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EXHIBIT 21

Walters et al, "Effect of Solitary Confinemnt on Prisoners"

EFFECT OF SOLITARY CONFINEMENT ON PRISONERS [1]

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The reports of Ribble(5) and Spitz(8) on the consequences of maternal deprivation in infancy have, during the past fifteen years, stimulated a great deal of interest in the effects of restricted social contact. Until recently, however, there have been relatively few experimental studies with human subjects in which degree of social contact has been experimentally manipulated. Moreover, studies of prolonged isolation have, for the most part, been inspired by interest in the role of exteroceptive stimulation; consequently, the experimental subjects have been both perceptually and socially isolated.

In two studies of perceptual isolation, isolated subjects have shown increased susceptibility to social influence. In one of these(6), isolated subjects were found to be more influenced by persuasive communications than were nonisolated subjects; in the other(3), isolation appeared to increase suggestibility in a body-sway test.

Other investigators(1, 2, 10, 11), using children as subjects, have provided evidence that both brief social isolation and restricted social contact may increase the effectiveness of social reinforcers. These findings suggest that the increased suggestibility of the perceptually isolated adult subjects may have been due to the restricted social contact which was a concomitant of the perceptual isolation. The study reported in this paper was aimed primarily at investigating the effects of prolonged social isolation on susceptibility to social influence. Some restrictions were necessarily imposed on the perceptual experiences of the subjects, but there was no direct interference with sensory input during the isolation period.

METHOD

Forty long-term prisoners at a federal penitentiary volunteered for a study of solitary confinement. Twenty of the volunteers were placed in isolation cells for 4 days; the remainder served as controls. All but 1 of the experimental subjects remained in isolation for a full 96-hour period.

The isolation cells were approximately 12 ft. by 6 ft. and contained only a wooden-board bed with mattress, a toilet, and a hand-basin. During the day the cell was illuminated by a single electric light adequate for reading and by light from a 3 ft. by 4 ft. window high up on the wall of the cell. A dim light remained on during the night. While in isolation prisoners had no social contacts except those necessary for exchange of food and dirty crockery. They were allowed to smoke and were given regular diet, but reading matter and mail were not permitted. Prisoners were told only that they would be tested before and after isolation. No indication was given that their behavior might undergo change or that their thoughts and feelings might be influenced by the experience.

Experimental subjects were tested immediately before and immediately after isolation. Control subjects were tested on 2 occasions, 4 days apart; during the intervening period, they carried out their normal prison routines.

Subjects were given 3 tests of susceptibility to social influence:

1. *Body sway test.* The subject stood with his feet together and eyes closed. The repeated suggestion, "You are falling, falling forward," which was recorded on tape, was played to the subject for approximately 2 minutes. The same procedure was used in both the pre-test and post-test periods.

2. *Autokinetic test.* The subject was

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shown a stationary pinpoint of light on a dark background and was told that it would move. He was asked to judge, on 10 trials, how far the light had moved. A further 10 trials were given during the post-test period after the subject had been informed that his previous estimates had been too small. An attempt was then made to condition him to give judgments of a specific size.

3. *Conditioning of meaning.* A technique devised by Staats and Staats(9) was utilized in an attempt to change the subject's evaluation of concepts. During the pre-test period the subject rated 4 concepts on 7 bipolar scales defined by the adjectives "pleasant" and "unpleasant." During the post-test period one of the concepts was repeatedly paired with words having high positive loadings on Osgood's evaluative force(4), the other with words having high negative loadings on this factor. The subject was then asked to re-rate the concepts.

The prisoners' reactions to the experimental procedures were assessed by the several paper-and-pencil tests: 1. Subjects were asked, during the pre-test and post-test periods, to indicate, by means of self-ratings, how anxious they felt about participating in the study. 2. During the post-test period, subjects rated 5 concepts—punishment, solitary, prison, authority, and society—on 5 scales defined by bipolar pairs of adjectives with high loadings on Osgood's evaluative factor. 3. The Maudsley Personality Inventory was used in both pre-test and post-test sessions to obtain scores for neroicism and introversion. 4. A brief aggression scale, devised by Zaks and Walters(13), was used during both sessions to assess the subject's level of aggression.

Since a number of investigators have reported perceptual-motor and cognitive impairment in subjects who have experienced sensory deprivation, the prisoners were given a manual dexterity test and the Shipley-Hartford Abstraction Test. During the post-test period, all subjects were also given a brief test of verbal productivity, in which they were asked to give their comments on recently proposed prison reforms. The comments were recorded on tape and transcribed.

RESULTS

More isolated than nonisolated prisoners reported an increase in anxiety from the pre-test to post-test period ($p=.038$; Fisher's Exact Probability Test)(7). In contrast, following isolation the experimental subjects rated the concepts "solitary" more positively, and "society" more negatively, than did prisoners who had remained in regular prison routines ($p<.05$ in each case; Mann-Whitney Test)(7). The isolation subjects were also somewhat less verbally productive ($p<.10$; Mann-Whitney Test)(7). A similar decrease in verbal productivity following isolation has been found for adolescents(12). There were no differences on any of the remaining tests.

DISCUSSION

This study suggests that while social isolation may produce some change in subjective feelings, it does not result in mental or psychomotor deterioration or in increased susceptibility to social influence.

The largely negative findings may, of course, be due in part to the personality characteristics and the past experiences of the subjects of this study. In the first place, the subjects were volunteers who were apparently not too frightened by the prospect of 4 days of isolation. Consequently, it is possible that their affiliative or dependency responses were, in some respects, only weakly developed.

Secondly, prisoners who live in cellblocks or dormitories suffer from lack of privacy; thus, a 4-day period of isolation may have had pleasant, as well as unpleasant, aspects. This latter consideration may, in fact, explain the rather perplexing finding that, while reporting relatively high anxiety, the isolated prisoners gave a more positive evaluation of the concept "solitary" than did the nonisolated controls.

The study, nevertheless, suggests that the deleterious consequences of social isolation have been too greatly emphasized. Prisoners may not be representative of the general population; however, the same can be said of the college students and regular servicemen who have served as subjects in other studies.

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EXHIBIT 22

Ecclestone et al, "Solitary Confinement of Prisoners"

Solitary confinement of prisoners: an assessment of its effects on inmates' personal constructs and adrenocortical activity*

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ABSTRACT

The effects of 10 days prison solitary confinement on inmates' personal constructs and adrenocortical activity were examined. Eight *Ss* maintained their regular institutional routine. Eight *Ss* were placed for 10 days in solitary confinement. Personal construct (Repertory Grid Technique) rankings increased in stability for confined *Ss* as compared with non-confined *Ss*. This effect was more pronounced for "good" than for "bad" constructs for inmates independently rated as "simple" concept types. Adrenocortical function, as measured by plasma cortisol levels, indicated that solitary confinement was not more stressful than normal institutional life.

Confinement in prison has been condemned on several counts (e.g., Mitford, 1973). In particular, the severest form of incarceration, solitary confinement, is looked upon as a cruel treatment since it is not only physically punishing but is often supposed to affect the inmates' self-identity. However, while the solitary confinement of inmates does in some respects resemble sensory deprivation (Gendreau, Freedman, Wilde, & Scott, 1972), the literature (Zubek, 1969) is equivocal as to how "punishing" sensory deprivation is. The experiential set of prison inmates towards

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confinement (Gendreau *et al.*, 1972; Walters, Callaghan, & Newman, 1963) also differs markedly from that of the type of *Ss* usually employed in isolation studies. In fact, Walters *et al.* (1963) suggest that some inmates may find solitary confinement a relatively pleasant experience.

Because "anti-confinement" proponents tend to argue from a phenomenological perspective, the Repertory Grid Technique (RGT) appears to be one of the most appropriate tests for exploring the effects of isolation on inmates' self-identity. The RGT purports to examine how events are perceived by the individual (Anastasi, 1968) as defined in terms of a set of core constructs relating to that person's self-identity (Kelly, 1955; Slater, 1969). Secondly, if solitary confinement produces harsh physical effects, these should be manifest in altered stress levels as indicated by adrenocortical activity.

Thus, the present study investigated the effect on prisoners of 10 days of solitary confinement, this being the longest time inmates usually remain in solitary.

METHOD

Subjects

The *Ss* were inmates of Millbrook Correctional Centre, an Ontario maximum security institution. Two of the authors interviewed potential volunteers. Of the first 44 *Ss* interviewed, 43 agreed to volunteer. The *Es* stopped asking for volunteers when the pool seemed to be large enough. A note was placed on each volunteer's file regarding his willingness to participate, whether or not he completed the experimental requirements. Eight volunteers changed their mind and withdrew and five were transferred to other institutions. Of the remaining 30, 16 *Ss* agreed to be randomly assigned to either treatment condition. This was done by lottery, with all *Ss* present; in this way the inmates were assured that they were not being manipulated by *Es* and the *Es* were able to prevent the inmates from coercing each other. The *Ss* were all in good health, none were diagnosed as mentally defective, and none had any extensive psychiatric history. All had jobs in the institution that allowed them to participate in the experiment and all would remain in Millbrook for the duration of testing. Four *Ss* quit the experiment after two days of solitary confinement. They were replaced from the remaining volunteers, all of whom met the same classification criteria as the other *Ss*. Of the 16 *Ss* who completed the experiment, seven were incarcerated for theft, three for narcotics violations, two for fraud, and one each for arson, aiding prostitution, gross indecency, and vagrancy. The age range of the control *Ss* was 19–39 years, with a mean age of 25.1 years. For the solitarily confined *Ss*, the age range was 19–25 years, with a mean age of 21.7 years. None of the *Ss* had higher than Grade 12 education. The final 16 volunteers did not differ from the other inmates usually sent to Millbrook in either their type of convictions or in their institutional histories.

This sample of inmates, like most non-first offender inmates in any adult correctional institution, had previous experience with non-volitional lock-up in their past institutional histories (true of 40 of the original 43 volunteers). However, this implied

similarity is deceptive since the quality of enforced confinement varies markedly from institution to institution.

Apparatus

The isolation cells at Millbrook were very similar to those described in a previous study (Gendreau *et al.*, 1972). Cells were 8 feet by 4 feet and 12 feet in height, each containing a toilet, bed, and window. A double door led into the cell and the walls were of concrete, 2 feet thick. The isolation cells were located in a special wing in the institution set apart from the main living quarters. Illumination was set at 35 ML but it was higher during daylight hours when outside light reached the cells through a small window. Subjects were allowed to take nothing into the cell except blankets and clothing.

Procedure

Bannister and Mair (1968) have described the basic theory and rationale of the RGT, and only a brief outline of the method used in the present study need be presented here. The RGT matrix has rows representing constructs, which may be elicited from the *S* or supplied to him. The columns contain elements which are the stimuli to be sorted, the usual elements being photographs of individuals. Thus, for any given construct (e.g., "insecure"), the S rates these persons from most to least insecure. One important feature of the RGT is that what is actually being measured is not necessarily what is ostensibly being measured. This is a desirable feature in any test that is being used with a prison population, since inmates can easily give biased responses (Gendreau, Irvine, & Knight, 1973), particularly on questionnaires. Another advantage of the RGT is that the personal meanings of verbal labels, and/or their interrelationships, are explicitly examined by such a test (Bannister, 1965).

The procedures used in the present study for eliciting constructs were taken from Kelly (1955). The elements (8 in number), which constituted the stimuli in terms of which Ss rated their personal constructs, were black-and-white, head-and-shoulders photographs of "ordinary" people, selected from magazines and mounted on 3" × 5" white cards. The same elements were used for each S throughout. Because most *Ss* had less than Grade 9 education, the constructs rated had to be words easily understood by all inmates. Instead of choosing constructs unique to each S, constructs were elicited from some of the Ss and, from those obtained, nine constructs common to all or nearly all the Ss were selected. The tenth construct, "like me" was supplied by the *Es*. A uniform set of constructs was chosen to avoid the difficulties involved in making statistical comparisons between different construct dimensions (Watson, 1970), RGTs were obtained on seven occasions; for Pre- and Post-treatment Days 1 and 3 and Treatment Days 1, 5, and 10. Each test administration took approximately 10 to 15 minutes per S.

RGT Scoring

The repeated measures design is in effect an "in series" approach to the RGT. An "in series" analysis has considerable potential for use with the RGT, but there are few, if any, methodological guidelines for such use of the RGT (Slater, 1969). For this reason, just as others (e.g., Crisp, 1964) have adapted RGT scoring procedures for their own specific aims, the *Es* developed the Self-Stability and Disparity indices for the purpose of the present study.

The Self-Stability score was obtained in the following manner. Each S was required to rank all of the elements in terms of each construct. A rank order correlation (Spear-

men rho) was then calculated for each construct from the rankings of elements on that construct for Pre-treatment Days 3 and 1. The resulting 10 rank order correlations were then summed and an average rank order correlation score for all constructs was obtained for Pre-treatment Days 3 and 1. This score, obtained separately for each S, is the Self-Stability score. A high score (i.e., approaching unity) indicates that the elements were ranked in much the same way each time (i.e., on Pre-treatment Days 3 and 1) for any given construct. A low score, conversely, means that the elements were ranked differently on the same constructs from one occasion to the other. The Self-Stability score corresponds closely to a test-re-test reliability score. In this study 6 Self-Stability scores would be obtained for each S since the procedure used to generate the Self-Stability score for Pre-treatment Days 3 and 1 was then repeated for successive overlapping pairs of trials (i.e., for Pre-treatment Day 1 and Treatment Day 1, then for Treatment Day 1 and Treatment Day 5, and so on). The resulting data matrix of Self-Stability scores was then analysed in a repeated measures design.

Of the 10 constructs employed, five intuitively appeared to have "good" connotations (understanding, honest, successful, easy going, like me) and five appeared to have "bad" connotations (stubborn, violent, unstable, pessimistic, insecure). This arbitrary distinction was developed for two reasons. First, the Self-Stability of "good" constructs may be affected differently by solitary confinement than the Self-Stability of "bad" constructs. This would be determined by analysing the Self-Stability of "good" and "bad" constructs separately.

Second, if "good" and "bad" constructs are perceived as psychologically distinct construct classes, they should be ranked differently from each other[1] (i.e., the element sets should be sorted similarly within a construct class but differently between construct classes). It was of experimental interest to note whether the assumed difference in rankings between "good" and "bad" constructs may itself change as a function of treatment. Thus, a Disparity score was developed and calculated in the following way. Each S had ranked all of the elements in terms of each construct. The "good" constructs were separated from the "bad" constructs and the average ranking of the element sets across both the 5 "good" constructs and the 5 "bad" constructs was obtained for each S. Then a rank order correlation between these two separate sets of average rankings was calculated. This association would have been expected to be at least zero and probably negative if different classes of construct were indeed represented. If, on the other hand, the product moment correlation between the sets of "good" and "bad" average rankings was positive, this would indicate that there was little difference between the psychological implications of these terms for the raters (Watson, 1970). Alternatively the Ss may not have been paying sufficient attention to the task. In any case the *Es*' distinction between "good" and "bad" constructs would be meaningless and the Disparity score, attempting to measure a non-existent disparity, would be worthless. It should be noted that the Disparity score is a within-test-period measure since it indicates how disparate Ss' rankings of "good" *vs* "bad" constructs were for any given test period. In contrast, the Self-Stability score is a between-successive-test-periods measure summed across all 10 constructs and reflecting the consistency of any given construct from one test-period to the next. Hence, across n test-periods, n Disparity scores and $(n - 1)$ Self-Stability scores can be calculated for each S. In this study Disparity scores were obtained for each S for all 7 test days and the resulting data matrix was then analysed in a repeated measure design.

[1] The applicability of these constructs was further confirmed on a sample of 82 inmates in a subsequent study. Inmates had little difficulty employing these constructs and individual Disparity scores were in nearly all cases $r = -0.50$.

Plasma Cortisols

The operational definition of stress was derived from adrenocortical activity as measured by plasma cortisol levels found in the peripheral blood. There are a number of methods for assessing the activity of the adrenal cortex and the one chosen for the present study was fluorometric assay of adrenal-steroids in peripheral blood. This method has been shown to be precise, sensitive, and clinically applicable for the determination of adrenal cortex function (Thiessen, Batsakis, Stiles, & Shilling, 1968). The exact method for the fluorometric assay used in the present experiment has been described by Silber, Busch, and Oslapas (1958) and was used as modified by Guillermin, Clayton, Lipscomb, and Smith (1959). Plasma samples were taken from each *S* between 6:30 AM and 7:00 AM and 4:15 PM and 4:45 PM on Pre-treatment Days 3 and 1, Treatment Days 1, 2, 3, 5, 8, 9, and 10 and Post-treatment Days 1 and 3. Plasma cortisol values were recorded in micrograms per 100 millilitre. Four determinations were made for each plasma cortisol reading and the average of these was taken as the *Ss* score to be used in the between groups repeated measures analysis. Inmates ate after the morning blood samples were taken and also again at noon hour: the PM samples were taken before the evening meal. All *Ss*, including those in monotonous confinement, remained on their regular diets.

Other Measures

In addition to plasma samples, each *S*'s heart rate, respiration rate, and oral temperature were recorded. These measures were taken just before the blood samples and the inmates were seated throughout. Readings were taken of oral temperature, heart rate (pulse rate at wrist), and respiration (hand on chest wall) over a 60-second period. *Es* took these measures largely to monitor the health of the *Ss*, but also to detect possible changes in these indices as a result of prolonged monotonous confinement.

Prison Routine

Confined *Ss* had neither reading material nor any task to occupy their time. They were not let out of their cells, or allowed contacts other than those resulting from the usual custodial checks, meals, and experimenter intrusions. Canteen privileges for these *Ss* were allowed to accumulate and none of the *Ss* was displaced from his job or his cell by other inmates. Non-confined *Ss* rose at 6:00 AM, ate breakfast, returned briefly to their cells, then worked (e.g., as cleaners, in the marker plant or tailor shop, etc.) until noon. At 1:00 PM, following lunch in their cells, they returned to their tasks until about 4:30 PM. After their evening meal they could either remain in their cells or participate in recreational activities (e.g. movie, card games, sports). Not all of the recreational facilities were available every evening. Non-confined *Ss* could receive visitors in compliance with normal regulations and in general were treated as ordinary inmates except for *Es* testing.

