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The role of personality functioning in drug misuse treatment engagement

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ABSTRACT

Background and aim: Personality functioning is predictive of drug misuse and relapse, yet little is known about the role of personality in engagement with the treatment process. This study aimed to estimate the extent to which broad and facet level characteristic adaptations contribute to or hinder treatment engagement, while controlling for psychosocial indicators. **Design**: Multi-site cross-sectional survey. **Setting:** Inpatient treatment units covering 80% of residential treatment entries in Greece. **Participants**: 338 service users, 287 (84.9%) male, 51 (15.1%) female, average age 33.4 years. **Measurements:** Expressions of personality functioning (characteristic adaptations) were assessed using the Severity Indices of Personality Problems (SIPP-118). Treatment engagement was measured using the Client Evaluation of Self and Treatment, inpatient version (CEST). **Findings:** Dysfunctional levels of Relational Capacities predicted Counselling Rapport (β= 1.50, 95%CI= 0.36 to 2.69, p=. 013), Treatment Participation (β=2.09, 95%CI= 1.15 to 3.11, p< .001) and Treatment Satisfaction (β= 1.65, 95%CI=.073 to 2.57, p< .001). Counselling Rapport was also predicted by dysfunctional levels in Self-Control (β= 1.78, 95%CI=.89 to 2.67, p< .001), Self-Reflective Functioning at the facet level (β= 2.24, 95%CI= 1.01 to 3.46, p< .001) and Aggression Regulation (β= 1.43, 95%CI= 0.43 to 2.42, p= .005). Dysfunctional levels on Social Concordance (β= -1.90, 95%CI= -2.87 to - .94, p= .001), Emotional Regulation (β= 1.90, 95%CI= .87 to 2.92, p< .001) and Intimacy (β=2.04, 95%CI= 1.31 to 3.05, p< .001) were significant predictors of Treatment Participation. Treatment Readiness and Desire for Help predicted treatment engagement. **Conclusions:** In people attending substance use treatment services, maladaptive interpersonal patterns and relational intimacy, emotional dysregulation and impulse control may be associated with low levels of Counselling Rapport and Treatment Participation. Low frustration tolerance and aggressive impulses also appeared to predict low participation.

Keywords: treatment engagement, personality functioning, treatment effectiveness, characteristic adaptations, dimensional diagnosis

INTRODUCTION

After years of separation of personality research from treatment research, a considerable literature has now grown around the themes of dimensional evaluation of personality functioning [1,2,3,4,] and personality matched-interventions [5,6]. In the addictions field, there is some evidence suggestive of a relationship between personality and poor outcomes, including treatment attrition [7,8] and relapse [9,10,11] but there has been surprisingly little investigation of whether personality influences a client's ability to actively engage with the treatment process. This is important because clients' engagement in therapy, often conceptualised as active participation, good counselling rapport and satisfaction with the ongoing process, has been consistently associated with increased tenure in treatment, reduction of drug use and improved post treatment outcomes [12,13,14]. In contrast, lack of treatment engagement has been associated with early drop out and relapse [15,16].

One of the most consistent predictors of lack of engagement, treatment drop out and relapse is clients' comorbidity, in particular when substance use disorder co-exists with personality disorder [17,18]. However, diagnostic indicators to rule out personality disorder symptomatology are based on the behavioural expression and extremity of certain maladaptive traits that mimic personality pathology [19,20] and increase the risk of over-diagnosis of personality disorder among those with substance use disorders. Consequently, overlapping symptomatology as well as lack of clarity and clear distinction between and within diagnostic categories have prompted several prominent researchers to suggest alternatives [21,22]. Current research is evolving towards the recognition that a number of personality traits and personality dysfunction commonly observed in drug users do not necessarily reflect diagnosis of personality disorder pathology [4]. This has led to significant improvements of the categorical-based diagnostic procedures, by including progressive methods of dimensional assessment [23] disentangling personality traits from disorders and discriminating the conceptual differentiation of stable dispositions from context sensitive characteristic adaptations [24].

Contemporary diagnosis according to the new Diagnostic and Statistical Manual of Mental Disorders (DSM-5) involves the assessment of Personality Functioning Scale (PFS), a hybrid model that simultaneously uses the traditional categorical approach of DSM-IV, along with a dimensional approach. This provides a more comprehensive assessment of pathological

personality trait domains as well as a "Level of Personality Functioning-Scale", as an overall measure of the severity of personality dysfunction [24]. This approach is also a significant step towards improving the clinical utility of the diagnostic manual as it provides a detailed description of individuals' personality profile including personality traits and characteristic adaptations. These characteristic adaptations refer to the dynamic organization of personality such as affect tolerance and impulse regulation, self and other representations, identity, coping strategies, and acquired skills. Individuals' characteristic adaptations profile could provide a more in-depth understanding of personality in treatment. As Joe et al. (1999) suggested, therapeutic involvement requires a certain degree of adaptation to the social context [26]. Any variation of treatment responses may result from the interaction between an individual's characteristic adaptations and the capacity of the contextual environment, including therapists, to work with those who exhibit difficulties in adapting to, for example, social norms and programme expectations.

