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# INMATE-ON-INMATE ASSAULT

## A Multilevel Examination of Prison Violence

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Most literature on inmate assaultive behavior considers only one level of analysis, thereby ignoring the importance of prison context on inmate behavior. This study improved on past research by combining inmate and prison-level data into a multilevel model explaining inmate-on-inmate, nondeadly assaults. Data from 1,054 male inmates in 30 prisons revealed that age and aggression were the most robust predictors of inmate-on-inmate assaults. In terms of multilevel effects, aggressive inmates were found to commit more assaults in prisons that were more crowded and had a greater percentage of younger inmates (e.g., younger than age 25). Policy implications and suggestions for a multilevel theory of prison violence are discussed.

**Keywords:** prison violence; inmate assaults; importation theory; deprivation theory

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As a response to crime, it has long been the practice in the United States to lock up violent individuals in “correctional” institutions. Although punishment philosophies may have changed throughout the decades (i.e., from rehabilitation in the 1970s to incapacitation/semi-retribution in the 1990s), one of the overarching goals of prisons has always been to house and separate violent persons from the rest of society. Once these individuals are placed inside correctional facilities, the public often turns a deaf ear to the inmate’s struggle for survival and safety. Inmate violence is dismissed as inevitable given the purpose of these institutions and the nature of the individuals housed behind prison walls. However, not all inmates and not all prisons display the same extent of violent behavior. Some research suggests that prison violence is a result of the violent nature of inmates, whereas other research indicates that “deprived” prison conditions cause violent inmate behavior.

Mumola (2005) reported that homicide rates in state prisons have fallen sharply during the past two decades (54 per 100,000 in 1980 to 4 per 100,000 in 2000). Moreover, Useem and Piehl (2006) found that murders of correctional staff have also decreased in the past two decades (62.7 per 100,000 in 1973 to 0 in 2000 and 2001). On the other hand, the most recent Census of State and Federal Correctional Facilities (Stephan & Karberg, 2003) indicated that inmate assaults on other inmates were up 32% from 1995. Likewise, Useem and Piehl reported that inmate assaults on staff were up from 1995. Taken together, these studies seem to indicate that prison assaults are still occurring, but fewer of these attacks result in serious injury or death to inmates and correctional staff. Thus, it appears that prisons in the United

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States are still violent places but are not as deadly as in decades past. The combination of increased number of assaults, ever-increasing prison populations, loss of programs, and longer mandatory sentences could portend more violent behavior in the future.

#### THEORETICAL EXPLANATIONS OF PRISON VIOLENCE

*Deprivation theory.* Developed during the 1950s and 1960s, deprivation theory suggested that inmate socialization was a specific response to the losses suffered or “pains of imprisonment” experienced at a prison or total institution (Goffman, 1961; Sykes, 1958). In terms of prison violence, the deprivation model argued that prison life is degrading and stigmatizing and that, in response to the oppressive conditions within prison, inmates often acted out aggressively. Specifically, prison life was so sterile that any interference with privileges could trigger an outburst of individual violence (McCorkle, Miethe, & Drass, 1995). From this perspective, inmate violence is influenced and determined solely by prison-specific variables, rather than inmate characteristics. Some of the most common measures of deprivation have been prison security level, crowding, staff-to-inmate ratio, number of correctional staff, population, and number of programs. These variables are presumed to affect inmate violence irrespective of the individual characteristics of those involved. More current work by Useem and Piehl (2006) suggests that variables such as the use of segregation, loss of rehabilitation programs, and prison architecture can also be considered as measures of deprivation or prison disorder.

*Importation theory.* The other major theoretical model used to explain inmate violence is the importation model. Developed in response to the deprivation model, this theoretical orientation did not see the prison as a closed system. Rather, inmate adaptation to prison life was shaped by an inmate’s pre-prison experiences and socialization. Thus, offenders—specifically, lower class offenders—rather than adopting an inmate code as the deprivation model suggests, bring with them into prison their own subcultural values, including those related to violence (Giallombardo, 1966; Irwin & Cressey, 1962; Schrag, 1961; Wheeler, 1961).

Essentially, the importation model suggests that as prisoners enter prison, they import their roles from outside of prison into the prison culture that they are entering. Inmate behavior is merely an extension of previously held values, motivations, and attitudes. If an inmate was violent outside prison, it is most likely that the inmate “values” violence and will be violent while incarcerated. According to the importation model, inmates bring with them to prison their violent pasts and draw on their experiences in an environment where toughness and physical exploitation are important survival skills (Poole & Regoli, 1980). The defining characteristic of the importation model is that it stresses the importance of variables that originate outside the context of the prison and, in many cases, cannot be directly manipulated by correctional officials (Thomas, 1977). Thus, some of the most widely used importation variables have been age, race, social class, educational attainment prior to arrest, pre-prison employment, income prior to incarceration, and prior criminal history (Irwin & Cressey, 1962; Schrag, 1961; Thomas, 1977).

It is important to note that some of these aforementioned inmate characteristics, especially race, are presumed to serve as proxies for adherence to a criminal value system. However, it would appear that these proxy measures do not really indicate anything directly about adherence to subcultural values, attitudes, or beliefs. This is certainly not to say that

importation is only about values, but values involve an area of importation that has not been properly measured or adequately tested in past literature. The current study sought to measure the importation of a belief system. Specifically, inmates' beliefs or acceptance of certain behaviors prior to entering prison were tapped and included in addition to measures of personal characteristics. Thus, this study expanded importation theory to include both personal inmate characteristics and beliefs.

