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## Understanding Offender Needs Over Forms of Isolation Using a Repeated Measures Design

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## Abstract

A number of studies find that solitary confinement is associated with mental impairment by some who experience it; yet dosage of confinement, and which individual and exogenous variables that lead to mental impairment have received less attention. Using a harm reduction perspective, we employ a repeated measures design to examine if varying forms of isolation affect mental health and psychological needs. We find that the duration of disciplinary segregation, incarceration, homelessness, and other individual-level descriptors had deleterious effects on mental health and psychological needs. Vocational programming and a high school education were found to be protective factors for psychological needs.

Key words: Solitary Confinement, Harm Reduction, Mental Health, Homelessness, Repeated Measures

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3 Prison systems across Western society are in the midst of an ongoing mental health crisis  
4 resulting from the lack of treatment beds for those with impaired mental capacity. The  
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Prison systems across Western society are in the midst of an ongoing mental health crisis resulting from the lack of treatment beds for those with impaired mental capacity. The deinstitutionalization movement of mental health hospitals of the 1970's has resulted in fewer beds for mentally ill and indigent patients and little legal justification to hold them. As a result, correctional institutions – particularly jails, but also prisons – have become de facto mental health institutions in the United States (Kurki & Morris, 2001). In 1955 there were 559,000 state hospital beds to serve 164 million people; by 1994, there were only 72,000 beds to serve 250 million people (Chaimowitz, 2011, p. 2). As the number of hospital beds dropped, there was a noticeable increase in the number of people in jails and prisons who were mentally disturbed (Lamb, Weinberger, & Gross, 2004).

Correctional institutions are ill-suited to serve in the capacity of mental health providers, particularly because they were not constructed for this purpose and often lack a sufficient number of trained practitioners or special programs to assist offenders requiring treatment (Metzner & Fellner, 2010). One overarching concern with the proliferation of the mentally ill in prisons regards two of the purposes of these institutions: retribution and deterrence (Kurki & Morris, 2001). Generally, these two perspectives presume that individuals' cognitive capacities can accurately connect a negative consequence with a particular behavior or action. Specifically, deterrence presumes that actors are 'rational' – in this case, neurotypically functioning human beings that can correlate cause and effect. Retribution, on the other hand, does not demand rationality, rather in contemporary society it assumes a rational being if the punishment is to be considered ethical. However, many mentally ill may have difficulty making these rational connections due to this disability. They can end up not only in prison, but in restricted custody beds as a result of their behavior and/or for their own safety (Abramsky & Fellner, 2003).

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3 Paradoxically, placement in isolation may cause offenders with mental illnesses to  
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5 deteriorate further and their psychological symptoms to worsen. As their symptoms worsen, their  
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7 misbehavior may increase, further prolonging their stay in solitary confinement (SC) (Fellner,  
8  
9 2006). While most agencies limit the amount of time an offender may be placed in SC or  
10  
11 disciplinary segregation, the frequency and durations of the typical and extreme isolation  
12  
13 placements are largely unknown (Morris, 2015). Of particular concern is that offenders with a  
14  
15 mental illness may be overrepresented in SC in order to control offensive behavior (O'Keefe &  
16  
17 Schnell, 2007).

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21 Although the meaning of SC varies considerably between jurisdictions and facilities, the  
22  
23 current study focuses on the isolation component of SC and how it affects offenders' social  
24  
25 functioning and their risk for mental health disorders. Our particular interest will be offenders  
26  
27 placed in disciplinary segregation for a violent infraction. Generally, SC refers to a correctional  
28  
29 sanction for institutional misconduct, but may also be used to separate out offenders who may  
30  
31 pose a safety risk, or to protect vulnerable offenders from potential victimization (Browne,  
32  
33 Cambier, & Agha, 2011).

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37 The current study examines whether the duration of disciplinary segregation affects  
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39 offenders' subsequent mental health functioning and other psychological constructs. However,  
40  
41 we do not limit the sample to only individuals who experienced SC, rather we consider SC the  
42  
43 most restrictive form of isolation on a continuum of incapacitation. We rely on an examination of  
44  
45 institutional records to illuminate general trends on how isolation and other covariates impact  
46  
47 subsequent assessment responses. Findings from this study may help elucidate the consequences  
48  
49 of isolation as part of SC or disciplinary segregation policy.  
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### 53 **Literature Overview**

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## History of Isolation in Corrections

Modern solitary confinement draws its roots from the Pennsylvania prison system of the 1800's. The practice's primary purpose was to help offenders reform, repent for their wrongs, and, institutionally, to prevent contamination of and from other offenders (Johnston, Finkel, & Cohen, 1994). In hindsight, this practice resulted in negative physical and psychological consequences for offenders (Arrigo & Bullock, 2008; Kurki & Morris, 2001; Pizarro & Stenius, 2004). Isolation was eventually determined to be unfavorable to psychological outcomes, and SC as a technique of control for all offenders was limited to the function of administrative/protective custody and discipline for subsets of the prison population (Grassian, 1983; Haney, 1993; Smith, 2006).

Isolation was reexamined throughout the 1950's via sensory deprivation and perceptual deprivation assessments following stories of prisoners of war being brainwashed through social isolation during the Korean War (Brownfield, 1965). Such studies were conducted at McGill University (Smith, 2006) and were not necessarily intended to mimic offenders' experiences; rather, they utilized volunteer samples and were short-term. However, findings from these studies had the potential to generalize the isolation experience to offenders in any correctional facility. The overarching results of these studies demonstrated that limiting sensory stimulation, even for short amounts of time, resulted in meaningful symptoms. The studies found participants experiencing changes in their learning, perception, cognition (Schultz, 1965), physiological, and behavioral functioning (Zubek, 1973).

Despite this body of evidence, the use of isolation to control behavior became widespread in the 1980's as the movement to construct supermax prisons gained ground. Supermaxes utilized the most extreme form of isolation as a means of maintaining prison order, decreasing

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2  
3 violence, and deterring offenders from misbehaving (Mears & Reisig, 2006). In the ideal-typical  
4 operation of supermaxes, offenders are kept in single-cell environments 23 hours per day, for an  
5 indefinite period of time; within a prison facility that operates on a lockdown status (O'Keefe,  
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10 2008; Smith, 2006). Marion, arguably the first full-fledged modern supermax prison (although  
11 Alcatraz was an early prototype) in the U.S., was established in Illinois in 1979 (Pizarro &  
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14 Stenius, 2004). In the 1980's, several states followed suit and adopted their own version of  
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16  
17 supermax prisons with the stated intent of providing a means of controlling unruly offenders,  
18  
19  
20 many of whom were declared too dangerous for traditional prisons (Pizarro & Stenius, 2004).  
21  
22 "The worst of the worst," offenders were to be placed in Marion and other supermaxes to  
23  
24 decrease the likelihood of injury to prison staff and other housed offenders (Ward & Kassebaum,  
25  
26  
27 2009, p. 70). Nonetheless, as supermax construction increased the capacity of correctional  
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29  
30 systems to house high risk offenders, the number of severely incorrigible offenders did not keep  
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33 pace with cell construction. Consequently, 'nuisance offenders' have been placed in some of  
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36 these cells; including those who irritate correctional staff, or have minor prison infractions  
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39 (Metzner & Dvoskin, 2006; Toch, 2001). The perpetual lockdown used in such facilities set the  
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41  
42 stage for the increased use of isolation to maintain order in today's prisons (Pizarro & Stenius,  
43  
44  
45 2004).

