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# The Role of Temperament and Parental Style in Predicting Desire Thinking and Anger Rumination

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**Abstract**

The objective of this study was to investigate the relative contribution of temperament and parental style in predicting Desire Thinking and Anger Rumination. 200 Italian adolescents (mean age: 15.79±1.35, range 14-19) were administered self-report questionnaires to assess anxiety, depression, temperament, parental style, Desire Thinking and Anger Rumination.

Hierarchical regression analyses and GLM have been implemented to investigate predictor's effects. Results showed that Desire Thinking was predicted by low levels of Maternal Overprotection and Harm Avoidance, high levels of Novelty Seeking, whereas Anger Rumination was predicted by low levels of Maternal Overprotection, high levels of Novelty Seeking and Reward Dependence.

GLM found significant interaction effects between the two variables Maternal Overprotection/Harm Avoidance for Desire Thinking. Differently, in the model on Anger Rumination we found significant interaction effects between the two variables Maternal Overprotection/Reward Dependence and Novelty Seeking/Reward Dependence. Results present important clinical implications. In particular, the knowledge of environmental and temperamental risk factors can help to identify subjects at high risk for Desire Thinking and Anger Rumination, in order to prevent psychopathology connected with these rigid thinking processes.

**Keywords:** Temperament; Parental style; Desire thinking; Anger rumination; Adolescents

## Introduction

Several studies have confirmed in developmental age the relationship between dysfunctional thinking and several psychopathological disorders such as depression [1], anxiety [2], binge eating [3], use of substances [3], self-injurious behaviours [4].

Desire Thinking (DT) and Anger Rumination (AR) are two recurring, dysfunctional and rigid thinking processes often associated with different forms of psychopathology in childhood and adulthood [5-7].

DT can be described as a voluntary thinking elaboration of a desired target at a verbal level (repetitive self-talk about the need to achieve the desired target and self-motivated statements; [8,9]) and at an imaginable level (construction of mental images of the desired target or of its context of consumption; [10]). The target could be represented by an activity, an object, or a state [11]. DT is focused on the elaboration of a desired target and is characterized by positive target-related experience and self-motivational statements [9]. Several studies have identified high level of DT as a risk factor for different kind of psychopathologies, first of all substance use and abuse [9,12].

Differently, Anger Rumination (AR) is the tendency to think over and over anger by inducing past events and may be employed in a conscious attempt to resolve negative feelings or may intrude despite the intentions of the individual to avoid such thoughts [13-17]. AR may be a risk factor for depressive disorder [18,19], borderline personality features [20], suicidal ideation [5], ineffective coping [6], aggressive behaviour [21], alcohol abuse [22] and psychophysiological high activations, such as blood pressure [23,24].

Although the relationship between dysfunctional thinking and psychopathology is well established, very little is known about the aetiology.

One of the great contributions to the understanding of psychiatric disorders is Cloninger's biosocial personality theory [25-29]. Cloninger's theory of personality includes 4 temperament dimensions and 3 character dimensions. Temperament represents automatic emotional responses to experiences that are moderately heritable and stable throughout life, whereas character refers to self-concepts and individual differences in goals and values which influence choice, intention and meaning. In particular temperament includes [25,30]: i) novelty-seeking: the propensity for approach and exploration; ii) harm avoidance: the propensity to withdraw and worry; iii) reward dependence: the propensity for attachment and dependence; and iv) persistence: the propensity for diligence and perseverance.

Previous studies have indicated that specific temperamental profiles are associated to psychiatric disorders strongly connected to dysfunctional thinking control strategy, such as depression [31-33], anxiety [34,35], and personality disorders [30]. Hankin and Abramson [36] postulated that preexisting vulnerabilities, such as specific temperament profiles, increase the likelihood of experiencing


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negative events and forming cognitive vulnerabilities. The authors also hypothesized that, once formed; cognitive vulnerabilities would interact with stressors, which may be generated as a result of particular temperamental traits, to predict later symptoms.