#### MICRO-LEVEL STUDIES OF PRISON VIOLENCE

Extant research on prison violence has examined this phenomenon from the micro level (i.e., individual violence), the macro level (i.e., rates of violence), or with a combination of micro- and macro-level variables. At the micro level of analysis, age has been shown to be one of the strongest correlates of prison misconduct and prison violence (e.g., Ellis, Grasmick, & Gilman, 1974; Mackenzie, 1987; Malibi, Holley, Patrick, & Walls; 1979; Woolredge, 1991). In fact, Flanagan (1983) said that "the most adequately established correlate of misconduct among prison inmates is age and/or age of entry into the institution" (p. 30). Thus, younger inmates are more violent than older inmates. Wright (1991) revealed that assaulters were, on average, 3 years younger than their nonassaultive counterparts (age 27 versus age 30, respectively). Recent work by Griffin and Hepburn (2006) reiterated that age had a strong inverse relationship not only with overall violence but also with threats of violence and weapons use.

Gender, like age, has also been associated with violence. Harer and Langan (2001) showed that male inmates overwhelmingly committed not only more violence but also more extreme forms of violence when compared to female inmates. The present study only examined male inmates because of their established propensity toward violent behavior.

The relationship between race and prison violence is less clear-cut, because micro-level studies have provided extremely mixed results. Carroll (1974) and Myers and Levy (1978) found that non-White inmates were more involved in violent prison misconduct, whereas the work of Ellis et al. (1974) and Wright (1989, 1991) found no difference between Whites and non-Whites in their level of violent prison misconduct. Petersilia and Honig (1980) found that in California, Whites reported more violent misconduct; in Texas, Blacks had higher violence rates than Whites; and in Michigan, race was not associated with any misconduct. Poole and Regoli (1980) found that Black and White inmates were equally likely to engage in rule breaking, but Black inmates were more likely to be officially reported for such infractions. A very recent study by Griffin and Hepburn (2006) indicated that race/ethnicity was not a significant indicator of major violent misconduct when other variables were controlled for. Thus, the link between race and inmate violence still needs much examination.

Prior criminality, as measured by several variables (e.g., type of offense, prior escapes, prior record, prior incarceration, prior violence), has also been strongly related to violent prison misconduct. Studies indicate that inmates with histories of violent behavior who had served time for violent behavior, or whose current incarceration was for a violent crime, have committed more rule infractions and engaged in more assaultive behavior while incarcerated (Adams, 1983; Flanagan, 1983; Griffin & Hepburn, 2006; Wolfgang, 1961). Griffin and Hepburn (2006) also found that inmates with gang affiliation prior to entering prison were more likely to be involved in all types of violent misconduct. All of these relationships were explained in accordance with the importation model.

Finally, prior residence or type of community appears to be a strong predictor of violent institutional misconduct. The work of Clayton and Carr (1981) and MacKenzie (1987) indicated that residents from urban communities were more likely to commit assaults on other inmates as compared with those from rural backgrounds. These researchers speculated that urban residents might be more disruptive while incarcerated because the prison environment is very similar to the environment that they lived in prior to entering prison. These inmates could be replicating their “home” environments, as importation theory would maintain.

Within the prison violence research, there are also individual-level studies that examine the effects of so called “individual-level institutional variables” on prison violence (Woolredge, 1991). These variables (e.g., sentence length, outside visits) were measured at the individual level but could also have been affected or influenced by the prison. Akman (1966) found that inmates serving short to medium sentences were more likely to commit assaults in Canadian prisons than inmates serving long sentences. In the United States, Flanagan (1983) found similar results and revealed that inmates who served fewer than 5 years were more deviant than those who had longer sentences. In addition, the recent work of Jiang and Fisher-Giorlando (2002) found that inmates serving longer sentences were less violent.

Visitation also seems to affect violent behavior. Ellis et al. (1974) revealed that inmates who received more visits were less likely to be aggressive while in prison. This strong inverse relationship indicated that contact with outside individuals appeared to have important positive effects on inmate behavior and disposition while incarcerated. Inmates who are isolated from family and friends might experience more problems with adjustment to prison life.

In sum, these micro-level studies have been crucial in revealing some of the most important determinants of individual-level prison violence. However, the problem with these micro-level studies is that they have ignored the context of the prison in which the inmate resides. Camp and Gaes (2005) conducted one experimental study that did not ignore prison context and its effect on individual-level violence. Specifically, they examined the violent misconduct of 561 male prisoners in California who were all classified at a similar security-classification level. With prior criminality controlled for, inmates were randomly assigned to two separate prisons—a low-security facility and a higher security facility. Interestingly, prison context had no effect on inmate misconduct; inmates behaved violently in either type of prison, no matter the contextual conditions. Thus, the results supported the idea of importation, suggesting that inmates who entered prison with violence in their backgrounds were more likely to be violent in any context.

#### MACRO-LEVEL STUDIES OF PRISON VIOLENCE

This body of literature examined structural/contextual characteristics of prisons and their influence on prison-violence rates, or number of violent incidents across several institutions. Although these macro-level studies are relatively few in number compared to studies of individual-level prison violence, they have provided invaluable insights into the predictors of rates of prison violence.

Ellis et al. (1974) examined the relationship between several prison structural variables and aggregate violence rates across 55 North Carolina prisons and jails (29 felon and 26 misdemeanor). The researchers used macro-level predictors of importation (i.e., proportion of inmates younger than age 21, percentage of inmate sentences for violent crimes, and percentage/proportion of non-White inmates) and macro-level predictors of deprivation

(i.e., percentage of inmates incarcerated for more than 1 year, total number of recreational and educational programs, percentage of inmates who had no visitors during the preceding 3 months, and percentage of inmates with parole referral dates 1 year or more away) to predict aggressive transaction rates across prisons.

Ellis et al. (1974) found that in misdemeanor facilities, the number of activities was negatively related to aggressive behavior, whereas the percentage of inmates with parole dates 1 year away or more was positively related to prison aggression (both deprivation variables). On the other hand, in felon facilities, the greater percentage of inmates younger than 21 (importation), the percentage of inmates with no visitors (deprivation), and the percentage of inmates with parole more than 1 year away (deprivation) all increased the number of aggressive transactions. Among the entire sample, visitors and parole were significant predictors of aggregate-level violence, indicating support for a macro-level deprivation model over a macro-level importation model.