Individual Differences

Two experienced psychometrists who had known each *S* intimately for at least two months ranked the inmates in terms of their judgment of the prisoner's conceptual ability. The conceptual dimension used was defined as "rigid, hierarchical, roughly differentiated, externally determined information processing" at the simple end to "flexible, combinational, finely differentiated and internally controlled processing" at the complex end (Schroder, Driver, & Streufert, 1967). The ratings of experienced judges were used rather than the quasi-projective tests often employed for this purpose in sensory deprivation studies, Suedfeld, 1964) in order to reduce the already

long period of testing. In addition, the written and verbal abilities of some Ss were below the level of functional literacy. Since there were eight Ss in each group, the four Ss ranked lowest on conceptual complexity within each group made up the simple group and the four ranked highest defined the complex group. The rank order correlation between judges' ratings for such simple-complex differentiation was 0.93.

RESULTS

RGT Validity

Repeated testing using the RGT may result in a situation that might produce increasing Self-Stability scores, not because the subjects are influenced by a particular treatment, but simply because they remember more and more from one trial to the next. This potential confounding was checked out in the control Ss' performance only, since any changes in the confined Ss' Self-Stability scores could presumably be due to treatment effects. A repeated measures analysis of variance with one standard condition (Edwards, 1968) was used to examine the control Ss' construct rankings. The mean Self-Stability scores for all control Ss across overlapping days in order of testing were, 0.62, 0.70, 0.61, 0.57, 0.63, 0.62. Confounding effects due to in-series testing would be shown by rho's increasing over days, but this trials effect was not, in fact, significant, $F(5/35) = 1.5$, $p > 0.05$. Indeed, S's mean rankings (0.62) were identical at the beginning and end of testing. The range and magnitude of Self-Stability scores in this study were comparable to those obtained in other studies using different subject samples (Gathercole, Bromley, & Ashcroft, 1970).

As noted above, constructs were subdivided into "good" and "bad" categories and Disparity scores were calculated for all Ss. Potential confoundings in the Disparity scores, assuming the two categories are regarded initially as distinct, should increase or decrease disparity. This was tested by analysing the control Ss' data in a repeated measures design similar to that used on the Self-Stability scores. The mean Disparity scores over days in order of testing were, −0.64, −0.75, −0.63, −0.71, −0.46, −0.62, and −0.68. The trials effect was not significant, $F(6/42) = 1.9$, $p > 0.05$. The highly negative Disparity scores obtained on all trials suggested that the Ss attached markedly different sets of rankings to "good" constructs as opposed to "bad" constructs.

Self-Stability Scores of Constructs

The following statistical comparisons were between groups repeated measure analyses of variance (Edwards, 1968). The major concern was the trials × treatment interaction which specifies the change over days in confined Ss' constructs as compared with those of the control Ss.

As can be seen in Figure 1, the construct rankings of the confined Ss, as

defined by Self-Stability scores, increased over the period of confinement. Control *Ss*' rankings were very similar to those of the confined *Ss* on the initial two test periods but, as noted above, the control *Ss*' Self-Stability scores did not increase over days. The trials × treatment interaction was significant, $F(5/70) = 2.6$, $p < 0.05$.

Not only did the Self-Stability scores increase for the confined *Ss*, there was also less variation in their rankings. A rank order correlation of less than 0.50 indicated that an *S* considerably altered his rankings from one session to the next. Rank order correlations of less than 0.50 occurred 25 per cent of the time for control *Ss* but not at all for the confined *Ss*.

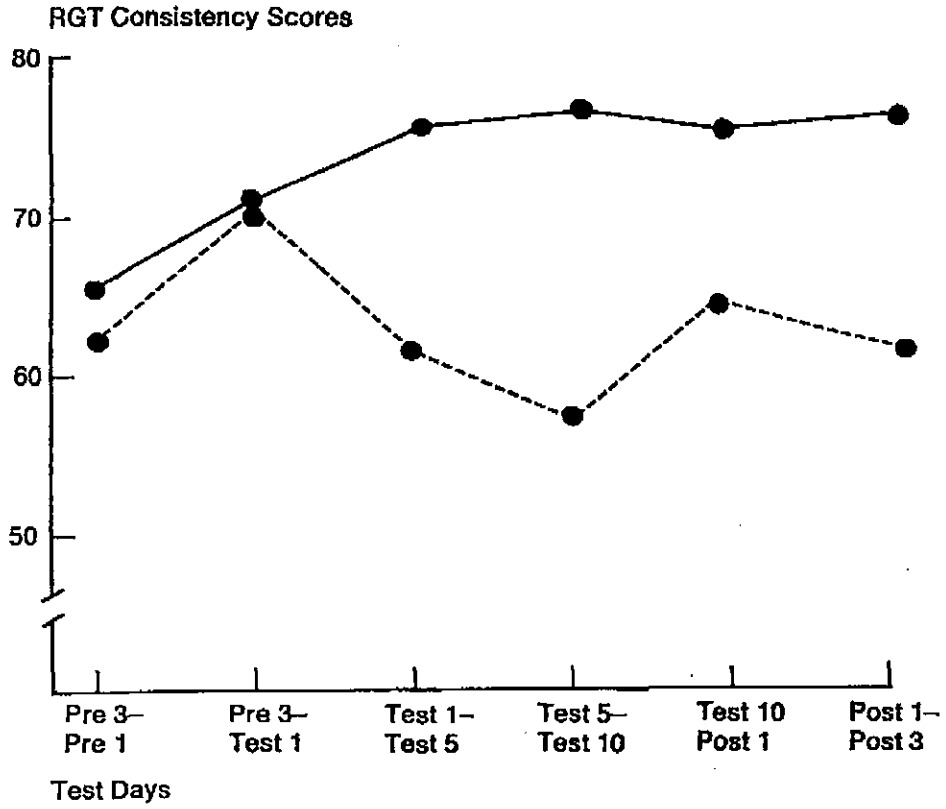

FIGURE 1
RGT *average Self-Stability scores for confined (_____) and non-confined (_ _ _ _) inmates.*

"Good" vs "Bad" Constructs

Self-Stability score changes over days were examined separately for "good" and "bad" constructs. The increase in Self-Stability scores for confined *Ss* was primarily due to a change within the "good" constructs. The trials × treatment interaction for "good" constructs was significant, $F(5/70) = 2.8$, $p < 0.05$, but not for the comparison of "bad" constructs ($F < 1$).

Individual Differences

Because the increase in Self-Stability scores was most pronounced for "good" constructs, Ss ranked high and low on conceptual ability were compared separately on these constructs. The four Ss of the confined group who were ranked low (simple) in conceptual ability demonstrated increased Self-Stability scores during confinement as compared with the four control Ss who were rated as "simple" concept types, $F(5/30) = 3.1$, $p < 0.05$.

Comparisons of confined *vs* non-confined Ss categorized as complex conceptual types were not significant on either "good" or "bad" constructs.

Disparity Scores

Control and confined Ss did not rank "good" constructs differently than they did "bad" constructs. The mean Disparity score for all days for controls was −0.64 and for confined Ss it was −0.66. Over days, the confined Ss did not differentiate "good" from "bad" constructs either significantly more or significantly less than controls ($F < 1$).

Plasma Cortisols

Plasma cortisol values were expressed in μg/100 ml. Figure 2 depicts AM and PM readings of confined and non-confined Ss over days. As is typically the case in human subjects, there was considerable day to day variation in the cortisol values. Over all of the days, the confined Ss' mean cortisol levels were 24.7 for AM and 21.3 for PM readings. For the control Ss the mean AM and PM readings were 28.1 and 25.2 respectively. The mean values of both groups were well within the range reported for non-incarcerated samples of normals. Normal cortisol levels are reported to be within the 12 to 40 μg/ml range with a mean between 20 and 30 μg/ml (Soffer, Dorfman, & Gabrilove, 1961; Thiessen *et al.*, 1968). Diurnal rhythm usually results in higher AM than PM readings and the data in the present study conform to this expected pattern. All confined Ss maintained their diurnal variation over days, but two of the eight control Ss had, on the average, slightly higher PM and AM readings. These two Ss showed a great deal of day to day variation. Clinically such a pattern may have a variety of meanings (e.g., change in sleep cycle or the effect of stressful events). It was, in fact, noted that both of these Ss were upset by their imminent parole and transfer prospects during the testing period.

Extremely low (<10) or very high (>80) plasma cortisol readings would indicate adrenalcortical malfunction (e.g., Cushing's syndrome for high readings). No such values were obtained in the present study.

Pre-Treatment and Post-Treatment days were initially included in the trend analysis since it has been suggested that inmates may be upset by

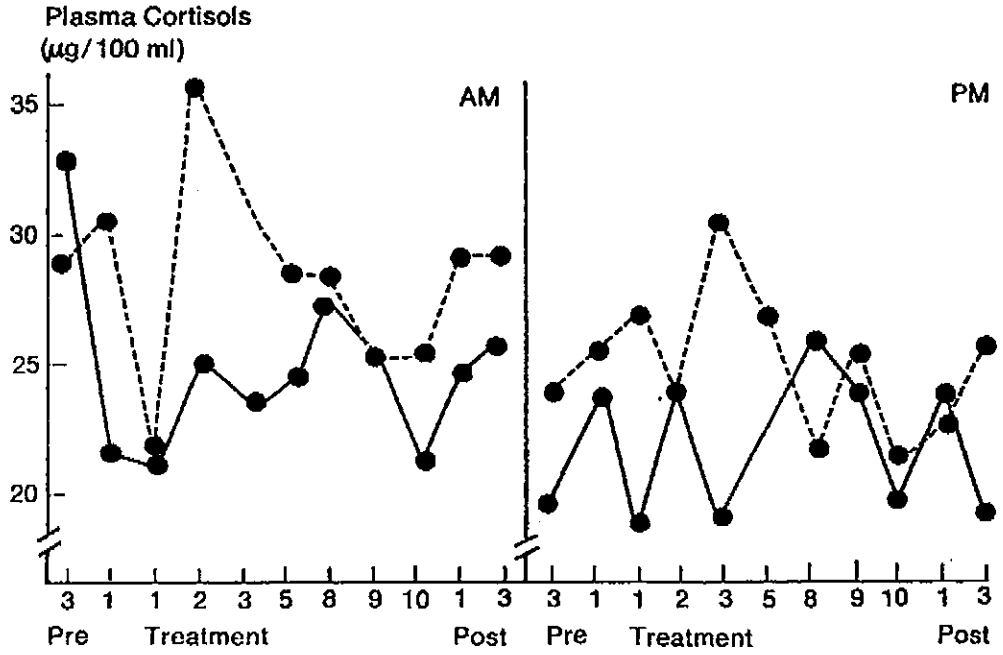

FIGURE 2
AM and PM Plasma cortisol levels (μg/100 ml) for confined (_____) and non-confined (_ _ _ _) inmates.

entry into confinement or by re-entry into routine prison life (Gendreau *et al.*, 1972). No significant effects or interactions were reported. For the AM data, the trials × treatment interaction was $F(10/140) = 1.3, p > 0.05$. If any trend was apparent, it was shown only by the confined Ss who produced slightly lower cortisol values during isolation. The treatment effect was $F(1/14) = 3.7, p > 0.05$. The PM readings showed similar results, in this case the trials × treatment interaction was $F(10/140) = 1.4, p > 0.05$, while the treatment effect was $F(1/14) = 3.6, p > 0.05$.

None of the individual difference comparisons of plasma cortisol levels with conceptually simple *vs* conceptually complex Ss was significant.

A follow-up study was made of three of the initially confined inmates who quit the study. Other informants told *Es* that these Ss claimed that they had intended to sabotage the experiment and therefore quit deliberately. In each case, however, there was a wide range of cortisol readings and all three quitters failed to produce regular AM-PM diurnal rhythm patterns.

Heart Rate, Respiration, and Body Temperature

Statistical comparisons similar to those carried out on the plasma cortisol levels were also carried out on heart rate, respiration, and temperature. Neither the trials × treatment interaction nor the treatment effect was significant on any of these indices for either AM or PM readings.

DISCUSSION

The personal constructs of confined Ss became more consistent during confinement. In effect, the confined Ss showed more test-re-test reliability in sorting photographs in the same order over days.

Since the RGT is basically a fairly simple sorting task, a vigilance-arousal hypothesis might provide a tenable explanation for this result. Johnson, Smith, and Myers (1968) have found performance on simple perceptual tasks to be enhanced by sensory deprivation. Gendreau *et al.* (1972) reported increased arousal to sensory input for confined inmates. Granting the fact that each inmate's rationale for ranking constructs may be complex, nevertheless future research based on vigilance theory may prove to be a useful beginning in the further analysis of changes in inmates' thought processes in confinement.

It should also be noted that the increase in consistency was both construct specific and related to individual differences. It was the "good" constructs that increased in consistency and this effect was greatest in those Ss judged to be "simple" conceptual types.

An increase in the consistency of the sorting of "good" constructs does not necessarily mean that there is a positive or beneficial change in an S's personal constructs as a result of solitary confinement. While sensory deprivation has been claimed by some to be of therapeutic value in facilitating positive changes in the self-concepts of psychiatric patients (e.g., Schultz, 1965), the RGT does not easily lend itself to this kind of interpretation. The "good-bad" construct dimension was defined by the experimenters. It can only be asserted that for Ss described as simple conceptual types, constructs which were expressed to the S in terms of the positive pole (i.e., "good" constructs) increased in consistency during the S's time in monotonous confinement.

Secondly, the meaning which inmates attach to "good" constructs such as "honest," "successful," or "easy-going," may be quite different from the view taken of them by law-abiding persons. In future, the authors suggest that along with the RGT, other self-concept tests (e.g., the Adjective Check List) be used. These should lend themselves to a relatively clear-cut interpretation as to whether self-experienced changes which occur under specified conditions are beneficial or detrimental.

Individual differences (e.g., low IQ, simple conceptual types) have been found to be significant determinants of the degree of "ideational" change found in laboratory isolation studies (Suedfeld, 1969). In the present study, unlike many of the laboratory isolation studies, there was no deliberate attempt to influence the inmates' cognitive processes. We do not know why the simple conceptual types' constructs may be more open to change.

Suedfeld (1969) had tentatively suggested that dissonance factors may account for the reaction of simple conceptual Ss. Given the operational definition of these Ss (Schroder *et al.*, 1967) it might be expected that their constructs would be easily shifted as they do not have a complex, well-differentiated base.

There exists a considerable gap between clinical opinion in the correctional field concerning the effects of stress in solitary confinement and the extensive body of knowledge gained in laboratory investigation of sensory deprivation. If laboratory studies have relevance for the correctional area, it is not too surprising that the plasma cortisol results in this study failed to confirm the clinical expectation that solitary confinement would be more stressful than routine prison life. Indeed, if there was any trend (see Fig. 2), it was toward lowered cortisol levels for confined inmates. Consistent with the cortisol results was the fact that heart rate, body temperature, and respiration of confined Ss were not significantly higher than those of the control Ss. Similarly, laboratory studies of sensory deprivation have often failed to show changes in these latter variables (Zubek, 1969). Walters *et al.* (1963) expressed the view that the likelihood that solitary confinement in prison has deleterious consequences has been much overemphasized.

Also of note is that Gendreau (1969) and Gendreau, Horton, Hooper, Freedman, Wilde, and Scott (1968) reported virtually no change in either the affect or the perceptual abilities of inmates just after they were released from seven days solitary confinement. Furthermore, Zubek (1969) noted that higher stress levels have not been found for Ss subjected to prolonged periods of sensory deprivation whether these were assessed in terms of the activity of the sympathetic-adrenomedullary system via adrenaline and noradrenaline output, or in terms of the activity of the adrenocortical system via 17 KCS and 17 KS steroid output. Only in the extreme case of the combination of perceptual deprivation with immobilization for 7 days were such stress effects reported (Zubek, Bayer, Milstein, and Shephard, 1969). In this latter case only adrenaline was raised (noradrenaline was not) and only for Days 6 and 7 of confinement. Zuckerman, Persky, Link, and Basu (1968) and Zubek (1969) have stated that isolation may, at most, be stressful in its earliest stages. It is not surprising then, to find that "confinement wise" inmates adapt well to solitary confinement, showing no reliable stress effects. Even college student Ss who initially may rate sensory deprivation as a very negative experience (Zuckerman *et al.*, 1968) readily adapt to such confinement.

Altman and Haythorn (1967) have reported that groups in confinement seem to develop a need for privacy and increased territoriality in order to cope with the situation. Whether inmates develop such a strategy as a

result of years of institutionalization is not known. The authors have seen prisons where solitary conditions would be ideal for a prisoner seeking privacy. In some instances, on the other hand (given the type of prison and its routine), "normal" prison cells can also offer a good deal of privacy. The "privacy" theory certainly merits more attention because some clinicians feel that certain inmates (those who have some schizo-affective symptoms) seek solitary confinement only in order to reinforce their psychopathology (Scott & Gendreau, 1968).

Zubek and Schutte (1966) and Zubek *et al.* (1969) have reported that those who quit isolation have significantly lower baseline adrenaline levels than Ss who successfully completed sensory deprivation. Haythorn (1967) reported that quitters had lower adrenaline and higher uric acid levels than Ss who were able to endure isolation. The three quitters in the present experiment asserted that they quit deliberately after the second day of confinement, but these Ss' AM and PM cortisol levels were high and all had difficulty in maintaining a diurnal pattern. The authors believe it likely that these Ss advanced their claim in an attempt to save face with their peers. Zubek (1969) has found that most of his college Ss who quit sensory deprivation have done so on the second or third day. Zubek and Schutte (1966) inferred that quitters may be biochemically or "constitutionally" different. From a medical and psychiatric viewpoint, this suggestion merits further study with those inmates who cannot cope with confinement.

As in all of the prison studies volunteer Ss were employed. These volunteers may have reacted differently from inmates sent into isolation against their will. From our clinical experience, however (Gendreau *et al.*, 1972; Scott & Gendreau, 1968), we have noted that inmates who initially objected strongly to being sent to solitary appeared to adapt as well as inmates who actually requested solitary. Furthermore, these inmates stated in post-test interviews that they approached the experimental confinement period in the same way as they did their non-volitional confinement episodes.

Finally, attention should be drawn to the fact that there have been no attempts to examine an "outside world" control group of matched delinquents. There may be marked differences in both psychometric and physiological variables between this type of control and either routine prison incarceration or solitary confinement. To date the authors have not found such a study methodologically feasible. It does seem to us, however, that such a study would be a valuable contribution to applied penology and to sensory deprivation theory, and would ultimately increase the generalizability of theories which try to account for human behaviour under conditions of monotonous confinement.