Current evidence in non-substance misuse settings suggests that personality functioning is malleable towards more adaptive levels in response to treatment [27], that the levels of adaptation predict differential response to treatment [28], and that more maladaptive levels are associated with worse treatment response [29] and increased likelihood of attrition [30,31]. Therefore, the identification of personality functioning that may activate dysfunctional behavioural patterns during treatment is of significant clinical importance. Delineating the role of personality functioning within treatment process could contribute to the identification of individual attrition vulnerabilities so that they can adequately addressed early on, prevent premature termination and enhance clients' engagement. Practically, this would imply that despite personality traits' stability, treatment interventions could moderate the degree of dysfunctional behavioural phenotypes by targeting the partially context-sensitive characteristic adaptations. The aims of this study were 1) to investigate the effects of broad and facet level characteristic adaptations on indicators of early treatment engagement– namely, *Counselling rapport*, *Treatment Participation* and *Treatment satisfaction*; and 2) to elucidate and explain differences in the levels of engagement according to personality dimensions, while controlling for age, gender, drug use, psychosocial characteristics, motivation and treatment modality. We hypothesised that more dysfunctional personality adaptations would be negatively related to treatment engagement.

METHODS

Design

This paper describes part of a larger Greek treatment effectiveness study examining the therapy process using a quantitative multi-site individual follow-up design in naturalistic treatment settings. This paper focuses on the early inpatient phase to explore the relationship between service users' characteristic adaptations and their early treatment engagement.

Treatment services

For this part of the study, five inpatient treatment units were recruited from the two major publicly funded treatment organizations (one providing therapeutic community treatment, one psychosocial rehabilitation) that provide free of charge, psychosocial care for alcohol and substance misuse and have the largest number of individuals seeking therapy, jointly covering more than 80% of the treatment demand in Greece [32]. The five units (two therapeutic communities and three psychosocial rehabilitation units) cover different geographical regions, two were in Athens, one in Piraeus, one in Salamina and one in Thessaloniki. The two treatment organizations are similar in terms of both therapeutic interventions, protocols and organizational structure. Both have 6-12 week outpatient phases (in practice mostly 9 weeks) followed by 6-9 month inpatient phase, with similar procedures to progress from one phase to the next. Treatment in both modalities consists of a mix of individual counselling and group therapy, although there are some differences in staff backgrounds, e.g. the involvement of former service user staff in therapeutic community treatment.

Ethics

The study received ethics approval from the University of Sheffield. Since data collection involved clients undergoing substance misuse treatment, the study also obtained approval by the Institutional Review Board of the organisations involved in the study.

Recruitment procedure

We used a cohort sampling approach: All individuals who were admitted to the inpatient treatment phase in the above-mentioned units for a 36 months period (sampling period was determined by study timescales) were contacted individually by the researcher (FP) and invited to participate. The eligibility criteria were: 1) at least 18 years old, 2) used illicit drugs during

the past 90 days, 3) able to read and speak Greek fluently, 4) no current or previous experience of psychotic symptoms and 5) no serious developmental disabilities or cognitive disturbances. Eligibility was determined through pre-screen data and information supplied by the treatment providers and clinical records. Those who expressed interest and met the inclusion criteria received the related documents including study information sheet and consent form. Only participants who read and signed the consent form were included in the research. The final sample from the inpatient phase is 338 participants, 204 from the therapeutic communities and 134 from the psychosocial rehabilitation units. The participation rate was 98% of eligible clients.

Measures and administration

Clinical and demographic information

Clinical data were routinely collected by the treatment services during the service's initial intake procedures and included Treatment Demand Indicator [33] and Addiction Severity Index [34,35] scores. These measures provided information regarding service users' demographic (sex, age, marital status, level of education, current employment status) and substance use information (primary and secondary drug of choice, frequency of drug use and route of drug administration).

Personality and treatment engagement

Personality, treatment engagement and the remaining covariates were assessed between the 2nd and 4th week after admission to the inpatient phase of treatment. Pilot assessments were conducted in both organizations in order to examine and fine-tune the administration process. The final administration procedure involved the completion of all questionnaires on the same day. The approximate time required for completion of the assessment battery was 45 – 60 minutes.

Personality. The Severity Indices of Personality Problems [SIPP-118, 36] is a 118-item dimensional self-report measure to assess the core components of personality functioning (i.e. characteristic adaptations). The measure comprises 16 facets clustered into five higher-order "broad" domains named *Social Concordance*, the ability to value someone's identity, withhold aggressive impulses towards others and to work together with others; *Relational functioning*, the capacities for interpersonal communication and relational intimacy; *Self-control*, the capacity to tolerate, use and control one's own emotions and impulses; *Responsibility*, the

capacity to set realistic goals and to achieve them in line with the expectations you have generated in others; and *Identity Integration,* the ability to see oneself and one's own life as stable, integrated and purposive. High scores in the facets, and on the broad domains, indicate better adaptive functioning. Broad level characteristic adaptations are the weighted sum of the facet level scores, with weights provided in the SIPP technical report [37]. The SIPP has demonstrated good validity in several countries on clinical and non-clinical populations [38,39]. The SIPP-118 and the CEST (below) were professionally translated into Greek for this study and internal reliability for the facet level scales were good, ranging from α=.74 to α=.96 in this study.

Treatment engagement. This study used the treatment process model of the Texas Christian University [14] to conceptualize clients' engagement. Therefore, we used the Client Evaluation of Self and Treatment, inpatient version [CEST, 40]**.** The CEST conceptualizes Treatment Engagement as multidimensional construct that encompasses behavioural (*Treatment Participation*; 12 items), cognitive (*Treatment Satisfaction*; 7 items), and interpersonal (*Counselling Rapport*; 14 items) components, with self-completion items scored on 5-point Likert scales. These key treatment process indicators have consistently received empirical support as significant predictors of increased tenure and improved post treatment outcomes [12,13,14,15]. Scores for each of the subscales are obtained by summing responses to the set of items (after reversing scores on reflected items by subtracting the item response from "6"), dividing the sum by number of items included (yielding an average) and multiplying by 10 in order to rescale final scores to range from 10 to 50 (e.g., an average response of 2.6 for a scale becomes a score of "26"). Published reliability and validity information for the CEST is available [7].

