THE INFLUENCE OF EXTRAVERSION ON PREFERENCES AND ENGAGEMENT IN PLEASANT ACTIVITIES IN PATIENTS WITH SUBSTANCE USE DISORDERS: ONE SIZE FITS ALL?

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A hallmark of the Community Reinforcement Approach (CRA) is its emphasis on getting individuals to increase their engagement in healthy old and new rewarding activities that can compete with substance use. The personality dimension extraversion seems to be an important mechanism underlying activity engagement. A median split classified 265 patients with substance use disorders as high or low on NEO-FFI extraversion scores. Group comparisons indicated that patients with low NEO-FFI extraversion scores reported lower pleasant activity levels in general, and lower intensity of social interactions in particular. The disparity between conditions as far as what they valued was relative, since both groups pinpointed a wealth of potentially pleasant activities that could play a role in achieving non-substance related positive reinforcement for sobriety.

Keywords: CRA, extraversion, NEO-FFI, substance use, addiction, pleasant activities

There is a firm association between substance use and other psychiatric disorders (Brady & Sinha, 2005). The National Household Survey on Drug Abuse indicated that more than 50% of those with a lifetime history of substance use disorders also have a lifetime history of other mental disorders (Substance Abuse and Mental Health Services Administration, 1999). The daily lives of patients with severe mental disorders are solitary and passive, characterized by minimal participation in meaningful activities (McCormick, Funderburk, & Lee, 2005), whereas having multiple mental disorders yields an even higher level of disability (Ormel et al., 1994). The impaired day-to-day experience has been substantiated by descriptions of patients’ reports of spending up to 71% of their time at home, 37% of their time alone, and 10% of their time “doing nothing” (Delespaul & deVries, 1987).

To counteract the general deficit in pleasant activities of these patients, it has been proposed that components of addiction treatment should focus on increasing patients’ involvement with alternative reinforcers (e.g., Volkow, Fowler, & Wang, 2003). Recent research has confirmed that patients who were voluntarily admitted to outpatient addiction treatment services had a reduced level of engagement in pleasant activities as compared to healthy controls (Roozen et al., 2008). The increase in rewarding activities, as a lifestyle change, ameliorates the general well being. For instance, exercise is associated with improvement on several domains, including physical health, mood and anxiety, sleep, self-esteem and resilience to stress in clinical populations (e.g. Callaghan, 2004; Read et al., 2001; Scully, Kremer, Meade, Graham, & Dudgeon, 1998). In addition, research has shown that an increase in substance-free behaviors is inversely related to substance use (Correia, Benson & Carey, 2005). Therefore, increasing the frequency and intensity of alternative, non-substance related, rewarding activities in the natural environment is essential to initiating and maintaining abstinence (Meyers & Smith, 1995; Pantalon et
The Community Reinforcement Approach (CRA; Hunt & Azrin, 1973), which is listed among interventions with the strongest scientific support in terms of efficacy and cost-effectiveness (Finney & Monahan, 1996; Miller, Wilbourne, & Hettema, 2003; Miller, Zweben, & Johnson, 2005), is built upon this philosophy. CRA is a comprehensive multi-modal treatment package that addresses substance using behavior by promulgating enhancement of positive reinforcement for sobriety (Meyers & Smith, 1995). More specifically, CRA reverses the patients’ isolation process by helping them become progressively involved in non-substance related pleasant activities with other non-substance using individuals in their “community” (Azrin, 1976; Miller, Meyers & Hiller-Sturmhöfel, 1999; Smith, Meyers, & Delaney, 1998). CRA assists patients in making increasingly effective choices by capturing their activity preferences for specific points in time, and by implementing procedures to increase the accessibility of these behaviors (e.g., problem-solving, systematic encouragement, reinforcer access, and reinforcer sampling (Meyers & Smith, 1995, pp. 140-143).

To enhance the propensity to sample new activities/behaviors outside treatment sessions, CRA stresses the importance of homework assignments. There is empirical support for the use of homework during treatment for patients with substance use disorders (Carroll, Nich & Ball, 2005; Gonzales, Schmitz & DeLaune, 2006). Recent data suggest that the extent to which participants are adherent to completing their homework assignments is associated with positive intermediate and long-term outcomes in cocaine dependent patients (Carroll et al., 2005). Getting patients to follow through with homework assignments in general is difficult (Beck, Rush & Emery, 1979; Davis & Hollon, 1999), but perhaps more so when the assignment is for a substance-abusing individual to sample a new activity while clean and sober. Given the difficulties in getting patients to sample new activities in the first place, it would be worthwhile to develop ways to determine in advance which pleasant activities (both interpersonal and solitary) might be most rewarding for a particular patient. Even if patients are willing to sample new behaviors, they can easily become discouraged if the experience is not similar to what they expected, and the reinforcement is insufficient.