RÉSUMÉ

Etude des effets produits par 10 jours de réclusion cellulaire sur les construits personnels et l'activité adrénocorticale de prisonniers. Huit sujets conservent leur routine institutionnelle régulière alors que huit autres sont placés en réclusion cellulaire. Les résultats montrent que le classement des construits personnels (*Repertory Grid Technique*) gagne en stabilité chez les sujets reclus par rapport aux sujets non reclus. L'effet est plus prononcé pour les "bons" que pour les "mauvais" construits chez les prisonniers par ailleurs jugés comme possédant une aptitude conceptuelle "simple." La fonction adrénocorticale, mesurée par le niveau de contrôle du plasma sanguin, indique que la réclusion cellulaire n'est pas plus stressante que le régime institutionnel normal.

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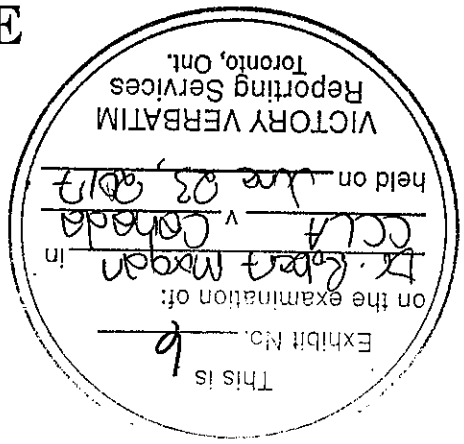
EXHIBIT 23

Cloyes et al., "Assessment of Psychosocial Impairment in a Supermaximum Security Unit Sample"

ASSESSMENT OF PSYCHOSOCIAL IMPAIRMENT IN A SUPERMAXIMUM SECURITY UNIT SAMPLE



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This article concerns a study of Washington State supermaximum security unit (SMU) residents conducted to generate systematic, empirical data for this population and to investigate behavioral, institutional, and policy issues that affect their treatment. The Brief Psychiatric Rating Scale (BPRS) is used to standardize interview-based assessments of participants' psychosocial functioning, in conjunction with other operational, situation-specific measures. Results indicate that the BPRS is a reliable and effective measure of psychosocial impairment in SMU residents. Comparison of factor-based BPRS scores in this sample with scores and factor analysis solutions achieved in other populations points to considerations specific to this population that require further study. Finally, assessment of SMU residents using the BPRS and convergent measures of impairment indicates that a significant number demonstrate psychosocial impairment and/or meet criteria for serious mental illness.

Keywords: supermaximum security; prison; mental illness; mental health; Brief Psychiatric Rating Scale

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The present controversy surrounding supermaximum security units (SMUs)[1] involves a host of issues, from administrative challenges and questions of best practice to the opposition of human rights organizations that deplore their very existence. One perennial problem concerns the relationship between mental illness and SMUs. At present, more than 40,000 people are confined in SMUs in the United States (Camp & Camp, 2000). Of these, up to 30%, or twice the rate of the general prison population, meet clinical criteria for serious mental illness (SMI), and a larger number demonstrate documented psychosocial impairment (Bureau of Justice Statistics, 2002; Hodgins & Cote, 1991; Human Rights Watch, 2003; Lovell, Cloyes, Allen, & Rhodes, 2000; Rold, 1992). In addition, SMUs are the fastest growing form of incarceration in the United States. The increasing practice of using SMUs as a proactive strategy for population management, combined with the challenge that irrational behavior presents to a correctional system, means that inmates with mental illness continue to be housed in these settings, sometimes long term (Human Rights Watch, 2003; King, 1999).

The *Madrid v. Gomez* (1995) and *Jones'El v. Berge* (2001) cases have applied legal pressure at the state level by restricting or prohibiting the use of SMUs to house mentally ill offenders. These decisions reflect growing concern among correctional, clinical, and legal communities regarding the inappropriateness of SMU conditions for seriously mentally ill offenders (Haney & Zimbardo, 1998; Human Rights Watch, 1997, 2003). Although SMUs vary in structure and operation, in general they are characterized by a combination of social isolation, lack of positive stimuli, and environmental factors such as constant light and noise. A number of studies suggest that these conditions may trigger grave cognitive and behavioral decompensation for those inmates already at risk (Grassian & Friedman, 1986; Haney, 1993, 1998; Haney & Lynch, 1997; Human Rights Watch, 2003; Porter, 1998). Without intervention, these inmates may react to an increasingly confusing and threatening environment with escalating decompensation.

When the need for mental health treatment is recognized, it is greatly complicated by the demands of unit management and by ideological differences between standards of custody and treatment (Cloyes, 2004; Rhodes, 2004; Toch & Adams, 2002). SMU practice

is often marked by interpretive disagreement or even confusion as to what constitutes evidence of psychosocial impairment and mental illness. Doubts about the authenticity of symptoms and concerns of manipulation and malingering are a central focus for SMU staff, who may interpret decompensation as a strategic manipulation for softer conditions.[2] In addition, the sometimes bizarre and incomprehensible actions of mentally ill inmates tax limited resources and are seen as a threat to the central mandates of safety and security (Cloyes, 2004).

Mentally ill offenders may be housed in SMUs for indeterminate periods of time, a practice justified by perceptions that mentally ill inmates are inherently dangerous, unpredictable, and explosive (Cloyes, 2004; Lovell & Jemelka, 1998; Tardiff, 1992). The high degree of security required in this setting makes implementing any treatment intervention extremely difficult. Pharmacotherapy is often the only therapeutic avenue practically achievable in such a restrictive setting, and mentally ill inmates who receive no adjunctive treatment tend to refuse medication (Lovell & Jemelka, 1998; Metzner, Cohen, Grossman, & Wettstein, 1998). Furthermore, many inmates cite an undesirable degree of social risk in identifying oneself as being in need of mental health intervention or taking psychotropic medication. They report that inmates and staff see such behaviors as evidence of a weak or broken status, which is closely associated with increased potential for victimization (Cloyes, 2004). Together, these factors make the assessment and treatment of mental illness in an SMU an extremely complex proposition.

The Prison Mental Health Project is a collaboration of the Washington State Department of Corrections (DOC) and University of Washington researchers. The goal of the Project is to investigate issues related to mental health and incarceration in Washington's control units, including ongoing efforts to describe this population; to track how time in SMU relates to inmate histories and institutional practices; and to develop plans for successful and timely transitions out of SMU to residential mental health treatment, general population, or the community. In an earlier study (Lovell et al., 2000), we reviewed records of all inmates in SMU confinement in the state at a single point in time ($N = 232$) to establish a baseline characterization of the population. These inmates had more convictions for violent offenses, more serious infractions, were younger, and were serving

longer sentences than the general population. Records also tracked different patterns of movement through the SMU based on a number of factors: protection issues, immaturity, infractions, progressively poor adjustment, and stalemate from being at war with the system.

Data were also collected on SMU inmates' clinical status and the prevalence of symptoms, according to a set of situation-specific operational indicators: confirmed diagnosis by a mental health professional, multiple admissions to psychiatric acute care units, extended residency on a mental health unit, and case management notes describing psychotic behavior or use of psychotropic medications. Records for 29% of Washington State SMU residents show strong evidence of mental illness, a rate substantially higher than the 10% to 15% often cited for general inmate populations (Bureau of Justice Statistics, 2002; Lamb & Weinberger, 1998; Lovell et al., 2000). These findings also underline problems with viewing these units as having a homogeneous population or in applying a one-size-fits-all approach to managing them.

The next phase of the study, the data for which are reported here, was a 2-year multimethod study of three Washington State SMUs. The study was designed to further explore this variability and its implications, including questions about the mental health status of SMU inmates.

METHOD

PARTICIPANTS

The sample comprises 90 scores achieved by assessing 87 male SMU residents in three institutions, totaling 32% of Washington State SMU residents. Potential participants included all inmates housed in three SMUs at the time of the study.[3] When prospective participants declined to participate, we approached alternate participants from a randomly ordered list of inmates until at least 30% of the unit population was enrolled. Of the 131 participants solicited, 87 interviewed (1 inmate interviewed two separate times, and 1 interviewed three separate times at different institutions, thus, yielding 90 Brief Psychiatric Rating Scale [BPRS] assessments).

Forty-four declined or were unavailable at the time of interviews. Charts of those who declined were reviewed as well as charts of those who accepted to ensure that findings would be representative. No systematic differences were noted. Participants resembled the total inmate population in ethnic distribution: 69% Caucasian, 23% African American, 5% Native American, 2% Asian/Pacific Islander, and 1% Other; in addition, there were 17% in the crosscutting Hispanic origin category. Although individual histories were highly variable, participants were, on average, substantially younger than other prison inmates (29 vs. 34.5 years old) and had long prison sentences (199 months), extensive SMU time (1 year), and many major infractions (25). As the total sample represents almost half the population of SMU inmates at the time of the study, this sample adequately represents Washington SMU residents.

MEASURES

The BPRS. Symptoms were measured using the 18-item BPRS, based on previous use in Project studies and its extensive history in clinical practice and research (Faustman & Overall, 1999; Hedlund & Vieweg, 1980). The BPRS measures 18 of the most common psychiatric symptoms: anxiety, somatic concern, guilt feelings, tension, mannerisms, depressive mood, motor retardation, uncooperativeness, unusual thought content, blunted affect, excitement, disorientation, hallucinations, suspiciousness, hostility, grandiosity, conceptual disorganization, and emotional withdrawal. Each of these 18 items is rated on a 7-point scale from 0 (*absence of symptom*) to 6 (*symptom present to extremely severe degree*). Ratings are assigned by trained assessors and are based on interview data and observed behavior. Item scores are then summed, with higher total scores marking more severe global impairment. Previous research with the BPRS (Lovell & Jemelka, 1998) suggests the following classification of BPRS total scores based on level of impairment: 0 to 13 = mild impairment; 14 to 23 = moderate impairment; 24 to 36 = marked impairment; 37+ = severe impairment.[4]

The BPRS has been widely studied and consistently demonstrates adequate reliability and validity (Bengtsson & Hansson, 2001; Burger, Calsyn, Morse, Klinkenberg, & Trusty, 1997; Hafkenscheid,

1993; Lachar et al., 2001; Morlan & Tan, 1998; Overall & Beller, 1984; Ownby & Seibel, 1994; Ventura, Green, Shaner, & Liberman, 1993; Zuardi, Loureiro, & Rodrigues, 1995). Furthermore, researchers have analyzed the factor structure of the BPRS in a variety of populations (Burger et al., 1997; Larcher et al., 2001; Overall & Beller, 1984; Ownby & Seibel, 1994). These studies repeatedly identify five subscales and related items that consistently correlate with clinical diagnoses such as mood disorder, organic brain syndrome, or thought disorder:

- Thinking Disturbance (items: conceptual disorganization, hallucinatory behavior, unusual thought content)
- Anxious Depression (anxiety, guilt feelings, depressive mood)
- Withdrawal Retardation (emotional withdrawal, motor retardation, blunted affect)
- Hostile Suspiciousness (hostility, suspiciousness, uncooperativeness)
- Agitation Excitement (tension, excitement)

It is interesting that although numerous factor analyses confirm this model, individual items function differently in various studies, sometimes associating with different subscales and sometimes dropping from analysis. This indicates variability in the factor structuring of BPRS scores among populations with different demographic and clinical profiles and points toward the possibility that the instrument is sensitive to underlying dimensions of differing groups.

Operational indicators of mental illness. Both conceptual and operational definitions were used to triangulate data on psychosocial impairment. *Serious mental illness* (SMI) was defined as a major thought disorder, mood disorder, or organic brain syndrome that fits well-established *Diagnostic and Statistical Manual of Mental Disorders* (4th ed; American Psychiatric Association, 1994) categories, substantially impairs functioning, and requires treatment. To measure this, we developed a set of proxy indicators of psychosocial impairment based on an algorithm of generally and practically recognized DOC decision points regarding intervention and management for mentally ill inmates. Throughout the past decade, Project researchers have been closely involved with DOC administrators, staff, and clinicians in identifying criteria used in daily practice to

determine which behavioral patterns indicate SMI and, therefore, warrant assessment and intervention. This approach combines evidence from the electronic database, medical chart reviews, staff logs and unit records, and clinical interviews to estimate the number of participants with SMI. Medical diagnosis alone was insufficient because in DOC practice, diagnosis is neither determined nor recorded in a reliable manner. Thus, an inmate was counted as seriously mentally ill (Evidence of SMI Documented or EVSMI-DOC) if records review showed evidence of any one of the indicators described below:

- Confirmed SMI: The inmate has been evaluated by a mental health professional and an assessment of SMI has been recorded electronically (SMIYes).
- Mental health residency + significant use of medications: 30 or more days in one of the DOC's residential mental health units, together with a significant record of medications—either steadily or with interruptions (Res+Meds).
- Diagnosis + significant use of medications: a psychiatric evaluation with a qualifying diagnosis, together with a significant or steady record of medications (Diag+Meds).
- Steady use of antipsychotics or mood stabilizers, not just antidepressants, with no interruptions (SteadyMeds).

Combining these data provides practical evidence of mental disturbance that is more robust, more situation specific, and therefore more nuanced than that available through electronic files or diagnosis alone. Furthermore, it allows the analysis of convergent validity between BPRS data and practical indicators of SMI. This approach also helps situate our findings relative to the larger questions and issues that characterize and complicate the study of SMUs. Table 1 summarizes the operational indicators and corresponding data sources.

PROCEDURES

This research was funded by contract with the Washington State DOC, carried out with the active collaboration and support of administrators and staff, and governed by strict university and DOC institutional review board rules concerning protection of human participants. Prospective participants had the right to refuse interviews. All inmates

TABLE 1: Summary of Operational Indicators of Mental Illness and Data Sources

Indicator	*Description*	*Data Source*
SMIYes	Inmate evaluated by mental health professional; Documented as meeting clinical criteria for SMI	OBTS
Res+Meds	30 ≥ days in residential mental health units + Significant pattern of psychotropic medication use[a]	OBTS; Medical chart
Diag+Meds	Psychiatric evaluation with a qualifying diagnosis[b] + Significant pattern of psychotropic medication use	Medical chart; Staff narrative notes Medical chart; Staff narrative notes
SteadyMeds	Steady use of antipsychotics or mood stabilizers (not only antidepressants) with no interruptions	Medical chart; Staff narrative notes
EVSMIDOC	Inmate meets at least one of the above criteria	OBTS; Medical chart; Staff narrative notes

Note. SMI = serious mental illness; OBTS = Offender Based Tracking System (Department of Corrections database); EVSMIDOC = evidence of serious mental illness documented.
a. The following criteria qualify as a significant pattern of use: Use of psychotropic medication for more than 3 months, with breaks of 3 or more months in between (significant but discontinuous use); psychotropic medication for more than 3 months with no breaks (steady meds). Qualifying medications included antipsychotics, antidepressants, and mood stabilizing agents.
b. Qualifying diagnoses as assigned by psychiatric and/or psychological evaluation include schizophrenia, schizoaffective disorder, psychosis not otherwise specified, organic brain disorder, dementia, and borderline personality disorder.

who agreed to be interviewed granted informed consent following the explanation of the nature of the research contract with the DOC, the exploratory nature of our multiple-method study, and their right to terminate participation at any time without repercussions.

During a 9-month period, five members of the research team conducted individual semistructured interviews with participants in visiting booths or medical rooms on the units. Prior to interviewing, all team members engaged in comprehensive training, including how to achieve and maintain an adequate level of interrater reliability (see Ventura et al., 1993.). Each interview lasted from 45 minutes to

1 hour, and all were audiorecorded with participants' permission. Because the purpose was to describe issues related to SMU confinement, including factors not related to mental health, interviews did not focus solely on this topic.[5] In addition, BPRS scores were assigned based on participants' presentation, speech, and behavior during the interview. It is important that participants were not specifically aware that an assessment tool was being used to evaluate their clinical presentation.

Data were gathered on convergent measures through review of medical charts and the electronic institutional database, including inmate records, unit records, and the narrative notes of frontline staff. To mitigate effects of bias, interviewers did not review either inmate charts or institutional data prior to meeting with participants and completing BPRS ratings.

Analysis. SPSS software and sample scores on all measures were used to explore data structure and patterns, reliability, correlation, and construct validity. We applied factor analysis to BPRS scores to examine sample factors and compare with previous analyses and computed reliability for BPRS total and subscale scores and operational indicators of SMI (SMIYes, Res+Meds, Diag+Meds, SteadyMeds, EVSMIDOC). Total BPRS scores, subscale scores, and operational indicators of mental illness were tested for significant correlations. Finally, three methods were used to compare the sample for significant differences in means among groups: (a) total BPRS scores, (b) whether inmates demonstrated marked or severe impairment (BPRS > 24, BPRSY), and (c) whether inmates met all operational criteria for SMI (EVSMIDOC).

RESULTS

ANALYSIS OF BPRS SCORES

The mean of total BPRS scores in this sample is 17.01 (*SD* 8.99; range = 1 to 57), indicating a moderate level of psychosocial impairment. Reliability analysis of total BPRS scores yielded an alpha coefficient of .7471, indicating that items are consistently measuring psychopathology in this sample. The grandiosity item had the largest

effect on this alpha value, which would be .7629 if the item were deleted from scores. This finding has sample-specific considerations that reinforce face as well as construct validity, discussed below.

Factor analysis of sample BPRS scores generated a five-factor model similar to previous studies but with important differences to be highlighted in the discussion section of this article. These five factors, or subscales, correspond to diagnostic categories identified in earlier research and are named after the clinical picture they evoke: Thought Disturbance, Withdrawal Retardation, Anxious Depression, Agitated Excitement, and Hostile Suspiciousness. To further explore these subscales, we obtained bivariate correlations between each subscale score from the sample and scores computed for each participant using another widely replicated five-factor model (Overall, 1987). Each correlation was significant at the .01 level. Internal consistency coefficients (alphas) for each of the five subscales were moderate yet satisfactory, ranging from .57 to .77. Intercorrelations between sample subscale scores, indicating reasonably distinguishable subscales (Surwillo, 1980), are reported in Table 2. Thus, despite the constraints of having a small sample-to-item ratio in this study, the BPRS performed reliably, discriminantly, and distinctively.