Other covariates: Four motivational scales of CEST were used evaluating the levels of *Problem Recognition, Desire for Help* and *Treatment Readiness* including an index for *Pressures for Treatment***.** The psychological domains of the CEST were used to assess *Depression* and *Anxiety*, and social functioning indicators were comprised of scales for *Hostility, Risk-taking*, and *Childhood problems.*

Analyses

Data analysis was conducted using the statistical software SPSS20. Descriptive analysis was performed to present the distribution of the sample's demographic and key study variables. Quality control involved double entry of a random ten percent of cases, checking for missing values, outliers and unexpected values, and scatterplots (to identify any unexpected associations between variables and bivariate outliers). Coding that was unexpected or missing was cross-checked with the treatment units prior to analysis. In order to test assumptions for the second part of the analyses, all predictors and criterion variables were tested for normality using kurtosis, skewness, Kolmogorov-Smirnov tests and the normal Q-Q Plot.

A series of regression analyses examined the impact of the characteristic adaptations (5 broad characteristics *Self-Control, Relational Capacities, Social Concordance, Responsibility, Identity Integration* and their 16 facet-level subcomponents) on treatment engagement (repeating the analyses described below for *Counselling Rapport*, *Treatment Participation* and *Treatment Satisfaction*). Initially, bivariate regression analyses were used to assess which personality variables predicted each engagement indicator independently. Then we estimated a series of two-stage multiple regression models, predicting each of the three treatment engagement indicators in turn. Covariates (age, gender, marital status, education level, drug use, injecting status, legal problems, the CEST treatment motivation, anxiety and depression scales and treatment site) were included in the first step for each model. In the second step, a forward stepwise procedure was applied for either the five broad characteristic adaptations or the 16 facet-level characteristic adaptations, applying a probability of $p = 0.10$ for entry and removal for each of the variables considered. Out of the 338 participants, 315 were included in these analyses, while 23 (6.8%) were excluded due to missing values in core items. The R^2 for the initial model and the R^2 change (denoted as ΔR^2) for the final model are reported below each Table. As the analysis plan was not pre-registered on a publicly available platform, results should be considered exploratory.

RESULTS

Sample characteristics

Sample. The sample consisted of n=338 service users in the inpatient phase of substance abuse treatment. The average age was 33 years, and the majority were males, single and unemployed (see Table 1). Overall, 193 (57.1 %) successfully completed the treatment programme, while 145 (42.9 %) dropped out prior to completion.

(Table 1 about here)

Broad and facet level characteristic adaptations as predictors of Treatment engagement

The demographic, substance use, emotional wellbeing, motivational and treatment site control variables together explained 36.7% of the variance in *Counselling Rapport*, 20.7% of the variance in *Treatment Participation* and 29.4% of the variance in *Treatment Satisfaction*. The motivational variables *Desire for Help* and *Treatment Readiness* were consistently related with treatment engagement indicators. In contrast, neither demographics, substance use characteristics nor treatment site were associated with treatment engagement.

After entry of the five higher-order personality dimensions at step two, the total variance explained by the models was 45% of the variance in *Counselling Rapport* (+9%), 35% of the variance in *Treatment Participation* (+14.6%), and 32% of the variance in *Treatment Satisfaction* (+2.8%).

Counselling Rapport: In the final multiple stepwise regression model including the five broad domains and all covariates (Table 2a), *Self-Control* and *Relational Capacities* were significant positive predictors of Counselling Rapport. At the facet level (Table 2b), *Self-Reflective Functioning*, *Aggression Regulation* and *Enduring Relationships* were positively associated with better counselling relationships.

Treatment Participation: The broad domains (Table 3a) *Social Concordance*, *Relational Capacities*, *Self-Control* and *Responsibility* were significant predictors, indicating that service users who had more dysfunctional levels on these domains had lower levels of *Treatment Participation*. At the facet level (Table 3b), higher levels of *Emotional Regulation, Intimacy, Trustworthiness* and *Respect* were associated with more *Treatment Participation*.

Treatment Satisfaction: Of the broad level adaptations (Table 4a), only *Relational Capacities* was positively related with *Treatment Satisfaction* in the adjusted model. At the facet level (Table 4b), two relational concepts, *Intimacy* and *Cooperation,* explained additional variance in *Treatment Satisfaction* after adjusting for the effects of the other covariates, suggesting that *Treatment Satisfaction* is influenced by the clients' ability to form close, positive relationships with others.

(Tables 2a to 4b about here)

Discussion

More dysfunctional personality characteristic adaptations were strongly related to poorer *Treatment Participation* and *Counselling Rapport* and moderately related to *Treatment Satisfaction*. The present study's findings lend support to the notion that characteristic adaptation help to understand the association of personality with a client's treatment experience. It is the first study to set out to discover whether personality functioning as measured through characteristic adaptations might assist in the identification of potential obstacles to treatment engagement in substance misuse treatment. The evidence provided in this study is broadly consistent with, and extends, previous studies in diverse clinical populations which found that personality functioning was associated with differential responses to treatment [28], with maladaptive levels predicting poorer treatment response [29] and non-engagement [30,31]. High levels of emotional dysregulation had also previously been found to be associated with non-compliance, denial and behavioural disengagement [41]. Our study, adopting TCU's multivariate conceptualization including interpersonal, behavioural and cognitive components of treatment engagement, found that individuals with dysfunctional levels in *Self-Control* or *Relational Capacities* were less likely to report good therapeutic relationships (*Counselling Rapport*). Similarly, the behavioural component of engagement (*Treatment Participation*) was most strongly associated with *Social Concordance*, *Relational Capacities* and *Self-Control,* and the cognitive component of treatment engagement (*Treatment Satisfaction*) was also influenced by the capacities for interpersonal communication and relational intimacy (*Relational Capacities*).