A further risk factor for the onset of dysfunctional thinking could be represented by parental style [37,38]. Several studies have showed how parental style, characterized by the children's perception of parental rejection, anxious rearing or control, is associated with internalizing disorders [39-42]. Finally, a positive association has been found between low protective parental style and poor care and risk behaviors in adolescence, such as substance abuse [43,44], smoke [45] and risky sexual behaviors [46]. In addition, recent studies analyzed the relationship between reported "affectionless control" parenting and other types of cognitive vulnerability [47]. Several studies [48-54] found significant relationships between low parental care and/or high parental control/overprotection and dysfunctional attitudes, negative cognitions, or negative attribution style. In particular, researches of Nolen-Hoeksema [55] demonstrated that parents may play a role in the development of children's ruminative style and that over-controlling parenting contributed to children's negative cognitions [55,56].

Thus, both temperamental traits and parental styles seem to constitute predictors of cognitive vulnerability.

A previous study realized by Manfredi et al. [37] investigated the role of temperament and perceived parental style as predictors in Recurrent Negative Thinking in an adult sample. Results showed that a temperament characterized by high levels of harm avoidance or high levels of reward dependence may facilitate the tendency to use thinking process like worry or brooding. Moreover a parental style characterized by high control and protectiveness over children seems to be a risk factor for the development of both the types of recurrent negative thinking.

To our knowledge, no study has investigated the contribution of temperament and perceived parental style to DT and AR. Understanding which are the most relevant developmental predictors could have important implications in the creation of specific preventive programs for reducing emotional susceptibility. A precocious individuation of the subjects at high risk for DT and AR could facilitate the treatment and limit the development of pathological dysfunctional and rigid thinking process. Our study, for the first time in literature, investigated which dimensions of temperament, in addition to the perceived parental style influence, are predictors in the development of DT and AR in a sample of Italian adolescents.

## Materials and Methods

### Participants

The sample consisted of 200 adolescents (49% females and 51% males) who were referred for psychological diseases to an outpatient treatment centre of Child Psychiatry in Milan (Department of Child Neuropsychiatry, Fondazione Don Carlo Gnocchi, Piazza Castello 20/22, Pessano con Bornago, Italy). The mean age of the sample was 15.79 (SD = 1.35, range 14-19). All the subjects were Caucasian. Demographic characteristics of study completers are reported in Table 1.

No child was affected by severe neurological/psychiatric disorders, such as mental retardation, infantile cerebral palsy, autism, severe behavioural disorders. Clinical assessment revealed that the 41% of the sample manifested as the main problem Affective symptoms, 32% Anxiety symptoms, 16% Attention Deficit/Hyperactivity symptoms, 11% Oppositional Defiant symptoms.

Parents signed an informed consent for all participants and the Health Direction of the treatment centre approved the study design.

### Materials

Several self-report measures were used to collect data on the variables of interest.

*State-Trait Anxiety Inventory* (STAI (Form Y); [57]). The STAI is a psychological inventory based on a 4-point Likert scale. This questionnaire assesses two types of anxiety: state anxiety or anxiety about an event (STAI-X1), and trait anxiety (STAI-X2). Higher scores are positively correlated with higher levels of anxiety. Considerable evidences attest to the construct and concurrent validity and the psychometric properties of the scale [57,58].

*Beck Depression Inventory* (BDI; [59]). This is a 21-item self-report questionnaire assessing the existence and severity of symptoms of depression as listed in the American Psychiatric Association's Diagnostic and Statistical Manual of Mental Disorders Fourth Edition [60]. There is a four-point scale for each item ranging from 0 to 3. Total score of 0-13 is considered minimal range, 14-19 is mild, 20-28 is moderate, and 29-63 is severe. This measure has been used in several studies and has shown to have good psychometric properties [61].