ANALYSIS OF OPERATIONAL INDICATORS

Correlations among the operational indicators used in this study also mark a significant and unique clinical profile and confirm our assumptions about the importance of combining operational and contextual indicators with other measures. All correlations among these variables (outlined in Table 1) were significant ($p \leq .01$; Res+Meds $p \leq .05$). The variable SMIYes, recorded by a psychiatric provider on inmates' DOC admission, was most highly correlated with the variable Diag+Meds ($r = .5107$). When interpreted in terms of the purpose of mental health screening, this finding suggests that when such screening is in fact carried out, it is functioning as intended: namely, to identify those inmates most at risk for SMI because of clinical presentation and most in need of pharmacological intervention. However, as noted earlier, the nature of clinical practice in the DOC setting makes this procedure, at best, something of a haphazard prospect. The highest correlation was between Diag+Meds

TABLE 2: Correlations Among Brief Psychiatric Rating Scale (BPRS) Subscale and Total Scores ($N = 90$)

	TD	*WR*	*AD*	*AE*	*HS*	*BPRS Total*
TD	1.000	.177	.130	.199	.343**	.559**
WR	.177	1.000	.209*	−.057	.311**	.499**
AD	.130	.209*	1.000	.233*	.166	.665**
AE	.199	−.057	.233*	1.000	.282**	.548**
HS	.343**	.311**	.166	.282**	1.000	.702**
BPRSTotal	.559**	.499**	.665**	.548**	.702**	1.000

Note. TD = Thought Disturbance subscale; WR = Withdrawal Retardation subscale; AD = Anxious Depression subscale; AE = Agitation Excitement subscale; HS = Hostile Suspiciousness subscale.
*$p < .05$. **$p < .01$.

and SteadyMeds ($r = .5426$), again suggesting that when the evaluation of inmates is actually carried out, it is effective in achieving not only the initial prescription of psychotropic medication but also the follow-up necessary to ensure adequate long-term pharmacotherapy.

Alpha value for the operational indicators (.7245) demonstrates an adequate degree of internal validity, thereby supporting the conclusion that each of these variables contributes in a significant way to the reliable measurement of SMI as an underlying construct. To exclude any of these four operational indicators from the analysis would negatively affect validity and reliability, with Diag+Meds having the most impact. This is not an unexpected result, given the extent of overlap among the operational indicators (for example, three of four indicators involve tracking patterns of medication use). In a similar manner, the fact that these indicators were intended to represent practical and widely used decision-making criteria strengthens the conclusion that they are describing the underlying construct of SMI in a situation-specific way. Moreover, it suggests that the categorical variable EVSMIDOC, constructed to summarize the other four operational measures, can be used to categorize this sample in terms of whether a participant meets DOC criteria for SMI. Indeed, correlations between the EVSMIDOC variable and each of the other four operational indicators were highly significant ($p \leq .01$).

ANALYSIS OF CONVERGENT VALIDITY AMONG BPRS AND OPERATIONAL INDICATORS

Convergent validity was further analyzed in three ways. First, we tested correlations among BPRS scores, the BPRSY variable (BPRS > 24 and in the marked/severe impairment range), and the operational indicators. The results are reported in Table 3, with a few points noted here. Again, this pattern of correlations suggests that formal diagnostic and clinical constructs correspond with the decisional criteria used in everyday practice and, therefore, with the operational variables. A brief examination of both significant and negative association underscores this convergence. For instance, correlations among BPRS total scores, BPRSY, and scores on the Thought Disorder and Withdrawal Retardation subscales (clinically associated with serious psychotic and depressive symptoms, respectively) yielded significant association with the operational indicators Res+Meds, Diag+Meds, and EVSMIDOC. This pattern elucidates a distinctive clinical picture for a number of reasons. These variables describe major patterns of medication prescription and use, repeated and/or lengthy admission to mental health units, and clinical evaluation and diagnosis positive for SMI. In these cases, presentation is more likely to be dramatic and to fit established frameworks. Moreover, the behaviors and symptoms captured by these variables are those most likely to be recognized as SMI in a correctional setting (as opposed to merely anxious or hostile behavior) and, therefore, most likely to elicit intervention.

The two slightly negative correlations also highlight connections among BPRS scores, operational indicators, and practical issues. Hostile Suspiciousness subscale scores were negatively associated with Diag+Meds (–.016). This reflects a tendency, in an SMU setting, to regard hostile presentation and guarded, mistrustful behavior as evidence of personality disorder, antisocial motivation, or a reaction to prison pressures rather than as a symptom of psychiatric illness. Those who present a primarily hostile or suspicious demeanor are, therefore, less likely to be diagnosed as mentally ill and in need of treatment. In a similar manner, there is a negative correlation between scores on the Withdrawal Retardation scale and the SMIYes indicator. Because an SMI flag is based on a rapid and often chaotic

TABLE 3: Correlations Among Brief Psychiatric Rating Scale (BPRS) Total, BPRSY, Subscale Scores, and Operational Indicators[a]

	SMIYes	*Res+Meds*	*Diag+Meds*	*SteadyMeds*	*EVSMIDOC*
BPRSTotal	.137	.327**	.239*	.129	.379**
BPRSY	.077	.250*	.221*	.080	.247*
TD	.113	.350**	.281**	.051	.393**
WR	−.014	.294**	.158	.148	.286**
AD	.100	.110	.152	.058	.181
AE	.179	.141	.107	.100	.066
HS	.097	.038	−.016	.035	.165

Note. BPRSY = BPRS > 24; TD = Thought Disturbance subscale; WR = Withdrawal Retardation subscale; AD = Anxious Depression subscale; AE = Agitation Excitement subscale; HS = Hostile Suspiciousness subscale.
a. See Table 1 for outline of operational indicators.
*$p < .05$. **$p < .01$.

screening process, the depressive symptoms of those inmates who exhibit blunted affect, are slow to engage, and cannot communicate effectively with the screener are likely to be missed.

As a second analysis of convergent validity, a *t* test was used to detect possible differences between the mean BPRS scores of those inmates who met operational criteria of SMI (EVSMIDOC, outlined in Table 1) and those who did not. The group with positive records for SMI had a mean BPRS score of 25.29, and the group with negative records for SMI had a mean score of 15.39, resulting in a significant difference between these two groups, $t(17) = 2.556$, $p = .02$. Given the relatively small sample size, this finding constitutes statistically strong evidence that this difference is systematic. In other words, it is highly unlikely that such a difference in mean scores is because of either random chance or sampling error. Given relevant concerns of representativeness, sampling error resulting from small sample size would tend to underestimate such a difference and, therefore, decrease the power of the *t* test to detect any differences. Therefore, it appears that higher BPRS scores actually do reflect more severe symptoms and are positively associated with patterns of behavior and intervention that mark SMI in this setting.

Third, convergent validity was analyzed via a chi-square test to measure the association of the EVSMIDOC variable with the

BPRSY variable indicating marked/severe impairment, $\chi^2 = 5.509$ $(1, N = 90) = 5.509$, $p = .019$. Again, given the relatively small sample size as well as the number of values being analyzed, this suggests that these variables are strongly and systematically related—those inmates who have psychiatric symptoms in the marked to extremely severe range are the same inmates who meet DOC-based criteria for SMI and who are most likely to need and receive intervention. This finding further points to the convergence of these data on the construct of psychosocial impairment and underscores the effectiveness of combining measurement variables for more robust results.

Taken together, the analyses support three primary findings: (a) The BPRS is a reliable and effective measure of psychosocial function in SMU residents, (b) comparison between factor-based BPRS scores in this sample and scores and factor solutions achieved in other populations points to considerations specific to this population that require further study, and (c) assessment of SMU residents using the BPRS and convergent operational measures of psychosocial function indicates that a significant number of participants meet criteria for serious psychosocial impairment.

DISCUSSION

BPRS ASSESSMENT IN SMU SAMPLE: EFFECTIVENESS, LIMITATIONS, AND RECOMMENDATIONS

In addition to reliability and effectiveness, the BPRS demonstrated a satisfactory degree of construct validity to conclude that what is being measured is in fact psychosocial impairment, inflected by distinct patterns of disturbance that are meaningful in this particular context. This holds true despite several issues that constrain interpretation of these results. Sample scores represent point-in-time measures and, thus, do not permit claims of correlation or cause regarding the damaging effects of SMU conditions, incidence of illness, or change with time. Despite this limitation, the data do offer a measure of prevalence and show a significant degree of impairment in this group of inmates. Specifically, 22% of Washington State SMU residents had total BPRS scores greater than 24, indicating a

marked or severe degree of distress. Generalizability of results is limited by the relatively small, although statistically adequate, sample size. However, as demonstrated, this sample is representative of Washington State SMU residents. Notwithstanding these limitations, the analysis demonstrates the reliability, validity, and rationality of the BPRS scores for this sample and setting.

It is also important to highlight conceptual and operational distinctions between psychosocial impairment and mental illness. We use the rubric of psychosocial function for several reasons that relate to the use of BPRS measurement with operational indicators and ultimately to the potential for developing a framework that triangulates individual and institutional variables. A question of function is especially clear in the definition of *SMI* adopted by many correctional systems, where it is used to delimit the class of inmates for whom treatment is medically necessary as required by federal court precedents and consent decrees. In these cases, *SMI* is defined as "a substantial disorder of thought or mood which significantly impairs judgment, behavior, capacity to recognize reality or cope with the ordinary demands of life within the prison environment and is manifested by substantial pain or disability" (Ohio Bureau of Mental Health Services, 2000, § 319-03, p. 1). The range of symptomology that may be produced or exacerbated by SMU confinement, with negative consequences for inmates and staff, is broader than that captured by conventional *DSM-IV* algorithms (two examples commonly described by inmates are rage and despair). Furthermore, by using the language of psychosocial impairment, we deliberately avoid interpretive and practical limitations of a disease model. For example, hallucinations or extreme suspiciousness can have negative consequences for inmates and staff regardless of whether these occur in patterns that meet *DSM-IV* diagnostic criteria or respond to treatments that target organic disease.

In addition, the emphasis on functionality has important legal and ethical implications. For example, can an inmate understand and participate in his or her own legal representation and pursue his or her own best interests, both within an institutional disciplinary system and in court?

Finally, our research during the past decade reveals missing data, contradictory diagnoses, and inconsistent screening in many inmate

records. In light of these findings, as well as broader concerns about SMU confinement, viewing resource-intensive diagnostic interviews as the only legitimate indicator of impairment is limiting. The BPRS provides a flexible and reliable framework without the interpretive or analytic rigidity of a diagnostic model.

COMPARISON OF SMU SUBSCALE SCORES WITH PREVIOUS STUDIES

A comparison of SMU BPRS subscale scores and factor data from other studies highlights the fact that there is both enough compelling similarity and difference to call for further study. Subscales in this sample were strikingly comparable to those subscales repeatedly found in studies of populations with known psychopathology, such as chronic schizophrenic patients, and this parallel has several implications. Considering widely held views on SMU inmates, one might expect that the Hostility Suspiciousness subscale would have the most influence on scores for this sample. Yet Thought Disturbance, the subscale most closely associated with serious psychotic illness and thought disorder, accounted for the most variance. Hostility Suspiciousness actually had the smallest effect among all five subscales. In terms of overall profile, then, the sample actually looked much more akin to traditional inpatient psychiatric samples than expected. This further supports the supposition that what is being measured are those underlying constructs that correspond with psychiatric symptoms and not some other construct such as psychopathy, personality disorder, or character problems.

There are also notable differences in how particular BPRS items contribute to this SMU sample profile and patterns found in other research. Studies in other populations tend to drop the variables rating disorientation, somatic concerns, and grandiosity because of their small contribution to the clinical profile. However, these items had a much bigger effect for inmates in SMU. Disorientation has been extensively cited as an effect of solitary confinement and extreme social isolation (Grassian & Friedman, 1986; Haney, 1993). Inmates frequently describe somatic distress and preoccupation with physical symptoms as negative effects of solitary incarceration. Here, somatic distress was strongly associated with the Anxious

Depression subscale, which is consistent with the plausible hypothesis that the interaction of negative stimuli and isolation in SMU can lead to preoccupation and rumination concerning the effects of confinement on one's body.

In summary, it is important to note that the present findings are similar enough to those of previous analyses to suggest that they are not idiosyncratic but also different enough to indicate the influence of the uniqueness of this sample and their situation. These differences could be methodically analyzed and operationally developed to explore systematic correlations among symptoms of psychiatric impairment and the kind of environmental variables that characterize SMUs.

CONVERGENT VALIDITY: ASSESSMENT AND INTERPRETATION OF PSYCHOSOCIAL IMPAIRMENT

The convergence of BPRS scores and data gathered using operational indicators of psychosocial function points toward two conclusions. First, a significant number of SMU participants meet robust criteria for serious psychosocial impairment. Second, this study achieves a reasonable degree of validity in assessing psychosocial impairment in this sample.

Of the sample, 20% met DOC-based criteria for serious impairment; these inmates also had an average BPRS score of 25, in the marked to severe range. Furthermore, there was significant, systematic correlation among data for these variables. However, overlap between BPRS and DOC criteria was not complete. Of 78 inmates with both interview and chart review data, 11 showed marked or severe symptoms according to BPRS scores but did not satisfy operational criteria. Six met operational criteria but had BPRS scores in the mild or moderate range. There are several possible explanations for this disparity. First, some study participants have refused any mental health assessment or intervention since they arrived in prison. These men may or may not meet either diagnostic or operational criteria for mental illness, but this cannot be tracked. Second, follow-through in assessing, treating, and documenting mental illness among prisoners has not been consistent, as noted earlier. Again, this makes tracking and measuring criteria difficult or impossible in some cases. Third, participation in study interviews was voluntary and depended

on ability to understand the description of the study. Severely disturbed or paranoid inmates may be underrepresented in BPRS data if they refused participation by virtue of an inability to engage in the process. Of 44 potential participants who refused or were unavailable for interview, there were 10 whose electronic database or chart records showed clear evidence of mental illness. Fourth, inmates with SMI who are successfully treated may show only moderate symptom levels in clinical interviews—indeed, this underscores the snapshot quality of a one-time BPRS assessment.

Any attempt to assess SMU inmates will raise concerns about validity. These can be managed through study design and statistical analysis (as has been done here), yet they also tend to linger in questions of how best to interpret results—especially in prison research. These questions are not merely peripheral or confounding factors; nearly all arguments about SMUs center on the status of real or serious impairment and how best to operationalize and act on a definition. Therefore, we address questions of interpretive validity here.

First, the question of malingering will surely arise in relation to these data and conclusions. There are several important things to consider about malingering for an SMU study. As noted earlier, mental illness and manipulation are not mutually exclusive categories. This is a widely recognized truism among SMU staff, who contend that psychiatric symptoms and manipulative behavior co-occur more often than not (Cloyes, 2004). In addition, interviews with inmates did not solely, or even primarily, focus on clinical symptoms (see Note 5). Study information given to participants did not emphasize symptoms or illness, researchers were not presented as clinicians, and participants were not specifically aware that an assessment tool was being used to evaluate their clinical presentation. Thus, the perceived prospects for secondary gain were minimized. Furthermore, BPRS ratings are based on interview data and entail a number of factors including speech, behavior, overall presentation, and interviewer assessment. In this way, as compared with many self-report measures or schedules, the BPRS functions more like a mental status exam. Finally, the clinical profile described by our data is closely connected with the extraordinary situation of living in an SMU. Features such as hostility or manipulation, which

might be seen as confounding factors in other settings, are an integral part of the SMU context. It is therefore more plausible (and practical) to think of impairment and manipulation as cohesive elements of this clinical profile rather than as divergent diagnoses.

A second question related to interpretive validity involves how to situate study results in a larger SMU context that integrates individual, social, and environmental factors. The concept of psychosocial impairment focuses on an individual level of analysis, and the BPRS is constructed to measure symptoms as largely endogenous variables. In other words, the BPRS may be useful for assessing symptom levels; when used in a longitudinal design, it may show changes with the passage of time, but used alone, it cannot address the interactions between people and environment that epitomize concerns about SMUs. Our sample scored highest on the following items, in order: suspiciousness, hostility, anxiety, tension, depression, and grandiosity. This finding will hardly surprise readers familiar with conditions of SMUs and the reasons for assigning inmates to them. Conditions of confinement, surveillance, and social and physical isolation might reasonably be expected to coincide with suspicious, hostile, anxious, tense, or depressed behavior.

Finally, it is important to recognize that symptoms are not only influenced by but also interpreted within this larger context. For example, the BPRS item grandiosity is meant to measure a symptom of impairment. Yet a degree of grandiosity about personal power, bravery, and influence is part of common discourse among SMU prisoners (Cloyes, 2004; Toch, 1992). This pattern is a response to social challenges endemic to this setting and reflects role expectations within this particular context. In short, grandiosity may be an adaptive response, and not necessarily a pathological one, to the social and political features of the SMU environment. Therefore, future research should continue to develop a model that incorporates the BPRS as one measure among others aimed at situating individual factors within the context of an extreme environment. This strategy of triangulation provides data that are at once more meaningful and more useful and highlights the necessity for future studies to develop data sets that integrate individual symptoms, situation-specific practices, and institutional policies.

NOTES

1. Nationally, these supermaximum security units are generally referred to as SMUs or control units. The Washington State Department of Corrections calls its comparable units intensive management units or IMUs. In the interest of consistency, we use the term *SMU* when referring to our study of Washington State IMU residents.

2. It is interesting that this is often described as an either/or proposition, meaning that inmates are either sick or manipulative. This assertion seems to run counter to the opinion of those actually working in SMU settings, who are quick to point out that a diagnosis of mental illness does not preclude engaging in manipulative or antisocial behaviors and vice versa (Cloyes, 2004). A subtler and more plausible description would account for a significant degree of overlap in this matter and is in fact what most SMU staff recognize and accept as a feature of everyday practice.

3. Although some women live in segregation conditions in Washington State, according to Department of Corrections policy, these settings are neither defined nor managed like SMUs.

4. Lovell, Allen, Johnson, and Jemelka (2001) have taken this approach in constructing anchor points for interpreting overall scores.

5. The schedule for these semistructured interviews included the following domains of questions: the physical environment in SMU; the social environment in SMU; description of everyday life, practices, and activities in SMU; relations between staff and inmates; impact of unit and institutional policies and procedures on quality of life in SMU (positive and negative); and subjective experiences and accounts related to doing SMU time.

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EXHIBIT 24

James Bonta & Paul Gendreau, "Reexamining the Cruel and Unusual Punishment of Prison Life"

Law and Human Behavior, Vol. 14, No. 4, 1990

Reexamining the Cruel and Unusual Punishment of Prison Life*

James Bonta and Paul Gendreau

It has been widely assumed that prison is destructive to the psychological and emotional well-being of those it detains. However, this assumption has rarely been critically examined. The present report evaluated the evidence pertaining to the effects of imprisonment. Studies on the effects of prison crowding, long-term imprisonment and short-term detention, solitary confinement, death row, and the health risks associated with imprisonment provide inconclusive evidence regarding the "pains of imprisonment." Rather, the evidence points to the importance of individual differences in adapting to incarceration. As the use of incarceration is unlikely to decrease in the near future, research on its effects is urgently needed and a situation-by-person approach may be the most fruitful research strategy.