### 42 **Negative Outcomes of Solitary Confinement**

44  
45 Negative outcomes associated with isolation include affective symptoms, such as  
46  
47 *antisocial attitudes* (Haney, 1993, 2003; Koch, 1986; Korn, 1988b; Miller & Young, 1997),  
48  
49 *social withdrawal* (Scott & Gendreau, 1969; Toch, 1975;), *hypersensitivity* (Haney, 1993),  
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51  
52 *depression* (Andersen, Sestoft, Lillebaek, Gabrielsen, Hemmingsen, & Kramp, 2000; Clare,  
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55 Bottomley, Grounds, Hammond, Liebling, & Taylor, 2001; Haney, 1993, 2003; Korn, 1988b;  
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3 Kupers, 2008), *hopelessness* (Haney, 1993), *insomnia* (Haney, 1993, 2003; Koch, 1986; Korn,  
4 1988b), and *lethargy* (Haney, 1993, 2003; Koch, 1986; Martel, 1999; Scott & Gendreau, 1969;  
5 Smith, 2004). Moreover, symptoms of perceptual distortion following isolation have been  
6 documented; including *paranoia* (Smith, 2004) and *hallucinations* (Koch, 1986; Korn, 1988b;  
7 Haney, 1993, 2003; Smith, 2004). Offenders have also experienced anxiety symptoms following  
8 isolation (Andersen et al., 2000; Clare et al., 2001; Smith, 2004; Koch, 1986; Haney, 2003);  
9 including *signs of panic* (Toch, 1975) and *cognitive ruminations* (Korn, 1988b; Miller & Young,  
10 1997).

11  
12 Furthermore, offenders have demonstrated symptoms of cognitive alterations after  
13 experiencing isolation. These symptoms include *cognitive dysfunction* (Haney, 1993; Koch,  
14 1986; Miller & Young, 1997; Smith, 2004) and *a lack of concentration* (Korn, 1988b).  
15 Externalizing symptoms, such as *violent or aggressive fantasies* (Haney, 2003); *violent reactions*  
16 (Martel, 1999); *irritability, rage, and aggression* (Rhodes, 2004; Toch, 1975); and *loss of control*  
17 have been documented. Internalizing symptoms have included *self-harm* (Benjamin & Lux,  
18 1975; Kaba et al., 2014) and *suicidal ideation or behavior* (Kupers, 2008; Patterson & Hughes,  
19 2008; White, Schimel, & Frickey, 2002). The effects of isolation have even been likened to  
20 trauma suffered by torture victims (Herman, 1995; Horowitz, 1990; Siegel, 1984).

21  
22 Offenders may not experience the same symptoms following isolation because the  
23 conditions of their isolation and offender characteristics may vary (Smith, 2006). These myriad  
24 mental health consequences may occur within days of being isolated, and the risk of harm  
25 appears to rise for each additional day spent in isolation. Some research indicates offenders often  
26 recover once out of isolation (Kupers, 1999). Yet, some offenders may continue to experience  
27 negative effects and may not be able to adapt once they are returned to the general prison  
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3 population or upon reentry to the community (Haney, 2003; Kupers, 2008). Offenders may, for  
4 instance, have issues reintegrating into society following their adaptation to isolation (Rhodes,  
5 2004). Once out of isolation, offenders may have social anxiety and/or have a fear of emotional  
6 contact. Their new reality upon release may clash harshly with the reality of imprisonment where  
7 newly released offenders are expected to be in control of themselves and be self-motivated, but  
8 while incarcerated their movement and ability to make autonomous decisions was highly  
9 controlled. It may be difficult for individuals who experience isolation to resume their former  
10 social existence since one of the documented symptoms of isolation is social withdrawal (Haney,  
11 1993, 2003; Miller & Young, 1997; Scott & Gendreau, 1969; Toch, 1975). If these symptoms do  
12 not dissipate following release from isolation and, more generally, from prison, then the effects  
13 of isolation on community integration may need to be considered.

14  
15 Andersen and colleagues (2000) longitudinally compared rates of psychiatric disorders of  
16 those in SC to those in the general population (p. 20). They found that 28 percent of offenders in  
17 SC had psychiatric disorders, compared to only 15 percent of offenders in the general population  
18 (p. 22-23). They suggested these rates of disorders differed due to SC. However, generally, it is  
19 still unknown if those with more mental health issues are put in SC at higher rates, if SC is the  
20 cause of decreased mental health functioning, or if SC affects offenders with pre-existing mental  
21 health issues differently than those without (O'Keefe, 2007).

### 22 **Offenders Placed in Isolation**

23  
24 Offenders with mental illnesses may be overrepresented in isolation. For instance,  
25 Hodgins and Côté (1991) assessed offenders from two segregation units. Results showed that  
26 offenders in isolation had a higher prevalence of severe mental health disorders. Yet, many of  
27 these offenders had a mental illness prior to being placed in isolation. These authors concluded

