A prospective study of psychopathology stability and changes after 3-month residential treatment in Italian Substance Use Disorder patients

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Summary

Background: Using the SCL-90 checklist, we previously showed that a cluster of five psychopathological symptoms could be found in Heroin Use Disorder patients. This aggregation demonstrated a high specificity for Substance Use Disorder (SUD) patients. In this prospective study, we have explored the consistency across time of these dimensions by considering psychopathological stability and changes after 3-month residential treatment (TC: therapeutic community) in Italian SUD patients. Methods: 636 subjects with SUD according to DSM-IV diagnostic criteria, 558 (87.7%) male and 78 (12.3%) females, were evaluated at treatment entry and after three months during their stay in a TC. All patients recruited for this study had been detoxified elsewhere. Results: After a 3-month period in a TC, the severity of all psychopathological dimensions decreased significantly over time. This development was especially frequent in subjects characterized by predominant Worthlessness-Being Trapped (W/BT), Somatic Symptoms (SS) and Sensitivity-Psychoticism (S/P) symptomatology, whereas a majority of Panic Anxiety (PA) and Violence-Suicide (V/S) subjects remained unchanged or showed a worsening of their symptoms. The baseline PA subjects appeared to be the most stable over time, followed by S/P, then by V/S, then by SS, and, lastly, by W/BT subjects. Stable W/BT patients showed greater severity in their baseline symptomatology, while stable PA patients showed lower severity. The only prediction of psychopathological stability arose from the 3-month PA score for severity. By contrast, V/S baseline severity, W/BT and S/P baseline typology all indicated psychopathological instability. Conclusions: After continuing for three months in a TC, a general reduction of SCL-90 severity is accompanied by a reduction in the frequency of the dimensions most closely linked with the intoxication/withdrawal state and with active substance abuse-related behaviour (SS and W/BT). The less frequent change regards patients allocated to the dimensions most involved in addiction processes (PA and V/S).

Key Words: Substance Use Disorder; psychopathology specific to Substance Use Disorder; psychopathological stability; psychopathological changes; residential treatment

1. Introduction

Although a high degree of association between core symptoms of addiction and other psychiatric symptoms has been repeatedly documented [10, 12, 26], the nature of this association and its determinants still remains unclear. In particular, uncertainty about the classification of psychiatric symptomatology – as being intrinsic to the addictive disorder, or else due to psychiatric comorbidity – still persists [24].

Given this uncertainty, a low level of inferential presumption when investigating the psychopathology of addicted subjects has been applied by our research team, especially when it came to examining symptoms expressed by patients independently of a pre-established syndrome level (such as that of the
Diagnostic and Statistical Manual of Mental Disorders (DSM) nosography). Following this approach, we investigated the psychopathological dimensions of 1,055 heroin addicts at the beginning of opioid agonist treatment (OAT) received at public addiction services in Italy. By applying an exploratory principal component factor analysis (PCA) to the 90 items on the SCL-90 checklist, a 5-factor solution was identified: the first factor reflected a depressive 'Worthlessness and Being Trapped' (W/BT) dimension; the second factor picked out a 'Somatic Symptoms' (SS) dimension; the third identified a 'Sensitivity-Psychoticism' (S/P) dimension; the fourth a 'Panic Anxiety' (PA) dimension; and the fifth a 'Violence-Suicide' (V/S) dimension [20]. These same results were replicated by applying the PCA to another Italian sample of 1,195 heroin addicts entering a Therapeutic Community Treatment [25]. Although this second sample differed from the first in important factors regarding sociodemographic and clinical conditions, treatment settings and programme characteristics, the same five psychopathological dimensions were found. As a result, it seems that the existence of specific aggregations of psychological/psychiatric features within the category of opioid addicts can be confirmed. To better understand whether we were facing a trait rather than a state nature for the five factorial dimensions proposed by us as intrinsic patterns determining the psychopathological structure of addiction, we looked at additional confounding variables, observing the specific discriminating properties of:

- The 'Somatic Symptoms' dimension that differentiates detoxified patients from non-detoxified ones [22];
- The 'Panic Anxiety' and 'Somatic Symptoms' dimensions that differentiate between patients with and those without lifelong psychiatric problems [21];
- The severity of 'Somatic Symptoms' and 'Panic Anxiety' among patients with heroin, cocaine or alcohol dependence [23].

