2002). The replicability and utility of three personality types. *European Journal of Personality*, 16, 73-87.
- Covington, S. S. (1998). The relational theory of women's psychological development: Implications for the criminal justice system. In R. T. Zaplin (Ed.), *Female offenders: Critical perspectives and effective interventions* (pp. 135-164). Sudbury, MA: Jones and Bartlett.
- Covington, S. S. (2000). Helping women to recover: Creating gender-specific treatment for substance-abusing women and girls in community correctional settings. In M. McMahon (Ed.), *Assessment to assistance: Programs for women in community corrections* (pp. 171-233). Lanham, MD: American Correctional Association.
- Daly, K. (1992). Women's pathway to felony court: Feminist theories of law-breaking and problems of representation. *Review of Law and Women's Studies*, 2, 11-52.
- Daly, K. (1994). *Gender, crime, and punishment*. New Haven, CT: Yale University Press.
- Dolnicar, S., & Leisch, F. (2000). *Getting more out of binary data: Segmenting markets by bagged clustering* (Working Paper Series 71, SFB Adaptive Information Systems and Modeling in Economics and Management Science). Vienna, Austria: Vienna University.
- D'Unger, A. V., Land, K. C., & McCall, P. L. (2002). Sex differences in age patterns of delinquent/criminal careers: Results from Poisson latent class analyses of the Philadelphia cohort study. *Journal of Quantitative Criminology*, 18, 349-375.
- Farabee, D., Zhang, S., Roberts, R. E., & Yang, J. (2010). *COMPAS validation study final report*. Prepared for California Department of Corrections and Rehabilitation, University of California, Los Angeles.
- Farrington, D. P. (2003). Developmental and life course criminology: Key theoretical and empirical issues. *Criminology*, 41, 221-255.
- Farrington, D. P. (2005). The integrated cognitive antisocial potential (ICAP) theory. In D. Farrington (Ed.), *Integrated developmental and life course theories of offending: Advances in criminological theory* (Vol. 14, pp. 73-92). London, UK: Transaction.
- Felice, M., & Offord, D. R. (1972). Three developmental pathways to delinquency in girls. *British Journal of Criminology*, 12, 375-389.
- Fergusson, D. M., & Horwood, J. L. (2002). Male and female offending trajectories. *Development and Psychopathology*, 14, 159-177.
- Francis, B., Soothill, K., & Fligelstone, R. (2004). Identifying patterns and pathways of offending behavior. *European Journal of Criminology*, 1, 47-87.
- Gehring, K. (2011). *Are gender-informed needs related to pretrial outcomes? An examination of the Hamilton County, Ohio's Inventory of Need Pretrial Screening Tool* (Unpublished doctoral dissertation). University of Cincinnati, Cincinnati, OH.
- Gehring, K., Van Voorhis, P., & Bell, V. (2010). "What works" for female probationers? An evaluation of the Moving On program. *Women, Girls, and Criminal Justice*, 1, 6-10.