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3 that offenders with mental illness were disproportionately placed in isolation and did not receive  
4  
5 sufficient mental health care while incarcerated.  
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8 In contrast, O'Keefe and colleagues (2013) found that prisoners who entered SC with a  
9  
10 mental illness did not suffer significant deterioration in mental health functioning, relative to  
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12 non-mentally ill prisoners who were also subject to administrative segregation. When the  
13  
14 psychological functioning of these two groups were measured against comparison subjects in the  
15  
16 general population (e.g., GP mentally ill and non-mentally ill inmates), all four groups showed  
17  
18 roughly similar rates of change on psychological functioning during the one-year observation  
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20 period. Thus, the harm-inducing effects of SC are called into question by this research team's  
21  
22 rigorous methodological approach to studying SC.  
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27 Some individual factors, such as age and higher psychopathy scores, are associated with  
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29 offender disciplinary infractions (Coid et al., 2003; Ditchfield, 1990). Younger offenders are also  
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31 more likely to be placed in segregation (Butler & Steiner, 2016), which is as sensible conclusion  
32  
33 given that the young tend to have higher rates of disciplinary infractions and general rule-  
34  
35 breaking (Goetting & Howsen, 1986; Wooldredge, 1994). Likewise, offenders with shorter  
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37 sentences tend to have higher infraction rates than offenders with longer sentences (Ditchfield,  
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39 Britain, & Unit 1990), explained by having a longer adaptation period to incarceration (Flanagan,  
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41 1980). To examine this instance further, incarceration rate and age are included in this study's  
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43 models.  
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48 Moreover, racial/ethnic disparity in the placement in isolation may be found in some  
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50 prisons (Haney & Lynch, 1997), yet, disparity may result from some correctional facilities  
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52 purposefully isolating alleged gang members (Fleisher & Decker, 2001). Research has  
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54 demonstrated that gang affiliation is associated with increased violence and other rule-breaking  
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3 within prisons (Gaes, Wallace, Gilman, Klein-Saffran, & Suppa, 2002). Regardless of gang or  
4 race/ethnic disparities in placement, the consequences of isolation have not been shown to differ  
5 by race or gang affiliation; and to test these findings we include race and gang membership as  
6 covariates in our models.  
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11  
12 Additionally, as compared to the general U.S. population, the correctional population is  
13 over-represented by offenders who lack an adequate education (Lutze, 2014; Macmadu & Rich,  
14 2015; Petersilia, 2003). From a theoretical standpoint, offenders with higher levels of education  
15 may be more likely to conform to prison rules as a result of exposure to organized indirect  
16 control, where these offenders have a greater commitment to conventional norms (i.e., desist  
17 from deviance; Wooldredge, Griffin, & Pratt, 2001). However, some researchers have  
18 demonstrated that offenders' education levels do not impact their likelihood of being placed in  
19 segregation (Butler & Steiner, 2016; Coid et al., 2003). To assess this effect, education level is  
20 included as a covariate in this study.  
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33 Although homelessness is a significant contributor to poor health (see Henwood,  
34 Cabassa, Craig, & Padgett, 2013), the effects of isolation for the homeless are complex  
35 (Pedersen, Andersen, & Curtis, 2012). Some research indicates social isolation is typical for the  
36 homeless (Rokach, 2005; Stewart, Makwarimba, Reutter, Veenstra, Raphael, & Love, 2009),  
37 while other researchers have found that the homeless do not feel isolated (Lagory, Ritchey, &  
38 Fitzpatrick, 1991). Pedersen and colleagues (2012) found that some of the socially marginalized  
39 interviewees in their study described social isolation as positive; which appears counterintuitive,  
40 as isolation is frequently related to negative health outcomes. In addition to the obvious physical  
41 health problems resulting from extended exposure to the elements, violence, disease, the illegal  
42 drug market, and a lack of adequate healthcare, individuals suffering from mental illness appear  
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3 to disproportionately make up members of the long-term homeless population (Barrow, Herman,  
4 Cordova, & Struening, 1999; Henwood et al., 2013; Lin et al., 1994; Wright, 1990). McNiel and  
5  
6 Binder (2005) found that approximately 30 percent of patients in a California county hospital's  
7  
8 psychiatric emergency services unit were homeless. Additionally, eight percent of the homeless  
9  
10 patients displayed violent behavior in the 14 days leading up to the emergency visit. Considering  
11  
12 this evidence, homelessness is included as a covariate in the current study in the hopes of further  
13  
14 illuminating the relationship between homelessness and mental health, along with our other  
15  
16 dependent variables.  
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### 19 20 21 **Limitations of Prior Research** 22

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24 Prior findings on the effects of isolation have not been uniform. Whereas some  
25  
26 researchers have found that it results in maladaptation and is cruel and unusual (see above  
27  
28 section *Negative effects of SC*), others have found that isolation has little psychological impact  
29  
30 on offenders (O'Keefe, et al., 2013; Zinger, Wichmann, & Andrew, 2001). One possible  
31  
32 explanation for these disjunctive findings may be due to the populations examined being only  
33  
34 proxies for those in isolation. For instance, researchers have utilized college students (Bonta &  
35  
36 Gendreau, 1990) or excluded offenders with preexisting psychological conditions (Bonta &  
37  
38 Gendreau, 1995). Suedfeld, Ramirez, Deaton, and Baker-Brown (1982) found no evidence that  
39  
40 isolation was stressful or damaging to incarcerated offenders' mental health. However, this was a  
41  
42 simulated SC study that selected its sample by relying on volunteers. Therefore, their findings  
43  
44 may lack some external validity and application to real world circumstances.  
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48  
49 Another explanation regards methodological design. Researchers have used  
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51 autobiographies, self-reports, or clinical observations (Haney & Lynch, 1997), cross-sectional  
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53 data (Huebner, 2003), and/or small sample sizes (Grassian, 1983; Grassian & Friedman, 1986;  
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3 Korn, 1988a; 1988b; Suedfeld & Roy, 1975); all circumstances that limit the application of, or  
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5 compromise the validity of, their findings. To avoid the concerns raised in Suedfeld and  
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7 colleagues' (1982) simulated study, Haney (1997; 2003) examined a sample of offenders already  
8  
9 assigned to SC by prison administrators. He found that previously healthy offenders could  
10  
11 develop mental health problems in isolation and that SC can be detrimental for any type of  
12  
13 offender who endures it for a long period of time. The study design was cross-sectional, lacked a  
14  
15 comparison group, and focused on an extreme application of isolation that may not be  
16  
17 characteristic of other institutions' uses of SC. While a recent study shows that isolation is used  
18  
19 for administrative purposes and for longer durations than was previously known by either the  
20  
21 scholarly or practitioners communities (Shames, Wilcox, & Subramanian, 2015), these findings  
22  
23 are based on a subset of correctional institutions who returned the Bureau of Justice Statistics  
24  
25 prison census forms. If isolation is widely implemented as an institutional control tactic by  
26  
27 prison administrators, additional information may be gleaned from research studies that consider  
28  
29 the comprehensive uses, rather than extreme exemplars, of isolation by correctional institutions.  
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35 Additionally, differing conditions across prisons, using volunteer samples (Smith, 2006),  
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37 and the difficulty in accurately assessing symptoms due to offenders concealing conditions  
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39 (Grassian, 1983; Jackson, 1983) may also explain conflicting results. Evidence-based research  
40  
41 studies balancing rigorous methodological designs and realistic isolation conditions are needed  
42  
43 to better assess the outcomes of SC on offenders' mental health outcomes. Cross-sectional  
44  
45 designs often cannot assess offenders' mental well-being prior to isolation (Smith, 2006). There  
46  
47 is also a lack of research evaluating longer-term effects, including how isolation impacts  
48  
49 offenders' social lives. Rather, the crux of such research has focused on mental illness  
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51 immediately following isolation, which may still be problematic as some studies have  
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3 purposefully excluded offenders with preexisting mental health conditions. Post-isolation effects  
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5 may be an important consideration as many offenders who experience isolation will eventually  
6  
7 return to the community with typical and perhaps exacerbated offender needs. Taken together,  
8  
9 the cumulative weight of prior research underscores the need for assessing the effects of SC on  
10  
11 offender needs (included in the current study), taking into account the duration (or dosage) of  
12  
13 segregation episodes, as well as its longitudinal effects on offenders.  
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### 16 17 **Theoretical Foundation: Harm Reduction**