Historically, prisons have been described as barren landscapes devoid of even the most basic elements of humanity (cf. Sykes, 1958) and detrimental to the humanity of the offender (Rector, 1982). Perhaps one of the best known descriptions of the inhumanity of prison is Cohen and Taylor's (1972) description of long-term inmates in a British maximum security prison. Such notions about prison life have been pervasive whether from the perspective of investigative journalists (Mitford, 1973) or academics writing for basic criminology texts (see Fox, 1985).

Mitford (1973), in her very effective polemical style, painted a scathing in-

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dictment of prisons. Not only does imprisonment strip offenders of civil liberties, but also prison reforms are nothing but rhetoric and rehabilitation initiatives are despotic. Goffman (1961) also has been equally harsh in his assessment of the prison as a "total institution."

Careful empirical evaluations, however, have failed to uncover these pervasive negative effects of incarceration that so many have assumed. Mitford (1973) and Cohen and Taylor (1972) did not provide empirical evidence for psychological or behavioral deterioration. We need to be reminded that even Goffman (1961) did not collect data directly from prisons. His conclusions were based upon a review of the prison literature combined with data gathered from "asylums." Furthermore, earlier reviews of empirical studies also failed to uncover the widespread harm that is presumed inherent to prisons (Kilmann, 1980; Walker, 1983).

For some, the quantitative data, gathered as much as possible under conditions of objectivity, must not be believed. The failure of such data to confirm popular expectations has led to a number of responses. One is an increased dependence upon a phenomenological approach (e.g., Flanagan, 1982), or, at the very least, a shift from quantitative psychology to a process that examines prison existence in a qualitative and interpretative manner (see Sapsford, 1983).

Another expression of disbelief in the data comes from critics (Mohr, 1985) who have argued that the failure to find damaging effects of incarceration has been due to the "false reality" of the researchers concerned. This false reality has apparently been ascribed to the fact that government researchers have vested interests in reporting results uncritical of the penal establishment.

A final concern, in this case emanating from researchers who have not yet embraced phenomenology, has been that much of the research has reached a "dead end." Historically, incarceration research examined informal social organizations within prisons and did not speak persuasively to the actual effects of imprisonment itself. In addition, the methodological problems in much of the early work were considerable and a number of researchers have been rather critical of the early simplistic approaches to imprisonment research (Porporino & Zamble, 1984; Wormith, 1984). That is, much of the early research was guided by the "all or none" views of the deprivation (Clemmer, 1940; Sykes, 1958) and the early importation theorists (Irwin & Cressey, 1962). Thus, the complex nature of incarceration was not addressed.

In the past, most prisons were maximum security, and psychoeducational programming was minimal. Daily prison life featured 20-hour lock-up for a few and highly regimentized and monotonous work duties for the rest. Until recently, approaching the examination of prison life from a uniform perspective made eminently good sense. Now, however, the realities of prison life are far different. It is now appropriate to reexamine the effects of incarceration with special attention to the specific conditions of confinement. Although prisons may appear similar on the surface, closer examination finds them varying widely in security, living conditions, and the degree of programming.

Prison overcrowding, almost unknown in the early 1970s, is now very evident. Today, both very long-term and short-term periods of incarceration have dramatically increased. The number of offenders incarcerated is over 700,000

(U.S. Department of Justice, 1988). Current government crime control strategies, in the United States at least, will likely ensure that imprisonment will be the preferred option for the time being (Currie, 1989). In addition, one of the most extreme forms of prison life, solitary confinement, is still frequently employed.

Thus, research examining the effects of prison life is critically important. More knowledge must be generated and analyses of prison life must take into account the deprivation and importation literature, while also recognizing the great variety of structures and experiences that incarceration currently includes.

SELECTION AND ORGANIZATION OF STUDIES

This review focuses on quantitative studies about effects of imprisonment. Qualitative or phenomenological studies were not included. To be included in the review, a study was required to employ objective measures of the variables of interest and to evaluate the relationship between them by means of statistical tests.

Thus, the majority of studies were of a correlational or quasiexperimental nature. The only truly experimental studies (i.e., random assignment) were found in the solitary confinement literature. Some studies appeared to straddle both the quantitative and qualitative camps. In these instances, we made a judgment call and only included them for discussion where appropriate.

The studies were identified with the aid of a computer search of the prison adjustment and penal literature. Other reviews (e.g., Bukstel & Kilmann, 1980; Gendreau & Bonta, 1984; Wormith, 1986) and a review of recent criminological journals identified additional studies.

We viewed imprisonment as an independent variable and the behavioral and psychological observations of inmates as dependent variables. This organization appeared to work well with the studies dealing with specific conditions of confinement (e.g., solitary confinement). There is, on the other hand, a voluminous and frequently reviewed literature that has the independent variable, imprisonment, less clearly defined and investigates dependent variables such as attitude and self-esteem changes. These later studies were not included in the present review.

Finally, a further comment on the dependent variables in the review is in order. Our interest was on the evaluation of assumed negative effects due to incarceration, and, therefore, we reviewed topics that were most likely to evidence such effects. We did not review the literature on rehabilitation and educational programs in prisons (see Gendreau & Ross, 1987) because their stated purpose is to actively promote positive behaviors. In general, *negative effects* were behaviors that threatened the physical welfare of the offender (e.g., aggressive behavior, suicide) and indicators of physiological stress levels (e.g., elevated blood pressure) and psychological distress (e.g., depression).

We examined specific aspects of confinement, namely, crowding, long-term imprisonment, solitary confinement, short-term detention, and death row. We

make one departure from this format and provide a commentary on the health risks associated with imprisonment, which follows from our discussion of prison crowding. In our review of the prison crowding literature, we were able to use meta-analytic techniques because there were both an identifiable theoretical perspective and sufficient studies that could be subjected to analysis. With respect to the other aspects of confinement, either there were too few studies (e.g., death row) or they consistently failed to show negative consequences (e.g., solitary confinement), or, as in the case of long-term confinement, the cross-sectional methodology with multiple groups did not make the data amenable to meta-analytic techniques.

Crowding

Crowding is invariably perceived negatively. It is seen by many correctional managers as *the* major barrier to humane housing of offenders despite an estimated 170,000 additional new beds since 1980 (Corrections Digest, 1986). This population explosion has prompted court interventions (Angelos & Jacobs, 1985; Call, 1983), sentencing reforms (Kennedy, 1985), and innovative classification systems intended to reduce prison populations (Clements, 1982).

Researchers view crowding as a complex phenomenon. Stokols (1972) distinguished *density*, a physical condition, from *crowding*, a psychological condition involving the individual's perception of constraints imposed by limited space. Loo (1973) further differentiated physical density into *spatial density* (number of people constant but the available space varies) and *social density* (space is constant but the number of people vary). For example, prison renovations might reduce the amount of space available to a number of inmates (spatial density), but the effects of this spatial rearrangement on the inmates may differ from the effects of a sudden influx of new inmates into the institution (social density).

Despite these distinctions, corrections research has been inconsistent in the use of the concepts of crowding and spatial and social density. Studies have described crowding as both an independent and dependent variable, and the distinction between social and spatial density has infrequently been noted.

Most researchers agree that crowding describes a psychological response to high population density which is often viewed as stressful (Altman, 1978; Paulus, 1988). Although high population density is a necessary condition for crowding, it is not a sufficient condition, and other variables may be required to produce the perception of crowding. Sundstrom (1978) described crowding as a sequential process resulting from an interaction of person variables, high population density, correlates of high density (e.g., increased noise levels), and situational variables (e.g., duration of exposure).

Following Sundstrom's (1978) model, we would expect that the behaviors observed under high population densities would vary in intensity and variety with length of exposure. For example, under brief exposure we may see elevated blood pressure, followed by reports of anxiety as exposure increases, and ending with violent behavioral outbursts under prolonged exposures. To test this hypothesis, a longitudinal design is required, and, to the best of our knowledge, there is only

one study that has approximated this goal (Ostfeld, Kasl, D'Atri, & Fitzgerald, 1987). Indirect support of the model may be gathered from comparisons of the relative strength of the relationships between population density and a variety of outcomes. That is, we would expect that reports of physiological and psychological stress would be relatively easy to come by and that the findings would be robust, whereas observations of violent behavior would be more infrequent and equivocal.

To explore this model, we undertook both a qualitative and quantitative review of the prison crowding literature. Studies that provided sufficient statistical information on the relationship between population density and the dependent variable were subject to a meta-analysis. The dependent variable was arranged into three categories: physiological, psychological, and behavioral. Some studies reported more than one measure within a category. In these situations, we gave priority to systolic blood pressure for the physiological category, a paper-and-pencil measure of perceived crowding described by Paulus (1988) for the psychological category, and misconduct for the behavioral category. These measures were the most frequently used. We would have liked to categorize the measures of crowding into aggregate, social, and spatial density, but to have done so would have drastically reduced our samples in each cell.

The strength of the relationship, or effect size, was measured by Cohen's *d* (1977) and calculated using the statistical conversion formulas described by Glass, McGaw, and Smith (1981). In our analysis, *d* indicated the size of the difference in standard units between crowded and noncrowded conditions. Standardizing the measures (*d*) allowed us to compare results from different studies. For studies that reported nonsignificant results, *d* was set at zero. The results of this meta-analysis are shown in Table 1.

As can be seen from Table 1, physiological and psychological stress responses (Outcomes A and B) were very likely under crowded prison conditions. The majority of studies employing such measures found significant results. The one inconsistent finding was the *inverse* relationship between crowding and blood pressure ($d = -.70$) reported by McCain, Cox, and Paulus (1980). This may have been a spurious result because there was no relationship between blood pressure and crowding for the institution in question for the previous year (1978). If this size effect is removed from the calculation of the mean, then we obtain a mean of $d = .51$ for Outcome A, which is quite consistent with the model. In the case of behavioral acting-out, the strength of the relationship diminished to the point of being relatively insignificant as the studies ranged in effect size from $-.90$ to $+.87$.

While the results outlined under Outcomes A and B seem straightforward, some clarification is required. That is, although physiological stress in response to population density was the rule, reports of psychological stress concomitant with physiological stress were not always observed and, for the most part, rarely studied. When the two were observed together, the relationship was usually dependent upon other variables. In 1973, Paulus, McCain, and Cox reported (no data were presented) that social density was related to a physiological measure of stress (palmer sweat) but not to a subjective appraisal of feeling crowded. How-

Table 1. Effect Size of Outcome for Prison Crowding[a]

Study	Sample	Outcome A	Outcome B	Outcome C
D'Atri (1975)	34 adults (M)	1.19		
D'Atri & Ostfeld (1975)	91 adults (M)	1.06		
	126 adults (M)	1.05		
D'Atri et al. (1981)	37 adults (M)	.79		
Ostfeld et al. (1987)	128 adults (M)	.54	n.s.	
McCain et al. (1976)	64 adults (M)		.53	
Paulus et al. (1975)	121 adults (M)		.34	
McCain et al. (1980)	206 adults (M)	n.s.		
	183 adults (M)	n.s.	.82	
	87 adults (M)	−.70		
	121 adults (M)	n.s.		
	212 adults (M/F)		.51	
Ray et al. (1982)	115 juveniles (M)	n.s.		
Ruback & Carr (1984)	561 adults (F)			.37
Jan (1980)	4 adult prisons (M/F)			.43
Megargee (1977)	1 adult prison (M)			.87
Nacci et al. (1977)	37 adult prisons (M/F)			.47
Bonta & Kiem (1978)	1 adult prison (M)			n.s.
Bonta & Nanckivell (1980)	1 adult prison (M)			−.52
Clayton & Carr (1984)	21,500 adults (?)			n.s.
	1,203 adults (?)			.70
Porporino & Dudley (1984)	24 adult prisons (M)			−.90
Ekland-Olson et al. (1983)	14 adult prisons (M/F)			n.s.
N of studies		10	5	11
Means		.39	.44	.13
SD		.62	.30	.52

[a] A = Physiological measures (blood pressure, heart rate); B = Psychological measures (reports of crowding, discomfort); C = Behavioral measures (assaults, misconducts). Samples may employ male (M) or female (F) inmates or both. Sometimes the composition of the sample was unclear (?).

ever, in a subsequent study (Paulus, Cox, McCain, & Chandler, 1975), which considered length of exposure, there was an increased perception of feeling crowded for inmates in dormitories (high social density) but not for inmates in cells (low social density). Other studies have noted the moderating effect of length of exposure on physiological and psychological measures of stress (D'Atri, 1975; D'Atri, Fitzgerald, Kasl, & Ostfeld, 1981; Paulus, McCain, & Cox, 1978, 1981; McCain, Cox, & Paulus, 1976).

In the one longitudinal study reported in the literature, Ostfeld and his colleagues (1987) followed 128 inmates through their incarceration to release and postrelease. Physiological and psychological measures were taken at regular intervals and controls were introduced for other confounding variables such as weight and criminal history. They found changes in blood pressure associated with population density but no statistically significant changes for anxiety, hostility, and depression.

These studies, nevertheless, suggested a positive relationship between social density and physiological indicators of stress and subjective reports of discomfort.

Indications of physiological stress appear as immediate consequences to high social density, and it is possible that with increased exposure to such a situation other cumulative consequences such as psychological distress may follow (Paulus et al., 1975).

It is most important, however, from a policy perspective, to evaluate whether or not population density is related to severe, disruptive behavior that may jeopardize the physical safety of the inmates. The findings as shown in Table 1 do not support an overall relationship between crowding and disruptive inmate behavior.

Megargee (1977) was the first to empirically study the relationship between crowding and reported disciplinary infractions. He collected data over a 3-year span at a medium security prison for youthful offenders (aged 18 to 25). Spatial density was more highly correlated with institutional misconduct than was social density, but social interaction factors (e.g., friendship ties) may have played an important role. Density, without distinction to spatial or social density, and disciplinary infractions are, according to some investigators, positively related (Cox, Paulus, & McCain, 1984; Jan, 1980; Nacci, Teitelbaum, & Prather, 1977; Paulus et al., 1981; Ruback & Carr, 1984), but no such association was found by others (Bonta & Kiem, 1978; Bonta & Nanckivell, 1980; Clayton & Carr, 1984; Ekland-Olson, Barrick, & Cohen, 1983; Porporino & Dudley, 1984).

From our appraisal of the empirical literature we cannot conclude that high population density is always associated with aggressive behavior. Most researchers agree that other variables play important moderating roles (Bonta, 1986; Cox et al., 1984; Ellis, 1984). One important moderator variable is age of the inmates. The relationship between misconduct and population density has been more pronounced in institutions housing young offenders (Ekland-Olsen et al., 1983; Jan, 1980; Megargee, 1977; Nacci et al., 1977). Even in studies that failed to uncover a general positive relationship, the introduction of age as a moderator showed a correlation between population density and misconduct (Bonta & Kiem, 1978; Bonta & Nanckivell, 1980; Clayton & Carr, 1984; Ekland-Olson et al., 1983). In the Ekland-Olson et al. study (1983), when institutions with a relatively young population (median age of 27) were selected for analysis, a highly significant correlation was found ($r = .58$ or a $d = 1.43$). The authors concluded that age is a much better predictor of disciplinary infractions than prison size.

Only one study (Gaes & McGuire, 1985) discounts the importance of age. Gaes and McGuire (1985) assessed a variety of predictors along with age and under these conditions age became relatively less important. The authors observed that most studies of overcrowding and misconduct typically assess few variables and may overestimate the importance of any one variable.

Interpreting the behavioral consequences of prison overcrowding is further confounded by the use of aggregate level data. As Table 1 clearly shows, almost all the studies under Outcome C are aggregate level data. The problem with this level of analysis is that many other factors (e.g., age, release policies) may play more important roles than population density. Clayton and Carr (1987) have shown that aggregate data analysis overestimates the relationship between crowding and behavior (a point already made in the preceding paragraph). In their study investigating the relationship between prison overcrowding and recidivism (2

years postrelease), age was the critical variable. The only other study that used recidivism as an outcome measure was by Farrington and Nuttall (1980), and they found a significant relationship between crowding and postrelease recidivism. However, Gaes (1983) has suggested that other extraneous variables (e.g., age, staff–inmate ratios) could better account for the results.

Although age has consistently been identified as an important moderating variable, explanations of why this is so have not been carefully researched. Are the young simply impulsive, lack coping skills, and more easily susceptible to stress? MacKenzie (1987) found oppositional or "assertive" attitudes and fear of victimization rather than coping ability as most relevant to misconducts. Clearly further research on this issue is desirable.

The identification of person variables as moderators in the experience of prison crowding raises the enduring issue of importation versus deprivation. That is, are the behaviors observed in prison reflective of behavioral patterns that were present prior to incarceration or a response to the deprivation of liberties imposed by confinement? As Freedman (1975) wrote, "crowding has neither good nor bad effects but rather serves to intensify the individual's typical reactions to a situation" (p. 89). Thus, the disciplinary infractions observed in crowded prisons may be the result of either high population densities or a continuation of behaviors that existed before incarceration, or both. As Ruback and Innes (1988) have remarked, there are no studies that have partitioned inmates with violent histories from nonviolent inmates. This is very important because it is usually the maximum security settings that are crowded, and they are also the settings most likely to house violent inmates. The possibility of an interaction can be seen in Smith's (1982) account of how assertive inmates became more aggressive and the passive inmates more submissive under crowded conditions.

There are other factors, besides person variables, that may influence aggressive behavior in crowded prisons. For instance, crowded prisons may be poorly managed (Gaes, 1985). Although prison populations may fluctuate widely, corresponding changes in the number of supervisory staff, counselors, and programs rarely occur. When the population is large, there are fewer correctional staff to monitor behavior and provide inmates with the opportunities to learn adaptive coping skills. The management of prisons and prison systems may account for some inmate disturbances. A case in point is the occurrence of sudden changes in the population membership (Ellis, 1984). Porporino and Dudley (1984), in reviewing evidence from 24 Canadian penitentiaries, found high inmate turnover more important than population density in the prediction of inmate disruptions. The authors speculated that inmates are required to deal with newly arrived inmates more frequently and this may be extremely stressful. For example, in the 1980 New Mexico prison riot, the inmate population was not at its peak but there was a sudden influx of new inmates in the months preceding the riot (Colvin, 1982).