- Gilligan, C. (1982). *In a different voice: Psychological theory and women's development*. Cambridge, MA: Harvard University Press.
- Giordano, P., Deines, J., & Cernkovich, S. A. (2006). In and out of crime: A life course perspective on girls' delinquency. In K. Heimer & C. Kruttschnitt (Eds.), *Gender and crime: Patterns in victimization and offending* (pp. 17-40). New York, NY: New York University Press.
- Gordon, A. D. (1999). *Classification*. New York, NY: Chapman and Hall.
- Gottfredson, M. R., & Hirschi, T. (1990). *A general theory of crime*. Stanford, CA: Stanford University Press.
- Hamilton, Z. K. (2011). *Treatment matching for substance-abusing offenders*. El Paso, TX: LFB.
- Jones, N. (2011). *Merging theoretical frameworks to inform risk assessment for the young female offender* (Unpublished doctoral dissertation). Carleton University, Ottawa, Canada.
- Kratzer, L., & Hodgkins, S. (1999). A typology of offenders: A test of Moffitt's typology among males and females from childhood to age 30. *Criminal Behavior and Mental Health, 9*, 57-73.
- Lansing, S. (2012). *NYS-COMPAS Probation Risk and Needs Assessment Study*. Albany: New York State Division of Criminal Justice Services.
- Laub, J., & Sampson, R. (2003). *Shared beginnings, divergent lives: Delinquent boys to age 70*. Cambridge, MA; Harvard University Press.
- Lenzenweger, M. F. (2004). Consideration of the challenges, complications, and pitfalls of taxometric analysis. *Journal of Abnormal Psychology, 113*, 10-23.
- Linehan, M. M. (1993). *Cognitive behavioral treatment of borderline personality disorder*. New York, NY: Guilford.
- Lykken, D. T. (1995). *The antisocial personalities*. Mahwah, NJ: Lawrence Erlbaum.
- Megargee E.I., Carbonell J.L., Bohn M.J. and G.L.Sliger Classifying Criminal Offenders with the MMPI-2. University of Minnesota Press. Minneapolis.
- Magnusson, D. (2000). The individual as an organizing principle in psychological inquiry: A holistic approach. In L. R. Bergman, R. B. Cairns, L. Nilsson, & L. Nystedt (Eds.), *Developmental science and the holistic approach* (pp. 33-48). Mahwah, NJ: Lawrence Erlbaum.
- Mann, K. M., Gulick, K., Blomberg, T., Bales, W., & Piquero, A. (2012). Broward County's jail: Population management study. *American Jails, 25*, 14-19.
- Mauer, M., Potler, C., & Wolf, R. (1999). *Gender and justice: Women, drugs and sentencing policy*. Washington, DC: The Sentencing Project.
- McClellan, D. S., Farabee, D., & Crouch, B. (1997). Early victimization, drug use, and criminality: A comparison of male and female prisoners. *Criminal Justice and Behavior, 24*, 455-476.
- McIntyre, R. M., & Blashfield, R. K. (1980). A nearest-centroid technique for evaluating the minimum-variance clustering procedure. *Multivariate Behavioral Research, 15*, 225-238.
- Megargee, E., & Bohn, M. J. (1979). *Classifying criminal offenders: A new system based on the MMPI*. Beverly Hills, CA: Sage.
- Milligan, G. W. (1996). Clustering validation: Results and implications for applied analyses. In P. Arabie, L. J. Hubert, & G. De Soete (Eds.), *Clustering and classification* (pp. 341-376). Singapore: World Scientific.
- Modell, J. (1994). Review: "Crime in the making: Pathways and turning points through life." *American Journal of Sociology, 99*, 1389-1391.
- Moffitt, T. E. (1993). Adolescence-limited and life-course-persistent antisocial behavior: A developmental taxonomy. *Psychological Review, 100*, 674-701.
- Moffitt, T. E. (2003). Life-course-persistent and adolescent-limited antisocial behavior: A 10-year research review and a research agenda. In B. B. Lahey, T. E. Moffitt, & A. Caspi (Eds.), *Causes of conduct disorder and juvenile delinquency* (pp. 49-75). New York, NY: Guilford.
- Moffitt, T. E., Caspi, A., Rutter, A., & Silva, P. A. (2001). *Sex differences in antisocial behavior*. Cambridge, UK: Cambridge University Press.
- Morash, M. (2009). A great debate over using the Level of Service Inventory-Revised (LSI-R) with women offenders. *Criminology and Public Policy, 8*, 173-181.
- Najavits, L., Weiss, R., Shaw, S. R., & Muenz, L. R. (1998). Seeking safety: Outcomes of a new cognitive-behavioral psychotherapy for women with posttraumatic stress disorder and substance dependence. *Journal of Traumatic Stress, 11*, 437-456.
- Owen, B. (1998). *In the mix: Struggle and survival in a woman's prison*. Albany: State University of New York Press.
- Owen, B., & Bloom, B. (1995). *Profiling the needs of California's female prisoners: A needs assessment*. Washington, DC: U.S. Department of Justice, National Institute of Corrections.
- Palmer, T. (1992). *The re-emergence of correctional intervention*. Newbury Park, CA: Sage.
- Palmer, T. (2002). *Individualized intervention with young multiple offenders*. New York, NY: Routledge.
- Piquero, A. R., & Moffitt, T. E. (2005). Explaining the facts of crime: How the developmental taxonomy replies to Farrington's invitation. In D. Farrington (Ed.), *Integrated developmental and life course theories of offending* (Vol., pp. 51-72). London, UK: Transaction.