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19 Correctional institutions justify the use of isolation as a means of enhancing staff and  
20  
21 offender safety as well as keeping the peace inside the prison by maintaining social control over  
22  
23 offenders. The use of isolation by prison administrators is consistent with both deterrence and  
24  
25 incapacitation perspectives on punishment (Kurki & Morris, 2001; Zinger & Wichmann, 1999).  
26  
27 Another perspective involves harm reduction, which will be the theoretical perspective employed  
28  
29 in this study. Harm reduction is a term that derives from the medical profession, and more  
30  
31 recently public health. The Hippocratic Oath implies that physicians ‘do no harm’; and this  
32  
33 concept some 2,500 years later has been derivatively applied to medical practice. Still, no  
34  
35 medical organization has acknowledged the negative effects of isolation on offenders and how  
36  
37 this placement may constitute inhumane treatment (Metzner & Fellner, 2010).  
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41  
42 From a system administrator perspective, harm reduction as it relates to SC may also be  
43  
44 viewed through the lens of the first U.S. prisons, where isolation was used to prevent offenders  
45  
46 from ‘contaminating’ each other in the Eastern and Western Pennsylvania penitentiaries  
47  
48 (Johnston, 1994). Accordingly, the potential harm of isolation for the individual may be justified  
49  
50 under the premise that it will reduce offenders’ deviant behavior, which will then reduce the  
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52 harm communities face once offenders are released. While the simplicity of this approach made  
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3 isolation attractive to 19<sup>th</sup> century prison administrators, the segregation model of penology was  
4  
5 not without its critics (see Rothman, 2012). Moreover, this model ultimately proved to be  
6  
7 expensive and harmful to offenders as many of them suffered from mental illness due to being  
8  
9 alone for such long periods of time (Roth, 2011, p. 110). The effects of this ‘natural’ experiment  
10  
11 suggested early on in the history of American corrections that there was a law of diminishing  
12  
13 returns to isolating prisoners.  
14  
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16  
17 More recently, harm reduction has become the centerpiece of public health assessments  
18  
19 of drug programs and policies as it is believed these programs should reduce harm, rather than  
20  
21 cause it, both for the individual and their communities. Implicit in harm reduction is the premise  
22  
23 that public policies and practices, such as the use of SC, should not disproportionately burden or  
24  
25 harm the most marginalized despite their risk level or prior offenses. In the context of this study,  
26  
27 harm reduction may come to mean keeping offenders out of isolation in order to reduce negative  
28  
29 outcomes while incarcerated and improve offenders’ mental well-being prior to reentry into the  
30  
31 community. Hence, isolation is not an issue that affects only correctional institutions or  
32  
33 offenders. Rather, it is a public health issue because any collateral harm from it spills over into  
34  
35 communities when offenders, their families and communities struggle with the negative effects  
36  
37 of this policy (Cloud, Drucker, Browne, & Parsons, 2015). For instance, offenders released  
38  
39 straight from isolation back to the community have been shown to recidivate more quickly and  
40  
41 more frequently than offenders who have a transition from isolation to the general prison  
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43 population and then to the community (Lovell et al., 2007).  
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49 Harm reduction is then a complicated issue and centers on who we are most concerned  
50  
51 about and which theoretical perspective guides the correctional institution. A correctional  
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53 institution most concerned with maintaining order and security and staff and inmate safety may  
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3 be less attentive to any associated harms experienced as a result of their practices (e.g. the use of  
4  
5 SC) on inmates placed in solitary. Correctional institutions of the 21<sup>st</sup> century, however, though  
6  
7 out of necessity still concerned with maintaining order and security of their institutions and  
8  
9 safety for their staff, also balance those genuine concerns with a more treatment approach to  
10  
11 incarceration or one where correctional practices are more reflective of a ‘penal help’ perspective  
12  
13 than a penal harm one (Stohr, Jonson, Cullen, 2014). A penal help perspective is focused on  
14  
15 rehabilitation, restorative justice and prisoner reentry, all areas of much interest and research  
16  
17 since the 1990’s. It is juxtaposed against the penal harm perspective as articulated by Clear  
18  
19 (1994), that still persists in guiding the operation of corrections, but which has found less  
20  
21 empirical support in terms of harm reduction for offenders (e.g. the value of deterrence or over-  
22  
23 incarceration is limited -- Nagin, Cullen, Jonson, 2009).

### 24 25 26 27 28 **Analysis Plan**

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30  
31 The current study longitudinally examines 408 male prisoners assigned to state  
32  
33 supervision (i.e., jail, prison, community supervision). It focuses on how isolation (e.g.,  
34  
35 disciplinary segregation) and protective factors (e.g., life skills programming) affect mental  
36  
37 health and offender needs over time. Each offender in the current sample was measured at three  
38  
39 time points. To longitudinally examine our dataset, we use Generalized Estimating Equations  
40  
41 (GEE), which is a repeated measures procedure that accounts for the correlation of  
42  
43 measurements of an individual’s status, over time (see Liang & Zeger, 1986; McCullagh &  
44  
45 Nelder, 1983). This multi-level procedure is now widely accepted in the medical literature; and  
46  
47 considering our study is founded on a harm reduction perspective that parallels the perspectives  
48  
49 used in public health assessments, we believe our modest sample size is offset by the  
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51 considerable strengths of GEE. GEE uses a reiterative process to estimate quasi-likelihood  
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3 parameters that does not estimate between-individual variation; rather it focuses on within-  
4 individual similarity in residuals (Hanley, Negassa, Edwardes, & Forrester, 2003, p. 373). The  
5 result is population-averaged differences between observed and expected values of the dependent  
6 variables.<sup>1</sup> To examine solitary confinement and its application to harm reduction we test the  
7 following non-directional hypotheses:  
8  
9

10 H<sub>1</sub>: Disciplinary segregation will affect mental health functioning.

11 H<sub>2</sub>: Disciplinary segregation will affect behavior towards authority.

12 H<sub>3</sub>: Disciplinary segregation will affect impulse control.

13 H<sub>4</sub>: Disciplinary segregation will affect readiness to change.

14  
15 Each dependent variable was coded so higher values indicated a better standing. For example,  
16 higher mental health functioning scores indicate better mental health (i.e., no services needed),  
17 while lower scores indicate poor mental health (i.e., special medical services likely needed).  
18 Likewise, higher values of behavior toward authority, impulse control, and readiness to change  
19 indicate better behavior towards authority, more impulse control, and a higher readiness to  
20 change, respectively. Subsequently, the reference category for each dependent was the highest  
21 value.  
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### 36 **Method**