Gaes and McGuire (1985) undertook another major macro-level study of prison violence. These researchers examined data from official reports of misconduct in 19 federal prisons. This study was unique in that it examined 20 structural variables and their effects on rates of inmate-on-inmate assaults with weapons and with nonweapons. Some of the predictors of assault rates were macro-level importation (e.g., mean age of the population, pre-prison work experience, type of crime, previous commitment record, prior alcohol/drug use, and racial composition of the population) and macro-level deprivation variables (e.g., average time remaining in inmates' sentences, staff-to-inmate ratio, and percentage of staff who were correctional officers). Control variables included in the analysis were indicators of crowding, security level, turnover rates, and program participation.

Gaes and McGuire (1985) found that among all structural variables examined, crowding (average daily population to the design capacity) was the most influential variable on both types of assault rates. More secure institutions and institutions with a higher ratio of correctional staff to inmates experienced more inmate-on-inmate, no-weapon assaults. Furthermore, institutions with a greater percentage of non-White population had less inmate-on-inmate, no-weapon assaults. This study provided modest support for both the aggregate-level importation and aggregate-level deprivation models of prison violence, with crowding being the strongest predictor among all the examined variables.

McCorkle et al. (1995) conducted a macro-level examination of prison violence, using data from more than 371 state prisons to test the effects of structural, managerial, and environmental determinants of inmate-on-inmate violence rates. Some of the variables examined were crowding, security level, correctional officer-to-inmate ratio, program involvement (number of inmates involved in programs), size of the institution, unemployment rate of the community where the prison was located, and White-Black income ratio of the community where the prison was located. No macro-level indicators of importation were examined in this study.

Interestingly, none of the crowding variables were significantly related to inmate-on-inmate assault rates, thus lending little support for a deprivation explanation of prison violence. Only three variables were sound predictors of assault rates: White-Black guard ratio and security level were positively related to assault rates, whereas program involvement was negatively related to assault rates. Overall, this study indicated no support for a deprivation model and mixed support for a management model, thus indicating that poor prison management may promote individual acts of violence in prison (McCorkle et al., 1995).



## INTEGRATED MICRO- AND MACRO-LEVEL STUDIES OF PRISON VIOLENCE

In an attempt to improve on single-level analyses at either the micro or macro level, multi-level studies have been conducted. These studies combined prisoner (i.e., importation) and contextual (i.e., deprivation) variables into one statistical model to see which was better at explaining prison violence. Some of the older multilevel studies employed traditional regression techniques, whereas recent studies have used more statistically sound multilevel methodologies. Results from both are mixed.

Harer and Steffensmeier (1996) conducted one of the most exhaustive multilevel studies of prison violence. The researchers collected data from more than 58 federal prisons and 24,000 federal inmates. Interestingly, they included importation variables (i.e., race, criminal history, and community background) and deprivation variables (i.e., inmate turnover, program-staff-to-inmate ratio, custody-staff-to-inmate ratio, security level, length of time served, the capacity of inmates to maintain relationships outside of prison, and staff perceptions) in one logistic regression model predicting individual likelihood of assaultive behavior.

Once prisoner- and prison-level variables were added into a full model, the researchers concluded that race, age, and criminal history were the only significant predictors of prison violence, thus lending credibility to the importation model of prison violence. None of the deprivation variables remained significant. However, the researchers used traditional statistical techniques, which unfortunately ignored the fact that prisoners are nested nonrandomly within prisons. Thus, they only explained variation at the individual level, seemingly ignoring prison context.

Woolredge, Griffin, and Pratt (2001) conducted one of the most recent and most statistically sound multilevel examinations of inmate behavior. This study did not specifically focus on assaultive behavior (i.e., violence). Rather, Woolredge et al. examined *rule infractions*, an umbrella term that included assaults. They examined the effects of both individual-level variables (i.e., age, race, prior arrests, commitment to convention, and offense) and a single prison-level variable (i.e., crowding) on inmate misconduct. Using officially documented incidents as their dependent variable, Woolredge et al. ran their models using pooled logistic regression and hierarchical logistic regression techniques for more than 1,800 inmates in 44 prisons.

Pooled results revealed inconsistency in the significance of inmate predictors, aggregate predictors, and interaction effects across their samples, whereas hierarchical modeling revealed more consistency in prediction across all levels (Woolredge et al., 2001), thereby justifying the use of more sophisticated multilevel modeling techniques. Woolredge et al. (2001) indicated that younger, non-White inmates with more prior arrests were more likely to engage in misconduct. Concerning macro-level main effects, the researchers found that higher levels of crowding corresponded to higher levels of misconduct. Most interesting, in terms of interaction effects (Age  $\times$  Crowding), the researchers revealed that younger inmates were more likely to engage in misconduct in crowded than noncrowded prisons.

Franklin, Franklin, and Pratt (2006) substantiated the finding of a relationship between age of inmates and crowding. Their meta-analysis found that crowded prison conditions exacerbated the level of misconduct of younger inmates (aged 18 to 25) more so than other age groups. This finding validates the aim of the current study to explore prison violence from a multilevel, integrated approach.

## THE CURRENT STUDY

Although previous research adds to our existing knowledge of prison violence, advances in statistical analysis now allow researchers to examine prison violence from a multilevel perspective (e.g., integrating individual- and prison-level variables into one statistically sound model). Multilevel modeling also allows detailed exploration of the interaction between the two levels of variables. This yields the possibility of explaining prison violence via the interaction between inmate and prison context. For example, the relationship between race and violent misconduct may be exacerbated or thwarted in a prison where there is more crowding or fewer programs. Thus, it was the goal of the current study to improve on single-level analyses by examining prison violence from this multilevel perspective in the hopes of providing a more integrated theoretical explanation of prison violence.