The analysis at the facet level adaptations representing intrapersonal (e.g., identity integration), interpersonal characteristics (e.g., intimacy), adaptations indicating disturbed prosocial behaviour (e.g., aggression regulation), as well as control or regulating behaviour (e.g., responsibility; effortful control) provided a framework for more meaningful interpretations. For instance, while the broad domains *Identity Integration* and *Social Concordance* were not statistically significant predictors of *Counselling Rapport*, the examination at the facet level showed that *Self-Reflective Functioning* from the *Identity Integration* domain and *Aggression Regulation* from the *Social Concordance* domain were strong predictors of *Counselling Rapport*. Likewise, *Emotional Regulation,* a facet of the *Self-Control* domain, along with *Intimacy,* a facet of the *Relational Capacities* domain, were the strongest significant predictors of *Treatment Participation.* This is consistent with the latest revision of the DSM-5 [42], where the concepts of *Identity* and *Relational Functioning* are seen as core markers of personality pathology and important predictors of dysfunction [43]. Surprisingly, identity and interpersonal functioning have not often been used to predict treatment outcomes in clinical or research settings [44].

In contrast to the traditional categorical system, contemporary dimensional based assessments integrate personality traits and the levels of personality functioning to advance clinical utility and capture the core impairments in personality pathology that would be able to predict possible therapeutic alliance problems in therapy [45]. Our study lend support to this hypothesis, since higher maladaptive scores on *Self-Reflective Functioning* significantly predicted low *Counselling Rapport*. Individuals who had dysfunctional scores on the capacity to understand the possible meanings of and causal connections between internal and external experiences were significantly less likely to develop a trusting counselling relationship with their therapist.

Ruptures in the alliance may be conceptualized as a normal condition in the treatment process that partially reflects clients' dysfunctional interpersonal patterns [46]. However, in treatment, failure to identify and address them early on may lead to re-enactments, further ruptures of alliance and premature termination. Several authors reported that clients with prior dysfunctional relationships are more likely to have difficulties in establishing and maintaining therapeutic relationships [47] and drop out from treatment [48]. Supporting previous findings, results in this study indicated that *Enduring Relationship,* a facet of *Relational* domain, was also a significant predictor of *Counselling Rapport*.

Finally, literature indicates that clients' *Hostility*, coldness and social avoidance have been found to predict poor therapeutic alliance [49,50]. In support of this, service users with high dysfunctional levels on *Aggression Regulation* and *Hostility* were significantly less likely to develop *Counselling Rapport* in this study. The findings extend our knowledge that dysfunctional levels on *Self-Reflective Functioning*, *Aggression Regulation* and *Enduring Relationship* significantly impaired the development of *Counselling Rapport*. Finally, individuals with higher maladaptive scores on *Responsible industry*, "*the capacity to set realistic goals, and to achieve these through effective and responsible constructive actions*", and *Respect*, "*the capacity to value someone's individual needs and personal identity*", were significantly less likely to participate actively in the treatment process. Some variables are consistent with suppressor effects. In univariable analyses *Anxiety* was negatively associated with outcomes Counselling Rapport, *Treatment Participation* and Treatment Satisfaction. However, in the final six distinct multivariable models *Anxiety* demonstrated positive association with the outcome. *Social Concordance* and *Respect* also showed suppressor effects with the outcome *Treatment Participation*.

There are clinical implications of these findings. For example, dysfunctional levels on *Emotional regulation and Intimacy* may alert counsellors that a client is at heightened risk of not being able to fully engage. Likewise, dysfunctional levels on *Self-reflective functioning, Aggression regulation* and *Enduring relationships* could provide an early warning sign for significant difficulties in building trusting therapeutic relationships. Thus, providers could anticipate that individuals might require further clinical attention and support on these issues and employ staff with appropriate skills to deliver strategically targeted interventions to ensure that individuals' needs are met. There are various recent examples of the clinical utility of dimensional conceptualizations of personality functioning for development of individualized treatment plans [21, 25, 51]. Given its ability to disentangle current personality functioning from stable traits and personality disorders, mapping characteristic adaptations can allow clinicians to develop subgroup norms with similar characteristics, identify which type of clients respond better to what type of treatment and subsequently facilitate the development of person-oriented clinical formulations. It has been suggested, for example, that work with clients with emotion dysregulation may include a focus on developing emotion regulating strategies, such as attentional redeployment, reappraisal, mindful tolerance and problem solving [52]. In contrast, those with disinhibition problems might benefit from contingency management, motivational mentoring and instrumental reinforcement approaches [27].

Strengths and limitations

This study explored the relationship between service users' personality and their treatment engagement in naturalistic treatment settings. Most studies have focused only on major personality traits. The current study is novel in that it examined the relationship between broad and facet level characteristic adaptations and different components of treatment engagement, in much greater detail and in a way that is consistent with current understandings of the likely interplay between personality expressions on the one hand, and treatment processes and outcomes on the other.