The mechanisms underlying the choice of and engagement in activities are considerably influenced by personality (Eysenck, 1967). Specifically, research has indicated that individuals differ in their search for, or response to, intrinsic rewards in activities (Csikszentmihalyi, 1990; Ryan & Deci, 2000). The personality of individuals thus affects the selection and setting of activities (Diener, Larsen, & Emmons, 1984). A frequently examined biologically-based dimension of personality is extraversion. In contrast to introverts, individuals with elevated scores on this dimension prefer high levels of arousal (Brandstatter, 1994), such as that experienced through participation in sports (Eysenck, Nias, & Cox, 1982; Furnham, 1990; Hills & Argyle, 1998; Kirkcaldy & Furnham, 1991). In a non-clinical sample it has been shown that extraverted individuals are more likely to both choose and enjoy social activities, as compared to introverts (Diener et al., 1984).

The present research examined the rewarding value of alternative, non-substance related activities, in terms of frequency and enjoyability, as proximal indices of reinforcement. The objective was to pinpoint rewarding activities as alternatives for substance-related behavior in individuals with substance use disorders. Subsequently, in order
to explore behavioral activity preferences and engagement in relation to extraversion, two subgroups of extraversion (i.e., low versus high) were demarcated in a patient sample with substance use disorders. Potentially rewarding activities were explored that could contribute to successful outcomes in treatment for each group. It was anticipated that high extraverted individuals would report higher scores not only on social activities, but would have higher activity levels overall than low extraverted individuals.

Method

Participants and Procedure

The sample consisted of 265 patients with a variety of substance use disorders and impulse-control disorders (e.g., pathological gambling). Assessment took place at the outpatient treatment facilities for addiction treatment services, Novadic-Kentron, in Roosendaal (population <100,000) and Breda (population <200,000), the Netherlands. This patient population was voluntarily referred for treatment and was characterized by male patients (72%) of European origin (96%). Thirty-six percent were married or living together, 52% had either elementary school or middle school education only, and 63% were full-time or part-time employed (see Roozen et al., 2008, for additional details).

Instruments

**NEO Five-Factor Inventory (NEO-FFI)**. This 60-item self-report personality inventory (Costa & McCrae, 1992) measures neuroticism, extraversion, openness, agreeableness and conscientiousness. Items are scored on a five-point Likert scale varying from “totally disagree” (1) to “totally agree” (5). This widely used inventory has good consistency, reliability and sufficient validity (Costa & McCrae, 1992; Hoekstra, Ormel, & De Fruyt, 1996). In the present study we only used the Extraversion subscale (Cronbach’s alpha=0.69).

**Pleasant Activities List (PAL)**. This 139-item self-report questionnaire measures the frequency and subjective pleasure of activities, and involves two parameters of reinforcement: (a) the amount of time engaged in the activity and (b) the respondent’s subjective enjoyment of the experience (Roozen et al., 2008). The PAL has a double five-point rating scale ranging from “not at all” (1) to “very much” (5) on both frequency and enjoyability. This inventory consists of seven factor analytically derived factors: social activities (SA), sensation seeking activities (SSA), domestic activities (DA), activities in culture, science and traveling (CST), passive, relaxing activities (PRA), sport-related activities (SRA) and activities that involve intimacy and personal attention (IPA). In addition, three supplementary rational factors were constructed: miscellaneous activities (MA), a subtotal of all activity scales (SAS) and general activities (GA). All 10 subscales had acceptable Cronbach’s alphas (see Table 1).

Results

Preliminary Analyses

Continuous variables were analyzed by means of t-test, and χ²-statistics were used to test differences in categorical data. Pearson product-moment correlations were applied to examine the strengths of the associations between variables. A Kolmogorov-Smirnov test showed that the NEO-FFI extraversion variable was normally distributed [D(263) = 0.54, p > 0.05], which legitimized the use of a median split to divide patients into two groups: high- and low NEO-FFI extraversion. Statistically significant differences were found between groups on two demographic variables: age [t(261) = -5.02, p < 0.001] and marital status [χ² (2) = 7.07, p =
0.029]. This latter variable was converted into dummy variables for each subcategory. Age and marital status were subsequently introduced in the general linear model as covariates. All \( p \)-values were 2-sided and considered significant at \( p < 0.05 \). Computations were performed with the Statistical Package for Social Sciences (SPSS version 15.0, 2004, SPSS Inc., Chicago, Illinois).