## METHOD

The data for this study came from various sources. Information on inmates (i.e., Level 1 data) came from surveys administered to 1,054 inmates in 30 prisons—11 in Kentucky (which comprised all of that state's prisons), 11 in Ohio, and 8 in Tennessee. Self-report data collection was chosen because the use of official prison records has been shown to be problematic; a large amount of prison violence often goes unnoticed or unreported by prison staff (Reisig, 1998). In addition, because data were collected across several states, the lack of uniformity of misconduct reports was an issue. Besides self-administered questionnaires, prison-level data (Level 2 data) came from each state's Department of Correction or from prison officials during the time of survey administration. All of the data were collected in 2001.<sup>1,2</sup>

## PARTICIPANTS

In Kentucky and Tennessee, the Departments of Correction generated a list of inmates who had resided at each facility for at least 6 months. This time restriction was necessary as it was important to gather inmates who had had time to absorb prison context. The size of the sampling frames, for each prison in each state, varied anywhere from 33 to more than 2,000 inmates. From these lists, inmates were randomly (via systematic random sampling) selected up to a total of 400 inmates per prison, or whatever was available, at each state's prisons for inclusion in the final sample. Inmates were then sent recruitment letters asking for their participation in the survey. In Ohio, inmates were recruited via use of sign-up sheets placed in common areas like dorms and day rooms in each of the prisons. Thus, the Ohio inmates were gathered via a convenience sampling technique. The final number of participants was 388 in Kentucky, 366 in Ohio, and 300 in Tennessee.

## MEASURES

The key micro-level dependent variable for this project was inmate-on-inmate (nonserious/nondeadly) assaultive behavior. The survey initially asked inmates to also report assaults against other inmates resulting in serious injury or death, but fewer than 1% of the sample inmates reported this kind of serious or deadly assault. Therefore, the variable was excluded



**TABLE 1: Variables and Descriptive Statistics**

<i>Variable</i>	<i>M</i>	<i>SD</i>	<i>Range</i>
Dependent variable			
Inmate-on-inmate assault	0.26	0.66	0-4
Explanatory variables			
Level 1 (inmate)			
Age	35.89	10.02	18-71
Race	0.44	0.50	0-1
Violent offense	0.67	0.47	0-1
Prior violence	0.26	0.44	0-1
Violent belief	8.19	3.26	0-12
Drug belief	7.14	2.26	0-9
Property belief	5.58	2.61	0-9
Time served	7.33	5.94	.16-.54
Time served <sup>2</sup>	89.09	161.44	.03-2916
Sentence length	22.94	23.91	.50-263
Visits	2.73	1.56	1-5
Aggression	11.23	3.35	4-20
Level 2 (prison)			
Security level	0.13	0.35	0-1
Programs	8.10	4.16	2-18
Custodial staff/inmate ratio	0.22	0.07	.22-.48
Crowding	1.00	0.11	.83-1.39
Proportion non-White	0.43	0.13	.08-.67
Proportion < age 25	0.18	0.10	.06-.51
Population size	1372.25	586.52	190-2281

*Note.* The total sample size is 1,054 inmates and 30 prisons.

from analysis. This lack of extreme violent behavior is not unusual in today's prisons (Mumola, 2005).

Each inmate was asked to report how often in the past 12 months, while at that particular facility, the inmate had engaged in an assault (physically attack with force) not resulting in serious injury or death to another inmate. Therefore, the response categories for the variable inmate-on-inmate assault (nonserious/nondeadly) formed an ordinal variable ranging from 0 = *never*, 1 = *once*, 2 = *2 to 5 times*, 3 = *6 to 12 times*, and 4 = *more than 12 times*. Table 1 reveals that the mean frequency of assaults is .26, which lies between the range of none and one assault, on average, for the inmates in the sample. This result indicates that inmate-on-inmate assault is a rare event for most of the inmates in the sample. However, 17% of the inmates had committed at least one inmate-on-inmate assault in the past year.

*Micro-level variables.* The other individual-level explanatory variables consisted of measures of importation and deprivation. Age, race, current offense, time served for a previous violent offense, and the belief scales all served as individual-level importation variables. All of these variables, except the belief scales, have been used in prior research as indicators of importation and have been shown to be strong predictors of violent behavior or misconduct (e.g., Ellis et al., 1974; Flanagan, 1983; Harer & Steffensmeier, 1996; Kratcoski, 1988).

Age was measured as a continuous variable by asking inmates to report their current age in years. As Table 1 indicates, the average age of inmates in the sample was 35.89. Race

was measured as a dichotomous dummy variable (0 = *White*; 1 = *non-White*). Across prisons, 44% of the sample was non-White. Current violent offense was also measured with a single dummy variable. Inmates were asked if they were currently serving time for a violent offense (0 = *no*; 1 = *yes*). As the Table indicates, 67% of the sample were currently serving time for a violent offense, primarily robbery. The sample may overrepresent violent inmates even though all attempts were made to get a random sample. Inmates, violent criminal history was measured by asking whether they had ever served time for a prior violent offense (0 = *no*; 1 = *yes*). Twenty-six percent of the sample had served time for a prior violent offense.

The final micro-level importation variables—beliefs—were constructed from 10 items modified from the National Youth Survey. This question asked inmates about their level of acceptance of certain behaviors prior to entering prison. Most previous studies of the importation theory have relied solely on the individual-level characteristics, such as race and age, as indicators of importation. These prior variables may serve as proxies for adherence to a violent value system without examining the values and beliefs that importation seems to imply. Thus, the current study expanded the importation model by assessing an inmate's belief system—specifically, violent beliefs. According to the importation theory, inmates who were more accepting of violent beliefs prior to entering prison should be more assaultive or violent while incarcerated. Inmates were asked questions about the extent to which they thought the following activities were wrong prior to their current incarceration: using illegal drugs, selling illegal drugs, abusing alcohol, participating in gang activities, hitting someone, carrying a concealed handgun, using a gun or knife on someone, using force to get money from someone, breaking into a vehicle, and stealing something. Answers ranged from 0 (*not wrong at all*) to 3 (*very wrong*). Factor analysis elicited three factors, thus three scales were created for the following components: a drug/alcohol belief component, a violent belief component, and a property-crime belief component. The items loading highest on each factor were summed to form each of the three belief variables. The alpha reliabilities for each of the three factors were .79, .77, and .86, respectively. As Table 1 indicates, the average scores were 8.19 on the violent belief factor, 5.58 on the alcohol belief factor, and 7.14 on the property-crime belief factor. The higher score for the violent belief variable revealed that the sample inmates were more opposed to violence than to behaviors surrounding drug/alcohol or property offenses.