Limitations of the study include that the sample was drawn from inpatient treatment settings only, which may limit the ability to generalize findings across treatment settings and types of treatment. Despite recruiting a large proportion of the eligible sample over a significant period of time, the sample was still not very large and some of the confidence intervals are wide. Also, Greek inpatient services mainly treat heroin users. Further work is needed to replicate the findings with larger samples and in treatment populations with different substance misuse profiles. The study was cross-sectional and considered personality and treatment engagement in the early inpatient phase, rather than assessing changing characteristic adaptations and engagement levels over time. Several factors that may influence treatment engagement were not assessed, such as personal circumstances of service users other than those captured by the services' intake assessments or conflicts with practitioners, and thus need to be seen as potential confounders. Behavioural observation measures are sometimes seen as more appropriate for capturing personality predispositions than self-reports. However, as the focus was to identify the phenotypic expression of personality, self-report measures provides data that is more relevant to this particular study, that is, data on individuals' own perception of their behavioural tendencies [33].

Conclusions and recommendations for future research

Given the significant role of treatment engagement in driving positive treatment outcomes, it is hoped that this study can provide the basis for the development of personalized clinical strategies. A next step is to test whether dysfunctional personality patterns are associated with long-term treatment outcomes. If so, it would be worth investigating whether counsellors can use knowledge of personality functioning to individualise treatment plans to meet specific needs of their clients (e.g. focused therapeutic work such as insight interpersonal oriented interventions for identity and relational capacities, while cognitive behavioural for affect

regulation and behavioural disinhibition), and whether personality-aware treatment adaptations improve treatment retention and substance misuse outcomes. To take this work further, clinical investigations should employ similar empirically driven assessment procedures and conceptual dimensional-based frameworks. Future studies could also incorporate qualitative methodology to explore how the partially context-sensitive characteristic adaptations relate to clients' subjective interpretation of their treatment experience.

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Table 1. Demographic and personality characteristics

Demographic and drug use variables		n	%	Mean	SD
Age		338		33.37	
Gender	Male	287	84.9		
	Female	51	15.1		
Marital Status	Single	160	55.4		

		N	%		
	Married	27	9.3		
	Divorced	26	9.0		
	Living together	51	17.6		
	Unknown	25	8.7		
Educational level	Graduate primary school	31	11.7		
	Graduate secondary school	194	73.5		
	Graduate University	17	6.6		
	Unknown	22	8.3		
Drug of Choice	Benzodiazepines	8	3		
	Cocaine	13	5.3		
	Heroin	201	76.5		
	Cannabis	18	6.8		
	Unknown	19	7.4		
Injected	Yes	103	39		
	No	161	61		
Legal problems	Yes	125	47		
	No	139	53		
Psychology	Depression			26.99	7.77
	Anxiety			30.54	7.83
Motivation	Treatment needs			37.98	7.61
	Desire for help			43.21	4.27
	Treatment readiness			39.73	5.72
	Pressures for treatment			30.67	6.36
Engagement Levels by treatment type					
Counselling Rapport	TC	204		38.50	6.13
	PR	132		41.78	5.41
Treatment Participation	TC	204		39.43	5.35
	PR	132		41.01	4.46
Treatment Satisfaction	TC	204		37.82	5.77
	PR	132		40.46	5.51
Characteristic adaptations broad level					
Self-Control		338		4.21	.91
	Emotion Regulation			2.36	.61
	Effortful Control			2.14	.53
Identity Integration		338		3.97	.64
	Self-Respect			2.81	.59
	Stable self-image			2.63	.59
	Self-reflective functioning			2.51	.56
	Enjoyment			2.54	.54
	Purposefulness			2.85	.49
Responsibility		338		4.12	.75
	Responsible industry			2.65	.58
	Trustworthiness			2.77	.52
Relational capacities		338		4.22	.67
	Intimacy			2.78	.51
	Enduring relationships			2.73	.53
	Feeling recognized			2.75	.53
Social concordance		338		5.27	.77
	Aggression regulation			2.90	.71
	Frustration tolerance			2.41	.47
	Cooperation			2.90	.51
	Respect			2.87	.46

Retention Rate by treatment unit	**Completed**		**Dropout**	
	N	%	N	%
Nostos	53	44.5	66	55.5

Therapeutic Community	Ithaki	43	12.7	43	50
	Patision	48	72.7	18	27.3
Psychosocial Rehabilitation	Exarhieia	32	69.6	14	30.4
	Aristidou	17	81	4	19
Total		193	57.1	145	42.9

Treatment Engagement by Unit	CR		TP		TS	
Nostos	M	SD	M	SD	M	SD
Ithaki	39.06	5.47	39.46	5.12	38.21	5.31
Patision	37.76	6.87	39.41	5.67	37.29	6.33
Exarheia	41.82	5.33	41.25	4.64	40.13	5.34
Aristidou	43.80	4.03	40.68	4.82	40.43	5.36
	40.80	5.95	40.95	3.14	41.63	4.38