After a series of studies, the 5-factor psychopathology discovered by us can be considered stable, because it was independent of the choice of treatment, of active substance use, of lifetime psychiatric problems, of the choice of substance(s) taken by polyusers and monusers, of stress sensitivity, and ethnicity. It was also strictly correlated with addictive behaviours, with stress sensitivity, and with the patient's age at his/her initial treatment. Lastly, it was able to differentiate SUD from major depression, chronic psychosis, and obesity, though it was unable to discriminate SUD patients from gamblers [1, 2, 7, 13-18, 21-23, 25, 27].

As a result, it seems that this 5-factor psychopathological structure tends to persist. More specifically, it seems that the allocation of patients to the W/BT, S/P and V/S groups is not influenced in any way by detoxification, lifelong psychiatric problems or typology of substance of abuse, while SS and PA are, to some extent, influenced by the conditions set out above.

**Aim:** What now remain to be explored are the variations over time of this structure.

## 2. Methods

### 2.1. Design of the study

This was a multicentre, naturalistic, prospective, cohort study, with double evaluation of Heroin Use Disorder (HUD) patients during a residential treatment in eight Italian Therapeutic Communities (TCs) involved in the VOECT project (Evaluation of Therapeutic Community Treatments and Outcomes) that included a total of 2,533 SUD patients. In inquiring into the situation of subjects who remained in a TC for a period of 3 months, the purpose of our study was to estimate the magnitude of changes in the severity and typology of their psychopathology, besides searching for demographic and clinical predictors of these variations to allow us to formulate a hypothesis on the stability of the psychopathology of patients with SUD. The study was conducted according to the WMA Declaration of Helsinki – Ethical Principles for Medical Research Involving Human Subjects. All the subjects examined filled in an informed consent document to qualify for participation in this study. Both the consent form and the experimental procedures were approved by the pertinent ethics committee in accordance with internationally accepted criteria for ethical research.

### 2.2. Sample

Specific inclusion criteria were applied in planning this study: sample participants had to be at least 18 years old, with a diagnosis of heroin, cocaine or alcohol dependence based on a clinical judgement, to be responder at 3-months, and to have information acquired from the SCL-90 inventory. All subjects were evaluated at treatment entry and after three months of residential treatment. Criteria for qualifying as a responder comprised patient’s compliance with the pro-
gramme rules, retention in treatment and, of course, having refrained from the use of unprescribed drugs during patient’s stay in a TC.

The sample consisted of 636 subjects with SUD. 558 (87.7%) were male and 78 (12.3%) female. The average age was 36.23 ± 8.8 years (minimum 18, maximum 68, mode 47, median 35.53, with an interval of 50 years between the youngest and oldest). 20% of the sample (N=127) had an educational curriculum lasting over 8 years, before entering the TC. 87.1% (N=554) were ‘single’, 80.7% (N=513) unemployed, 24.4% (N=155) lived alone, 98.1% (N=624) were of Italian nationality, 59.1% (N=376) were resident in Northern Italy, 18.2% (N=116) in Central Italy, 3.8% (N=24) in Southern Italy and 18.9% (N=120) in the Italian Islands. Regarding drug addiction history, 93.0% (N=586) had previously and unsuccessfully been treated for their addiction, 87.1% (N=553) had been periodically in abstinence from substances. 56.0% (N=356) had had legal problems, 152 (23.9%) patients primarily used alcohol, 294 (46.2%) heroin or opiates, 190 (29.9%) cocaine. 37.3% of the sample (N=237) had a dual disorder.

2.3. Assessment

For data collection we used the SCL-90, a self-assessment inventory of symptoms, while information on sociodemographic and clinical data was collected through a specially developed questionnaire administered to patients at TC entry.