Another factor appears to be the chronicity of the situation (Megargee, 1977). That is, as sentence length or exposure to crowded situations increase so does the risk for misconduct (Bonta & Nanckivell, 1980; Nacci et al., 1977). This is a tentative conclusion because of other confounding factors such as age and type of institution (Jan, 1980; Paulus, 1988).

In summary, crowded prisons may produce physiological and psychological stress among many inmates. More disruptive effects however, depend upon moderating person variables such as age, institutional parameters (e.g., sudden shifts in the inmate membership), and the chronicity of the situation. In addition, aggressive behavior may be a cumulative effect of high population densities. More research into the parameters that govern this effect is required.

Two theoretical models have been advanced in an effort to explain the inmate's response to prison overcrowding. The social-interaction demand model favored by Paulus and his colleagues (Cox et al., 1984; Paulus, 1988) assumes that social interactions interfere with goal attainment and increase uncertainty and cognitive load. That is, it is the nature of the social interactions that may produce negative effects and high population densities are important only to the degree that they affect social interactions. The second model is based on a cognitive social-learning model (Bonta, 1986; Ellis, 1984; see also Cox, Paulus, & McCain for a critique of this model.)

This latter model places greater emphasis on individual differences (person variables) and stresses two processes: attribution and learned coping behavior. Increases in population density produce changes not only in social interactions but also changes in noise level, temperature, etc., and these in turn produce physiological arousal. When inmates attribute this arousal to violation of their personal space rather than some other factor they then report feeling crowded. Once the attribution is made, existing coping behaviors are activated with the goal to reduce arousal and feelings of crowding.

Except for MacKenzie's (1987) findings, penal researchers have found that coping behavior plays a significant role in the inmates' response to incarceration and that inmates vary in the effectiveness of their coping behaviors (cf. Zamble & Porporino, 1990). Clements (1979) has suggested that coping behavior may be influential in the inmates' adaptation to prison overcrowding, although some of these behaviors, such as assault and suicide (Cox et al., 1984; Megargee, 1977), are clearly not adaptive. Unfortunately, poor coping skills are all too prevalent among inmate populations and this is reflected in their disruptive behavioral responses to high population densities. However, other behaviors can alleviate crowding-induced arousal and at the same time be adaptive. For example, classroom attendance (Jan, 1980; Lawrence, 1985) and psychological interventions (Karlin, Katz, Epstein, & Woodfolk, 1979) have been shown to decrease feelings of being crowded. Besides searching for ways to control the prison population growth we can also develop programs to teach individual inmates more effective skills to cope with high prison populations.

Health Risks

As we have seen with the prison crowding literature, it is not uncommon to observe physiological and psychological distress associated with high population densities. Such outcomes are also commonly associated with stress and physical disorders. In fact, many studies of prison overcrowding will use illness complaints as a dependent measure. Thus, we now turn our attention to a related topic and ask ourselves if imprisonment threatens the health of the confined.

Most of the research has dealt with the identification and description of illnesses reported by prisoners (cf., Novick & Al-Ibrahim, 1977). Available data fail to clearly indicate whether inmates display more or less health risks than the general population. When threats to health come from suicide and self-mutilation, then inmates are clearly at risk. Though it is widely believed that the risk of homicide is greater within prison than in the community, the evidence is mixed. In Canadian penitentiaries, the homicide rates are close to 20 times that of similar-aged males in Canadian society (Porporino & Martin, 1983). In the United States, deaths due to homicide are actually less likely within prison (Ruback & Innes, 1988). With respect to self-injurious behavior, the results are more consistent. Inmate suicides for a 20-year period in the United States were at a rate of 17.5 per 100,000 inmates in contrast to 11 per 100,000 people in the general population (Austin & Unkovic, 1977). Self-mutilations are at an even higher rate (Ross & McKay, 1979).

When one examines the incidence of physical illnesses, the findings are less conclusive. One of the classic studies comes from Jones (1976) who surveyed the health risks of Tennessee prisoners and compared them where possible to probationers and data existing on the general adult male U.S. population. The patterns of results are rather complex but, by and large, a variety of health problems, injuries, and selected symptoms of psychological distress were higher for certain classes of inmates than probationers, parolees, and, where data existed, for the general population.

In contrast to Jones (1976), a number of other researchers have failed to find deleterious effects on health. Goldsmith (1972) followed 50 inmates over a 2-month period and found no major health problems as assessed by physical examinations. On a larger inmate sample ($N = 491$), Derro (1978) found that only 12% of the symptoms reported on admission related to a significant illness. This is an important point because many studies "count" health care contacts without differentiating the nature of the contact. Inmates may seek the aid of health care professionals for reasons other than a physical illness.

Two studies also reported a significantly lower incidence of hypertension among inmates compared to the general population. Culpepper and Froom (1980) found the incidence of hypertension among a prison population at 6%. In another study (Novick, Della-Penna, Schwartz, Remlinger, & Lowenstein, 1977), the incidence of hypertension among 1,300 inmates was 4.5%. We remind the reader, however, that this finding relates to the effects of incarceration in general and not to specific conditions such as prison crowding where the results are different (Gaes, 1985).

One of the problems with the interpretation of the above data has been that there is so little use of adequate control groups especially with respect to age and race (see Ruback & Innes, 1988 for a notable exception). Also, Baird (1977) found that many prisoners with physical complaints were displaying a variety of health risks well *before* incarceration. As a case in point, Bentz and Noel (1983) found that upon entering prison, inmates were reporting a higher incidence of psychiatric disorder than a sample of a rural population in North Carolina. This finding is also of interest in light of Gibbs' (1987) claim that incarceration aggravates

psychological symptomatology (we will say more about this in the discussion on short-term detention).

A final consideration is that many prisons may actually be conducive to good health. In a number of cases, illness complaints have either decreased with time served (MacKenzie & Goodstein, 1985) or remained unchanged (Wormith, 1986). In most prisons, inmates have regular and nutritious diets, access to recreational exercise, and opportunity to sleep. Furthermore, offenders can obtain fairly immediate health care. Because of this last possibility, health risks could easily be overreported in prisons with extensive health services and thus bias some of the research findings.

In summary, the current findings recall Glueck and Glueck's (1950) comparison of 500 delinquents with 500 nondelinquents: In training school, the boys were generally healthy and physically fit, whereas in the community, as a result of their adventurous lifestyles, they were prone to more serious accidents. More than 35 years later, Ruback and Innes (1988) make this same observation based upon information from adult inmates. Thus, as far as physical health is concerned, imprisonment may have the fortuitous benefit of isolating the offender from a highly risky lifestyle in the community.

Long-Term Incarceration

In 1984 there were approximately 1,500 offenders serving life sentences in Canadian prisons (Wormith, 1984) and with recent legislation defining minimum sentences (25 years) without parole for first and second degree murder, those numbers are expected to increase significantly. Similar trends have also been noted in the United States, where mandatory and lengthy prison terms have been widely implemented (cf., Cullen & Gilbert, 1982). What happens to these people as a result of such lengthy sentences? Most of the research has focused upon time spans not longer than 2 or 3 years, and our knowledge regarding offenders serving sentences of 5, 10, or more years is less adequate.

Using cross-sectional designs, Heskin and his colleagues measured inmates' performances on cognitive tests (Banister, Smith, Heskin, & Bolton, 1973), personality measures (Heskin, Smith, Banister, & Bolton, 1973), and attitudinal scales (Heskin, Bolton, Smith, & Banister, 1974). Four groups of prisoners, all sentenced to at least 10 years, were studied. The average time served was 2.5 years for the first group of inmates, 4.9 years for the second group, 6.9 years for the third, and 11.3 for the last group. No differences were found among the groups in intellectual performance, although there was a decline in perceptual motor speed on the cognitive tasks (Banister et al., 1973). On the personality and attitudinal tests, there were increases in hostility and social introversion (Heskin et al., 1973) and decreases in self-evaluations and evaluations of work and father (Heskin et al., 1974).

Subsequently, Bolton, Smith, Heskin, and Banister (1976) retested 154 of the original 175 inmates in the Heskin research (average retest interval was 2 years). Their findings showed no evidence of psychological deterioration. In fact, verbal intelligence improved over time and hostility decreased. The findings with respect

to hostility are in contrast to the cross-sectional studies, but, as the authors noted, there was a significant drop-out rate. Furthermore, the initial testing occurred during a period of institutional tensions, which may have produced artificially high hostility scores.

Sapsford (1978) administered a psychometric test battery to 60 prisoners sentenced to life imprisonment. The prisoners formed three groups: (1) reception (newly received), (2) middle (6th year of sentence), and (3) hard core (average sentence served was 14 years). Some matching was attempted but it is not clear the extent to which the procedure was successful. From the results, only three inmates could be described as having failed to cope with their sentence. The only deteriorating effects observed were increases in dependency upon staff for direction and social introversion. In fact, depression and anxiety were lower for inmates serving longer sentences.

Reed's (1978) geriatric prisoner research also has relevance to the issue. His aged prisoners (mean age of 60 years), with an average sentence served of 23 years, reported fewer life problems than their peers in the outside community. Furthermore, they reported active interests and feeling younger than their age.

Similarly, Richards (1978) also failed to note negative differences between British prisoners who had served at least 8 years of their sentence and inmates who had served more than 10 years. The two groups were matched on age at sentencing and type of offense. The inmates were asked to rate the frequency and severity of 20 different problems that may be initiated by incarceration (e.g., missing social life, sexual frustration). The results showed no differences in the perception of problems by the two groups, and there was agreement by the inmates that coping could be best accomplished by relying on "myself."

Utilizing Richard's (1978) problem-ranking task, Flanagan (1980a) assessed American inmates who had served at least 5 years and compared his results to those reported by Richards (1978). He found that the American inmates perceived similar problems to those reported by the British prisoners in that they also did not perceive the problems as particularly threatening to their mental health. Furthermore, they preferred to cope with their sentences on their own rather than seek the aid of others. In another study, Flanagan (1980b) compared misconduct rates of 701 short-term prisoners (less than 5 years) and 765 long-term inmates. Even after controlling for age, the misconduct rate among the long-term inmates was approximately half that of the short-term offenders.

Rasch (1981) assessed lifers who had served 3, 8.5, and 13.5 years and found no deterioration in health, psychiatric symptoms, or intellect. The results of MMPI testing documented decreased pathology over time, replicating Sapsford's (1980) findings. Another German study, cited by Wormith (1984a), apparently found similar results. Moreover, when long-term inmates (20 years) displayed pathology, such behaviors were apparent long before incarceration.

A series of studies conducted by Wormith (1984, 1986) observed a differential impact from long-term incarceration. In the first study (Wormith, 1984), 269 inmates who had served from 1 month to 10 years were administered a psychometric test battery. Once again those inmates who had served the most time displayed significantly less deviance. This relationship remained even after the introduction

of controls for sentence length, age upon admission, and race. Improvement over time was also noted on attitudinal measures and nonpathological personality characteristics. Finally, changes in intelligence did not vary with length of incarceration.

The second study by Wormith (1986) consisted of a random sample of 634 male prisoners stratified according to sentence length and time served. Long-term inmates (8 years to life), compared to short-term inmates, demonstrated better adjustment on measures of self-reports of emotions and attitudes (e.g., anger) and institution discipline. On measures of criminal sentiments, long-term offenders displayed a U-shaped function while short-term offenders became more antisocial. As expected, long-term inmates had deteriorating community relationships over time but made more use of institutional programs (e.g., education), which was likely important for a successful adaptation to prison life.

MacKenzie and Goodstein (1985) reported findings similar to those described by Wormith (1984; 1986). Long-term inmates (more than 6 years served) found the earlier portion of their sentences more stressful, but with time they learned to cope effectively. Of particular interest was their differentiation of two subgroups of long-term offenders. Using prison experience as a discriminating factor, they identified two groups, inmates with minimal prison experience (lifers) and inmates with extensive prison experience (habituals). Both groups showed the same adjustment patterns, contrary to the expectation that habituals would evidence disruptive behaviors. Similar findings with respect to female offenders have also been reported by MacKenzie, Robinson, and Campbell (1989). In fact, long-term inmates were more bothered by boredom and lack of activities than by anxiety.

Most of the above studies have been cross-sectional. A publication by Zamble and Porporino (1990) on how inmates cope with prison assumes importance for two reasons. First, it is longitudinal. Of their sample (N = 133), 30% were serving sentences of more than 10 years. They were assessed within 1 month of admission and 1½ years later. Zamble and Porporino found no *overall* indication of deterioration of coping skills over time, even for inmates serving their first incarceration. As well, there was no increase in identification with "criminal others" and their "view of the world" did not change. The authors surmise that as prisons, by and large, constrain behavior and do little to encourage changes in behavior one way or the other, inmates typically undergo a "behavioral deep freeze." The outside-world behaviors that led the offender into trouble prior to imprisonment remain until release.

Secondly, it is important to emphasize that Zamble and Proporino do not in the least deny the fact that individual differences are meaningful. They reported that how some inmates coped with incarceration correlated with postprison recidivism. For example, some of the significant factors were changes in perceptions of prison life, degree and type of socialization with incarcerated peers, planning for the future, and motivation regarding work and educational goals. We will return to this point later.

In summary, from the available evidence and on the dimensions measured, there is little to support the conclusion that long-term imprisonment necessarily has detrimental effects. As a caution, however, Flanagan (1982) claims that lifers

may change upon other dimensions that have yet to be objectively measured. For example, family separation issues and vocational skill training needs present unique difficulties for long-term inmates (Wilson & Vito, 1988). Unfortunately, cross-sectional designs and, until recently, small subject populations have been characteristic of these studies.

Solitary Confinement

Solitary confinement is "the most individually destructive, psychologically crippling and socially alienating experience that could conceivably exist within the borders of the country" (p. 243). So wrote Jackson (1983) in his scathing denouncement of the use of solitary confinement for prisoners. The commonly accepted definition of prison solitary confinement is maximum security lock-up, usually for punitive reasons. Sensory stimulation is very limited. The inmate may have a book to read and access to a half hour of "recreation" (alone). Conditions of prison solitary should not be confused with other forms of protective segregation (cf., Gendreau, Wormith, & Tellier, 1985) where admission is usually voluntary, and the inmate has access to programming, TV, and so forth. No doubt, if any prison experience is evidence of cruel and unusual punishment, then surely that experience is prison solitary.

In contrast to the popular notions of solitary's negative effects, there exists an extensive experimental literature on the effects of placing people (usually volunteer college students) in solitary, or conditions of sensory deprivation, which has been ignored in the penology literature. It should be noted that the conditions in some of the sensory deprivation experiments are more severe than that found in prison solitary (cf., Gendreau & Bonta, 1984). In fact, this literature (cf., Suedfeld, 1980; Zubek, 1969) has much relevance to prison solitary confinement. Considerable research has also been undertaken with prisoners themselves (Gendreau & Bonta, 1984), and many of these studies are, methodologically, the most rigorous of all the prison studies. Therefore, conclusions drawn from this source are especially informative.

Experimental studies (Ecclestone, Gendreau, & Knox, 1974; Gendreau, Freedman, Wilde, & Scott, 1968, 1972; Gendreau, Horton, Hooper, Freedman, Wilde, & Scott, 1968; Gendreau, McClean, Parsons, Drake, & Ecclestone, 1970; Walters, Callaghan, & Newman, 1963) have found few detrimental effects for subjects placed in solitary confinement for periods up to 10 days. All but one of these studies employed random assignment and most employed a double blind assessment of dependent variables. Perceptual and motor abilities were not impaired, physiological levels of stress were lower than for the control groups, and various attitudes toward the environment and the self did not worsen. Individual differences have also been observed. Experience with prison life, conceptual ability, anxiety, diurnal adrenal levels, and EEG patterns were related to some of the results reported, although it should be noted that results are based upon very small sample sizes. Some of the experimental studies even reported beneficial results (cf., Suedfeld, 1980). In certain respects, the prison literature (Gendreau et al., 1972) is quite consistent with the experimental sensory deprivation laboratory data (e.g., Suedfeld, 1980; Zubek, Shepard, & Milstein, 1970).

In contrast to the studies that used volunteer subjects, Weinberg (1967) looked at 20 inmates who were involuntarily placed for 5 days in solitary confinement. Using measures such as cognitive and personality tests, language usage, and time estimation, he, too, found no deleterious effects. Suedfeld, Ramirez, and Baker-Brown (1982), also studying inmates involuntarily in solitary confinement, also failed to find detrimental effects. Their data were collected from five prisons in Canada and the United States, and they found that, in general, inmates found the first 72 hours the most difficult but after that they adjusted quite well. The authors reached this conclusion: "Our data lend no support to the claim that solitary confinement . . . is overwhelmingly aversive, stressful, or damaging to the inmates" (p. 335).

In contrast, Cormier and Williams (1966) and Grassian (1983) recorded signs of pathology for inmates incarcerated in solitary for periods up to a year. No objective measures or control groups were used. In the former study, most of the inmates exhibited substantial pathology prior to solitary. In the second study, all subjects were involved in a class action suit against their keepers at the time of the interview, and the author actively encouraged more disclosure when the inmates were not forthcoming with reports of distress. Similarly, the experimental literature on sensory deprivation demonstrates that once controls for set and expectancies are introduced, bizarre experiences, under even the most severe conditions (immobilization and sensory deprivation for 14 days), were minimal for the majority of subjects (e.g., Zubek, Bayer, & Shepard, 1969).

The real culprit may not necessarily be the condition of solitary per se but the manner in which inmates have been treated. There is evidence suggesting that this is the basis for most inmate complaints (Suedfeld, 1980; Vantour, 1975). Jackson (1983) himself acceded to this fact. When inmates are dealt with capriciously by management or individual custodial officers, psychological stress can be created even in the most humane of prison environments. Therefore, solitary confinement may not be cruel and unusual punishment under the humane and time-limited conditions investigated in experimental studies or in correctional jurisdictions that have well-defined and effectively administered ethical guidelines for its use.

We must emphasize that this is *not* an argument for employing solitary and certainly not for the absurdly lengthy periods as documented by Jackson (1983). Gendreau and Bonta (1984) have outlined several research issues that urgently need to be addressed. Some of these are studies investigating individual tolerance of solitary confinement, its possible deterrent effect, and a compelling need to find alternatives to humanely restrain those who are a danger to themselves and others while incarcerated. With rare exceptions (Barak-Glantz, 1983), the necessary research has not been conducted.