*Temperament and Character Inventory* (TCI; [25]). The TCI measures individual differences in the ways that people feel, act, or behave. These differences are expressed through different

**Table 1:** Demographic characteristics of study completers.

| | N | Minimum | Maximum | Mean | Std. Deviation |
|---|---|---|---|---|---|
| Age | 200 | 14 | 19 | 15.79 | 1.347 |
| Desire Thinking | 200 | 8 | 50 | 30.59 | 9.494 |
| Anger Rumination | 200 | 13 | 56 | 36.02 | 10.384 |
| Maternal Care | 200 | 1 | 33 | 13.96 | 8.285 |
| Maternal Overprotection | 200 | 1 | 32 | 13.12 | 7.277 |
| Paternal Care | 200 | 0 | 33 | 12.13 | 7.137 |
| Paternal Overprotection | 200 | 0 | 24 | 9.44 | 5.116 |
| Persistence | 200 | 34 | 120 | 64.75 | 19.467 |
| Reward Dependence | 200 | 14 | 148 | 86.23 | 26.826 |
| Harm Avoidance | 200 | 33 | 96 | 59.24 | 15.044 |
| Novelty Seeking | 200 | 36 | 169 | 88.92 | 28.791 |
| State Anxiety | 200 | 20 | 64 | 43.09 | 10.764 |
| Trait Anxiety | 200 | 5 | 66 | 41.32 | 12.062 |
| Depression Symptoms | 200 | 0 | 31 | 9.14 | 5.459 |
| *Gender*<br>Males<br>Females | 200<br>102 (51%)<br>98 (49%) | | | | |

**Table 2:** Correlations among variables of interest.

| | Desire Thinking | Anger Rumination | Maternal Care | Maternal Overprotection | Paternal Care | Paternal Overprotection | Persistence | Reward Dependence | Harm Avoidance | Novelty Seeking | State Anxiety | Trait Anxiety | Depression Symptoms |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Desire Thinking | 1 | .341* | -.303* | -.451* | -.318* | -.020 | .087 | .289* | -.247* | .401* | .135 | .251* | -.045 |
| Anger Rumination | .341* | 1 | -.490* | -.517* | -.305* | -.209* | -.074 | .534* | -.235* | .587* | .242* | .331* | -.027 |
| Maternal Care | -.303* | -.490* | 1 | .552* | .603* | .219* | .036 | -.471* | .229* | -.561* | -.106 | -.252* | -.071 |
| Maternal Overprotection | -.451* | -.517* | .552* | 1 | .314* | .262* | -.057 | -.472* | .163 | -.501* | -.189 | -.370* | .070 |
| Paternal Care | -.318* | -.305* | .603* | .314* | 1 | .141 | -.102 | -.400* | .116 | -.600* | -.069 | -.121 | -.039 |
| Paternal Overprotection | -.020 | -.209* | .219* | .262* | .141 | 1 | .132 | -.089 | .205 | -.143 | .009 | -.070 | .111 |
| Persistence | .087 | -.074 | .036 | -.057 | -.102 | .132 | 1 | .111 | .094 | .149 | -.012 | .081 | .073 |
| Reward Dependence | .289* | .534* | -.471* | -.472* | -.400* | -.089 | .111 | 1 | -.144 | .531* | .389* | .387* | .070 |
| Harm Avoidance | -.247* | -.235* | .229* | .163 | .116 | .205 | .094 | -.144 | 1 | -.186 | -.074 | -.011 | .053 |
| Novelty Seeking | .401* | .587* | -.561* | -.501* | -.600* | -.143 | .149 | .531* | -.186 | 1 | .305* | .325* | .030 |
| State Anxiety | .135 | .242* | -.106 | -.189 | -.069 | .009 | -.012 | .389* | -.074 | .305* | 1 | .693* | .037 |
| Trait Anxiety | .251* | .331* | -.252* | -.370* | -.121 | -.070 | .81 | .387* | -.011 | .325* | .693* | 1 | .006 |
| Depression Symptoms | -.045 | -.027 | -.071 | .070 | -.039 | .111 | .073 | .070 | .053 | .030 | .037 | .006 | 1 |

*Significant correlation after Bonferroni correction.

individual scores on 7 personality dimensions based on Cloninger's 'psychobiological theory of personality. The TCI encompasses 240 questions answered with "CORRECT" or "INCORRECT". The questionnaire comprises four temperament scales (Novelty Seeking, Harm Avoidance, Reward Dependence and Persistence) and three character scales (Self-Directedness, Cooperativeness and Self-Transcendence).

*Parental Bonding Instrument* (PBI; [62]). The PBI is a self-report questionnaire consisting of 25 items on which the father and mother are judged on a 4-point Likert scale (from true to not true). Two factors are derived for each parent (care and overprotection). The questionnaire has good psychometric properties and has been used extensively in several studies on parental rearing style [63,64].