- Quinsey, V. L., Skilling, T. A., Lalumiere, M. L., & Craig, W. M. (2004). *Juvenile delinquency: Understanding the origins of individual differences*. Washington, DC: American Psychological Association.
- Ragin, C. C. (2000). *Fuzzy social science*. Chicago, IL: University of Chicago Press.
- R Development Core Team (2005). R: A language and environment for statistical computing, reference index version 2.2.1. R Foundation for Statistical Computing, Vienna, Austria.]
- Reisig, M. D., Holtfreter, K., & Morash, M. (2006). Assessing recidivism risk across female pathways to crime. *Justice Quarterly*, 23, 384-405.
- Richie, B. (1996). *Compelled to crime: The gendered entrapment of battered Black women*. New York, NY: Routledge.
- Richie, B. (2001). Challenges incarcerated women face as they return to their communities: Findings from life history reviews. *Crime & Delinquency*, 47, 368-389.
- Salisbury, E. J., & Van Voorhis, P. (2009). Gendered pathways: A quantitative investigation of women probationers' paths to incarceration. *Criminal Justice and Behavior*, 36, 541-566.
- Salisbury, E. J., Van Voorhis, P., & Spiropoulos, G. V. (2009). The predictive validity of a gender-responsive needs assessment: An exploratory study. *Crime & Delinquency*, 55, 550-585.
- Sampson, R. J., & Laub, J. H. (1993). *Crime in the making: Pathways and turning points through life*. Cambridge, MA: Harvard University Press.
- Sijtsma, K., & van der Ark, A. (2003). Investigation and treatment of missing scores in test and questionnaire data. *Multivariate Behavioral Research*, 38, 505-528.
- Sim, J., & Wright, C. C. (2005). The kappa statistic in reliability studies: Use, interpretation, and sample size requirements. *Physical Therapy*, 85, 257-268.
- Simpson, S. S., Yahner, J. L., & Dugan, L. (2009). Understanding women's pathways to jail: Analyzing the lives of incarcerated women. *Australian and New Zealand Journal of Criminology*, 41, 84-108.
- Skeem, J. L., & Laudén, J. E. (2007). *Assessment of evidence on the quality of the correctional offender management profiling for alternative sanctions*. Davis: University of California, Davis, Center for Public Policy Research.
- Skinner, H. A. (1981). Toward the integration of classification theory and methods. *Journal of Abnormal Psychology*, 90, 68-87.
- Steffensmeier, D., & Allen, E. (1996). Gender and crime: Toward a gendered theory of female offending. *Annual Review of Sociology*, 22, 459-487.
- Stefurak, T., & Calhoun, G. B. (2007). Subtypes of female juvenile offenders: A cluster analysis of the Millon Adolescent Clinical Inventory. *International Journal of Law and Adolescence*, 30, 95-111.
- Tibbetts, S. G., & Piquero, A. R. (1999). The influence of gender, low birth weight and disadvantaged environment on predicting early onset offending: A test of Moffitt's interactional hypothesis. *Criminology*, 37, 843-878.
- Van Dielen, M. (2008). *Women offender case management model*. Washington, DC: National Institute of Corrections.
- Van Dielen, M., & MacKenna, P. (2001). *Moving On facilitator's guide*. Toronto, Canada: Orbis.
- Van Voorhis, P. (1994). *Psychological classification of the adult male prison inmate*. Albany: State University of New York Press.
- Van Voorhis, P. (2012). On behalf of women offenders: Women's place in the science of evidence-based practice. *Criminology and Public Policy*, 11, 111-145.
- Van Voorhis, P., Salisbury, E. J., Wright, E. M., & Bauman, A. (2008). *Achieving accurate pictures of risk and identifying gender responsive needs: Two new assessments for women offenders*. Washington, DC: U.S. Department of Justice, National Institute of Corrections.
- Van Voorhis, P., Wright, E. M., Salisbury, E. J., & Bauman, A. (2010). Women's risk factors and their contributions to existing risk/needs assessment: The current status of gender responsive assessment. *Criminal Justice and Behavior*, 37, 261-288.
- Van Wormer, K. (2002). Addictions and women in the criminal justice system. In S. Straussner & S. Brown (Eds.), *The handbook of addiction treatment for women* (pp. 470-486). San Francisco, CA: Jossey-Bass.
- Vapnik, V. N. (1999). *The nature of statistical learning theory*. New York, NY: John Wiley.
- Warren, M. Q. (1971). Classification of offenders as an aid to efficient management and effective treatment. *Journal of Criminal Law, Criminology, and Police Science*, 62, 239-268.
- Warren, M. Q., & Hindelang, M. J. (1979). Current explanations of offender behavior. In H. Toch (Ed.), *Psychology of crime and criminal justice* (pp.166-182). New York, NY: Holt, Reinhart & Winston.
- White, N. A., & Piquero, A. R. (2004). A preliminary test of Silverthorn and Frick's delayed-onset pathway in girls using an urban, African-American US-based sample. *Criminal Behaviour and Mental Health*, 14, 291-309.
- Widom, C. S. (1978). An empirical classification of female offenders. *Criminal Justice and Behavior*, 5, 35-52.
- Wikstrom, P. H., & Sampson, R. J. (2006). *The explanation of crime: Context, mechanism and development*. Cambridge, UK: Cambridge University Press.
- Witten, I. H., & Frank, E. (2005). *Data mining: Practical machine learning tools and techniques*. New York, NY: Morgan Kaufmann.
- Wright, E. M., Salisbury, E. J., & Van Voorhis, P. (2007). Predicting the prison misconducts of women offenders: The importance of gender-responsive needs. *Journal of Contemporary Criminal Justice*, 23, 310-340.