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38 Data was obtained from a Western state Department of Corrections on July 14, 2016  
39 (hereafter referred to as WSDOC). The sample was first limited to all offenders who recorded at  
40 least one violent infraction in WSDOC custody since the year 2000. Second, it was limited to  
41 offenders with at least three administrations of the state-wide standard needs assessment  
42 (hereafter referred to as NA) during 2014-2015. Therefore, we utilize data from the beginning of  
43 2014 until the end of 2015. Based on theory, this sample may represent some of the most high-  
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55 <sup>1</sup> We specified an independent working correlation structure, a cumulative logit link function, and a model-based  
56 estimation of standard errors.  
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3 risk supervised offenders for mental health illness not serving life sentences. The NA is  
4 administered while an offender is incarcerated and/or when he/she is in the community.  
5  
6 Therefore, our measurements were gathered by facility employees and community corrections'  
7  
8 employees depending on whether the offender was incarcerated or assigned to community  
9  
10 supervision.<sup>2</sup> The selected offender's most recent three NA's were used to represent three  
11  
12 intervals to be examined for each offender.  
13  
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16  
17 Offender sanction dates for a violent prison infraction were then matched with maximum  
18  
19 custody bed start dates to represent disciplinary segregation. Every offender in the sample  
20  
21 experienced both incarceration (i.e., general population) and some more intense form of isolation  
22  
23 (i.e., administrative, protective, disciplinary) during the 2014-2015 time period; so it may be  
24  
25 considered a high-dosage of isolation sample to varying degrees, relative to non-offenders in the  
26  
27 community. No matter their isolation status, all included offenders had committed a violent  
28  
29 infraction.<sup>3,4</sup> This final inclusion criterion also stresses the purpose of isolation, with disciplinary  
30  
31 segregation being the most involuntary.  
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36 Those who experienced disciplinary segregation in our sample were significantly more  
37  
38 likely to have a lower mental health score at the first measured interval ( $t = 2.56$ ). Likewise,  
39  
40 Attitude towards authority was significantly lower ( $t = 2.48$ ). Offenders did not differ in impulse  
41  
42 control and readiness to change at the first interval. While these preliminary findings support the  
43  
44 notion that offenders with higher mental health needs and lower positive attitudes towards  
45  
46 authority are placed into disciplinary segregation at higher rates, our longitudinal analysis  
47  
48 assesses the change in residuals across three time intervals – giving us an estimation of the effect  
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53  
54 <sup>2</sup> WSDOC offenders are scheduled a NA every six months, depending on extenuating circumstances.

55 <sup>3</sup> Approximately 15 % of all offenders since 1960 had committed a violent infraction in the full WSDOC database.

56 <sup>4</sup> Author calculations – data not shown.  
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3 of disciplinary segregation on the offenders who experienced it. Also, we are not examining the  
4 causes of SC – SC (i.e., disciplinary segregation) is an independent variable whose  
5 multicollinearity over intervals is addressed by GEE’s working correlation matrix.  
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10 The study was limited to men because the small number of females placed in disciplinary  
11 segregation would have required us to expand our study timeframe, opening our analysis to more  
12 drastic changes in policy, variability in inter-coder reliability, and reductions in parsimony. The  
13 first dependent variable measured mental health functionality and is collected by medical  
14 professionals. This variable is not on the NA and not administered by the same staff. The other  
15 three dependent variables are measures of offender needs, collected by the regularly  
16 administered NA. These four dependent measures serve as proxies for measures of harm  
17 experienced by offenders. Using GEE modelling across three time points, we examine whether  
18 disciplinary segregation is generally detrimental to our dependent measures (these are described  
19 and defined in the foregoing).  
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### 33 **Independent Variables**

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35 Based on theory and prior research, dozens of variables were selected from the database  
36 and entered into a bivariate correlation matrix with our dependent variables. Eleven potential  
37 covariates emerged as having a significant relationship with at least one of our dependents. The  
38 models contained herein utilize each of these covariates respectively. Fixed variables include  
39 race (0 = Non-White; 1 = White), age, and juvenile conviction (0 = No juvenile conviction; 1 =  
40 Juvenile conviction). Dynamic variables include homelessness (0 = Home; 1 = No home),  
41 education (0 = Less than HS; 1 = HS or more), incarceration rate, and gang affiliation (0 = No  
42 affiliation; 1 = affiliation). Unlike other studies of SC or disciplinary segregation, we found no  
43 statistically significant relationship between substance abuse and mental health.  
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3 As each measurement point could have been taken in the community or in custody, these  
4 variables were allowed to change. Accordingly, incarceration is not measured in days, rather in a  
5 rate to account for the varying interval lengths. For the homeless variable, if incarcerated,  
6 offenders reported their homelessness state during the prior six months in the community.  
7  
8 Finally, vocational programming hours were included as it is theorized that they have played a  
9 significant role in helping offenders change for the better while incarcerated and one might  
10 expect this would lead to fewer placements in disciplinary segregation (see Lipsey & Cullen,  
11 2007).

### 22 **Dependent Variables**

23  
24 The primary dependent variable in our study is mental health status. Values for this  
25 measure are assigned by trained WSDOC medical professionals who evaluate offenders at key  
26 points throughout their prison experience. WSDOC policy requires that a medical professional  
27 assess the mental health functioning of a person placed within disciplinary segregation every 72  
28 hours. Those marked with disciplinary segregation in our dataset had to be in disciplinary  
29 segregation for a minimum of six days to ensure that a mental health assessment had been  
30 completed within the requisite first 72 hours (we added three more days to account for weekends  
31 or delays). The values from this medical assessment are used by practitioners to determine  
32 medical treatment. Accordingly, we have a great deal of confidence in their accuracy, reliability,  
33 and ability to generalize a process of change in offender mental health needs relative to days in  
34 isolation. After reverse-coding and collapsing the two highest-need categories, mental health  
35 status ranged from one to four – one indicating the highest need for mental health services.

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52 Additional dependent variables were behavior towards authority, impulse control, and  
53 readiness to change. These measures are unweighted (i.e., manifest variables) and contained on  
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3 the NA. The behavior towards authority measure captures a dimension of criminal thinking  
4 associated with negative outcomes while incarcerated (Mills, Kroner, & Hemmati, 2004).  
5  
6 Impulse control measures the offenders' abilities to exercise their discretion before acting.  
7  
8 Known as 'self-control', low levels of this construct have been associated with criminal  
9  
10 behavior, analogous acts such as preferences for simple rather than complex tasks, being self-  
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12 centered rather than other-centered, and losing control of one's temper (Gottfredson & Hirschi,  
13  
14 1990; Grasmick, Tittle, Bursik, & Arneklev, 1993). Offender non-compliance with institutional  
15  
16 rules or conditions of community supervision is consistent with weak levels of self-control and  
17  
18 are risk factors for recidivism (DeLisi, 2006). Finally, for several decades, corrections scholars  
19  
20 have studied how offenders make positive changes during incarceration (Lipsey & Cullen, 2007).  
21  
22 Accordingly, a measure of readiness to change is included in our analyses.  
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### 28 **Results**