*Desire Thinking Questionnaire* (DTQ, [9]). The DTQ is a questionnaire developed to assess the Desire Thinking defined as a voluntary thinking process involving verbal and imaginal elaboration of a desired target. It consists of two factors of five items. The first one concerns the perseveration of verbal thoughts about desire-related content and experience (Verbal Perseveration). The second one regards the tendency to prefigure images about desire-related content and experience (Imaginable Prefiguration). Higher scores on both factors and on the total measure indicate higher levels of desire thinking.

*Anger Rumination Scale* (ARS; [15]). This scale assesses the tendency to focus attention on angry moods, recall past anger experiences, and think about the causes and consequences of anger episodes. The questionnaire includes 19 items, and has four factor structure (factors named "angry afterthoughts", "thoughts of revenge", "angry memories" and "understanding of causes"). The questionnaire showed good psychometric properties [15]. Higher scores on both factors and on the total measure indicate higher levels of anger rumination.

### Statistical analyses

Firstly, we conducted data configuration, data description and computed correlation analyses (with the alpha level adjusted for the Bonferroni correction). In order to test the hypothesis that temperament traits and perceived parental style predicted levels of perseverative thinking independently from negative emotional states, two multiple linear regression analyses (Stepwise Method) have been performed with Desire Thinking and Anger Rumination respectively inserted as dependent variables. Then, we ran two General Linear Models to analyse interaction effects between predictors. No missing data were present. All the statistical analyses were carried out using SPSS for Windows [65].

## Results

### Preliminary analyses

Histograms, skewness and kurtosis analyses showed that all the dependent variables were normally distributed. Comparisons based on t-tests showed no differences across sex groups (all $p > .05$); the correlations between age and all the variables of interest were not significant (all $p > .05$). We then examined multicollinearity using the Tolerance Index ($T_i$) and the Variance Inflation Factor (VIF). The range for the $T_i$ (.42 to .95) and for the VIF (1.05 to 2.55) supported the absence of multicollinearity between variables.

Pearson product-moment correlations reported in Table 2 showed that both ruminative brooding and worry were positively correlated with Reward Dependence, Novelty Seeking, and Trait Anxiety and negatively correlated with Maternal Care, Maternal Overprotection, Paternal Care and Harm Avoidance. Moreover Anger Rumination correlated with Paternal Overprotection (negative correlation) and State Anxiety.

### Regression analyses

Two stepwise regression analyses were run to explore the relative contribution of Temperament and parental style to predict Desire Thinking and Anger Rumination (Table 3). Only correlated variables were included as predictors. Stepwise regression tries out one independent variable at a time and includes it in the regression model if it is statistically significant.

**Table 3:** Stepwise linear regressions with Desire Thinking and Anger Rumination as the Outcome Variables and Temperament, and Parental Overprotection as Predictor Variables.