The current project also sought to expand deprivation theory by measuring it at the micro level because most extant literature uses only prison structural variables to indicate deprivation. The individual-level deprivation variables consisted of sentence length, time served, and number of visitors. Specifically, sentence length was measured as a continuous variable by asking the inmate to report the length of his current sentence in years. Table 1 shows that the average sentence length for the sample was about 23 years. Time served was also measured as a continuous variable. Again, Table 1 indicates that the average time served for this sample was about 7 years. Time served squared was also included as a control variable to test for a possible curvilinear deprivation effect. It is important to reiterate the overrepresentation of violent inmates in this sample, accounting for the increased sentence length and time served. The values for these two variables are greater than the "typical" prison sample.

The last individual-level deprivation variable was number of visits or outside contacts. This question was adapted from Aday and Webster's (1979) model of institutional dependence. Inmates were asked how often they received visits from family and friends in the past

12 months. Ordinal response categories ranged from 0 (*never*) to 4 (*more than 12 times*) in the past year. As Table 1 shows, the mean frequency of visits was 2.73, which is between the categories of 1 (*1 to 2 times*) and 2 (*3 to 6 times*) in the past year.

The final individual-level variable was a control variable for aggression. This variable was included because past research indicated that personality and emotional stability are significant predictors of violent behavior during incarceration (Adams, 1983; Toch & Adams, 1986; Wright, 1991). Buss and Perry (1992) developed the scale used here to measure aggression. The initial scale was 16 items long and contained four subscales or aggression factors: physical aggression, verbal aggression, anger, and hostility. Given the space constraints on the survey, only one item from each subscale was included. Inmates were asked to describe how characteristic (1 = *very much unlike me*; 5 = *very much like me*) it was for them to engage in certain aggressive behaviors. The indicators were combined into one aggression scale with an alpha reliability of .63. Table 1 reveals that the average aggression score was 11.22, with a low score of 4 and a high score of 20.

*Macro-level variables.* At the macro level, all of the prison-level explanatory variables (Level 2) served as measures of deprivation, and all have been used in previous studies as indicators of structural deprivation. Again, all of these variables were obtained from each state's Department of Correction, the departments' Web sites, or from prison officials during on-site data collection. Security level was measured with a dummy variable (0 = *nonmaximum* and 1 = *maximum*). As Table 1 indicates, 13% of the prisons in the sample, on average, were maximum-security institutions. Crowding was measured by dividing the average daily population by the institution's operational capacity. The mean crowding ratio of 1.00 indicates that the prisons in the sample were not overcrowded; rather, most of the sample prisons were at capacity. Interestingly though, the range for the crowding variable ran from .83 to 1.39, thus indicating the potential for some contextual effects of crowding.

Akin to crowding, population of each institution was also measured. This variable has typically been used in past research as a structural/management-style control variable (McCorkle et al., 1995). As Table 1 shows, the average population for these institutions was about 1,300 inmates. Institutional populations ranged from 190 to more than 2,200.

Also examined was the custodial-staff-to-inmate ratio. This variable was included because prisons with more correctional staff are thought to be more secure, thus more oppressive or deprived. This variable was ascertained by dividing the total number of correctional (custodial) staff, not the total number of all staff, by the inmate population. As seen in Table 1, the mean custodial-staff-to-inmate ratio across prisons was about .22 (approximately 1 custodial staff member for every 5 inmates).

Last, the combined number of vocational and educational programs was measured as a continuous variable. It is thought that prisons that offer more programming opportunities to inmates can be considered less deprived or better environments in which to serve one's time. In fact, the work of French and Gendreau (2006) has recently shown that inmates who participate in programs have lower rates of prison misconduct. According to Table 1, the average number of combined educational and vocational programs across prisons was 8.10.

The final two deprivation variables were proportion of non-Whites and proportion of inmates younger than age 25. Existing research has used both of these variables interchangeably as measures of both importation and deprivation. However, in the current study, both of these variables were assigned as deprivation variables because the dependent variable was

**TABLE 2** Null Model for Inmate-on-Inmate Assaults (Nonserious/Nondeadly)

<i>Fixed Effect</i>	<i>Coefficient</i>	<i>SE</i>
Level 1: Mean inmate assault frequency	.267	.033*
<i>Random Effect</i>	<i>Variance Components</i>	<i>z Score</i>
Level-2 variance: Mean frequency of assaults	.020	2.500*
Level-1 variance	.412	22.890*

Note.  $n = 1,054$  at the individual level;  $n = 30$  at the prison level

\* $p < .05$ .

individual-level assaultive behavior rather than an aggregate measure of rates of assault. Table 1 indicates that, on average, across prisons, the proportion of non-White inmates is .43 (43%) and the proportion of inmates younger than age 25 is .18 (18%). Interestingly, the proportion of young inmates in the sample prisons ranged from .06 to .51.

*Interaction terms.* Through the use of multilevel modeling techniques, this research not only tested the direct effects of the micro- and macro-level importation and deprivation variables, but it also examined the possible interaction effects between these variables. This research builds on to the work of Woolredge et al. (2001) as it sought to develop a more integrated theory of prison violence using both inmate- and prison-level variables alone and as interaction terms.

## RESULTS

The first step of hierarchical linear analysis was to run a null model to see whether the dependent variable (assault frequency) varied across prison context. This variation across context is known as an *intraclass correlation* (Bryk & Raudenbush, 1992). This intraclass correlation was found by dividing the variance at Level 2 by the sum of the variance at Levels 1 and 2 (.020/[.412 + .020]). The findings depicted in Table 2 reveal an intraclass correlation of 4.63%. This suggests that 4.63% of the variation in mean assaults on inmates is at the prison level, whereas the remaining 95.37% of the variation in mean assaults on inmates is at the prisoner level. Because the variation in inmate-on-inmate assaults significantly varied across both levels, the use of hierarchical linear modeling was justified.