2.3.1. SCL-90

Developed by Derogatis and colleagues [8], the SCL-90 is made up of 90 items, each rated on a 5-point scale of distress. It is a self-reporting clinical rating scale oriented towards the symptomatic behaviour of psychiatric outpatients. In the case of SUDs, the 90 items reflect 5 primary symptom dimensions that are believed to underlie the large majority of symptom behaviours observed in this class of patients. The primary symptom dimensions are: Worthlessness-Being Trapped (W/BT), Somatic Symptoms (SS), Sensitivity-Psychoticism (S/P), Panic Anxiety (PA), and Violence-Suicide (V/S) [20]. These five dimensions have been empirically established, and primarily validated and standardized (z-point and T point), in a sample involving over 2,500 SUD patients [18, 22, 23, 25]. On the basis of the highest standardized scores obtained on the five SCL-90 dimensions, subjects can be assigned to one of five mutually exclusive groups. For more information, see [18, 20]

2.3.2. Demographic and clinical data

For this study, the following demographic and clinical variables were selected: gender, age, nationality, marital status, education, work activity, life situation (alone, in the family), geographical residence, main substance used (e.g., alcohol, cocaine, heroin), presence of lifetime psychiatric problems, use of substances at treatment entry, previous treatments, primary substance modality of use.

2.4. Data analysis

Study participants were typified on the basis of the psychopathology presented at treatment entry (baseline) and after 3 months (end-point). If, over time, they still belonged to the same psychopathological typology they had at baseline, they were considered stable.

The baseline-to-endpoint changes in psychopathological severity were assessed by Student’s T-test (Mann-Whitney when appropriate). The stability of the psychopathological typologies was evaluated by tracking Cohen’s kappa from baseline to endpoint. Differences between stable and non-stable subjects were analysed using Student’s T-test and Chi-squared, respectively, for the comparison of continuous or parametric variables (Mann-Whitney, and Fisher exact test when appropriate). Patients who improved or worsened regarding severity of psychopathology were analysed by Wilcoxon Signed Ranks Test. Predictors of stability were evaluated by means of a logistic regression analysis using psychopathological stability as criterion, and severity and psychopathological typology at the baseline, as well as the type of substance used, gender, age, and the possible presence of a Dual Disorder, as predictors. In consideration of the exploratory nature of the study, we referred to levels of significance recognized at p ≤0.05. The SPSS 25.0 version statistical routines were used.

3. Results

3.1. Changes in severity of psychopathology

At residential treatment entry, the study subjects were distinguished, in all psychopathological types, by a low severity of symptomatology. The most pronounced symptomatology was that found in PA patients; even so, their severity of symptoms proved to be slightly below the average of the standardisation sample. In decreasing order, severity then declined successively along the series of the other four dimen-
Table 1. Changes in the severity of SUD psychopathology in SUD after three months in a residential therapeutic community

<table>
<thead>
<tr>
<th>Severity</th>
<th>Baseline M±sd</th>
<th>After 3 months in a TC M±sd</th>
<th>T</th>
<th>Improved condition (%)</th>
<th>Worsened condition (%)</th>
<th>Unvaried condition (%)</th>
<th>Wilcoxon Signed Ranks Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>W/BT</td>
<td>46.96±9.1</td>
<td>44.71±8.0</td>
<td>6.66**</td>
<td>60</td>
<td>36</td>
<td>4</td>
<td>-6.45**</td>
</tr>
<tr>
<td>SS</td>
<td>44.72±8.7</td>
<td>42.49±7.3</td>
<td>7.30**</td>
<td>59</td>
<td>36</td>
<td>5</td>
<td>-7.13**</td>
</tr>
<tr>
<td>S/P</td>
<td>47.91±8.7</td>
<td>46.64±7.9</td>
<td>4.19**</td>
<td>54</td>
<td>39</td>
<td>6</td>
<td>-4.52**</td>
</tr>
<tr>
<td>PA</td>
<td>48.06±8.3</td>
<td>46.81±7.9</td>
<td>4.20**</td>
<td>42</td>
<td>29</td>
<td>29</td>
<td>-4.04**</td>
</tr>
<tr>
<td>V/S</td>
<td>46.00±7.9</td>
<td>45.20±7.2</td>
<td>2.67**</td>
<td>49</td>
<td>40</td>
<td>11</td>
<td>-2.64**</td>
</tr>
</tbody>
</table>

