

# Symptoms of Dissociation in a Forensic Population

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## **Abstract**

*While researching the parameters of various individual psychological constructs in a mid-Michigan prison-diversion, work-release program, it became clear that dissociation was a factor in individual cognitive processing. The following document examines those dynamics in this population from valid Multiscale Dissociation Inventory and Dissociative Experiences Scale results.*

## **Introduction**

Dissociation as a psychological construct is thought to represent a problem with the integration of thoughts, feelings, and experiences into the individual's stream of consciousness.<sup>1</sup> Some later research indicated that the lack of integration is more of a psychological defense mechanism, or a withdrawal from reality to prevent reexperiencing traumatic events in the personal history of the experiencer,<sup>2</sup> although conclusive evidence for that assertion is still lacking.<sup>3</sup>

There does appear to be a strong correlation between biologically-based fantasy proneness and general cognitive failure,<sup>4</sup> and a strong correlation between symptoms of schizophrenia and dissociation.<sup>5</sup> This latter statement is supported by the symptoms of biologically-based perceptual distortions reported by a descriptively similar population<sup>6</sup> when completing the Hoffer-Osmond Diagnostic<sup>7</sup> with corrected scoring procedures,<sup>8</sup> and the data on dissociation presented herein.

Evaluating symptoms of dissociation, or any other psychological cluster, in a forensic population is at best a difficult task due to the inherent adversarial mind set of the inmates who keenly sense false

fronts or hidden agendas. Genuine sincerity and trustworthiness must be conveyed by the researcher or evaluator, and exceptional rapport must be established if the collected data is to have any meaningful reflection of actual individual functioning. The instruments used to evaluate those symptoms must also have an ease of use for the testee, as there is likely to be comorbid psychiatric issues present.<sup>9</sup> Based on the above statement, and with several exceptions noted below, it is believed that the following data is representative of the true level of experiential functioning of the participants.

## **Participants**

The tested population consisted of residents (N=89) of a mid-Michigan prison and jail diversion program. All subjects were male, and ages ranged from 18 (n=7) to 65 years (M=29.8, SD=10.79). The participants' median age was 27, similar to the mean, but the mode was significantly lower at age 19. Completed education levels reported by the participants ranged from eighth grade (n=1) to college graduate (n=1), with all others in between (M=11.5, SD=1.65). The median and the mode grade completed was 12, as slightly over one-quarter of the participants reported completing high school or its equivalent (n=24, 26.9%).

The racial composition of the group reflects a diverse population (see **Table 1**, p.87). The breakdown of the population was White (n=49), Black (n=28), and Hispanic (n=10). (Note: the term Black is used throughout with respect to the participants who prefer the term, rather than African American.) One participant chose the category Mixed, and one chose Other. Zero participants indicated be-

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ing in two other categories listed on the demographic sheet, which were Native American and Oriental.

Total arrests and convictions were also evaluated for potential impact or correlation to symptoms of dissociation. The total number of adult arrests reported by this population was 797 ( $M=9.0$ ,  $SD=5.93$ ). The median reported number of arrests was seven, and the mode was six. While the 0.05 confidence level of this data was 1.23, the Microsoft® Excel TRIMMEAN<sup>a</sup> function was used to eliminate high and low reported extremes and establishes a more stable mean of 8.3 arrests per person. Convictions for misdemeanors totaled 451 ( $M=5.1$ ,  $SD=4.08$ ). The median reported number of convictions for misdemeanors was four, and the mode was two. The 0.05 confidence level of the misdemeanor conviction data set was 0.85, but TRIMMEAN returned a more likely mean of 4.68 misdemeanor convictions each.

Reported felony convictions for the population totaled 211 ( $M=2.4$ ,  $SD=1.69$ ). The median for felony convictions was two, and the mode was one. The 0.05 confidence level of the felony conviction data set was 0.35, and TRIMMEAN provided a mean of 2.07 felony convictions each. The combination of convictions for felonies and misdemeanors totaled 662 for these 89 participants, or a mean of 7.4 combined convictions each.