**Correlational Analyses**

The correlations between NEO-FFI extraversion and the PAL subscales ranged from .16 - .47 for frequency, and .09 - .42 in terms of enjoyability (Table 1). Overall, the subscales showed moderate correlations with extraversion, with somewhat higher correlations on frequency compared to enjoyability. As expected, the strongest correlations were found on SA, but the IPA, SAS and GA scales also appeared to have relatively strong correlations with extraversion.

<table>
<thead>
<tr>
<th>Subscale</th>
<th>Frequency Alpha</th>
<th>Enjoyability Alpha</th>
<th>Frequency Pearson's r</th>
<th>Enjoyability Pearson's r</th>
</tr>
</thead>
<tbody>
<tr>
<td>SA</td>
<td>0.90</td>
<td>0.92</td>
<td>.47***</td>
<td>.42***</td>
</tr>
<tr>
<td>SSA</td>
<td>0.77</td>
<td>0.85</td>
<td>.16*</td>
<td>.09</td>
</tr>
<tr>
<td>DA</td>
<td>0.69</td>
<td>0.72</td>
<td>.20**</td>
<td>.20**</td>
</tr>
<tr>
<td>CST</td>
<td>0.78</td>
<td>0.88</td>
<td>.19**</td>
<td>.09</td>
</tr>
<tr>
<td>PRA</td>
<td>0.69</td>
<td>0.69</td>
<td>.16*</td>
<td>.10**</td>
</tr>
<tr>
<td>SRA</td>
<td>0.79</td>
<td>0.83</td>
<td>.28***</td>
<td>.23**</td>
</tr>
<tr>
<td>IPA</td>
<td>0.83</td>
<td>0.86</td>
<td>.35***</td>
<td>.33***</td>
</tr>
<tr>
<td>SAS</td>
<td>0.94</td>
<td>0.95</td>
<td>.43***</td>
<td>.33***</td>
</tr>
<tr>
<td>MA</td>
<td>0.75</td>
<td>0.90</td>
<td>.28***</td>
<td>.26**</td>
</tr>
<tr>
<td>GA</td>
<td>0.95</td>
<td>0.97</td>
<td>.42***</td>
<td>.32***</td>
</tr>
</tbody>
</table>

*Note. SA = Social Activities, SSA = Sensation Seeking Activities, DA = Domestic Activities, CST = Culture, Science & Traveling, PRA = Passive, Relaxing Activities, SRA = Sport-Related Activities, IPA = Intimacy, Personal Attention, SAS = Subtotal Activity Scales, MA = Miscellaneous Activities, GA = General Activities. Pearson’s \( r \) was calculated between extraversion and frequency and enjoyability of each subscale.  
* \( p < 0.05 \), ** \( p < 0.01 \), *** \( p < 0.001 \).  

**High and Low NEO-FFI Extraversion Group Differences: Subscales**

The comparisons yielded statistically significant differences on nearly all PAL subscales regarding frequency, and seven subscales regarding enjoyability. In general, patients with high levels of extraversion reported higher ratings. The largest differences were found on the frequency scores of SA [F(1, 250) = 43.92, \( p < 0.001 \)], IPA [F(1, 250) = 19.79, \( p < 0.001 \)], SAS [F(1, 250) = 36.71, \( p < 0.001 \)] and GA [F(1, 250) = 32.37, \( p < 0.001 \)]. Furthermore, these patients also differed the most from those patient with low extraversion scores on enjoyability on the subscales SA [F(1, 222) = 29.21, \( p < 0.001 \)], SAS [F(1, 222) = 15.94, \( p < 0.001 \)] and GA [F(1, 222) = 15.28, \( p < 0.001 \)]. With respect to this latter scale, the high NEO-FFI extraversion group reported higher scores on both frequency [12.3% (95% CI: 8.3 to 16.2)] and enjoyability [10.9% (95% CI: 6.6 to 15.2)].