CR: Counselling rapport; TP: Treatment participation; TS: Treatment satisfaction

Table 2a: Counselling Rapport predicted by broad level characteristic adaptation

	Unadjusted				*Adjusted model (stepwise entry*			
Covariates		*CI*				*CI*		
	β	Lower	Upper	P	β	Lower	Upper	P
Demographic variables								
Age	.130	.023	.237	.018	.002	-.096	.099	.975
Gender	.281	-1.56	2.13	.765	.437	-2.23	3.10	.747
Marital Status	.387	-.065	.838	.093	---			
Educational level	-.382	-.778	.014	.059	---			
Drug use and legal problems								
Drug of Choice	-.254	-.653	.145	.211	---			
Injected	-.042	-1.17	1.08	.942	---			
Legal problems	3.02	1.75	4.28	.000	1.80	.425	3.12	.010
Psychological wellbeing								
Depression	-.184	-.264	-.103	.000	-.068	-.175	.039	.212
Anxiety	-.112	-.194	-.030	.008	.105	-.007	.218	.067
Motivation								
Treatment needs	-.081	-.184	.021	.118	---			
Desire for help	.369	.221	.516	.000	2.87	.126	.448	.001
Treatment readiness	.577	.481	.673	.000	3.31	.204	.459	.000
Pressures for treatment	-.025	-.111	.060	.560	---			
Treatment Modality								
Unit TC Ith^					-1.33	-3.35	.682	.194
Unit PR Ex^					-.666	-2.55	1.22	.487
Unit PR Ar^					-.442	-4.03	3.14	.808
Unit TC No^					-.895	-2.66	.870	.319
Characteristic adaptations broad domains (IV)								
Self-Control	2.74	2.03	3.40	.000	1.78	.899	2.67	.000
Identity Integration	3.32	2.35	4.28	.000	NS			
Responsibility	2.68	1.86	3.50	.000	NS			
Relational Capacities	3.27	2.33	4.20	.000	1.50	.326	2.69	.013
Social Concordance	3.07	2.27	3.87	.000	NS			

Key: IV=independent variable, ---- = variables not entered in multiple model; NS=variables were entered in multiple model but not selected by stepwise method. Notes: Sample size for multiple analyses N=315. 5 Treatment units transformed into Dummy variables and the coefficients are estimated to the reference. Stepwise Forward entry criterion $p < 0.05$. Stepwise model $F (10,315) = 26.625$, $p < 0.01$, Full model $R^2 = 0.456$. Model without characteristic adaptation variables $R^2 = 0.367$. $\Delta R^2 = .089$ ($p < .001$).

Table 2b: Counselling Rapport predicted by facet level characteristic adaptation

| | *Unadjusted* | | | | *Adjusted model (stepwise entry)* | | | |
| | | CI | | | | CI | | |
	β	Lower	Upper	P	β	Lower	Upper	P
Covariates								
Demographic variables								
Age	.130	.023	.237	.018	.010	-.086	.106	.841
Gender	.281	-1.56	2.13	.765	.179	-2.43	2.79	.893
Marital Status	.387	-.065	.838	.093	----			
Educational level	-.382	-.778	.014	.059	---			
Drug use and legal problems								
Drug of choice	-.254	-.653	.145	.211	---			
Injected	-.042	-1.17	1.08	.992	---			
Legal problems	3.02	1.75	4.28	.000	1.73	.383	3.08	.012
Psychological wellbeing								
Depression	-.184	-.264	-.103	.000	-.096	-.201	.009	.074
Anxiety	-.112	-.194	-.030	.008	.121	0.10	.232	0.33
Motivation								
Treatment needs	-.081	-.184	.021	.118	---			
Desire for help	.369	.221	.516	.000	.264	.107	.421	.001
Treatment readiness	.577	.481	.673	.000	.319	.191	.446	.000
Pressures for treatment	-.025	-.111	.060	.560	---			
Treatment Modality								
Unit TC Ith^					-1.60	-3.58	.382	.113
Unit PR Ex^					-.516	-2.38	1.35	.586
Unit PR Ar^					-.018	-3.55	3.51	.992
Unit TC No^					-1.14	-2.90	.623	.204
Characteristic adaptations facet levels (IV)								
Self-Control								
Emotion Regulation	3.56	2.47	4.64	.000	NS			
Effortful Control	3.67	2.51	4.82	.000	NS			
Identity Integration								
Self-Respect	2.37	1.28	3.47	.000	NS			
Stable self-image	3.44	2.36	4.51	.000				
Self - reflective functioning	3.81	2.70	4.92	.000	2.24	1.01	3.46	.000
Enjoyment	3.56	2.40	4.72	.000				
Purposefulness	3.04	1.72	4.38	.000				
Responsibility								
Responsible industry	3.44	2.35	4.54	.000				
Trustworthiness	3.51	2.28	4.73	.000				
Relational capacities								
Intimacy	3.73	2.50	4.96	.000				
Enduring relationships	3.56	2.37	4.75	.000	1.49	.143	2.84	.030
Feeling recognized	3.58	2.38	4.78	.000	NS			

Social concordance					NS			
Aggression regulation	3.15	2.28	4.03	.000	1.43	.438	2.42	.005
Frustration tolerance	4.45	3.11	5.78	.000	NS			
Cooperation	3.61	2.37	4.84	.000	NS			
Respect	3.76	2.37	5.16	.000	NS			

Key: IV=independent variable, ---- = variables not entered in multiple model; NS=variables were entered in multiple model but not selected by stepwise method. Notes: Sample size for multiple analyses N=314. ^ 5 Treatment units transformed into Dummy variables and the coefficients are estimated to the reference. Stepwise Forward entry criterion $p < 0.05$. Stepwise model $F_{(14,31)} = 17.418$, $p < 0.01$. Full model $R^2 = 0.479$. Model without characteristic adaptation variables $R^2 = 0.367$. $\Delta R^2 = .112$ ($p < .001$).