** p<0.01

3.2. Changes in psychopathological typology

Table 2 shows the changes in psychopathological typology noted after three months in the TC. At treatment entry, the subjects best represented percentage-wise were those belonging to the PA typology (N = 214; 33.6%), followed by subjects with S/P (N = 164; 25.8%). The W/BT type was present in 112 (17.6%) subjects; 76 (11.9%) subjects were distinguished by the prominence of the SS dimension and 70 (11.0%) by the V/S dimension. After three months in residential treatment, the PA and V/S subjects had increased to 42.9% and 14.8% respectively, while the SS subjects were the most represented. After three months of drug abstinence, the S/P subjects were represented at 24.5%. In summary, after three months, the percentages of W/BT and SS subjects had been drastically reduced to 9.7% and to 8.1%, respectively. Cohen's kappa was 0.25, a figure indicative of a significant concordance of the psychopathological typology according to the Altman guidelines. The subjects who had shown a predominant PA dimension at the baseline, with a percentage as high as 64.0%, appeared

Table 2. Changes in typology of psychopathology in 3-month TC-retained SUD patients

<table>
<thead>
<tr>
<th>Data for each dimension after 3 months</th>
</tr>
</thead>
<tbody>
<tr>
<td>W/BT</td>
</tr>
<tr>
<td>------</td>
</tr>
<tr>
<td>Baseline data</td>
</tr>
<tr>
<td>W/BT</td>
</tr>
<tr>
<td>SS</td>
</tr>
<tr>
<td>S/P</td>
</tr>
<tr>
<td>PA</td>
</tr>
<tr>
<td>V/S</td>
</tr>
<tr>
<td>N %</td>
</tr>
</tbody>
</table>

Cohen’s Kappa = 0.259
Table 3. Comparison of psychopathological severity at baseline in subjects with and without stable temperament

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Stable</th>
<th>N</th>
<th>Unstable</th>
<th>T-value</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Worthlessness-Being Trapped</td>
<td>27</td>
<td>59.05±9.9</td>
<td>53</td>
<td>53.64±7.3</td>
<td>3.06</td>
<td>0.003</td>
</tr>
<tr>
<td>Somatic Symptoms</td>
<td>24</td>
<td>56.14±7.1</td>
<td>52</td>
<td>54.59±8.3</td>
<td>0.83</td>
<td>0.410</td>
</tr>
<tr>
<td>Sensitivity-Psychoticism</td>
<td>70</td>
<td>54.22±8.4</td>
<td>94</td>
<td>52.45±8.9</td>
<td>1.29</td>
<td>0.199</td>
</tr>
<tr>
<td>Panic Anxiety</td>
<td>137</td>
<td>48.04±9.4</td>
<td>77</td>
<td>51.81±13.0</td>
<td>-2.43</td>
<td>0.016</td>
</tr>
<tr>
<td>Violence-Suicide</td>
<td>25</td>
<td>54.49±8.8</td>
<td>45</td>
<td>53.04±9.9</td>
<td>0.62</td>
<td>0.535</td>
</tr>
</tbody>
</table>

to have become the most stable over time, followed by the S/P subjects with a percentage of 42.7%, by the V/S subjects with 35.7%, by the SS subjects with 31.6%, and, lastly, by the W/BT subjects with 24.1%. Overall, 243 (38.2%) subjects maintained the same psychopathological typology during 3-month drug abstinence.

3.3. Predictors of psychopathological stability

At baseline, comparing subjects with stable and unstable psychopathology, only W/BT and PA patients showed significant differences (Table 3). Stable W/BT subjects showed higher values than non-stable ones. In contrast, stable PA subjects showed lower scores. At baseline, SS, S/P and V/S subjects did not show significant differences, whether stable or unstable.

Table 4 shows significant predictors of psychopathological stability after 3-month drug abstinence in TC. Only the PA score for severity after 3-month abstinence predicted psychopathological stability. By contrast, V/S baseline severity, together with W/BT and S/P baseline typology, indicated psychopathological instability. The baseline severity of W/BT, SS, S/P, PA patients, the 3-month severity of W/BT, SS, S/P, V/S dimensions, the baseline S/P, PA typology, the 3-month typology of all five psychopathological dimensions, the patients’ age, gender, the primary substance of use (whether alcohol, cocaine or heroin), and the presence/absence of a dual disorder failed to reach statistical significance.