**High and Low NEO-FFI Extraversion Group Differences: Item Analyses**

As the PAL subscales yielded multiple statistical group differences, a further in-depth item exploration was set up for both groups. Based on the 10 highest ranked mean scores of the PAL items, group differences were calculated in terms of frequency and enjoyability (see Tables 2 and 3, respectively). Highly extraverted individuals rated the frequency of these items globally 19% [95% CI: 16.0 to 22.0] higher. Correspondently, individuals high in extraversion also rated the enjoyability of these items 12% [95% CI: 9.9 to 14.1] higher. Although the highly extraverted group showed elevated levels to all classes of rewarding activities generally, the rankings of both groups illustrate that the top five on frequency and the top three on enjoyability consist of identical items. Strikingly, only one and two SA items
emerged among the top ranked items for frequency and enjoyability, respectively.

This analysis was extended to items that were rated “A bit” or higher (≥2) on frequency.

Figure 1: Adjusted Means (SE) of Subscales Regarding Frequency

Note. SA = Social Activities, SSA = Sensation Seeking Activities, DA = Domestic Activities, CST = Culture, Science & Traveling, PRA = Passive, Relaxing Activities, SRA = Sport-Related Activities, IPA = Intimacy, Personal Attention, SAS = Subtotal Activity Scales, MA = Miscellaneous Activities, GA = General Activities. Error bars represent the standard error of the mean (±SEM).

* p < 0.05, ** p < 0.01, *** p < 0.001.

and enjoyability. Fifty-eight frequency items fulfilled this criterion, of which 24 items yielded major differences between high and low NEO-FFI extraversion (Fs > 7.94, ps < 0.01). Of these items 67% were SA and 21% IPA. Similar results were found on enjoyability. A total of
113 items fulfilled the criterion and were selected. Fourteen major differences were observed (Fs > 8.72, ps < 0.01) on SA (78%) and MA (21%). In general there was a large item overlap between both groups, as roughly similar items were valued.

**Potentially Enjoyable Activities**

Table 2

<table>
<thead>
<tr>
<th>Subscale</th>
<th>Activity</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>MA</td>
<td>Watching TV</td>
<td>3.27(0.11)</td>
</tr>
<tr>
<td>MA</td>
<td>Listening to the radio</td>
<td>2.96(0.12)</td>
</tr>
<tr>
<td>MA</td>
<td>Listening to music (radio, CD, mp3)</td>
<td>2.94(0.12)</td>
</tr>
<tr>
<td>SA</td>
<td>Telling something I have experienced</td>
<td>2.86(0.10)</td>
</tr>
<tr>
<td>IPA</td>
<td>Drinking coffee or tea</td>
<td>3.44(0.12)</td>
</tr>
<tr>
<td>MA</td>
<td>Watching attractive men or women</td>
<td>3.07(0.10)</td>
</tr>
<tr>
<td>IPA</td>
<td>Taking a shower or bath</td>
<td>3.99(0.10)</td>
</tr>
<tr>
<td>MA</td>
<td>Drinking a soda (lemonade, fruit juice)</td>
<td>3.51(0.12)</td>
</tr>
<tr>
<td>MA</td>
<td>Smoking a pipe, cigar or cigarette</td>
<td>3.36(0.10)</td>
</tr>
<tr>
<td>IPA</td>
<td>Knitting</td>
<td>2.88(0.15)</td>
</tr>
<tr>
<td>MA</td>
<td>Watching movies, videos, DVD’s</td>
<td>2.78(0.11)</td>
</tr>
</tbody>
</table>

Note. SA = Social Activities, SSA = Sensation Seeking Activities, DA = Domestic Activities, CST = Culture, Science & Traveling, PRA = Passive, Relaxing Activities, SRA = Sport-Related Activities, IPA = Intimacy, Personal Attention, SAS = Subtotal Activity Scales, MA = Miscellaneous Activities, GA = General Activities. The percentages (%) are displayed to highlight the difference between high and low NEO-FFI extraversion.  

* p < 0.05, ** p < 0.01, *** p < 0.001.

Potentially rewarding activities were identified to assess the opportunity for possible clinical utility to sample alternative behavior. The selection of these potentially rewarding unperformed (in the past 30 days) activities was based on two parameters, which were the same for both groups: high enjoyability ratings (“Much” and “Very Much”; ≥ 4) and concomitant frequency score (“Not at all”; = 1). Activities that fulfilled these criteria were reviewed and for each of these activities the percentage of patients was calculated. A prevalence threshold of 10% was pre-set as a baseline (for at least one of the NEO-FFI extraversion groups). The 32 activities that surpassed this threshold are shown in Table 4.