Table 3a: Treatment participation predicted by broad domains characteristic adaptations

| | Unadjusted | | | | *Adjusted model (stepwise entry)* | | | |
| | | CI | | | | CI | | |
	β	Lower	Upper	P	β	Lower	Upper	P
Demographic variables								
Age	.095	.005	.184	.039	-.007	-.084	.070	.856
Gender	.135	-1.41	1.68	.864	2.30	.568	4.02	.009
Marital Status	.092	-.282	.465	.628	NS			
Educational level	-.343	-.675	-.012	.042	NS			
Drug use and legal problems								
Drug of Choice	-.059	-.394	.276	.728	---			
Injected	.122	-.824	1.07	.799	---			
Legal problems	1.62	.537	2.70	.003	---			
Psychological wellbeing								
Depression	-.145	-.212	-.077	.000	-.043	-.125	0.038	.297
Anxiety	-.098	-.167	-.029	.005	.045	-0.03	0.126	.277
Motivation								
Treatment needs	.016	-.069	.102	.708	---			
Desire for help	.338	.215	.461	.000	.223	.106	.340	.000
Treatment readiness	.338	.302	.474	.000	.207	.109	.304	.000
Pressures for treatment	-.052	-.124	.019	.151	---			
Treatment Modality								
Unit TC Ith^					-1.08	-2.57	0.40	.151
Unit PR Ex^					-0.31	-1.90	1.27	.686
Unit PR Ar^					-3.13	-5.78	0.48	.391
Unit TC No^					-.817	-2.19	0.55	.244
Characteristic adaptations								
Self-Control	1.98	1.39	2.57	.000	1.38	.513	2.25	.002
Identity Integration	2.55	1.75	3.35	.000	NS			
Responsibility	.240	1.73	3.06	.000	.940	.123	1.76	.024
Relational capacities	.295	2.19	3.70	.000	2.09	1.15	3.113	.000
Social concordance	1.59	.892	2.28	.000	-1.90	-2.87	-.941	.000

Key: IV=independent variable, ---- = variables not entered in multiple model; NS=variables were entered in multiple model but not selected by stepwise method. Notes: Sample size for multiple analyses N=315. 5 Treatment units transformed into Dummy variables and the coefficients are estimated to the reference. Stepwise Forward entry criterion p < 0.05. Stepwise model F (14,314) =11.694, p < 0.00. Full model R^2= 0.353. Model without characteristic adaptation variables R^2 = 0.207. ΔR^2= .146 (*p*< .001).

Table 3b: Treatment participation predicted by facet level characteristic adaptations

	Unadjusted				*Adjusted model (stepwise entry)*			
		CI				CI		
	β	Lower	Upper	P	β	Lower	Upper	P
Covariates								
Demographic variables								
Age	.095	.005	.184	.039	-.008	-.084	.069	.844
Gender	.135	-1.41	1.68	.864	2.73	-.995	4.46	.002
Marital Status	.092	-.282	.465	.628	---			
Educational level	-.343	-.675	-.012	.042	NS			
Drug use and legal problems								
Drug of Choice	-.059	-.394	.276	.728	---			
Injected	-.122	-.824	1.07	.799	---			
Legal problems	1.62	.537	2.70	.003	---			
Psychological wellbeing								
Depression	-.145	-.212	-.077	.000	-.059	-.139	.021	.150
Anxiety	-.098	-.167	-.029	.005	.061	-.020	.141	.138
Motivation								
Treatment needs	.016	-.069	.102	.708	---			
Desire for help	.338	.215	.461	.000	.204	.088	.321	.001
Treatment readiness	.338	.302	.474	.000	.194	.098	.291	.000
Pressures for treatment	-.052	-.124	.019	.151	NS			
Treatment modality								
Unit TC Ith^					-1.17	-2.65	.317	.123
Unit PR Ex^					-.365	-1.96	1.23	.653
Unit PR Ar^					-3.67	-6.41	-1.12	.006
Unit TC No^					-.733	-2.10	.639	.294
Characteristic adaptations facet levels (IV)								
Self-Control								
Emotion Regulation	2.96	2.07	3.85	.000	1.90	.872	2.92	.000
Effortful Control	2.31	1.34	3.28	.000	NS			
Identity Integration								
Self-Respect	1.97	1.08	2.87	.000	NS			
Stable self-image	2.60	1.71	3.49	.000	NS			
Self - reflective functioning	2.83	1.91	3.76	.000	NS			.
Enjoyment	2.57	1.61	3.53	.000	NS			
Purposefulness	2.63	1.55	3.72	.000	NS			
Responsibility					.			
Responsible industry	3.11	2.22	4.00	.000	1.26	.309	2.21	.010
Trustworthiness	3.34	2.35	4.33	.000	NS			
Relational capacities								
Intimacy	3.71	2.73	4.69	.000	2.04	1.31	3.05	.000
Enduring relationships	3.18	2.22	4.14	.000	.129			
Feeling recognized	2.72	1.74	3.71	.000	NS			
Social concordance								
Aggression regulation	1.60	.851	2.36	.000	NS			
Frustration tolerance	3.15	2.04	4.26	.000	NS			
Cooperation	2.53	1.50	3.55	.000	NS			
Respect	1.37	1.85	2.55	.024	-1.65	-2.81	-.495	.005

Key: IV=independent variable, ---- = variables not entered in multiple model; NS=variables were entered in multiple model but not selected by stepwise method. Notes: Sample size for multiple analyses N=314. 5 Treatment units transformed into Dummy variables and the coefficients are estimated to the reference. Stepwise Forward entry criterion p< 0.05. Stepwise model $F_{(14, 314)} = 11.762$, $p < .001$. Full model $R^2 = 0.354$. Model without characteristic adaptation variables $R^2 = 0.207$. $\Delta R^2 = .147$ ($p < .001$).