The next step was to obtain a random-coefficient regression model. In this step, all of the  $\beta_{kj}$ 's (i.e., regression coefficients for the effects of the individual-level explanatory variables on inmate assaults) were allowed to vary across prisons. The Level-1 and Level-2 models were specified as follows:

$$\begin{aligned}
 \text{Level 1: Assaults on inmates (nonserious)} = & \beta_{0j} + \beta_{1j}(\text{age})_{ij} + \beta_{2j}(\text{race})_{ij} \\
 & + \beta_{3j}(\text{violent offense})_{ij} + \beta_{4j}(\text{time served for prior violent offense})_{ij} \\
 & + \beta_{5j}(\text{Violent Belief Scale})_{ij} + \beta_{6j}(\text{Drug Belief Scale})_{ij} \\
 & + \beta_{7j}(\text{Property Belief Scale})_{ij} + \beta_{8j}(\text{time served})_{ij} + \beta_{9j}(\text{time served}^2)_{ij} \\
 & + \beta_{10j}(\text{sentence length})_{ij} + \beta_{11j}(\text{visits})_{ij} + \beta_{12j}(\text{aggression})_{ij} + e_{ij}, \quad (1)
 \end{aligned}$$

$$\text{Level 2: } \beta_{kj} = \theta_{k0} + U_{kj} \text{ for } k = 0-12 \quad (2)$$

Only the aggression variable varied across prison context, so it continued to be specified as random. All other variables and their  $\beta_{kj}$ 's, for which the random variation assumption was incorrect (i.e., there was no significant variation across prisons), were subsequently specified as fixed. The Level-2 model was changed accordingly and was respecified as follows:

$$\begin{aligned} \beta_{0j} &= \theta_{00} + U_{0j}, \\ \beta_{12j} \text{ (aggression)} &= \theta_{120} + U_{12j}, \\ \beta_{kj} &= \theta_{k0} \text{ for } k = 1-11 \end{aligned} \quad (3)$$

Results from the reduced random-coefficient regression model (combining Equations 1 and 3) are presented in Table 3. As in Table 2, the random-effects portion of Table 3 reveals that the mean frequency of assaults on inmates varied substantially across prisons; its variance component was still significant at the .05 level. Also, there was an approximate 35% ( $1 - [.013/.020] \times 100$ ) reduction in the Level-2 variance component for the constant when comparing its value in the null model to its value in the random-coefficient regression model. Hence, although significant variation remains, individual-level characteristics alone account for a substantial portion of cross-prison variation in inmate-on-inmate assaults.

In addition, the random-effects portion of Table 3 also shows that the effect of aggression significantly varies across prisons ( $p < .05$ ). There was little to no significant variation in the other slope coefficients ( $\beta_{kj}$ 's) across prisons. Thus, there were no estimated variance components for any of the other slope coefficients from the Level-1 model in the random-effects portion of Table 3.

Rather, the main effects of the individual-level explanatory variables can be seen in the fixed-effects panel of Table 3, and these effects can be presumed to be "constant" across prisons. Specifically, age had a strong negative effect and aggression had a strong positive effect on the likelihood of an inmate-on-inmate assault occurring. None of the other individual-level variables proved significant indicators of assault. These findings provided support for the micro-level importation theory rather than micro-level deprivation as an indicator of inmate assault.

The final step was to add Level-2 prison variables<sup>3</sup> to try to account for the variation in mean frequency of inmate assaults across prisons and the variation in the effects of aggression. The author combined the following prison-level specification with that of Equation 3 at the individual level. The Level-2 models were specified as

$$\begin{aligned} \beta_{0j} &= \theta_{00} + \theta_{01} \text{ (proportion non-White)} + \theta_{02} \text{ (population size)} + U_{0j}, \\ \beta_{12j} \text{ (aggression)} &= \theta_{120} + \theta_{121} \text{ (crowding)} \\ &\quad + \theta_{122} \text{ (proportion younger than age 25)} + U_{12j}, \\ \beta_{kj} &= \theta_{k0} \text{ for } k = 1-11 \end{aligned} \quad (4)$$

From looking at the random-effects panel of Table 4, it is clear that the contextual variables are successful in reducing the variance component associated with mean assaults on inmates. Specifically, there is an approximate 54% ( $1 - [.006/.013] \times 100$ ) further reduction in the variation in the frequency of inmate-on-inmate assaults across prisons once the prison-level variables are considered. Furthermore, the variance component for the aggression slope coefficient is greatly reduced as well (80%), thus indicating that the prison-level

**TABLE 3: Random-Coefficient Regression Model for Inmate-on-Inmate Assaults (Nonserious/Nondeadly)**

<i>Fixed Effect</i>	<i>Coefficient</i>	<i>SE</i>	<i>t Ratio<sup>a</sup></i>
Constant: Mean frequency of assaults	.271	.031	8.742*
Age	-.012	.002	6.000*
Race	-.005	.039	0.128
Violent offense	.031	.041	0.756
Time served (prior violent)	.058	.043	1.349
Violent belief	-.002	.008	0.250
Drug belief	-.003	.009	0.333
Property-crime belief	-.001	.010	0.100
Time served	-.001	.001	1.000
Time served <sup>2</sup>	.000	.000	0.000
Sentence length	-.001	.001	1.000
Visits	-.010	.012	833
Aggression	.053	.010	5.300*
<i>Random Effect</i>		<i>Variance Component</i>	<i>z Score</i>
Level-2 variance: Mean frequency of assaults		.013	2.170*
Aggression		.005	2.500*
Level-1 variance		.340	22.667*

Note.  $n = 1,054$  at the individual level;  $n = 30$  at the prison level.

a. The  $t$  ratios are based on full estimates for coefficients and standard errors, not rounded estimates provided here.

