

A Measure of Severity of Multi-Drug Use among Psychiatric Patients¹

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Abstract. A method for measuring the severity of multi-drug use among psychiatric patients has been developed which takes into consideration the three basic criteria of drug abuse: number of different drugs used, frequency of use and length of use. The procedure initiated with several mental health professionals rating the drug-use patterns of 117 young psychiatric patients with a history of drug abuse. These ratings were then used to develop scoring criteria for each individual drug and combinations of drugs. The final result is a method which systematically categorizes drug users as either mild, moderate or heavy users.

One problem in the study of drug use is pooling together as 'drug users' subjects with widely divergent histories. In a previous study (1), the authors have shown significant demographic, cognitive and clinical differences between heavy, moderate and mild drug users. However, the method used for differentiating subjects into these different drug-use groups was somewhat arbitrary, and based primarily on the number of drugs used and secondarily on frequency and length of use. Based on interviews with over 100 drug-using psychiatric patients, a method has been developed which takes into consideration the 3 basic criteria of drug abuse — number of different drugs used, frequency of use, and length of use — in a scoring schema to determine severity of drug use.

Severity of drug use, as a concept, is multi-dimensional, and may be interpreted in many ways. For example, among psychiatric patients it may be interpreted as indicating a poor prognosis, a negative reaction to psychiatric treatment, producing deleterious psychiatric effects, etc. The definition of severity that we have worked with is not concerned with psychiatric effects or treatment *per se*, but rather with drug-use as an indicator of an individual's degree of rejection of social roles and willingness to engage in dangerously illegal practices, as well as the possibility of habituation or dependence on a drug or drugs. A regular user of heroin should be considered a severe drug user not only because he is likely to become addicted to the drug but because he is also likely to get arrested. A person using marijuana regularly is not as likely to get arrested and runs a lower risk of physiological and/or psychological dependence.

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Method

As part of a larger study, 117 young psychiatric patients with a history of drug use were interviewed to determine patterns of use. Patients were consecutive admissions between the ages of 15–25 who had remained in the hospital for at least 1 month. There were 56 males and 61 females in the interview sample. For each drug used, information was elicited as to frequency (e.g., daily, weekly, etc.) and duration (3 months, 1 year, etc.)²

Each patient's responses were placed on a 5 in × 8 in index card with a coded number for the specific patient. These cards were then given to 5 professionals (psychologists, social workers, psychiatrists) with experience in studying drug abuse, who were instructed to sort the entire set of 117 cards into 3 separate groups – one representing mild drug use, another moderate drug use, and the 3rd group representing heavy drug use. Thus, each card, representing a particular patient's drug use history, had 5 scores representing the raters' placements in the 3 groups.

The investigator utilized the results of the card sort to determine the rules used by the raters for categorizing patients into one of the 3 groups. First, the 'pure' cases, those in which there was 100 % agreement between the 5 raters, were analyzed. If 5 raters independently place a subject in the same category, they may well be utilizing a common set of criteria. Next, those cases in which there was high, but not total agreement (4 out of 5 raters placing the subject in the same group) were analyzed for the same purpose. Examples of some of the rules which emerged were:

A subject who used marijuana only, once a week for at least 3 months, was placed in category 1 – mild drug use.

A subject who used marijuana several times a week for over 2 years, amphetamines once or twice a month for 6–12 months, and LSD a total of 4 times, was placed in category 2 – moderate drug use.

A subject who used marijuana daily for over 2 years, amphetamines (including speed) once or twice a month for 1–2 years, barbiturates once or twice a month for 1–2 years, LSD and other hallucinogens several times a week for 3–6 months, and heroin once a week for 1–3 months, was placed in category 3 – heavy drug use.