## Method

Each participant completed a demographic sheet, a Multiscale Dissociation Inventory,<sup>10</sup> and the Dissociative Experiences Scale.<sup>1</sup> A subgroup ( $n=73$ ) also completed the Trauma Symptom Checklist-40.<sup>11</sup> The respondent's answers from each completed form was then inputted into a Microsoft® Excel scoring program designed by this author, and those data were then analyzed for statistical patterns and factor correlation. Based on various reasons, six of the original 95 participant's

tests were considered invalid, and neither their demographic data nor their MDI, DES, or TSC-40 scores were included in any of the following analysis.

The demographic sheet also asked a number of questions about the participant. Obviously from the above reported data, age, race, highest grade completed, arrests, and convictions were requested. Gender was not requested, as all participants were male. They were asked to indicate if they had been to prior counseling, and if they were on any current psychotropic medications. Further, the demographic sheet listed nine categories of commonly used drugs (i.e., alcohol, marijuana, cocaine, hallucinogenics, "downers", crack, "speed", mushrooms, and heroin<sup>b</sup>). Each participant was asked to indicate (up to) the top four choices regarding the individual's use pattern, although not all four ranks were required if the participant did not use four substances. The participants were asked to only indicate a rank number of one through four to indicate preference order, with the number one being the participant's favorite drug-of-choice. All listed substances beyond the individual's indicated choices (the four numbers requested) were given an equal value of five to statistically evaluate the data. Some participants had no second, third, or fourth choice. The participants were also asked to provide the number of days per week that they used their drug-of-choice.

## Results

*Multiscale Dissociation Inventory Results.* The Multiscale Dissociation Inventory is a 30-item, six-subscale self-report inventory for examining the six types of dissociative experiences described in detail below. Each item, or symptom, is scored by the participant on a five-point scale of one (Never) through five (Very often). The score for each item is then loaded on one of six subscales. The MDI total

score will also be discussed below, and the results of the participant's responses will be assessed for severity, including a short comparison of those scores in relation to Briere's normed T scores. The items most highly endorsed from the MDI are presented in Table 2, (below) along with the mean score of that item.

The MDI total score (TS) mean of the population was elevated well above what one would expect from a normal population merely incarcerated for violations of the law ( $M=64.69$ ,  $SD=23.30$ ). The range of the MDI TS scores were 32 to 121 (30 to 150 possible), and the median MDI TS

was numerically similar to the mean at 58, but the mode was 44. The 0.05 confidence level of the MDI TS was an elevated 4.84, and TRIMMEAN results did little to alter that range, returning an equally probable corrected mean of 63.08. While the MDI manual does not provide a specific cut-off or diagnostic criterion level for the TS, one could surmise from converted T score configurations for the subscales set at 80T or above, that scores over 66 would be indicative of a highly dissociative state. Many of the participants ( $n=41$ , 46.1%) had scores at this level (66) or above.

There were similar elevated results

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**Table 1.** Population by race and percent.

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Race	Number	Percent
White	49	55.1
Black	28	31.5
Hispanic	10	11.2
Other	1	1.1
Mixed	1	1.1

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**Table 2.** Most endorsed MDI items.

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Item No.	Mean	Most Endorsed MDI Items
7	3.02	Not paying attention because you were in your own world (DENG)
2	2.89	Your body feeling like it was someone else's (DEPR)
3	2.78	Things around you suddenly seeming not quite right, a little bit off (DERL)
10	2.67	Not having any emotions or feelings at a time when you should have been upset (ECON)
25	2.62	Staring off into space without thinking (DENG)

Note. Mean is based on a possible range of One to Five; DENG = Disengagement; DEPR = Depersonalization; DERL = Derealization; ECON = Emotional Constriction

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for the subscales as well. The disengagement subscale (DENG) measures the respondent's perceived level of emotional or cognitive separation from his or her immediate environment, and like all the MDI subscales it has a possible range of five to 25. The DENG scores returned a mean of 13.10, with a standard deviation of 4.72. The DENG range scores were five (n=3) to 21 (n=2), and the median and mode were both 13. The 0.05 confidence level of the DENG mean was an acceptable 0.98, and TRIMMEAN returned the exact figure as the raw (R) mean at 13.10. A significant number of participants (n=37, 41.6%) reported experiencing disengagement symptoms at or greater than 14R, or the 80T level of clinical concern on this subscale.