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31 Table 1 presents frequencies for the dependent variables for the first (n = 408) and all  
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33 three time intervals in the study (n = 1,224). While only 5.3 percent of our total measurement  
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35 points included the worst mental health status (i.e., n = 65), the distribution is fairly normal. In  
36  
37 fact, each of the dependent variables was normally distributed with the exception of readiness to  
38  
39 change, which was slightly negatively skewed. Descriptions of each measurement level for each  
40  
41 variable are provided as well to give readers a sense of the range of concepts measured by these  
42  
43 variables.  
44  
45

46  
47 Table 2 presents the means and standard errors for each variable across the first interval  
48  
49 and across all three intervals. The time points that determined interval length were decided by the  
50  
51 date of NA administration, and therefore intervals varied in length due to the logistics of  
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54 WSDOC  
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Table 1: Dependent variables (Offenders = 408; Total observations = 1,224)

Variable	Value	Frequency	Percent	Description
Mental Health Status	1	65	5.3	Significant major mental disorders; serious symptoms evident. Worst mental health score.
	2	383	31.3	Mental disorders and currently active symptoms, which generally meet medical necessity for treatment.
	3	667	54.5	Complete or near remission of a major mental disorder with no treatment required, but may receive psychotropic medication and/or outpatient counseling by mental health providers.
	4	109	8.9	No serious mental health symptoms present. Best mental health score.
		Total = 1,224	100.0	
Behavior Towards Authority	1	143	11.7	Resentful and defiant toward authority figures.
	2	638	52.1	Somewhat compliant with authority figures.
	3	443	36.2	Respectful and compliant.
		Total = 1,224	100.0	
Impulse Control	1	289	23.6	Impulsive; doesn't think before acting.
	2	772	63.1	Some level of self-control; sometimes thinks before acting.
	3	163	13.3	Possess self-control; thinks before acting.
		Total = 1,224	100.0	
Readiness to Change	1	90	7.4	Hostile toward change and unwilling to change.
	2	141	11.5	Does not see a need for a change; will continue with current lifestyle.
	3	724	59.2	Verbalizes desire for change, but not taking steps.
	4	269	21.9	Taking steps toward change.
		Total = 1,224	100.0	

administering hundreds of needs assessments state-wide per day. Counts for each dependent and independent variable were calculated from the first day of the respective interval until the last day of the interval. Reported are the average days during the first interval and average across all intervals. The first interval was longer than the subsequent two by over eight days. The average for days in disciplinary segregation was larger for the first interval than the subsequent two by

about three days. Across all three intervals, there were 77 instances of SC ( $\bar{X}$  = 21.15 days; sum = 1,629 days) for 74 individuals (not shown). Therefore, 222 of 1,224 intervals assessed disciplinary segregation relative to mental health functioning.

Table 2: Descriptives (Offenders = 408; Total observations = 1,224)

	First Interval (n = 408)		Combined Intervals (n = 1,224)	
<b>Independents</b>	$\bar{X}$	se	$\bar{X}$	se
Age	32.68	.47	33.02	.27
Days disciplinary segregation	1.52*	.36	1.33**	.18
Gang member	.25	.02	.28	.01
High school	.66	.02	.68	.01
Incarceration rate	.53	.02	.54	.01
Juvenile felony conviction	.34	.02	.34	.01
Vocation program hours	1.44	.69	9.76	1.37
White	.76	.02	.76	.01
<b>Dependents</b>				
Mental health status	2.71	.03	2.66	.02
Behavior toward authority	2.23	.03	2.24	.01
Impulse control	1.88	.02	1.89	.01
Readiness to change	2.92	.03	2.95	.02

Notes:  $\bar{X}$  = mean; se = standard error; \*sum = 623 days; \*\* sum = 1,629 days;

Days during first interval  $\bar{X}$  = 132.51; se = 5.81;

Days during combined intervals  $\bar{X}$  = 133.58; se = 3.20

Across all three intervals, 28 percent of the sample was affiliated with a gang, 68 percent had graduated high school, 34 percent had a juvenile felony conviction, 76 percent were White, and the average incarceration rate during the interval was 0.54, indicating just over half of the time during the interval was spent incarcerated. The mental health status variable averaged 2.66 over all intervals, which indicates a very slight decrease from the first interval that may be related to chance. Readiness to change increased slightly across all intervals compared to the first interval. Behavior towards authority and impulse control did not vary in the aggregate across all intervals.

### Mental Health

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3 Findings for the GEE models are presented in Table 3. When controlling for each of the  
4 covariates in the model, days in segregation negatively and significantly predicted mental health  
5 status ( $p < .05$ ). There was a 1.7 percent decrease in the odds of receiving a higher mental health  
6 score for every day spent in disciplinary segregation. In addition, incarceration rate, age, having  
7 a juvenile felony conviction, being homeless, and gang membership significantly decreased the  
8 odds of being diagnosed with a higher mental health score. Homeless offenders had a decrease of  
9 36.3 percent in the odds of being diagnosed with a higher mental health score when accounting  
10 for the other variables in the model. Gang membership and homelessness each decreased the  
11 odds of receiving a higher mental health score by over 30 percent. As expected, older offenders  
12 and those who spent more time incarcerated both had a decrease in the odds of receiving a higher  
13 mental health score ( $p < .000$ ). While no variable significantly increased the odds of a positive  
14 mental health status, Whites came close to our .05 threshold compared to non-Whites ( $p = .054$ ).<sup>5</sup>  
15 Taken together, the results of our model support the hypothesis that segregation has a negative  
16 effect on offenders' mental health; but other factors such as an offenders' incarceration rates,  
17 criminal history, gang affiliations, and homelessness had greater negative impacts on this  
18 outcome.

### 40 **Behavior Toward Authority**

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42 Consistent with our second hypothesis, days in disciplinary segregation was a significant  
43 negative predictor for behavior toward authority figures ( $p < .05$ ). For every day spent in  
44 disciplinary segregation, there was a 2.4 percent decrease in the odds of exhibiting better  
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54 Table 3: Multinomial generalized estimating equations – Three time intervals

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56 <sup>5</sup> We also examined Latinos/Latinas and did not find a statistically significant relationship.  
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	<b>Mental Health Status</b>			<b>Behavior Toward Authority</b>		
	Exp(B)	Wald	p (2-tailed)	Exp(B)	Wald	p (2-tailed)
Age	.952	22.106	.000***	1.002	.056	.813
Days Seg	.983	4.248	.039*	.976	5.508	.019*
Gang	.670	4.671	.031*	.655	4.424	.001**
Incar Rate	.449	25.838	.000***	.878	.622	.430
Juv Fel Cnvn	.695	3.677	.055	.893	.341	.559
≥ High School	1.170	.616	.433	1.101	.238	.636
Homeless	.637	5.661	.017*	.363	25.730	.000***
Vocation Hours	1.001	.392	.531	1.002	2.592	.107
White	1.446	3.723	.054	.904	.212	.645