\* $p < .05$ .

**TABLE 4: Contextual Model for Inmate-on-Inmate Assaults (Nonserious/Nondeadly)**

<i>Fixed Effect</i>	<i>Coefficient</i>	<i>SE</i>	<i>t Ratio<sup>a</sup></i>
Constant: Mean frequency of assaults	.265	.027	9.815 <sup>†</sup>
Proportion non-White	.381	.147	2.592*
Population size	.001	.000	2.339*
Age	-.010	.002	5.000*
Race	-.013	.039	0.333
Violent offense	.041	.040	1.025
Time served (prior violent)	.047	.042	1.119
Violent belief	-.003	.007	0.429
Drug belief	-.004	.009	0.444
Property-crime belief	.002	.010	0.200
Time served	.000	.001	0.000
Time served <sup>2</sup>	.000	.000	0.000
Sentence length	.000	.000	0.000
Visits	-.010	.012	0.833
Aggression	.055	.008	6.875*
Crowding	.070	.040	1.750**
Proportion < age 25	.210	.074	2.837*
<i>Random Effect</i>		<i>Variance Component</i>	<i>z Score</i>
Level-2 variance: Mean frequency of assaults		.006	1.500
Aggression		.001	0.000
Level-1 variance		.339	22.600*

Note.  $n = 1,054$  at the individual level;  $n = 30$  at the prison level.

a. The  $t$  ratios are based on full estimates for coefficients and standard errors, not rounded estimates provided here.

\* $p < .05$ . \*\* $p < .10$ .



variables have accounted for all of the variation in the effect of aggression. Also, the variance components at Level 2 for both mean assaults and aggression are highly insignificant.

The fixed-effects panel of Table 4 shows which prison-level variables were the most important in accounting for the reduction in variation in inmate-on-inmate assaults across prisons. Specifically, the proportion of the inmate population who were non-White and the population size were the only statistically significant contextual main effects. As the proportion of non-Whites in the prison population increases and as population size increases, so too does the mean frequency of inmate-on-inmate assaults. The remaining contextual variables all had statistically insignificant effects on assault frequency, lending little support for the macro-level deprivation theory.

In addition, the fixed-effects panel of Table 4 also shows the effects of individual-level variables while controlling for prison-level characteristics. The results are similar to those in Table 3. Controlling for prison-level characteristics, age and aggression had a continued negative and positive effect on inmate assaults, respectively. Likewise, the other individual-level variables remained insignificant. Again, although controlling for prison-level context, these results lend more support for importation rather (e.g., the age and aggression variables) than the micro-level deprivation theory.

In terms of interaction effects, Table 4 shows that two interaction terms (e.g., Aggression  $\times$  Crowding and Aggression  $\times$  Proportion Younger Than Age 25) were significant. These findings suggest that the effect of aggression on inmate assault frequency is stronger in prisons where there is more crowding and where the population of young inmates is higher. This finding supports an integrated theory of prison violence by combining importation (aggression) and deprivation variables (crowding and proportion younger than age 25) together to explain prison violence. Moreover, this finding adds some relevance to the idea that context matters, as highly aggressive inmates appear to act more violently in more deprived (i.e., more crowded and more younger inmates) conditions. This finding runs counter to the recent work of Camp and Gaes (2005), who said that prison context was not important in predicting inmate violent behavior. However, they examined only two prisons, and because they employed only single-level analysis, the effect of context was masked.

## DISCUSSION

Overall, this project has made significant contributions to the theoretical understanding of prison assault. First, the significant results for age and aggression in the full contextual model indicate continued support for the individual-level importation theory as a strong predictor of inmate-on-inmate assault. This finding was similar to the recent work of Jiang and Fisher-Giorlando (2002), who found the importation model to be a strong predictor of inmate-on-inmate violence. Furthermore, the importance of the aggression variable indicates that inmate-on-inmate assault is still predominantly very personal and psychological in nature. Also, this project extended the importation theory, as it indicated that certain contextual prison conditions exacerbate individual violent behavior.

Interestingly, the beliefs component of the importation theory produced null effects on inmate violence. It was assumed that a major component of importation was one's values and beliefs toward violence prior to entering prison. Until now, most of the measures of importation were proxy measures, such as criminal history, age, or race, indicating nothing

about violent beliefs. The lack of significance for a beliefs component in the present study suggests that importation may still be best measured by prior criminal behaviors rather than by beliefs.

One problem with attempting to measure the beliefs portion of importation is the issue of time order. The current study asked inmates to recall criminal beliefs, which can be highly problematic and could explain the null effect of the belief variable. A true test of the power of this beliefs variable would include measures of criminal values both prior to prison and during incarceration (i.e., a more longitudinal, developmental model). Continuing to pursue this beliefs portion of importation could prove to be costly and time-consuming for prison researchers. Therefore, the continued use of proxies as measures of importation is most likely to be continued.

The micro-level deprivation theory proved unsuccessful in significantly predicting assault frequency. Time served, sentence length, and visits were insignificant indicators of assaultive behavior in all the models. This suggests that micro-level deprivation and/or individual-level institutional variables (as they are referred to in the literature) do not have the significant effects that researchers had anticipated when other variables are controlled for. This finding is important because past studies of micro-level deprivation examined very few facilities and employed only single-level analysis, thus making their results questionable. Further multi-level investigation of these variables is needed because many states are continuing to give longer mandatory sentences to inmates. If variables like sentence length and time served have null effects on misconduct/violence, then longer, mandatory sentences may not produce the harmful effects that prison researchers say they do and will have.