The depersonalization subscale (DEPR) evaluates the extent to which the respondent perceives one's body or self as separate or alien to one's actual self. The DEPR mean in this population was less elevated (M=8.62, SD=4.05) than the DENG scale. Range scores for the population on this subscale were five (n=22) to 22 (n=1), with a median of seven, and a mode of five. The 0.05 level of confidence was 0.84, and TRIMMEAN smoothing resulted in a similar probable mean of 8.04. Ironically, even though the DEPR subscale seems to represent one of the least disturbing score sets, more than 37 percent of this population (n=33) reported experiencing depersonalization at or above nine (over 80T).

The derealization subscale (DERL) sub-scale measures to what extent the respondent experiences the perception of alteration to one's external world (e.g., suddenly feeling as if one is dreaming or the perception that things are unreal). The mean reported here was elevated at 11.53 (SD=4.71) on the standard five to 25 scale of the MDI. The range of scores were five (n=6) to 22 (n=2), with the median at 11, and the mode at five. Confidence at

the 0.05 level was 0.98, and TRIMMEAN provided a similar corrected mean of 11.34. The DERL subscale mean of this population might indeed be one of the most telling, as the average score of the population (both raw and TRIMMEAN corrected) is above the 80T established by Briere, with 41 of the participants (46.1%) reporting DERL scores at 12R or above.

The MDI emotional constriction subscale (ECON) measures the extent to which the respondent experiences reduced emotional responsiveness, reduced situationally appropriate emotional response, or general lack of emotionality. The population's ECON mean was also high at 11.82 (SD=5.19), the median was 11, and the mode was seven, with range scores of this population reported from five (n=8) to 25 (n=2). Additionally, 39 of the participants (43.8%) endorsed items at or above 13R (80T). Confidence of the ECON subscale scores at the 0.05 level was 1.08, and TRIMMEAN calculated a slightly lower ECON mean of 11.45.

The fifth subscale, the memory disturbance (MEMD) scale, measures the testee's difficulty in accessing memory for specific personal events not due to physiological or organic problems. The MEMD mean score of this population was 11.06, with a standard deviation of 4.62. Confidence at the 0.05 level was 0.96, and TRIMMEAN returned an adjusted mean of 10.77. Range scores on the MEMD subscale were five (n=10) through 22 (n=1), the median score was 10, and the mode was five. These scores are another example where the mean of the population, both raw and statistically adjusted, were higher than the clinical cutoff level of 80T (approximate 10.5R). Forty-two participants (47.2%) scored above the clinical cutoff.

The last subscale of the MDI is the identity dissociation (IDDIS) scale, originally called the "multiplicity" scale in the research version (John Briere,

personal communication, February 13, 2001), which measures the experience or perception of multiple internal ego states (i.e., dissociative identity disorder [DID] or “multiple personalities,” when the IDDIS is very high). The IDDIS mean for this group was the lowest of all the subscales ( $M=8.56$ ,  $SD=4.29$ ). Range scores for the population on this subscale were five ( $n=31$ ) to 24 ( $n=1$ ), with a median of seven, and a mode of five. The 0.05 level of confidence was 0.89, and TRIMMEAN smoothing resulted in an adjusted probable mean of 7.44. The IDDIS subscale is the least pathological of the scores reported by this population, as the mean was the least elevated in relation to the higher T score cutoff of 95 (R above nine), and clinical concern is not advised in the MDI manual until raw scores are above 15R, or 164T (pp. 15-17).

*Dissociative Experiences Scale Results.* The Dissociative Experiences Scale<sup>1</sup> is a 28 item self-report inventory designed to evaluate the extent to which a testee experiences overall symptoms of dissociation. There are no subscales on the DES. The respondent is asked to rate the level to which he or she experiences the stated

symptom on a scale of zero (Never) to 100 (Always) in 10 point increments. Scoring the DES is completed by summing the reported level of all 28 items, and dividing that number by 28, leaving possible total range scores of zero to 100 as well. Scores exceeding 30R are considered cause for clinical concern, and scores over 40R are considered potentially pathological.

The DES mean in this population was somewhat elevated ( $M=23.1$ ,  $SD=16.9$ ), with a median of 19.6, and a mode of 10.4. DES range scores for this population were 1.4 to 66.1. The 0.05 level of confidence was 3.52, and TRIMMEAN provided a similar probable mean of 21.7. It is important to note here, that more than 30 percent of this population ( $n=27$ ) reported DES symptoms at or above the clinical concern level of 30, and nearly 20 percent reported DES scores over 40 ( $n=17$ ), the level at which serious concern is warranted. The most highly endorsed items by this group are listed in Table 3 (below).