  

	<b>Impulse Control</b>			<b>Readiness to Change</b>		
	Exp(B)	Wald	p (2-tailed)	Exp(B)	Wald	p (2-tailed)
Age	1.003	.067	.795	1.003	.063	.802
Days Seg	.989	2.047	.152	.987	2.531	.112
Gang	.804	1.014	.314	.824	.969	.325
Incar Rate	1.391	3.531	.060	.795	1.796	.181
Juv Fel Cnvn	.912	.203	.653	.969	.027	.869
≥ High School	1.530	4.356	.037*	1.491	3.746	.053
Homeless	.481	13.868	.000***	.420	20.496	.000***
Vocation Hours	1.002	2.092	.148	1.004	9.865	.002**
White	1.001	.000	.995	1.347	2.026	.155

Note: Offenders = 408; Observations = 1,224 ; \* p > .05; \*\* p < .01; \*\*\* p > .001

behavior toward authority figure. Likewise, being in a gang or being homeless decreased the odds of having a better behavior toward authority score by 34.5 and 63.7 percent respectively.

All of the variables that diminished offenders' odds of exhibiting positive behavior toward authority are consistent with deviant adaptations to adverse circumstances or environments (gang membership and homelessness).

### **Impulse Control**

Days in disciplinary segregation did not significantly affect the odds of an offender increasing their impulse control (Table 3). While this finding is contrary to our third hypothesis, it is consistent with Gottfredson and Hirschi's (1990) theory of self-control, in that very few factors external to an individual's intrinsic motivation can affect adult populations' levels of self-

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3 control. Being homeless significantly decreased the odds of receiving a higher impulse control  
4 score over the course of our study by over 50 percent, accounting for the baseline of the other  
5 covariates ( $p < .000$ ). Gottfredson and Hirschi's General Theory would consider homelessness to  
6 be another manifestation of low self-control (e.g., an 'analogous act'), even accounting for the  
7 observed changes in impulse control frequencies across intervals.<sup>6</sup> Having a high school degree  
8 increased the odds of receiving a higher impulse control score over the course of our study by  
9 over 150 percent ( $p < .05$ ); which is also consistent with the General Theory's central premise  
10 that the level of self-control is consistent throughout the life course (Gottfredson & Hirschi,  
11 1990).  
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### 24 **Readiness to Change**

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26 Days spent in segregation did not affect the odds of being more ready to change ( $p =$   
27  $.112$ ). The coefficient for high school diploma, while only a marginally significant finding,  
28 indicates a decrease in the odds of increasing one's readiness to change by almost 150 percent  
29 ( $\text{Exp}(B) = 1.49$   $p = .053$ ). Homeless offenders had over a 57 percent decrease in the odds of  
30 having an increased score when holding the other variables at their average ( $p < .000$ ).  
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38 Somewhat refreshingly, vocational programming hours significantly increased one's  
39 readiness to change score ( $p < .01$ ). For every hour in vocational programming, there was a 0.4  
40 percent increase in the odds of an offender being more ready to change. While this increase in  
41 the odds seems small, the number of hours spent in vocational training averaged over 9.7 per  
42 interval analyzed. When only examining the 91 individuals who received vocational training, the  
43 average over all intervals was over 97 hours.  
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### 51 **Discussion and Conclusions**

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<sup>6</sup> We speculate they would attribute such variation to reliability issues in scoring procedures.  
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3 How does disciplinary segregation affect the mental health functioning of offenders?  
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5 How does it affect their adjustment to the prison environment? In this study, we answered these  
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7 questions by regressing dependent variables such as mental health status, behavior toward  
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9 authority, impulse control, and readiness to make positive change while incarcerated on SC  
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11 within a multi-variate space. We operationalized SC as the number of days segregated from other  
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13 offenders for disciplinary reasons and hypothesized that offenders with longer duration of time  
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15 spent in isolation would experience changes in mental health functioning, behavior toward  
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17 authority, impulse control, and readiness to change.  
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21 Our longitudinal design allows us to incorporate several psychological needs assessments  
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23 with time incarcerated (as a rate) and time in segregation over a two year period, along with a  
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25 number of other independent variables. The analysis of the psychological needs assessments at  
26  
27 three time periods indicates that the mental health and other related dependent variables changed  
28  
29 enough for the analysis to mark them as statistically significant. Our longitudinal analysis of  
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31 offenders who were dispersed across a correctional system in a state provides some confidence  
32  
33 that our findings do not suffer from the cross-sectional and sample selection biases of other  
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35 studies noted in our literature review.  
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39 Two of the hypotheses were supported at .05 level. The greater the number of days in SC,  
40  
41 the more negative the mental health status and behavior toward authority outcome for offenders.<sup>7</sup>  
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43 For every day in SC, positive mental health status decreased by almost 2 percent and positive  
44  
45 behavior toward authority figures decreased almost 3 percent, all else being equal. SC did not  
46  
47 affect the odds of an offender's readiness to change score. Contrary to our expectations – but in  
48  
49 line with The General Theory – days in segregation did not significantly affect offenders' levels  
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56 <sup>7</sup> While not significant, both impulse control and readiness to change had Wald coefficients over 2.0.  
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3 of self-control. The negative effects of being isolated from the general population on offenders'  
4 mental health and adjustment to prison is consistent with prior literature in this area (e.g.,  
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6 Andersen et al., 2000; Clare et al., 2001; Smith, 2004); but we do not find drastic, deleterious  
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8 effects of isolation on mental health functioning, as prior researchers have (Haney, 1993; 2003).  
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12 Our results suggest that factors other than disciplinary segregation can substantively  
13  
14 erode offenders' mental health functioning and prison adjustment. Increases in incarceration  
15  
16 rates during the three intervals of our study were statistically significant and substantively  
17  
18 decreased the odds of offenders' gains in mental health status scores. For mental health, being  
19  
20 incarcerated in a general population prison environment for months at a time intensified negative  
21  
22 effects to a greater extent than did disciplinary segregation. The same might be said of impulse  
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24 control, but only tentatively due to another marginal p-value for the association between it and  
25  
26 incarceration rate. Offenders' gang affiliations also decreased the odds of them having positive  
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28 mental health scores and prosocial behavior toward authority to a greater extent than did their  
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30 number of days in segregation. Finally, offender *homelessness* was the only independent variable  
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32 in our study that was statistically significant and substantively related to the reduction in the odds  
33  
34 of offender mental health and prison/community adjustment for all four outcomes (mental health,  
35  
36 behavior toward authority, impulse control, and readiness to change). Offenders in our study who  
37  
38 had experienced homelessness in their past six months in the community had substantially lower  
39  
40 odds than their non-homeless counterparts of decreased mental health functioning and  
41  
42 adjustment to the increased levels of control relative to non-offender populations. Keep in mind  
43  
44 homelessness was allowed to change for individuals over each interval. Taken together, the  
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46 policy implications of our research suggest that improvement in offenders' psychosocial  
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48 functioning could best be achieved by correctional/community programming targeting factors  
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3 associated with criminal associates (gangs) and homelessness, relative to disciplinary  
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5 segregation.  
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8 We do not find a very strong effect for disciplinary segregation on an offender's mental  
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10 health status and adjustment to supervision, relative to other institutional and individual level  
11  
12 factors. While we find that days in disciplinary segregation can exacerbate the negative effects of  
13  
14 incarceration on aspects of offenders' mental health functioning and supervision adjustment, it is  
15  
16 not alone in its effect on deteriorating offenders' mental health states. This finding is consistent  
17  
18 with a recent meta-analysis of prior research on administrative segregation (AS) and prisoner  
19  
20 mental health which demonstrated a weak to moderate (at best) association with prisoners'  
21  
22 mental health and anti-social behavior (Morgan et al., 2016). Morgan and colleagues recommend  
23  
24 AS be limited to offenders without a mental illness, except in the case of extreme circumstances  
25  
26 related to safety.  
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31 Our findings indicate that harm reduction for the individual might be achievable by  
32  
33 reducing the use and duration of SC and disciplinary segregation within institutions and by  
34  
35 addressing the isolation enhanced by homelessness in communities. Given the robust effects of  
36  
37 homelessness on the outcome measures in our study, our research may add to policy  
38  
39 recommendations of Morgan et al. (2016), in that offenders who were homeless prior to  
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41 incarceration would benefit from special considerations during an infraction hearing – limiting  
42  
43 their exposure to further social isolation that disciplinary segregation provides.  
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### 47 **Study Limitations**