Table 4a: Treatment Satisfaction predicted by broad domains of characteristic adaptations

	Unadjusted				*Adjusted model (stepwise entry)*			
		CI				CI		
	β	Lower	Upper	P	β	Lower	Upper	P
Demographic variables								
Age	.073	-.028	.174	.154	-.019	-.107	.069	.671
Gender	-.065	-1.80	1.67	.941	-.207	-2.16	1.74	.835
Marital Status	.079	-.339	.497	.710	NS			
Educational level	-.283	-.663	.097	.144	NS			
Drug use and legal problems								
Drug of Choice	.106	-.277	.489	.585	---			
Injected	.643	-.433	1.72	.240	---			
Legal problems	2.62	1.43	3.82	.000	---			
Psychological wellbeing								
Depression	-.168	-.243	-.092	.000	-.057	-.151	.038	.237
Anxiety	-.091	-.168	-.013	.022	.057	-.035	.149	.222
Motivation								
Treatment needs	-.100	-.195	-.004	.041	---			
Desire for help	.381	.243	.518	.000	.200	.066	.334	.004
Treatment readiness	.495	.402	.588	.000	.348	.239	.457	.000
Pressures for treatment	-.002	-.083	.078	.953	---			
Treatment Modality								
Unit TC Ith^					-1.25	-2.97	.465	.153
Unit PR Ex^					.422	-1.42	2.26	.652
Unit PR Ar^					.813	-2.34	3.86	.600
Unit TC No^					-.664	-2.34	.909	.407
Characteristic adaptations								
Self-Control	1.70	1.02	2.38	.000	NS			
Identity Integration	2.36	1.44	3.28	.000	NS			
Responsibility	1.86	1.07	2.65	.000	NS			
Relational capacities	2.65	1.78	3.53	.000	1.65	.735	2.57	.000
Social concordance	2.05	1.28	2.82-	.000	NS			

Key: IV=independent variable, ^ = Forced into the model ---- = variables not entered in multiple model; NS=variables were entered in multiple model but not selected by stepwise method. Notes: Sample size for multiple analyses N=314. 5 Treatment units transformed into Dummy variables and the coefficients are estimated to the reference. Stepwise Forward entry criterion p< 0.05. Stepwise model F (11, 314) = 13.082, p < .000. Full model R2= 0.322 Model without characteristic adaptation variables R^2 = 0.294. ΔR^2 = .028 (p< .001).

Table 4b: Treatment Satisfaction predicted by facet level characteristic adaptations

| | Unadjusted | | | | Adjusted model (stepwise entry) | | | |
| | | CI | | | | | CI | | |
	β	Lower	Upper	P	β	Lower	Upper	P
Demographic variables								
Age ^	.073	-.028	.174	.154	-.018	-.106	.069	.680
Gender^	-.065	-1.80	1.67	.941	-.137	-2.07	1.80	.889
Marital Status	.079	-.339	.497	.710	---			
Educational level	-.283	-.663	.097	.144	---			
Drug use and legal problems								
Drug of Choice	.106	-.277	.489	.585	---			
Injected	.643	-.433	1.71	.240	---			
Legal problems	2.62	1.43	3.82	.000	---			
Psychological wellbeing								
Depression	-.168	-.243	-.092	.000	-.069	-.161	.023	.141
Anxiety	-.091	-.168	-.013	.022	.077	-.016	.169	.106
Motivation								
Treatment needs	-.100	-.195	-.004	.041	---			
Desire for help	.381	.243	.518	.000	.203	.070	.337	.003
Treatment readiness	.495	.402	.588	.000	.334	.225	.444	.000
Pressures for treatment	-.002	-.083	.078	.953	NS			
Treatment Modality								
Unit TC Ith^					-1.23	-2.94	.473	.156
Unit PR Ex^					.335	-1.49	2.16	.718
Unit PR Ar^					.520	-2.51	3.55	.735
Unit TC No^					-.512	-2.08	1.05	.520
Characteristic adaptations facet levels								
Self-Control								
Emotion Regulation	2.59	1.57	3.61	.000	NS			
Effortful Control	1.92	.816	3.03	.001	NS			
Identity Integration								
Self-Respect	1.56	.525	2.59	.003	NS			
Stable self-image	1.74	.703	2.77	.000	NS			
Self - reflective functioning	2.10	1.03	3.17	.001	NS			
Enjoyment	2.93	1.82	4.03	.000	NS			
Purposefulness	2.65	1.42	3.88	.000	NS			
Responsibility								
Responsible industry	2.49	1.45	3.54	.000				
Trustworthiness	2.65	1.49	3.81	.000	NS			
Relational capacities								
Intimacy	3.53	2.39	4.67	.000	1.40	.178	2.63	.025
Enduring relationships	2.78	1.66	3.90	.000	NS			
Feeling recognized	2.48	1.34	3.62	.000	NS			
Social concordance								
Aggression regulation	1.56	.703	2.42	.000	NS			
Frustration tolerance	3.25	1.97	4.52	.000	NS			
Cooperation	3.28	2.14	4.41	.000	1.54	.258	2.82	.019
Respect	2.28	.948	3.61	.001	NS			

Key: IV=independent variable, ^ = Forced into the model, ---- = variables not entered in multiple model; NS=variables were entered in multiple model but not selected by stepwise method. Notes: Sample size for multiple analyses N=314. 5 Treatment units transformed into Dummy variables and the coefficients are estimated to the reference. Stepwise Forward entry criterion $p< 0.05$. Stepwise model $F (12, 314) =$

12.620, $p < .001$. Full model $R^2 = 0.334$ Model without characteristic adaptation variables $R^2 = 0.294$. $\Delta R^2 = .040$ (p< .001).