**Tim Brennan** is chief scientist at Northpointe Institute and formerly associate research professor (health sciences) and associate of the Institute for Cognitive Science, Colorado University. His research interests are in taxonomic research and classification. He was recipient of the 2007 Warren-Palmer award from the American Society of Criminology.

**Markus Breitenbach**, PhD, was a research associate at Northpointe and now is at Google. His research interests are in machine learning, computer science, and criminology.

**William Dieterich**, PhD, is director of research at Northpointe Institute. His research interests include the development and testing of prognostic modeling for use in criminal justice agencies.

**Emily J. Salisbury** is an assistant professor of criminology and criminal justice in the Hatfield School of Government at Portland State University. Her primary research interests include correctional assessment and treatment intervention strategies, with a particular focus on female offenders. Her research has appeared in *Crime & Delinquency* and *Criminal Justice and Behavior*. Her most current research focuses on implementing and sustaining EPICS (Effective Practices in Correctional Supervision) in the state of Oregon.

**Patricia Van Voorhis**, PhD, is a professor of criminal justice at the University of Cincinnati. She received her doctorate degree in criminal justice from the State University of New York at Albany. She has published extensively in the leading criminology and criminal justice journals and is the author of *Psychological Classification of the Adult, Male Prison Inmate* and lead author of *Correctional Counseling and Rehabilitation*, currently in its seventh edition. She recently concluded a federally funded, multisite study of the risk factors for female recidivism.