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49 While our research makes a substantive contribution to the literature on SC and  
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51 disciplinary segregation in particular, it is not without its limitations. We used a harm reduction  
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53 conceptual framework to ground our hypotheses, yet we did not have explicit measures of this  
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3 construct in our study as such measures, as they refer to SC or disciplinary segregation, do not  
4 exist. However, though exploratory, a kind of harm reduction may be indirectly measured  
5 through the mental health status and functioning measures included in our hypotheses and  
6 measured in this study.  
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12 In addition, all of the outcome measures we used are gathered by WSDOC staff via the  
13 department's periodic assessment protocols; they are not self-reports coming directly from  
14 offenders. The NA is not a validated scale, but a pragmatic needs assessment used to determine  
15 case management decisions (e.g., programming priorities, supervision). As such, there may be  
16 some inherent bias in these outcome measures as the WSDOC's personnel are a filter between  
17 the research team and the offenders. The independent variable that was also taken from the NA  
18 and is a manifest variable was high school education. Other independent variables were taken  
19 from intake and prison operations databases that are updated continuously.<sup>8</sup> Finally, the  
20 psychological needs assessment (i.e., the mental health measure) was conducted by medical staff  
21 and may have different biases than the NA.  
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35 Our study was not experimental; rather we assessed the population of male offenders who  
36 fit our selection criteria. It is possible that these selection criteria, including the lack of female  
37 offenders in it, resulted in findings that did not fully capture the effect of disciplinary segregation  
38 on the four dependent variables for all offenders. Moreover, the recent nature of the data,  
39 collected as it was for 2014 and 2015 (Shames et al., 2015), and given the media attention to the  
40 negative effects of SC on offenders, likely means that it is not as representative of the use of SC  
41 or disciplinary segregation in earlier periods of its use.  
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54 <sup>8</sup> Data was obtained from the WSDOC on July 2, 2016.  
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3 Additional limitations include the use of a non-parametric statistical procedure (i.e.,  
4 GEE), non-random assignment to disciplinary segregation, and, despite full cooperation from  
5 WSDOC, incomplete measurement of the true SC population due to difficulty identifying  
6 disciplinary segregation assignment. We also did not assess the severity of the violent infraction  
7 that led to disciplinary segregation – an avenue for future research to incorporate into analysis.  
8 We included limited community-relevant variables that may be relevant to mental health and  
9 other psychological needs examined (e.g., social support groups, religious services, non-  
10 WSDOC case management). Finally, homelessness in and of itself is a form of social isolation  
11 that may have a comorbid relationship with other forms of isolation (e.g., incarceration)  
12 (Rokach, 2005). Future research may focus on interaction terms that include homelessness and  
13 other personal and community-level variables that affect mental health. Finally, the differences  
14 between the use of disciplinary segregation was not assessed between facilities within the  
15 WSDOC, a potential source of variation in length and instance of disciplinary segregation.

### 32 **Study Contributions**

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35 Despite these limitations, our study makes a substantive contribution to the literature on  
36 the effects of isolation on offenders' mental health and adjustment to prison. We were able to  
37 longitudinally assess the dosage effect of isolation on offender outcomes over a two-year study  
38 period, relative to other institutional and personal factors. While much of the literature on  
39 isolation considers the effects of SC or disciplinary segregation on offenders' mental health  
40 functioning, we find that exogenous factors such as homelessness and endogenous factors such  
41 as incarceration rate over the days of our analysis have a greater effect on these outcomes than  
42 isolation. These results do not in any way negate the research findings illustrating disciplinary  
43 segregations harmful effects on the human psyche (e.g., Haney, 2003; 2006). Rather, our  
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3 research suggests that in more mundane applications of disciplinary segregation within prisons,  
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5 the negative effects on mental health and supervision adjustment are present, but overshadowed  
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7 by criminal history, sentencing policy (e.g., incarceration dosage), perceived opportunities for  
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9 the future (education, gang involvement), and poverty (homelessness).  
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### 11 **Unknowns and Future Research**

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15 Future study in this area is warranted to validate our findings as regards the types of  
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17 harms experienced by those exposed to disciplinary segregation or SC. The degree of harm and  
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19 the remedies to reduce it, while also maintaining the order of institutions and the safety of their  
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21 staff and offenders, is also not known. Since isolation may harm offenders who have no prior  
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23 mental health symptoms, exacerbate the symptoms of those offenders who enter isolation with a  
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25 mental illness, and has been equated with torture (Haney, 2003), it may be important to reduce  
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27 these negative effects, and thus harm, by providing isolated offenders with greater social contact  
28  
29 (Smith, 2006). This may be accomplished by increasing contact between correctional staff and  
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31 segregated offenders, increasing how many visits offenders may have, permitting access to social  
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33 activities with other offenders, and increased communication between offenders and mental  
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35 health staff, volunteers, and other correctional staff. In balancing the needs of correctional  
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37 facilities (i.e., order maintenance and safety) and the consequences endured by offenders, it may  
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39 be difficult to establish how much isolation is tolerable or how much social contact is needed to  
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41 prevent the negative outcomes in evidence in this research and that by others (Smith, 2006).  
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43 However, it appears that further research is needed to determine this balance as it is likely it  
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45 would vary amongst offenders placed in isolation.  
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