*Trauma Symptom Checklist-40 Results.* The Trauma Symptom Checklist 40<sup>11</sup> is a 40-item checklist similar to the Symptom Checklist-90-R by Derogatis,<sup>12</sup> but with specific emphasis on the per-

**Table 3.** Most endorsed DES items.

Item No.	Mean	Most Endorsed DES Items
2	42.02	Some people find that sometimes they are listening to someone talk and they suddenly realize that they did not hear part or all of what was said.
19	39.89	Some people find that they sometimes are able to ignore pain.
17	36.85	Some people find that when they are watching television or a movie they become so absorbed in the story that they are unaware of other events happening around them.
23	35.51	Some people sometimes find that in certain situations they are able to do things with amazing ease and spontaneity that would usually be difficult for them (for example, sports, work, social situations, etc.)
20	33.71	Some people find that they sometimes sit staring off into space, thinking of nothing, and are not aware of the passage of time.

Note. Mean is based on a possible range of zero to 100

ceived symptoms related to traumatic experiences. A sub-group of the total number of participants in this study also completed the TSC-40 (n=73, 82%) along with the MDI and the DES. The TSC-40 has a four-point scale for each symptom ranging from zero (Never) to three (Very Often). Each item then loads onto one of six subscales. The TSC-40 was included in this study to assess the connection of dissociative states to perceived trauma. (information and scoring procedures of the TSC-40 are outlined in reference 11). Also, the possible correlations of the MDI and DES were evaluated against the results of the TSC-40 for other potential connections. Lastly, the TSC-40 was used as a validation tool for respondent's over or under reporting symptoms.

*Substance Abuse Results.* The demographic sheet requested information on substance use patterns, as it was believed that the type and effect might give insight into the mental processes that play a role in the mental functioning of the participants. Of the selections cast for drug of choice on the demographic sheet, alcohol received the most number

one votes (n=42, 47.2%), with marijuana second in first place votes (n=29, 32.6%). Crack received seven votes (7.9%), with cocaine and hallucinogens tied with three (3.3% each). This was a marked increase in percentage of hallucinogenic preference as drug-of-choice over previous research at this facility (Mitchell, in press). Three participants reported not using any drugs or alcohol.

To further illustrate drug-of-choice patterns, weighted values of reported choices were also analyzed (see Table 4, below) for a statistical mean based on numerical values assigned by the respondents. Note that the closer the mean is to 1 (one) the more preferred the substance is for the user. On the contrary, the closer the mean is to 5 (five), the more rejected the substance was by the population. Use days per week (UPW) is presented as a straight mean, as it had no weighted value. The UPW as reported (again, see Table 4) was very high (M=5.39, SD=2.19). The median and mode were both seven, and the 0.05 confidence level of the UPW data set was 0.45, and TRIMMEAN provided a slightly higher and more probable mean

**Table 4.** Weighted value means, days of use per week, and confidence.

Substance	M	SD	Confidence	Raw
Alcohol	2.20	1.40	0.28	257
Marijuana	2.71	1.67	0.33	201
Cocaine	4.06	1.27	0.28	103
Hallucinogenics	4.77	0.64	0.23	53
Downers	4.80	0.69	0.13	18
Crack	4.01	1.49	0.26	53
Speed	4.75	0.78	0.16	23
Mushrooms	4.84	0.54	0.19	41
Heroin	4.75	0.91	0.05	7
Use Days Per Week	5.22	1.83	0.45	

Note. The lower the weighted mean, the more preferred, the closer to 5, the more rejected. The Use Days Per Week is not weighted, but is a straight mean. Confidence tested at 0.05. Raw reflects total weighted votes received.<sup>c</sup>

of 5.71 days per week that a statistically similar population would use their drug-of-choice. Raw values<sup>c</sup> are also presented in Table 4. This data is quite similar to previous larger-population research at this facility.<sup>13</sup>

### Correlations

Correlation of the MDI total score mean to the DES mean indicated a strong positive relationship (see Table 5, below). In fact, all of the subscales of the MDI have a strong positive correlation to the DES, indicating that the two instruments are measuring a similar psychological construct. The MDI total, each MDI subscale, and the DES values were also evaluated against complete reported demographics of this population (see Table 6, p.92), and are included here to further evaluate potential connections and possible correlations. While some of the correlative data in this Table was less than statistically significant, there were both strong positive and negative relationships to be noted. Age and education had a strong inverse relationship with symptoms of dissociation, as did the preference for alcohol as a drug-of-choice to a lesser extent. The strongest positive correlation to drug use were with hallucinogens, cocaine, and heroin, but the positive relationship with heroin might be somewhat illusory due to the small number

of participants who selected this drug as a drug-of-choice.