Short-Term Detention

In 1972, nearly 4,000 jails in the United States processed 1 million male and female offenders per year (Miller, 1978). The offenders were charged with a variety of crimes and approximately 75% of them were awaiting trial. Despite the extensive use of jails, little is known about the effects of short-term detention.

Perhaps this is the area that requires most attention, as it is the initial adjustment phases that are important in assessing the impact of incarceration. For example, 50% of suicides occur in the first 24 hours of imprisonment (Hayes, 1983).

A common belief is that waiting for trial and sentencing produces a considerable amount of anxiety (Cholst, 1979; Dy, 1974; Gibbs, 1982; Schneider, 1979). More specifically, anxiety increases as the trial and sentencing dates approach and then decreases after sentencing when the uncertainty surrounding trial has passed.

A study by Dyer (reported in Krug, Sacheier, & Cattell, 1976) is difficult to evaluate because of the lack of information provided. Dyer administered an anxiety scale to adolescent females and found a decrease in anxiety over time in detention. However, no information regarding the number of subjects, the setting, and the interval between tests was provided. Oleski (1977) administered the same scale to 60 male inmates (ages 18 to 26) in a Boston city jail. All were awaiting trial and all had limited prior prison experience. The tests were administered 1 week after admission and again 8 weeks later. Anxiety levels were found to be higher at posttest.

Bonta and Nanckivell (1980) administered the same anxiety scale used in the previous studies to four groups of inmates selected without age and court status limitations. Group 1 inmates were remanded into custody and sentenced by the time they were retested. Group 2 were still awaiting sentencing. Group 3 inmates entered the jail already sentenced, and Group 4 was a control group for the effects of testing. The test was administered within 1 week of reception and again 3 to 4 weeks later. No changes in anxiety over time or after sentencing were observed.

Gibbs (1987) assessed psychopathology among 339 jail inmates. The inmates were asked to rate symptoms prior to incarceration, 72 hours into confinement, and again 5 days later. He found symptoms to increase between preincarceration and 72 hours of imprisonment and interpreted this finding as showing that detention per se affects symptoms. However, the interpretation is not entirely convincing. First of all, symptomatology prior to incarceration was based upon the inmates' recollections of their difficulties before detention and thus subject to memory and reporting biases. Second, at the 5-day retest, symptoms actually diminished, and third, the finding that those without prior hospitalizations did worse was a puzzling finding and not consistent with the prison as stress model.

There is another intriguing, albeit tangential, aspect to the short-term detention literature, and that is the use of short-term detention as a deterrent. Three common strategies are "Scared Straight," "boot camp," and shock probation programs. The assumption is that prison life is aversive in some form or other and that exposure to it will decrease the probability of future criminal behavior, particularly for impressionable young offenders.

The classic evaluation of "Scared Straight" by Finckenauer and Storti (1978) found only one of nine attitudinal measures significantly changed for juveniles as a result of brief exposure to hardened prisoners and no reduction in recidivism (Finckenauer, 1979). Other variations on the original program have also found no overall deterrent effect (Buckner & Chesney-Lind, 1983; Lewis, 1983), although some individual differences were noted. Similarly, there is now general consensus

that shock probation (i.e., short prison terms prior to probation) has also failed to demonstrate significant deterrent effects (Boudouris & Turnbull, 1985; Friday & Peterson, 1973; Vito, 1984). There is even one report (Vito, Holmes, & Wilson, 1985) suggesting that shock probation for a subgroup of probationers increased recidivism!

Some jurisdictions have received media attention by employing quasimilitary, boot camp regimes for offenders. In the only evaluation with a follow-up that we are aware of—although more will be forthcoming in the near future (MacKenzie, personal communication)—juveniles taking part in such a program did not have reduced reconviction rates compared to nonparticipatory youths (Thornton, Curran, Grayson, & Holloway, 1984). Curiously, older adolescents reported an easier time in the program compared to their previous experiences with incarceration.

Death Row

Once an issue of little importance, the pragmatics of how best to deal with inmates awaiting capital punishment is now of particular concern. The rate of death penalty commitments between 1981 and 1983 ranged from 228 to 264 per year in the United States, and these rates are expected to remain in the same range (Cheatwood, 1985). Since the rate of executions is far lower, a considerable number of offenders are on death rows waiting out lengthy appeal applications. In fact, psychiatrists are now being asked to assess the death row inmate's appreciation of the appeal process and competency for execution (Kenner, 1986). In 1985, nearly 1,500 inmates were in this situation (Cheatwood, 1985). The growing numbers have led to crowded conditions on some death rows, and, in one incident, apparently motivated two condemned prisoners to take hostages as a sign of protest (*The Citizen,* 1986).

Very little evidence is available on how inmates adjust to death row. Perhaps the first study reported is that by Bluestone and McGahee (1962). They interviewed 19 inmates (18 men and one woman) awaiting execution at Sing Sing prison. Expecting to find intense anxiety and depression, they found none. Gallemore and Panton (1972) tested 8 men awaiting execution at reception and several times thereafter up to a period of 2 years. Five men showed no observable deterioration upon the measures employed whereas 3 reported symptoms ranging from paranoia to insomnia. In a further study of 34 inmates on death row, Panton (1976) compared their MMPI profiles with a large prison sample. Death row inmates showed increased feelings of depression and hopelessness. Severe disturbances (e.g., psychosis) were not observed.

Johnson (1982) interviewed 35 men on death row and found them concerned over their powerlessness, fearful of their surroundings, and feeling emotionally drained. Younger inmates were more susceptible to these concerns. However, no comparison group was employed and the prevalence of these feelings among inmates in general is unknown.

Smith and Felix (1986) conducted unstructured psychiatric interviews of 34 death row inmates. Most of their sample exhibited well-intact defenses regarding

their alleged guilt. Only 7 inmates evidenced a depressed mood that might have required further counseling intervention. Debro, Murty, Roebuck, and McCann (1987) interviewed 25 death row inmates and found that *all* slept well and felt relatively good about themselves. None requested or received tranquilizers. Finally, in a rare study of death row inmates who had their sentences commuted to life imprisonment, 23 inmates (46%) showed no change in personality functioning as measured by the MMPI (Dahlstrom, Panton, Bain, & Dahlstrom, 1986). Furthermore, 18 (36%) showed an improvement while only 9 (18%) deteriorated.

This literature, inadequate as it is, is meaningful for what it fails to produce—evidence of severe psychological reactions to a tragic fate. Why this is so is unclear. Some (Bluestone & McGahee, 1962; Smith & Felix, 1986) have suggested that death row inmates have particularly well-developed defense mechanisms, but this hypothesis has been based solely on subjective clinical impressions. In fact, it may be those associated with the condemned inmate (family, prison staff, etc.) that suffer more (Smykla, 1987). The limited data are a testimony to the ability of men to cope with the worst of consequences.

SUMMARY AND CONCLUSIONS

When it comes to scholarly inquiry in the field of criminal justice, a pernicious tendency has been to invoke rhetoric over reality and affirm ideology over respect for empirical evidence. We have witnessed this sad state of affairs in the debates over the effectiveness of rehabilitation, personality and crime, and the relationship between social class and criminal behavior (Andrews & Wormith, 1989; Cullen & Gendreau, 1989).

If we are to make progress in understanding what it is our prisons do to inmates, then we must respect the available evidence. We do not discount the importance of phenomenology in assessing prison life; this line of inquiry does provide valuable insight (e.g., Toch, 1977). But, if we stray too far from the epistemic values that are crucial to a vigorous social science then we run the risk of marking disastrous policy decisions. Therefore, if we are to have a more constructive agenda we must face the fact that simplistic notions of the "pains of imprisonment" simply will not be instructive and will mitigate against the inmate's well-being.

The facts are that long-term imprisonment and specific conditions of confinement such as solitary, under limiting and humane conditions, fail to show any sort of profound detrimental effects. The crowding literature indicates that moderating variables play a crucial role. The health risks to inmates appear minimal. Unfortunately prisons, in a way, may minimize some stress by removing the need to make daily decisions that are important for community living (Zamble & Porporino, 1990).

If we approach prison life with sensitivity, however, we will foster a much more realistic and proactive research and policy agenda. Our literature review revealed considerable support for this notion. We repeatedly found that interac-

tions between certain types of individual differences and situational components explained a meaningful percentage of the variance. To illustrate, we found that age, changes in the prison population, and the chronicity of the situation had profound influences on the responses of inmates to high population density. There also appear to be some cognitive and biological individual differences that may influence adjustment to solitary confinement.

In regard to the above, it is important that the assessment of environments reach the same level of methodological sophistication as the assessment of individuals. There have been some promising developments toward that end. Wenk and Moos (1972) have developed the Correctional Institutions Environment Scale; Toch (1977), the Prison Preference Profile; and Wright (1985), the Prison Environment Inventory. These are initial steps and it is hoped that research along these lines will continue.

Our final comments are in regard to theory development. To date, the incarceration literature has been very much influenced by a "pains of imprisonment" model. This model views imprisonment as psychologically harmful. However, the empirical data we reviewed question the validity of the view that imprisonment is *universally* painful. Solitary confinement, under limiting and humane conditions, long-term imprisonment, and short-term detention fail to show detrimental effects. From a physical health standpoint, inmates appear more healthy than their community counterparts. We have little data on the effects of death row, and the crowding literature indicates that moderating variables play a crucial role.

On a brighter note, the stress model does provide a positive agenda for ameliorative action. In the long-term incarceration literature, researchers (Zamble, 1989; Zamble & Porporino, 1988, 1990) have found that some inmates cope successfully with prison but others do not and that the type of coping is modestly related to future recidivism. Furthermore, on the basis of their analysis, if emotional distress is reported by inmates, it is more often early on in their incarceration. It is at this point that they may be receptive to treatment. The implications for the timing of prison-based treatment programs is obvious. The crucial point is that on the basis of this evidence, we can now develop a variety of cognitive-behavioral and/or skills training programs that could assist prisoners in dealing with their experiences in the most constructive manner possible. There is accumulating and persuasive evidence, moreover, that certain types of offender programming strategies in prison can reduce subsequent recidivism (Andrews, Zinger, Hoge, Bonta, Gendreau, & Cullen, 1989). This proactive agenda, we wish to emphasize, was not forthcoming from those who viewed prisons as invariably destructive. Unfortunately, their recommendations were for almost total deinstitutionalization, which is not only an extreme view, but also one that is totally unpalatable given North American cultural values and the current sociopolitical reality (see Currie, 1985; Glazer, 1989).

In our view, a social learning perspective (cf. Bandura, 1977) provides a more comprehensive explanation of the evidence. Social learning theory examines behavior (attitudes, motor actions, emotions) as a function of the rewards and punishments operating in a prison environment. There is an explicit acceptance of person variables moderating the responsivity to imprisonment. Several questions

emerge from this perspective: *Who* perceives prisons as stressful? *What* aspect of imprisonment shapes behavior? And *how* do individuals respond to imprisonment? Answers to these questions would provide insight into the individuals who do not perceive their environments as stressful while imprisoned and what aspects of imprisonment attenuate the prison experience. In addition, this perspective would clarify the links between emotions, attitudes, and behavior.

From this review, we also see a clear research agenda. Further efforts to understand the effects of prison overcrowding should focus on individual levels of analysis along with multiple measures of the three outcome variables (emotions, attitudes, and behavior). Longitudinal designs (e.g., Zamble & Porporino, 1990) should be the rule. The inherent difficulties in interpreting aggregate level data appear only to confuse our understanding of the impact of crowded conditions on the individual. We need to know under what conditions an individual feels crowded, becomes emotionally distressed, and copes with this distress in a maladaptive manner. For example, Ruback, Carr, and Hopper (1986) suggested that perceived control is a possible mediator. The solution to prison overcrowding is not to embark on a prohibitively expensive prison construction program (Funke, 1985) but rather to alter the rate of intake and release (Skovron, 1988). One way of accomplishing this task is to increase community correctional treatment programs that would allow the diversion of inmates away from prisons (Bonta & Motiuk, 1987). Despite the reluctance of many correctional administrators to develop such programs, there appears to be considerable public support not only for community treatment initiatives (Skovron, Scott, & Cullen, 1988) but for rehabilitation in general (Cullen, Skovron, Scott, & Burton, 1990).

The application of longitudinal designs using data collected at the individual level is also needed in the other areas we have discussed. This is especially so with long-term imprisonment and health risks where the data suggest that if anything, the prison system may actually prevent deterioration. However, only longitudinal designs will allow us to make such a conclusion with any high degree of certainty. If future research leads us to the same conclusion, then the next step would be to identify the system contingencies that support such an environment, for certainly we can learn something positive from this type of result. Finally, and remarkably, we know so little about the psychological impact of a system that houses over a million individuals: the jails. Here, almost any type of reasoned research would be a step in the right direction.

All of the above is easier said than done. The host of issues that need to be researched seem infinite. The methodological complexities in examining both person and situation interaction are pronounced. But, it appears to us to be a positive agenda in order to gain knowledge addressing a vital question.

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EXHIBIT 25

Heigel et al., "Self-Reported Physical Health of Inmates"

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Self-reported physical health of inmates: Impact of incarceration and relation to optimism

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Abstract

This study investigated the relationship between inmates' physical health concerns and optimism. Optimism has been consistently associated with physical health in community samples, but little research has examined this potentially malleable variable in an inmate population. This study of 502 male and female jail inmates attempts to bridge this gap. Results showed optimism was negatively associated with physical health concerns upon entry to jail and prior to release or transfer. Additionally, optimism assessed upon entry to jail predicted modest decreases in physical health concerns over incarceration. Results suggest that optimism is a health-related variable that may be beneficial when optimism-increasing components are integrated into treatment.

Keywords

physical health; optimism; jail; inmates

From June 2005 to June 2006, the US prison and jail population increased 2.8%, housing 2,245,189 inmates (Bureau of Justice Statistics, 2007). This housing is expensive and a substantial part of the cost is medical care – totaling $3.3 billion in state prisons during 2001 (Stephan, 2004). One third of jail inmates in a nationally representative sample reported a physical health problem, many of which were present prior to incarceration (Maruschak & Beck, 2001; Maruschak, 2006). Inmates have a wide variety of health problems ranging from arthritis, asthma, and backaches, to more serious diseases such as hepatitis, HIV, and tuberculosis (Conklin, Lincoln & Tuthill, 2000; Hammett, Harmon & Rhodes, 2002; National Commission on Correctional Health Care, 2002; Staton-Tindall, Duvall, Leukefled & Oser, 2007).

Inmates also have a number of risk factors for health problems. Many come from neighborhoods mired in poverty with limited access to community based health care and often have lower levels of formal education (Glaser & Greifinger, 1993). Additionally, the prevalence of drug and alcohol abuse, and associated health problems, is high among offenders. Moreover, the increasing rate of incarceration of females and older individuals further taxes the medical resources of jails and prisons, as both populations have a higher likelihood of physical health concerns relative to young male inmates (Maruschak & Beck,

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2001; Maruschak, 2006). In general, inmates have a wide variety of risk factors that have been associated with poor physical health (Bureau of Justice Statistics, 2004; Garrity, Hiller, Staton, Webster & Leukefeld, 2002; Harlow, 2003; Staton-Tindall et al., 2007). While useful for planning and prevention purposes, these variables are relatively fixed and do not readily point to areas of intervention for individuals currently incarcerated.

As the care for the physical health of offenders is becoming increasingly expensive, interventions that can improve the offenders' physical health are desirable. Our interest is in identifying more malleable psychological factors that are related to physical health and that can be incorporated into interventions for those currently incarcerated. One possible psychological factor is optimism, the expectation of positive outcomes and confidence in future success (Domino & Conway, 2001; Scheier & Carver 1985).

Cross-sectional results from studies in the general community indicate that higher optimism is associated with fewer mental and physical health problems (Aspinwall & Taylor, 1992; Brissette, Scheier & Carver, 2002; Peterson & Bossio, 2001; Ustundag-Budak & Mocan-Aydin, 2005). More importantly, in longitudinal studies, optimism has been prospectively correlated with outcomes such as a decreased likelihood of becoming ill, reduced severity and length of illness, and faster and more complete recovery following surgery (Carver & Scheier, 2002; Scheier & Carver, 1985; 1987; Scheier et al., 1989). For example, in a longitudinal study of men undergoing coronary artery bypass surgery, Scheier et al. (1989) found that higher levels of optimism the day before surgery was associated with faster rates of physical recovery during hospitalization and better postsurgical quality of life at 6 month and 5 year follow-ups.

Aspinwall, Richter and Hoffman (2001) have offered three explanations for the optimism/positive outcome relationship. First, optimists are likely to utilize more effective and adaptive coping strategies, such as choosing and maintaining appropriate goal-directed behaviors. Second, optimists are better able to distinguish controllable situations from those that are uncontrollable and thus are more likely to demonstrate acceptance in the face of events that they cannot control. Finally, optimists demonstrate more flexible and adaptive thinking than pessimists. Optimists pay more attention to the most useful information available and show evidence of greater flexibility. Aspinwall et al. (2001) posit that optimists' openness to new information allows them to better process information in their environment and respond accordingly. Findings from research with cancer patients indicate that optimists address stressors by reframing negative situations, scan the environment looking for information to apply to their situation, plan and expect recovery, and implement goals that will help them to achieve recovery (Carver et al., 1993; Carver & Scheier, 2002).

Not only have higher levels of optimism been related to better health outcomes in the general community, but optimism is presumably amenable to intervention. Research indicates that there are several interventions that can help individuals increase their level of optimism (Carver & Scheier, 2002; Gillham & Reivich, 2004). One approach is cognitive behavioral therapy (CBT), which may increase optimism by helping individuals change their negative thought patterns. In CBT, individuals learn to identify and evaluate their negative thinking patterns, and generate more realistic and optimistic thoughts and beliefs. Other therapies that teach individuals to set and reach realistic goals also appear to be related to increased levels of optimism (Carver & Scheier, 2002).

Although there is extensive literature examining the relationship between optimism and physical and psychological health in the general community, to date only one article is known to address optimism in an inmate population (van Harreveld, Pligt, Claassen, & Dijk, 2007). In a sample of 30 male inmates in the Netherlands, optimism was associated with

lower concurrent self-reports of mental and physical health problems. Researchers have yet to replicate this finding with female inmates, with larger samples of inmates, or in samples of inmates incarcerated in the United States correctional system, and none have examined inmates' optimism and health longitudinally.