4. Discussion

After a 3-month period in TC the severity of all psychopathological dimensions decreased significantly over time. It seems, therefore, that patients who remain in a therapeutic community do, on average, improve their psychopathological condition. This result, testifying in favour of the efficacy of treatment in a therapeutic community, is consistent with the literature on the subject [3-6]. Of course, our information does not allow us to identify the determinants of this reduction of psychopathological severity. That may depend on the active pharmacological and/or non-pharmacological components of the treatment; it may simply depend on the interruption of the use of substances and on consequent changes in lifestyle; it may also depend on the easier dropout from treatment of those patients whose psychological condition does not improve.

Looking now at the severity specific to each dimension, a majority of PA and V/S subjects remain unchanged or experience a worsening of their symptoms over time, whereas a majority of W/BT, SS and

Table 4. Results of regression analysis designed to predict the presence of stable psychopathology from psychometric and clinical variables (only significant results are reported)

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>Exp(B)</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Min</td>
</tr>
<tr>
<td>V/S baseline severity</td>
<td>-0.03</td>
<td>0.97</td>
<td>0.94</td>
</tr>
<tr>
<td>PA 3-month severity</td>
<td>0.04</td>
<td>1.04</td>
<td>1.01</td>
</tr>
<tr>
<td>W/BT baseline typology*</td>
<td>-0.78</td>
<td>0.46</td>
<td>0.25</td>
</tr>
<tr>
<td>S/P baseline typology*</td>
<td>-0.71</td>
<td>0.49</td>
<td>0.28</td>
</tr>
</tbody>
</table>

*SS as reference dimensions; Statistics:χ² 19.58, p = 0.003

Not reaching statistical significance: severity of W/BT, SS, S/P, PA at baseline; severity of SS, S/P, PA, V/S after 3-month abstinence; PA and V/S baseline typology; W/BT, S/P, PA and V/S after 3-month typology; primary substance of use (alcohol, cocaine, heroin); gender; age; presence of Dual Disorder
S/P subjects improve their psychopathological condition (Wilcoxon test).

Turning to the frequency of the stability of the five dimensions, after three months 46.8% of the sample maintained the same psychopathological profile, while 53.1% changed. The PA dimension appeared to be the most stable over time, with 64% of subjects belonging to this profile were still found to be in the same profile after three months. The other psychopathological dimensions are progressively less stable, starting with S/P (42.7%) and ending with W/BT (24.1%). It therefore seems that the dimension that is most susceptible to the effect of an uninterrupted stay in a TC is W/BT, followed by SS, while the less susceptible ones are PA, preceded by S/P and V/S. As a result of the changes in psychopathological profiles, after staying in a TC for three months, PA is the most strongly represented dimension, followed by S/P and then by V/S.

As shown by logistic regression, after a stay of three months, PA severity is positively correlated with the stability of the psychopathological profile, while V/S baseline severity, together with W/BT and S/P baseline typology, indicated psychopathological liability. Other clinical variables that in previous studies have been shown to influence the psychopathological profile, such as primary substance of use (alcohol, cocaine or heroin) and the presence/absence of a dual disorder, did not turn out to have a significant predictive value.

In trying to explain these results, it may be observed that the W/BT dimension is characterized by features like sadness, feelings of uselessness and of being trapped in a corner, as well as difficulties in making decisions and concentrating. These features may easily be associated with the condition of active substance use and a related lifestyle [18]. The reduction of the prevalence of SS patients at three months may also be easily explained by reference to their recovery from substance use and its related health conditions. In a previous study we have shown the association of the SS dimension with intoxication and active substance use [22]. By contrast, the more stable PA and V/S dimensions may be dependent on the closer association of their related features, especially anxiety and impulse dyscontrol, with the ‘core’ psychopathological features of addiction per se, which are part of the psychopathological nucleus that predisposes to addiction, as well as on the persistent psychopathological change brought by addiction. The same observation may be made, even if to a lesser degree, for the S/P and V/S dimensions. In this connection it may be observed that research on addiction and related mental disorders indicates strong neurobiological and neuropsychological links, and that substance abuse and associated psychiatric conditions may be overt manifestations of a few common transdiagnostic, often latent factors [9, 11, 24, 28].