The number of days per week that the respondent used their drug of choice correlates most positively with the MDI disengagement and derealization subscales. Also evaluated was the potential correlation of reported criminal history to the MDI total, the subscales, and the DES. The data here proved less conclusive than anticipated, however, as only emotional constriction (ECON) seemed to play a positive role in criminal history.

Additionally, the MDI and the DES were correlated against the TSC-40 (not included in the Table). The MDI total score indicated a positive relationship with the symptoms listed in the TSC-40 ( $r=0.62$ ), with the strongest MDI subscale positive correlation with the TSC-40 being the DENG scale ( $r=0.64$ ), and the least positive correlation being the DEPR subscale (0.43). The DES figures were only slightly less correlated than the MDI to those symptoms of the TSC-40 (0.58). There were no inverse relationships involving any of the instruments or their subscales.

### Discussion

Schizophrenia-like symptoms and dissociation have “a robust correlation”<sup>5</sup> (p.428), and while the prior is not yet proven to be causal of the latter, there are many similarities.<sup>14</sup> In the population studied

**Table 5.** Correlation of DES to MDI total score and subscales.

	MDI Subscales						
	MDI Total	DENG	DEPR	DERL	ECON	MEMD	IDDIS
DES	0.73	0.69	0.57	0.68	0.52	0.73	0.56

Note. DENG = Disengagement; DEPR = Depersonalization; DERL = Derealization; ECON = Emotional Constriction; MEMD = Memory Disturbance; IDDIS = Identity Dissociation

here, it has been established that there are more similarities than differences. In a previous study of perceptual distortion in this population<sup>6</sup> with the Hoffer-Osmond Diagnostic, individuals scored consistently higher than what could reasonably be expected from a population incarcerated for merely engaging in unwanted social

behavior. Abram Hoffer stated:

For years, I have assumed that all the dissociative states are in fact schizophrenic states, and that they are not diagnosed as such because most psychiatrists do not know the subtle differences of the diagnoses. They do not understand that feeling unreal is another way by which

**Table 6.** Correlation of MDI and DES scores to gathered demographic data.

MDI	Tot	DENG	DEPR	DERL	ECON	MEMD	IDDIS	DES
Age	-0.26	-0.30	-0.24	-0.31	-0.19	-0.15	-0.12	-0.34
Education	-0.21	-0.23	-0.12	-0.21	-0.19	-0.15	-0.18	-0.23
Arrests	0.01	0.00	0.01	-0.05	0.09	0.02	-0.06	0.00
Con Mis	0.03	0.06	-0.04	0.03	0.11	0.04	-0.08	0.00
Con Fel	-0.02	-0.02	0.03	0.06	0.00	0.01	-0.06	-0.01
Alcohol	-0.15	-0.10	0.24	-0.09	-0.11	-0.13	-0.09	-0.19
Marijuana	0.01	-0.02	0.06	0.04	0.04	0.01	-0.07	-0.02
Cocaine	0.19	0.13	0.28	0.17	0.13	0.11	0.16	0.16
Hallucinogens	0.17	0.24	0.10	0.16	0.22	.02	0.14	0.11
Downers	0.10	0.07	-0.01	0.07	0.18	0.02	0.14	0.06
Crack	0.13	0.05	0.09	0.08	0.13	0.15	0.18	0.03
Speed	-0.06	0.02	-0.09	-0.08	0.04	-0.13	-0.09	-0.09
Mushrooms	-0.05	-0.04	-0.01	-0.08	-0.07	-0.05	-0.03	-0.07
Heroin	0.19	0.11	0.31	0.12	0.23	0.08	0.15	0.11
UPW	0.17	0.19	0.11	0.20	0.17	0.13	0.05	0.09

Note. Con = Convictions; Mis = Misdemeanors; Fel = Felony; UPW = Use days Per Week; DENG = Disengagement; DEPR = Depersonalization; DERL = Derealization; ECON = Emotional Constriction; MEMD = Memory Disturbance; IDDIS = Identity Dissociation



these patients try to explain the perceptual changes they are suffering (personal communication, December 24, 2004).