The percentage of activities that were not performed but which had a high intrinsic reward potential varied between 7.3% (“Laying or sitting in the sun or on a sun bed”) and 41.0% (“Taking a vacation”). In general, the high NEO-FFI extraversion group scored higher on most items. Specifically, the high NEO-FFI extraversion group scored higher on 22 activity items, and yet there was a statistically significant difference on only two items. Of the remaining 10 activity items the low NEO-FFI extraversion group scored higher, but again only two items showed statistically significant differences. For instance, the activities appraised by both groups as potentially most enjoyable encompassed “Taking a vacation”, “Travel to a foreign country”, “Riding a motorcycle” and “Racing in a car, track racing”.

Table 3

<table>
<thead>
<tr>
<th>Subscale</th>
<th>Activity</th>
<th>Enjoyability</th>
</tr>
</thead>
<tbody>
<tr>
<td>MA</td>
<td>Listening to music (radio, CD, mp3)</td>
<td>3.64(0.16)</td>
</tr>
<tr>
<td>SA</td>
<td>Visiting friends or acquaintances</td>
<td>3.76(0.13)</td>
</tr>
<tr>
<td>IPA</td>
<td>Make love</td>
<td>3.64(0.16)</td>
</tr>
<tr>
<td>IPA</td>
<td>Hugging someone</td>
<td>3.86(0.14)</td>
</tr>
<tr>
<td>IPA</td>
<td>Kissing</td>
<td>3.87(0.14)</td>
</tr>
<tr>
<td>MA</td>
<td>Watching attractive men or women</td>
<td>3.68(0.11)</td>
</tr>
<tr>
<td>IPA</td>
<td>Taking a shower or bath</td>
<td>4.16(0.11)</td>
</tr>
<tr>
<td>SA</td>
<td>Going to a restaurant / eat out</td>
<td>3.75(0.15)</td>
</tr>
<tr>
<td>CST</td>
<td>Taking vacation</td>
<td>3.94(0.13)</td>
</tr>
<tr>
<td>IPA</td>
<td>Buying something for someone else</td>
<td>3.66(0.13)</td>
</tr>
<tr>
<td>MA</td>
<td>Watching movies, videos, DVD’s</td>
<td>3.36(0.12)</td>
</tr>
<tr>
<td>CST</td>
<td>Travel to a foreign country</td>
<td>3.45(0.10)</td>
</tr>
</tbody>
</table>

Note. SA = Social Activities, SSA = Sensation Seeking Activities, DA = Domestic Activities, CST = Culture, Science & Traveling, PRA = Passive, Relaxing Activities, SRA = Sport-Related Activities, IPA = Intimacy, Personal Attention, SAS = Subtotal Activity Scales, MA = Miscellaneous Activities, GA = General Activities. The percentages (%) are displayed to highlight the difference between high and low NEO-FFI extraversion.  

* p < 0.05, ** p < 0.01, *** p < 0.001.
Discussion

The present study investigated differences in activity engagement and preferences between patients with high- and low NEO-FFI extraversion scores in terms of frequency and enjoyability. There were meaningful correlations between extraversion and the PAL subscales: SA, IPA, SAS and GA on both frequency and enjoyability. The results on frequency disclosed relatively robust differences on all PAL activity domains (Figure 1). The largest difference was found on SA, where patients with high NEO-FFI extraversion reported 19.4% higher frequency scores than did low extraversion patients. Statistically significant differences between subgroups with respect to enjoyability occurred on six distinctive subscales (Figure 2). Again, the largest difference between both NEO-FFI extraversion groups was found on SA (16.8%). These findings confirm the earlier assumption that extraversion is associated with higher activity levels in general, and intensity of social interactions in particular (e.g. Costa & McCrae, 1992; Diener et al., 1984).

It has been suggested that extraverts are considered happier (Hayes & Joseph, 2003), due to a heightened sensitivity to a range of pleasant stimuli and incentives occurring in the natural environment (e.g. Costa & McCrae, 1992; Tellegen, 1985). More specifically, it has been suggested that extraverts are more sensitive to rewards derived from social situations than introverts (Lucas, Diener, Crob, Suh, & Shao, 2000). Extraversion has been shown to correlate positively with activation within dopaminergically innervated, reward-sensitive regions (Carver, Sutton, & Scheier, 2000; Depue & Collins, 1999). This pleasure-reward system of the brain is also activated in response to substances of abuse and dependency (Volkow, et al., 2003). Correspondently, extraversion is inversely related to multiple psychiatric illnesses, including mood, anxiety and substance use disorders (Clark, Watson & Minenka, 1994).