Summarizing the results of the studies being carried out at present by our research group, we can state that the 5-dimension psychopathological structure of patients asking for therapeutic community treatment is partly influenced by the active use of substances (so increasing the prevalence of the SS group of patients), by each patient’s psychiatric history (so increasing the prevalence of the SS and PA groups of patients), by individual dependence on specific substances such as:

- Heroin and alcohol, which increase the prevalence of the SS and PA groups in comparison with cocaine dependence;
- Alcohol, which increases the prevalence of S/P in comparison with heroin and cocaine dependence.

After three months in a therapeutic community, the more labile dimensions seem to be SS, W/BT and, to a lesser degree, S/P, while PA and V/S appear to distinguish the psychopathological structure of individuals with substance dependence even after three months spent in a TC, most likely without using substances.

**Limitations**

General limits to the validity of the SCL-90-based psychopathological 5-dimension solution were commented on in our previous studies on the SCL-90-defined structure of the psychopathology of opioid addiction [19, 22, 25]. Among these, there is the lack of any observer-related ‘objective’ evaluation, as SCL-90 is a self-administered instrument that may be affected by the voluntary or involuntary hiding of some symptoms. The use of other instruments to check the tendency of patients to lie, their understanding of the questions, and their motivation to participate in the procedure, would certainly lead to a substantial improvement in the validity of our work.

Moreover, patients involved in our research have never received any formal psychiatric diagnosis. It must be pointed out that, in Italy, psychiatric diagnosis is often formulated late in the course of the treatment received in addiction facilities or local addiction treatment units. In this connection, we have to point out that our research’s starting point is the weakness of categorical psychiatric nosography
combined with the tendency to allocate symptoms expressed by subjects with addiction to pre-established psychiatric categories, such as a form of comorbidity. SCL-90 does not allow discrimination in terms of the impact of psychiatric problems: it is likely that a formal and objective psychiatric diagnosis would have made it possible to distinguish between people who do and do not have significant psychiatric conditions and so investigate the relationship between SCL-90-based psychopathological conditions and psychiatric diagnosis. As a result, we are not yet in a position to know whether or how strongly the identified profiles are correlated with specific psychiatric diagnostic criteria.

Lastly, there may be a patient selection bias. In fact, the most severely ill patients may not have been able to meet the criteria for inclusion in TC, or else be likely to leave treatment early. In such circumstances (beyond our control) our study is prevented from extending current results to the entire category of SUD patients.

5. Conclusions

After SUD patients have stayed in treatment for three months in a TC, their SCL-90 psychopathological profile is modified, showing a general reduction of its severity and, in many cases, a change in the prominent dimension. The most frequent change occurs in patients showing the prominent dimensions most closely associated with an intoxication/withdrawal state and with active substance abuse-related behaviour (SS and W/BT). A change in the most prominent dimension is less frequent in patients allocated to the dimensions most involved in addiction processes (PA and V/S). Adding these findings to those of previous studies that had shown the substantial stability of the psychopathological features defined by SCL-90 irrespective of active substance use behaviour, of the history of psychiatric problems and of the kind of substances abused, we can state that, within the SCL-90 5-factor psychopathological structure, the less stable dimensions are: SS, which is influenced by active substance use and lifelong psychiatric problems; W/BT, which is influenced by the time spent in a therapeutic community; and PA, which is influenced by the time spent in TC treatment and, marginally, by lifetime psychiatric problems.

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the National Comorbidity Survey. Arch Gen Psychiatry. 51: 8-19.


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Contributors
All authors were involved in the study design, had full access to the survey data and analyses, and interpreted the data, critically reviewed the manuscript and had full control, including final responsibility for the decision to submit the paper for publication.

Conflict of interest
All authors have no conflict of interest. IM served as board member for Angelini, Camurus, CT Sanremo, D&A Pharma, Gilead, Indivior, Lundbeck, Molteni, MSD, Mundipharma.
Ethics

Authors confirm that the submitted study was conducted according to the WMA Declaration of Helsinki - Ethical Principles for Medical Research Involving Human Subjects. The study has ethics committee approval.

Note

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