In another previous study with this group, the level of substance abuse was indeed rampant to the extent that it could be reasonably inferred that the substance abuse might very well be related to self-medicating behavior intended to ameliorate various aspects of ego-dystonic psychological dysfunction.<sup>13</sup> This author has stated previously that recidivism at this level now becomes a genuine clinical issue, rather than a problem that can be corrected by purely punitive measures. Psychiatric influences and potential biological dis-equilibrium that influence dissociative states and other experiential perceptual distortions must be appropriately evaluated and addressed, or it is most likely that the behaviors that led to this episode of incarceration will merely reoccur with progressively more severe consequences.<sup>15</sup>

Another unsettling fact revealed by this collected data is the extremely high percentage of individuals (82%) that have previously been in therapy prior to this current incarceration (n=73), with apparently little impact on the psychological issues that influence their criminal justice problems. Finally, the number of individuals who scored very high in terms of moderate to severe dissociative symptoms that should likely be medicinally compensated was also unsettling, and yet only a very minor proportion of this population were receiving allopathic compensation (n=3, 3.4%), and none were receiving orthomolecular treatment. In fact, orthomolecular intervention is discouraged at this facility, and one could infer the motive based on the recidivism rate. From other research, symptoms of perceptual distortion, personality disorder, depression, anxiety, psychoticism, and substance abuse, among other severe psychological problems, are almost uniformly elevated in this

population<sup>6,13</sup> with the more disturbing symptoms on most inventories being more consistently endorsed. The results of the above-evaluated data indicates a genuine need for further study of biologically-based contributing factors of socially unwanted behavior, the incorporation of more appropriate evaluative measures in assessment, and a serious reconsideration of current treatment modalities.

### Conclusion

While it is somewhat inchoate and exploratory at this point, there does appear to be a strong connection between symptoms of dissociation, perceptual distortion, and other forms of experiential disorders such as absorption, schizotypy, sudden and severe panic attacks, and schizophrenia. Hoffer's adrenochrome (C<sub>9</sub>H<sub>9</sub>NO<sub>3</sub>) theory of schizophrenia<sup>16,d</sup> could help to explain why so many symptoms are so closely related. Even small amounts of an ingested hallucinogen would mimic many of these symptoms. Trauma and fear releases adrenaline into the body to prepare it for defensive behavior (adrenaline is the precursor of adrenochrome), and when the victim of that traumatic fear is at the threshold of mentally re-experiencing the event, it is reasonable to assume that the body would react as it did previously during the original event by releasing adrenaline again.

If the necessary mechanism for subsequently reducing the adrenaline to an inert substance were faulty, or if there were some other dis-regulation of body chemistry present that would impede that process, the result could be quite similar to a mild hallucinogenic state like those experiential states described above. This process does not merely apply to victims of trauma. Any fear-based reaction to a real, misperceived, or imagined threat could trigger this internal mechanism. Certainly this supposition warrants further investigation into pos-

sible orthomolecular intervention with the above listed psychological states, and an upcoming article will discuss the effect of niacin and ascorbic acid treatment on panic attacks.

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## Notes

a) Microsoft® TRIMMEAN calculates the interior mean of the data set by excluding outlying data from the top and bottom tails of the data set. The trimmed percentage of all TRIMMEAN functions calculated in this research is 0.2, or 20 percent, ten percent from the top and ten percent from the bottom.

b) While cocaine and crack are quite simply both cocaine, and mushrooms and marijuana are in fact hallucinogenics, due to the variety of their strength, individual impact, and forms these were listed separately to further delineate use trends.

c) It is important to note here that the weighted mean and the raw scores in Table 4 do not have to agree. Raw votes are those total weighted votes cast for the substance, whereas the weighted mean is inverted and includes the rejected value ("5" score) in the calculations. For example, crack and hallucinogenics have the same raw sum of weighted votes, but hallucinogenics received fewer overall votes and are thus more rejected by the overall population.

d) The adrenochrome theory has a great deal of research and support behind it, too abundant to list here. This book by Abram Hoffer gives an excellent explanation in a brief format.