At the macro level, there were only two deprivation variables that had significant positive effects in the full contextual model. They were the proportion of non-White variable and the population size variable. The effect of both of these variables is a multilevel one, in which the proportion of non-White inmates and population size are both positively related to individual inmate violence. Some may explain these multilevel effects as deprivation effects. For example, a White inmate in a predominantly non-White prison may feel that these conditions are deprived and, therefore, act out aggressively because the inmate feels threatened. It is quite possible that these feelings may be rooted in an inmate's own personal negative stereotypes and misconceptions about race and violence. Furthermore, this effect of proportion of non-Whites may also create deprivation because certain types of prisons (i.e., more non-Whites) may be more restrictive and have differential resources; thus, inmates may be acting out in response to these more deprived conditions. The effect of proportion of non-Whites is very complex and needs further investigation. In terms of population size, it is possible that within larger prisons there are simply more inmates to come into contact with and more places to engage in violent misconduct than in smaller prisons. In larger prisons, correctional staff cannot monitor the entire prison grounds at all times, giving inmates more freedom to engage in misconduct throughout the prison. The findings from this research indicate that prisons should operate with a population limit or that policy makers should rethink the design of newer prisons to maximize surveillance.

One of the most important contributions of the current study was the significant interaction effect between aggression and crowding and aggression and proportion younger than age 25. These findings indicate support for a possible blended theory of importation and deprivation to explain inmate assaults. Specifically, highly aggressive inmates (i.e., inmates who enter prison with aggressive or violent tendencies) were more affected by *specific*

deprived conditions (i.e., overcrowding and a greater presence of younger inmates) and committed more inmate-on-inmate nonserious assaults in these conditions. Prison officials may need to rethink the importance of housing context for these particular types of inmates. This research indicated that the effects of inmates' aggressive personalities might be minimized in more appropriate living conditions (i.e., those with less crowding and older inmates). However, because of budgetary, housing, and/or staff constraints, prisons typically cannot concentrate on placing specific inmates in the most suitable contexts. In fact, most focus on individual characteristics and not contextual factors when placing an inmate in the proper housing unit. It is possible that the classification of inmates may need to incorporate context as well as individual characteristics. This may involve the creation of new classification tools that assess both micro- and macro-level variables. Thus, prison researchers and prison officials will need time to develop new classification tools and test them. This may make the placing of inmates in the proper housing units a more time-consuming effort for prison officials.

In addition to possibly changing housing policies, the importance of the relationship between age and assaults cannot be ignored because it was constant across all contexts. With more and more states trying juveniles as adults, the increased presence of younger inmates could create a situation of more violence. These findings may force policy makers to reconsider the effects of putting juveniles into adult facilities. However, prison officials are placed in a quandary: As they reduce the number of young inmates in adult facilities, they are potentially making juvenile facilities more dangerous.

Despite the contributions of this research, it has several limitations. First, the sample institutions were in close geographic location to one another, so the results are not generalizable to other prisons across the country. It is quite possible that regional differences between prison contexts may exist. Thus, more contexts are continually needed to examine specific differences.

In addition, the sampling techniques used to gather inmates, although intended to be random, were problematic. As is typical with prison research, not all inmates were given the opportunity to participate. Some were not allowed to participate (e.g., they were safety risks). Furthermore, the research possibly missed some of the most violent inmates because they may have been in segregation at the time. Thus, the results of the research may reflect the more motivated, bored, or opportunistic inmate in the general population who chose to take the survey. On the other hand, this sample was clearly overrepresented with violent offenders (67%) who, in turn, were serving very long sentences. Recent research by Jiang and Fisher-Giorlando (2002) suggested that inmates who served longer sentences engaged in less violent misconduct. This overrepresentation of violent inmates, with their longer sentences, could have accounted for the low incidence of violence among the sample inmates in this study. Future research should try to secure a more representative sample. Thus, the results of this research extend only to those subjects under investigation and not to the rest of the U.S. prison population.

The findings of this research can serve as a solid foundation for much future prison violence research. First, this project should and needs to be expanded to different parts of the country and include as many more inmates and prisons as possible. Examining more prison contexts will contribute to a better understanding of the interactive effects between individuals and context. Furthermore, this study provided an impetus for future researchers to include more importation and deprivation variables in their analysis. Variables such as inmate attitudes/beliefs, gang presence, the availability of other types of rehabilitation

programs, participation in prison programs, prison architecture, housing design, and other factors may influence inmate behavior as well. Many of these additional management-style variables were omitted from this analysis because increasing the number of variables in multilevel models, given the small number of Level-2 units, increases the chances of Type I errors. The continual testing of other contextual variables is needed.

In addition, future studies on misconduct should be expanded to female inmates, whose lives are often ignored and whose experiences are simply generalized from the results of studies of male inmates. Women's prisons present a very different context to examine. Moreover, the context of women's prison has been generally overlooked because female prisoners tend to engage in less violent behavior than male prisoners (Harer & Langan, 2001). As the context of women's prisons continues to change (i.e., increases in population and crowding), female inmates too may then alter their personal behavior in response to changing prison environments.

The results of this study have begun to show penologists that both the inmate and the prison context are important factors. The current study suggests that explaining prison violence from one theoretical level does not provide the most accurate picture. It implies that a more integrated theoretical approach between importation and deprivation is needed to fully explain the predictors of prison violence. Thus, prison researchers who study prison violence must collect more data on both the inmate and the context in which the inmate resides. This will make data collection for prison researchers much more time and labor intensive, as they will need to collect multiple sources of data from more inmates and multiple prisons. With multilevel modeling, the more data there are, the more potentially robust the results. Prison researchers will need to continue to employ multilevel statistical techniques to analyze their prison violence data, as single-level analyses mask the crucial interplay between inmate and prison context. This study showed that prison violence, although still mainly an individual-level event, was exacerbated in specific prison contexts. The excuse that all prisons are equally "bad" no longer can be used as a valid reason to ignore the importance of prison context.

## NOTES

1. Missing data were substituted for with the appropriate measure of central tendency. All variables were centered on their grand means.
2. Bivariate correlations were obtained for all levels of independent and dependent variables. None of the correlations were more than .50. Variance inflation factors were less than 4, indicating that multicollinearity was not an issue.
3. To test for the stability of Level-2 coefficients, Level-2 variables were entered into this model alone as well as in pairs. The coefficients for the variables indicated as significant remained stable throughout this process.

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