The next step was to utilize these results in establishing specific scoring rules for *each* drug separately and then for *combinations* of drugs. In other words, if a subject used only marijuana, and no other drugs, he would receive a score based only on his use of this specific drug. If, however, he used marijuana and amphetamines, he would receive a *separate* score for *each* drug. The scoring rules would have to consider the *combination* of scores in determining a subject's drug-use category (i.e., mild, moderate, heavy). The scoring system which evolved out of this process, and which allows one to categorize subjects into one of the 3 drug-use categories, was based on maximum agreement with the results of the card sort by the 5 raters (table I).

The scoring system is based on determining the *highest* group in which the subject may be categorized. Towards this end, one of the things taken into consideration in devising the rules was the pattern of drugs used among the subjects – to see whether subjects who had used a drug such as heroin had also used a host of other drugs (e.g., marijuana, amphetamines, LSD). If this was true, that most subjects who had used heroin extensively had also used a wide variety of other drugs, and if such drug users were placed in category 3 (heavy drug use) by the raters, then knowing only the subject's heroin use would be sufficient to place the subject in this category. This method approximates the Guttman scaling technique (3).

2 Copies of the questionnaire form used are available by writing to the authors.

Table 1. Category agreement between modal response of 1st set of raters and scoring rules

Scoring rules category	1st set of raters		
	1	2	3
1	26	0	0
2	0	44	1
3	0	5	41

95 % agreement: weighted kappa = 0.936 ± 0.035; Z = 26.74; p < 0.001 (2).

Category 3 (heavy drug use) represents the highest possible category of classification. If a subject's use of *any* drug, according to the scoring rules presented below, places him in this category, then it is unnecessary to apply the rules to his use of other drugs. If a subject's use of specific drugs does *not* warrant his automatic placement in group 3, then the scoring rules must be applied to each drug used, and the placement of the subject in one of the 3 drug groups depends upon the cumulative results of the scoring rules.

Scoring Rules

According to each subject's drug usage, he is to be placed in one of the following 3 groups:

- Group 1 = mild drug abuse
- Group 2 = moderate drug abuse
- Group 3 = heavy drug abuse

For *each* drug used, the frequency of use and overall length of use will yield a specific score for *that* drug. A separate score is derived for each drug used. The scores are then combined, according to the rules stated below, so that the subject is placed in the *highest* group to which he may belong.

Scores (the asterisks are for cumulative purposes only).

1. The '1's are *not* cumulative. A subject who has only '1's and no other scores is placed in group 1.

1*. Two or more '1*'s places the subject in group 2 (unless he meets the requirements for placement in group 3). A '1' and a '1*' are *not* cumulative. If a subject's highest score is a single '1*', he is placed in group 1.

2. Three or more '2's places the subject in group 3. Less than three '2's places the subject in group 2 (unless he also has a '3').

2*. Two or more '2*'s places the subject in group 3. Only one '2*' places the subject in group 2. A '2' and a '2*' places the subject in group 2 (unless he also has a '3'). Any combination of three '2's and '2*'s places the subject in group 3.

3. Any score of '3' automatically places the subject in group 3.

As this system is based on determining the *highest* group in which a subject's drug use is to be categorized, if a subject has received a '2' or a '2*' for *any* drug, then the '1's and '1*'s need not be considered. If a subject has received a '3' for any drug, then the scoring rules need not be applied to other drug usage.

The actual scores given for each drug used by frequency and length of use are given in tables II A - G.

Table II A. Scores for *marijuana* (and/or hashish) use¹

Months used	Frequency of use					
	1 × / year	2-3 × / year	1-2 × / month	1 × / week	several × / week	daily
24+	1	1	1	1*	2	2*
12-24	1	1	1	1*	2	2*
6-12	1	1	1	1*	1*	2*
3-6	1	1	1	1	1*	2
1-3	1	1	1	1	1	1*
1	1	1	1	1	1	1

1 Use of *marijuana only* (no other drugs), 1-6 times = 0. Subject is *not* considered a drug user.

Table II B. Scores for *amphetamine/barbiturate* use¹

Months used	Frequency of use					
	1 × / year	2-3 × / year	1-2 × / month	1 × / week	several × / week	daily
24+	1	1	1*	2	2	3
12-24	1	1	1	2	2	2*
6-12	1	1	1	1*	2	2*
3-6	1	1	1	1*	2	2
1-3	1	1	1	1*	1*	2
1	1	1	1	1	1	1*

1 Use of *amphetamines and/or barbiturates only* (no other drugs), 1-6 times = 0. Subject is *not* considered a drug user.