From this point of view it seems viable to promote a reduction of substance use by enriching the environment with a high quantity of rewarding, non-substance related alternatives (Carroll, 1996; Tucker, 2001; Vuchinich & Tucker, 1996). CRA is consistent with this approach, as it entails turning to and enhancing social, recreational, personal and vocational reinforcers to help the patient in the process of rehabilitation (Azrin, 1976; Hunt & Azrin, 1973). Since the social network and daily activities of many substance abusers often revolve around acquiring and using alcohol and/or drugs, the CRA therapist works closely with the patient to identify alternative potential sources of non-substance related pleasant activities.

With respect to the apparently reduced reward sensitivity of patients with low NEO-FFI extraversion scores, there might be a need for a somewhat larger density or array of alternative pleasant activities to achieve an adequate level of alternatively derived reinforcement. In a cocaine-dependent population, research has indicated that the adoption of a number of activities and frequent engagement in them is more critical to successful treatment outcome than relying on any single activity (Farabee, Rawson, & McCann, 2002).
The finding of the present study suggests that treatment strategies might benefit from a screening of the personality dimension extraversion at treatment entry. This could enable therapists to assist the patient to choose certain types of activities of interest (e.g., solitary versus social) and to derive a sufficient intensity of reinforcement. Based on the findings that patients in the low NEO-FFI extraversion group reported lower activity levels, they might need auxiliary assistance in the form of social support in addressing practical barriers (e.g., intimidation). At the same time, high extraversion patients might have a unique set of problems that interfere with successfully engaging in new potentially pleasant activities. As these patients are typically more sociable, enthusiastic, and gregarious, they might need relapse management (Roozen & Van de Wetering, 2007) in the event that they find themselves in a risky social event, or CRA’s specialized skills training (e.g., alcohol/drug refusal training, problem-solving training, or enlisting social support,) to prevent them from entering into (unanticipated) high-risk situations in the first place (Meyers & Smith, 1995).

According to the PAL results in this study, potentially pleasant activities were captured that were unperformed yet rated as highly enjoyable. Discussing these findings with patients might motivate them to accept the challenge of sampling an alternative behavior with a high promise for pleasure. Interestingly, while higher percentages of patients in the high NEO-FFI extraversion group scored globally twice as high on potentially enjoyable items, only four comparisons were statistically significant. Thus, both groups listed a wealth of opportunities for treatment planning, which has implications for selecting strategies to compete with substance-related behaviors. Both the therapist and patient can set up activities that the patient plans to undertake, and then determine under which conditions (where, when, how, and with whom) the patient will participate in those activities (Miller et al., 1999).

As noted earlier, despite the proven importance of homework tasks in substance abuse treatment (Carroll et al., 2005; Gonzales et al., 2006), compliance is often an issue (cf. Beck et al., 1979; Davis & Hollon, 1999). Several components of CRA are specifically designed to successfully introduce scheduled pleasant activities into patients’ everyday lives, thereby minimizing compliance problems. For example, assume a patient appeared motivated to go to the public swimming pool to socialize and relax, but the week passed and he never made it there. By applying a variety of CRA’s procedures at the next session, the patient would receive assistance in addressing any potential obstacles for the upcoming week. For instance, the therapist would first check to be sure the patient still wanted to go to the pool (goal setting), and would have him call the pool staff during the treatment session (systematic encouragement) to obtain useful information (e.g., costs, requirements, hours). Furthermore, the therapist would help the patient anticipate and address any potential obstacles to successfully carrying out the assignment. Assume, for example, the patient reported that there was a chance he would run into his old using buddies while riding his bike to the pool. The therapist would practice drug-refusal training with the patient so that he could turn down drugs, or perhaps problem-solving training so that he could plan an alternate route or mode of transportation to minimize the chance of running into these friends in the first place.

In summary, it is well known that many patients with substance use disorders spend much of their time relatively inactive, often characterized by the absence of goal-oriented and pleasant non-substance related purposeful activities. This study considered the activity engagement in terms of frequency and enjoyability for these patients based on the personality dimension extraversion. The results confirmed that highly extraverted patients engage in activities more frequently and consider them more enjoyable than patients who score low on extraversion. Despite the major differences on most subscales, both patient groups globally value similar activities in terms of how often they engage in them and how pleasurable they find them. Furthermore, both patient groups value similar potentially
rewarding activities, which may hold promise in treatment planning to pin-point alternative rewarding activities in patients' everyday lives. More research is needed to confirm the present findings. An interesting avenue of research would be to focus on the frequency, enjoyability and type of activity engagement as they relate to treatment outcome for distinctive clinical extraversion groups (i.e., low versus high).

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