Drawing on data from a larger longitudinal study (Tangney, Mashek & Stuewig, 2007), the current paper addresses three areas. First, we examine the concurrent relationship between self-reported physical health and optimism in a sample of 501 county jail inmates in the U.S. It was hypothesized that, as in community samples, optimism would be negatively associated with reported physical health concerns.

Second, we examine whether the number of reported physical health concerns changes over the course of incarceration. Much of the literature regarding inmates' physical health investigates physical health upon entry to the correctional facility, and medical treatment while incarcerated, but does not adequately address changes in inmates' self-reported health concerns over the course of incarceration. Based on the expectation that participants would have access to services, such as medical exams, medication and a regular diet, which may be unavailable in the community for a substantial portion of inmates (Conklin et al., 2000; Staton-Tindall et al., 2007), it was hypothesized that there would be a decline in reported physical health concerns over the period of incarceration. Although inmates face significant stressors, such as separation from loved ones, loss of freedom, and overcrowding while incarcerated, it was expected the benefits from nutritious meals and access to medical services would offset these negatives.

Third, we examine the possibility that optimism upon incarceration may explain some of the changes in physical health concerns observed over the period of incarceration. We hypothesized that the higher the optimism the more likely symptomatology would decline.

Methods

Participants

The sample consisted of 501 male and female inmates at an urban Adult Detention Center who agreed to participate in a large-scale recidivism study (Tangney et al, 2007). The majority, 349 (69.7%), were male and 152 (30.3%) were female. Participants's ages ranged from 18 to 69 (M = 32, SD = 10). The racial/ethnic background of the participants was 44.8% African American, 35.9% Caucasian, 9.2% Mexican American/Hispanic, 2.8% Asian/Pacific Islander, 7.4% Other/Mixed. The number of days participants were incarcerated ranged from 12 days to 607 days (M = 160.87, SD = 114.04).

Inmates were eligible to participate if they (1) were arrested on at least one felony charge and held without bond or on total bond of at least $7,000; (2) were initially assigned to the jail's medium or maximum security "general population" (e.g., not in solitary confinement or forensics), and (3) had sufficient language proficiency to complete study protocols in English or Spanish.

Participants were eligible for a follow-up assessment just prior to release or transfer from the facility (Time 2) if they had been incarcerated for at least 6 weeks. Of the 502 inmates in the study at Time 1, 407 were eligible for the Time 2 assessment. Of those eligible, 267 (65.6%) were re-interviewed at Time 2. Attrition at Time 2 was primarily due to unanticipated transfer to another correctional facility or unanticipated release to the community; 8 individuals refused to be re-interviewed. Of the 267 inmates interviewed at Time 2, 39 (14.6%) participants had missing data on one or more variables used in this analysis due to incomplete protocols. For Time 2 data analysis, complete data were available for 227

participants -- 159 (70.0%) were male and 68 (30.0%) were female. The racial/ethnic background of the Time 2 participants was 46.5% African American, 35.1% Caucasian, 9.2% Mexican American/Hispanic, 1.8% Asian/Pacific Islander, 7.4% Other/Mixed.

Procedures

Shortly after assignment to the general population, eligible inmates were presented with a description of the study and asked to participate, with assurance of the voluntary and confidential nature of the project. In the interest of confidentiality, interviews were conducted in the privacy of the professional visiting rooms in the jail. In addition, the PI obtained a Certificate of Confidentiality from U.S. Department of Health and Human Services to ensure the confidentiality of the data collected. Inmates who agreed to participate and who completed the initial four sessions of interviews received an honorarium of $15 to $18[1].

English-speaking participants (95% of the sample) completed computer-based questionnaires using "touch-screen" computers that required minimal familiarity with technology (e.g., no keyboard, no mouse). In addition to presenting questionnaire items visually, the computer read each item aloud to participants via headphones, thus accommodating participants with limited reading proficiency. For participants requiring Spanish versions of the questionnaires (5%), questionnaire responses were gathered via individual interview. Both the interviewer and participant had paper copies of the translated questionnaires. The participant followed along as the interviewer read each question aloud. To approximate the level of privacy afforded by the touch-screen (funding was not available to support programming a Spanish touch-screen) participants filled in their own responses. Participants were reassessed in a similar manner just prior to transfer to another facility or release into the community (Time 2; $25 honorarium). Participants who missed the Time 2 interview were contacted within two weeks following their release date in order to complete the interview via telephone.

Measures

Optimism was assessed at Time 1 and Time 2 using an abbreviated version of the Values in Action - Inventory of Strengths hope/optimism scale (VIA; Peterson & Seligman, 2001). Due to time constraints, the VIA was abbreviated for this study. To assess optimism, the hope/optimism scale was modified to 4 items. Items that appeared to assess entitlement and superiority, e.g.. "I always expect the best," were dropped from the current scale in order to achieve a measure of dispositional optimism. Items retained were: "I always look on the bright side" "I can always find the positive in what seems negative to others" "Despite challenges, I always remain hopeful about the future" and "If I feel down, I always think about what is good in my life." Participants responded on a 5-point Likert scale from 1 "not at all like me" to 5 "very much like me." The revised optimism scale demonstrated a good reliability at Time 1 and Time 2 (see Table 1 for Cronbach's alphas of measures).

Physical Health was assessed with two self-report measures. Participants completed the Cohen-Hoberman Inventory of Physical Symptoms (CHIPS; Cohen & Hoberman, 1983), a list of 33 commonly experienced physical symptoms that are rated on their presence over the past 2 weeks on a 5-point Likert scale ranging from 0 "not at all bothered" to 4 "extremely bothered." One item was deleted from the measure due to a clerical error. The final score is calculated as the average of the 32 item ratings. The scale has been shown to have adequate

[1]We took great care to ensure that the honorarium was not coercive by working closely with our IRB, correctional staff, and inmates at the facility to become familiar with the jail's "economy" so that we could establish a fair, but non-coercive honorarium for initial interviews and pre-release interviews.

reliability and validity (Cohen & Hoberman, 1983) and was internally consistent for this sample (see Table 1).

Additionally, participants completed the Personality Assessment Inventory (PAI; Morey, 1991). The PAI is a self-report instrument designed to assess a variety of personality traits as well as symptoms associated with mental illness and personality disorders. The items are rated on a 4-point likert scale ("False," "Slightly True," "Mainly True," and "Very True"). Of specific interest in this paper is the Somatic Complaints scale and its three clinical subscales (Health Concerns, Conversion, and Somatization).

Items on the Health Concerns subscale (e.g. "It's a struggle for me to get things done with the medical problems I have") reflect a preoccupation with physical health functioning. Items on the Conversion subscale (e.g. "I've had numbness in parts of my body that I can't explain") assess physiological symptoms prevalent in conversion disorders. Items on the Somatization subscale (e.g. "I suffer from a lot of pain") address routine physical complaints such as headaches, back problems or pain. Raw scores were converted to T-scores using the census matched standardization sample (Morey; 1991). The reliability and validity of the PAI has been demonstrated in multiple studies (Edens, Cruise, & Buffington-Vollum, 2001; Morey, 1991).

Results

Concurrent Relationships between Optimism and Physical Health

It was hypothesized that optimism would be inversely related to reports of physical health concerns[2]. As shown in Table 2, optimism was indeed significantly negatively correlated with the total PAI Somatic Complaints Scale, as well as its three subscales, and this was the case at both Time 1 (entry to the jail) and Time 2 (pre-transfer or pre-release). Physical complaints, assessed by the CHIPS, were not significantly related to concurrent assessments of optimism at Time 1, but at Time 2 optimism and CHIPS were significantly negatively related. Overall, results indicate that the higher the optimism, the fewer physical health concerns.

Inmates' Optimism over the Period of Incarceration: How optimistic are they?

Before examining the relationship between physical health and optimism, analyses were conducted to determine how optimism changed or did not change over time in this sample. Of those who had data at both time points, the mean score for optimism at Time 1 was 3.81 (SD = 0.78) and at Time 2 the mean was 3.77 (SD = 0.75), indicating no significant overall change in level of optimism across the period of incarceration ($t = 1.02, p > .05$). Moreover, individual differences in optimism were moderately stable ($r = .64, p < .001$). In general, the average level of optimism in this sample was mildly elevated, given that a 3 on the Likert scale meant "Neutral" and a 4 meant "Like Me."

Prevalence of Physical Health Concerns among Jail Inmates

Before examining whether inmates' physical health concerns diminish over the period of incarceration, we compared the overall level of health concerns in our sample of jail inmates to other non-correctional samples. On the PAI Somatic Complaints scale and its three subscales, participants reported slightly higher mean T-scores (ranging from M = 50 to M = 54) compared with those observed in Morey's (1991) college and standardized samples

[2]Because two measures of physical health concerns (CHIPS and PAI) were utilized in this study, a factor analysis was conducted to determine if the physical health variables were tapping multiple domains. Results indicated the presence of only one factor. However, because researchers often use the CHIPS without the PAI, and vice versa, we present results separately for each scale.

(ranging from M = 46 to M = 50). Inmates' scores were slightly lower than those observed in Morey's (1991) clinical sample (ranging from M = 55 to M = 58).

Making comparisons between our sample and other samples using the CHIPS was more difficult. As described above, one question was invalid due to a clerical error. As a result, the CHIPS used in this study had 32, rather than 33 questions. In addition, previous studies vary in the number of questions asked (N of questions range from 32 to 40) and in the time frame used (ranging from "past week" to "past month"). One study was identified as being comparable to our study in number of items and in time frame. The total CHIPS score in one college sample (M = 0.82, SD = 0.59) (Hale, Hannum & Espelage, 2005) was very similar to the inmates' total score (M = 0.83, SD = 0.66), although we assessed one fewer item. Pro-rating inmate scores for 33 items, the comparisons remained the same (inmates' transformed CHIPS score increased to 0.86.).

Do Physical Health Concerns Change Over the Period of Incarceration?

To determine if the number of physical health concerns endorsed changed from arrival at the jail (Time 1) to release or transfer (Time 2), paired *t*-tests were conducted on each variable. As seen in Table 3, there was a statistically significant decrease over time in the level of physical health concerns on 4 out of 5 study measures. Analysis of the CHIPS, indicated that inmates were bothered by fewer physical health concerns upon leaving the jail than upon entry. The PAI total Somatic Complaints scale and two subscales (Conversion and Somatization) also showed a significant decrease between Time 1 and Time 2. No significant difference was observed for the Health Concerns subscale between Time 1 and Time 2. These results indicate that, on average, physical health concerns declined modestly over the period of incarceration.

Another question is whether participants retain their relative rank order over time, as indicated by the correlation between Time 1 and Time 2 measures. As shown in the far right column of Table 3, health concerns were quite stable across time, indicating that inmates who had more health concerns relative to others upon entry to the jail tended to have more concerns relative to others just prior to release. Although physical health concerns appear to decline over the period of incarceration, individual's rank order relative to each other remained quite stable.

Relationship between Time 1 Optimism and Subsequent Changes in Physical Health Concerns

We examined whether optimism at Time 1 predicted a decrease in physical health concerns over the period of incarceration. A series of hierarchical multiple regressions were conducted in which each Time 2 physical health variable was regressed on its corresponding Time 1 physical health variable. Time 1 optimism was then entered into the equation on Step 2, allowing us to determine the main effect of optimism on changes in physical health. Optimism at Time 1 was consistently negatively related to changes in physical health concerns, but only one regression was significant at the .05 level (two others show a marginally significant trend). Individuals higher in optimism at Time 1 reported significantly larger decreases in symptoms of Somatization over time relative to their less optimistic peers (Table 4).

Discussion

In a sample of 501 jail inmates, we examined whether physical health concerns increased or decreased over the period of incarceration, and whether optimism was associated with physical health. Our first hypothesis examined the relationship between physical health and

optimism. Whereas optimism has been widely investigated in the general community, it has been largely ignored in the inmate population. Consistent with studies of community samples, the concurrent relationship between inmates' optimism and physical health concerns was negative.

Given the documented high rates of physical problems in incarcerated populations, it was expected that health concerns would be elevated in this sample. However, inmates in this sample did not report levels of physical health concern significantly higher than community samples. It is possible that inmates in this sample entered the jail in better physical health than other correctional samples. It is also possible that this finding may be due to our assessment of general health concerns as opposed to specific medical conditions. Future research should investigate the differential implications of these types of health measurement.

Our second hypothesis, that there would be a decline in reported physical health concerns during incarceration, was confirmed as participants reported significantly fewer health problems upon release or transfer to another facility, compared to the onset of incarceration. This finding is inconsistent with Maruschak (2006) who found no change in the number of medical problems reported by a nationally representative sample of jail inmates. One possible explanation for this discrepancy is that we assessed general health perceptions, whereas Maruschak (2006) questioned jail inmates about the existence of specific medical problems. It is possible that although an individual may have the same medical problem over the course of incarceration, his or her perception of impairment or day to day symptomology may change.

A strength of this research project is the longitudinal design, thus allowing us to examine the predictive relationship between optimism and changes in self-reported health. Although only one regression equation was statistically significant, results across measures were in a direction consistent with the notion that optimism predicts decreases in physical symptoms over time.

Although results of this study document concurrent and predictive relationships between optimism and physical health, the causal nature of the link is not completely understood as optimism is a complex concept which includes various values and cognitions. One possible pathway for further investigation among offenders is coping style. Research on non-inmates indicates optimists are more likely to productively deal with stressors and major life transitions as a result of engaging in effective and adaptive coping styles (Carver et al., 2002; Scheier et al., 1986). It is unknown whether such effects would generalize to inmates in jail or prison (a very different and greatly constricted environment).

Alternatively, it may be that optimists are more likely to adopt a healthier lifestyle. Results from several studies found a significant positive relationship between optimism and engagement in health-promoting behaviors, such as exercise and good nutrition (Robbins, Spence, & Clark, 1991; Steptoe et al., 1994). By engaging in health-promoting behaviors, optimists may reduce their likelihood of contracting illnesses, increase their overall physical health, and recover more quickly when feeling ill. Future research should investigate the mechanisms by which this change might take place.

There are several limitations to this study. One limitation is that all data analyzed are self-report measures. Therefore, the data are subject to the well-known response distortion and socially desirable responding. Second, pharmaceuticals may influence results as the observed decline in physical health symptoms over the period of incarceration may be a result of receiving medical attention (which is unknown). It would be beneficial to examine

inmate medical records to determine the amount of medical care requested, medical care received, medications prescribed, and medication compliance.

Another limitation is the generalizability of the results as participants were from an urban jail population. It is probable that unique factors exist across various correctional facilities and inmates in rural settings may differ from those in an urban setting. Replication of these results is necessary to determine whether these findings apply to individuals in different types of facilities, such as rural jails, and state or federal prisons.

Findings from this study suggest that inmates' optimism is a valid and informative variable with clinical implications. Given the multiple physical and mental problems often seen in the inmate population, it is important to view incarceration as an opportunity to provide medical care to underserved individuals. Future research can examine appropriate interventions, such as health programs in correctional facilities which could be designed to incorporate optimism raising techniques, such as those using cognitive-behavioral methods.

Incarcerated individuals represent a unique and socially important population to explore the relationship between optimism and physical health as an estimated 95% of prisoners are eventually released into the community (Petersilia, 2003) ***with their physical health problems.*** In addition, communicable diseases may be transmitted to other inmates, correctional employees and visitors to the facility, all of whom may unknowingly carry the disease into the community (Hammett, Roberts, Kennedy, 2001; National Commission of Correctional Health Care, 2002). Many of the variables previously identified as associated with poor physical health are difficult, if not impossible, to change. Psychological factors, such as optimism offer an opportunity for researchers to explore potential points of intervention. It is important that future research continue to explore the relationship between optimism and physical health in an inmate population.

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Table 1

Descriptive Statistics

Variable	Time	Mean	SD	Number of items	Possible Range	Observed Range	Cronback's alpha
Dispositional Optimism	T1	3.85	0.78	4	1-5	1.25-5	0.75
	T2	3.78	0.74	4	1-5	1-5	0.79
Physical Health Concerns							
CHIPS[a]	T1	0.83	0.66	32	0-4	0-3.28	0.94
	T2	0.70	0.59	32	0-4	0-2.78	0.94
PAI[b]							
Somatic Complaints (Total of Subscales)	T1	52.75	10.99	24	39-110	39-102	0.88
	T2	51.03	10.18	24	39-110	39-89	0.89
Health Concerns	T1	50.66	9.98	8	40-97	40-97	0.77
	T2	50.35	9.84	8	40-97	40-92	0.80
Conversion	T1	54.24	12.97	8	43-114	43-114	0.77
	T2	51.82	11.35	8	43-114	43-99	0.81
Somatization	T1	52.48	10.74	8	38-102	38-92	0.65
	T2	50.53	9.42	8	38-102	38-81	0.63

Note: Time 1 N's = 501, Time 2 N = 227

[a] Cohen-Hoberman Inventory of Physical Symptoms

[b] Personality Assessment Inventory

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Table 2

Concurrent correlations of optimism and physical health concerns

	Optimism	
Physical Health Variable	**Time 1**	**Time 2**
CHIPS	−0.05	−0.17*
PAI		
Somatic Complaints (Total of Subscales)	−0.25**	−0.33**
Health Concerns	−0.22**	−0.29**
Conversion	−0.17**	−0.27**
Somatization	−0.27**	−0.32**

Note: Time 1 N=501, Time 2 N=227

* $p < .05$

** $p < .01$

Table 3

Changes in Physical Health Concerns over the Period of Incarceration

Variable	Time 1		Time 2			
	M	SD	M	SD	*t*	*r*
CHIPS	0.78	0.62	0.70	0.59	2.11*	0.61**
PAI						
Somatic Complaints (Total of Subscales)	52.98	11.36	50.88	10.08	4.32**	0.78**
Health Concerns	50.64	10.38	50.24	9.72	0.78	0.72**
Conversion	55.25	13.16	51.63	11.25	5.50**	0.68**
Somatization	52.21	10.53	50.48	9.38	3.21**	0.68**

* $p < .05$.

** $p < .01$

Table 4

Summary of Step 2 of Hierarchical Multiple Regression Analyses Using Time 1 Optimism to Predict Change in Physical Health from Time 1 to Time 2

Variable	B	SE	Beta	*t*
CHIPS	−0.05	0.04	−0.07	−1.25
PAI				
Somatic Complaints (Total of Subscales)	−0.10	0.56	−0.08	−1.80†
Health Concerns	−0.65	0.59	−0.05	−1.10
Conversion	−1.19	0.71	−0.08	−1.67 †
Somatization	−1.31	0.60	−0.11	−2.18*

† $p < .10$

* $p < .05$