Table II C. Scores for *hallucinogen* (LSD, mescaline, etc.) use

Months used	Frequency of use					
	1 × / year	2-3 × / year	1-2 × / month	1 × / week	several × / week	daily
24+	1	1*	2	3	3	3
12-24	1	1*	2	3	3	3
6-12	1	1	2	3	3	3
3-6	1	1	2	2	3	3
1-3	1	1	1*	2	2	3
1	1	1	1	1	2	2

Table II D. Scores for heroin use

Months used	Frequency of use					
	1 x / year	2-3 x / year	1-2 x / month	1 x / week	several x / week	daily
24+	1*	2	3	3	3	3
12-24	1*	2	3	3	3	3
6-12	1*	1*	3	3	3	3
3-6	1*	1*	3	3	3	3
1-3	1*	1*	2	3	3	3
1	1*	1*	1*	2	3	3

Table II E. Scores for glue-sniffing/cough syrup (codeine) use¹

Months used	Frequency of use					
	1 x / year	2-3 x / year	1-2 x / month	1 x / week	several x / week	daily
24+	1	1	2	2	2	3
12-24	1	1	2	2	2	3
6-12	1	1	2	2	2	3
3-6	1	1	1	2	2	2
1-3	1	1	1	1*	2	2
1	1	1	1	1	1*	1*

1 Use of glue and/or codeine *only* (no other drugs), 1-3 times = 0. Subject is *not* considered a drug user.

Table II F. Scores for speed (methamphetamine) use

Months used	Frequency of use					
	1 x / year	2-3 x / year	1-2 x / month	1 x / week	several x / week	daily
24+	1	2	2	2	3	3
12-24	1	2	2	2	3	3
6-12	1	1	2	2	3	3
3-6	1	1	2	2	2	3
1-3	1	1	2	2	2	3
1	1	1	1	1	2	2

Table II G. Scores for opium use

Months used	Frequency of use					
	1 x / year	2-3 x / year	1-2 x / month	1 x / week	several x / week	daily
24+	1	1*	3	3	3	3
12-24	1	1*	3	3	3	3
6-12	1	1	2	3	3	3
3-6	1	1	2	2	3	3
1-3	1	1	1*	2	3	3
1	1	1	1	1	2	3

Examples to Demonstrate Use of the Scoring System

	Score
Case No. 1 <i>Marijuana</i> – several times a week for over 2 years	2
<i>Amphetamines</i> – once or twice a month for 1-2 years	1
<i>LSD</i> (and mescaline) – once or twice a month for 1-2 years	2

This subject has two number '2's and, according to the scoring rules, this places him in drug-abuse group 2 – moderate drug use.

	Score
Case No. 2 <i>Marijuana</i> – at least once a day for 1-2 years	2*
<i>Amphetamines</i> – several times a week for 6-12 months	2
<i>Barbiturates</i> – once a week for 1-2 years	2
<i>LSD</i> (plus other hallucinogens) – once a week for 6-12 months	3
<i>Codeine</i> – once or twice a month for over 2 years	2

This subject has a '3' for LSD, which automatically places him in drug abuse group 3 – heavy drug use. If he did *not* use any LSD, he would still be placed in group 3 because he also has received three or more '2's (including the '2*').

	Score
Case No. 3 <i>Marijuana</i> – once a week for 1-2 years	1*
<i>Amphetamines</i> – several times a week for over 2 years	2
<i>Barbiturates</i> – several times a week for over 2 years	2
<i>LSD</i> – once or twice a month for 6-12 months	2
<i>Glue-sniffing</i> – several times a week for over 2 years	2

This subject has at least three '2's, which places him in drug abuse group 3 – heavy drug use.

		Score
Case No. 4	<i>Marijuana</i> – several times a week for 3–6 months	1*
	<i>Amphetamines</i> – once or twice a month for 3–6 months	1

This subject has a '1' and a '1*' which are *not* cumulative and is placed in drug abuse group 1 – mild drug use.

Reliability

Once the scoring rules were devised, the 117 cards were given to a different set of 5 raters who were also professionals with experience in studying drug abuse. This was to test the reliability of the original scoring rules. As shown in table III, there was 81 % agreement (weighted kappa = 0.787 ± 0.056 ; $Z = 14.05$; $p < 0.001$) (2) between a subject's group placement as determined by the scoring rules and his group placement as determined by the modal response of the 2nd set of raters. There was 80 % agreement (weighted kappa = 0.766 ± 0.064 ; $Z = 11.97$; $p < 0.001$) between the modal scores given patients by the 2 sets of raters (table IV). Taking the modal response for both sets of raters *combined* ($n = 10$; table V), and eliminating those patients for whom there are 2 *equally* modal responses ($n = 9$), the agreement between the scoring system and the 10 raters is 93 % (weighted kappa = 0.925 ± 0.037 ; $Z = 25$; $p < 0.001$).

Table III. Category agreement between modal response of 2nd set of raters and scoring rules

Scoring rules category	2nd set of raters		
	1	2	3
1	25	1	0
2	12	27	6
3	0	3	43

81 % agreement; weighted kappa = 0.787 ± 0.056 , $Z = 14.05$, $p < 0.001$.

Table IV. Category agreement between modal response of 1st and 2nd set of raters

1st set of raters	2nd set of raters		
	1	2	3
1	25	1	0
2	12	28	9
3	0	2	40

80 % agreement; weighted kappa = 0.766 ± 0.064 , $Z = 11.97$, $p < 0.001$.

Table V. Category agreement between modal response of 2 sets of raters combined¹ and the scoring rules

Scoring rules category	2 sets of raters combined		
	1	2	3
1	26	0	0
2	3	33	2
3	0	2	42

1 Combining responses of the 2 sets of raters allowed for the possibility of equal bimodal responses (ties, 5 in one category and 5 in another category). These ties (n = 9) were *eliminated* in this analysis.

93 % agreement; weighted kappa = 0.925 ± 0.037 , Z = 25, $p < 0.001$.

In analyzing those patients for whom the raters disagreed, we see in tables I and III-V that they are those predominantly placed in drug abuse group 2 by the scoring system. There is a very high agreement for groups 1 and 3 and less agreement for group 2. Thus, this test is very reliable for the 'mild' and 'heavy' drug abuse categories and somewhat less reliable for the 'moderate' drug abuse group. In a previous paper, involving diagnostic classification, Klein *et al.* (4) have suggested that reliability is poorest in the middle and best at the extremes.

Discussion

The results of the scoring system, when applied to the original cohort of 117 subjects, yielded the following groupings for drug abuse severity by sex: 22 % of all subjects were placed in the *mild* category, 38 % in the *moderate* category, and 40 % in the *heavy* drug-abuse category. There were more females in the *moderate* group and more males in the *heavy* drug-abuse group. These findings coincide with our observations.

Although this scale is far from perfect, it is an attempt to develop an easily used scoring system to classify drug users by the severity of drug use. It seems to be a reasonable assumption that a fairly reliable, but less than perfect scoring system for categorizing subjects by severity of drug abuse is an improvement over lumping all drug users together or arbitrarily assigning subjects to drug-use groups by subjective reaction. The validation of this scale will depend on demonstrating its relationship to meaningful validity criteria. We have shown that it has face validity in that it mimics well the judgment of informed professionals.

References

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