| DESIRE THINKING | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | |
| STEP 1 (F=50.518, p<.001)<br>R= .451<br>$R^2$= .203<br>Adj $R^2$ =.199<br>Std Error= 8.495 | (Constant) | 38.313 | 1.241 | | 30.874 | <.001 |
| | Maternal Overprotection | -.588 | .083 | -.451 | -7.108 | <.001 |
| STEP 2 (F=31.853, p<.001)<br>R= .494<br>$R^2$= .244<br>Adj $R^2$ =.237<br>Std Error= 8.295 | (Constant) | 29.436 | 2.971 | | 9.909 | <.001 |
| | Maternal Overprotection | -.435 | .093 | -.333 | -4.659 | <.001 |
| | Novelty Seeking | .077 | .024 | .234 | 3.273 | .001 |
| STEP 3 (F=23.849, p<.001)<br>R= .517<br>$R^2$= .267<br>Adj $R^2$ =.256<br>Std Error= 8.188 | (Constant) | 35.619 | 3.846 | | 9.260 | <.001 |
| | Maternal Overprotection | -.416 | .092 | -.319 | -4.500 | <.001 |
| | Novelty Seeking | .070 | .023 | .213 | 2.987 | .003 |
| | Harm Avoidance | -.098 | .039 | -.155 | -2.484 | .014 |
| **ANGER RUMINATION** | | **Unstandardized Coefficients** | | **Standardized Coefficients** | **t** | **Sig.** |
| | | **B** | **Std. Error** | **Beta** | | |
| STEP 1 (F=104.110, p<.001)<br>R= .587<br>$R^2$= .345<br>Adj $R^2$ =.341<br>Std Error= 8.428 | (Constant) | 17.194 | 1.939 | | 8.868 | <.001 |
| | Novelty Seeking | .212 | .021 | .587 | 10.203 | <.001 |
| STEP 2 (F=69.447, p<.001)<br>R= .643<br>$R^2$= .414<br>Adj $R^2$ =.408<br>Std Error= 7.993 | (Constant) | 12.129 | 2.119 | | 5.724 | <.001 |
| | Novelty Seeking | .152 | .023 | .423 | 6.564 | <.001 |
| | Reward Dependence | .120 | .025 | .310 | 4.811 | <.001 |
| STEP 3 (F=53.547, p<.001)<br>R= .671<br>$R^2$= .450<br>Adj $R^2$ =.442<br>Std Error= 7.757 | (Constant) | 21.261 | 3.250 | | 6.542 | <.001 |
| | Novelty Seeking | .123 | .024 | .342 | 5.154 | <.001 |
| | Reward Dependence | .094 | .025 | .243 | 3.741 | <.001 |
| | Maternal Overprotection | -.330 | .091 | -.231 | -3.629 | <.001 |

In the first regression analysis Desire Thinking was entered as dependent variable. In step 1 Maternal Overprotection was entered as predictor, Novelty Seeking was entered in step 2 and Harm Avoidance was entered in step 3. In the second regression analysis Anger Rumination was entered as dependent variable, and Novelty Seeking entered in step 1, Reward Dependence entered in step 2, and Maternal Overprotection in step 3.

### General Linear Model

When we run two General Linear Models in order to analyze interaction effects of predictor variables we found significant interaction between the two variables Maternal Overprotection/Harm Avoidance (Partial $Eta^2$=.023, p=.34) for DT (F= 14.146, p<.001; $R^2$= .225, Adjusted $R^2$= .209). While in the model on AR (F= 37.882, p<.001; $R^2$= .437, Adjusted $R^2$= .426) we found significant interaction effects between the two variables Maternal Overprotection/Reward Dependence (Partial $Eta^2$=.029, p=.17) and Novelty Seeking/Reward Dependence (Partial $Eta^2$=.069; p <.001).

## Discussion

Our study investigated the relationship between temperament, parental style and two forms of dysfunctional thinking processes, DT and AR. Results showed that both DT and AR were predicted by low levels of Maternal Overprotection. Data seem to show that high perceived level of maternal overprotection could prevent the development of DT and AR. High level of DT and AR are associated with psychopathological behaviors such as use of substances [3] and self-injurious behaviours [4]. Thus, the fact that low level of Maternal Overprotection predicted High level of DT and AR is in accordance with previous studies that found a positive association between low protective parental style and poor care and risk behaviors in adolescence, such as substance abuse [43,44], smoke [45] and risky sexual behaviors [46].

Regarding temperament dimensions, high levels of Novelty Seeking significantly predicted high levels of DT and AR while Harm Avoidance predicted low levels of DT and Reward Dependence predicted high levels of AR. In particular, it seems that people with an inclination to respond with intense excitement to novel stimuli, leading to pursuit of rewards and escape from punishment, are more prone to thinking activation such as Desire Thinking and Anger Rumination. Our results showed also that a temperamental profile characterized by a high tendency to respond intensely to previously established signals of aversive stimuli and to learn to passively avoid punishment, novelty and frustrating non-reward, can prevent the development of Desire Thinking. Our data are in line with the literature. In fact, expanding the clinical picture, Desire Thinking is related to disorders, such as substance and alcohol abuse, that are typically characterized by low

levels of damage avoidance and high levels of Novelty Seeking. Harm Avoidance by definition facilitates behavior inhibition and avoidance of punishment, novelty and frustrating omission of expected reward [25,26]. Clearly this temperamental asset implies high levels of worry connected with the anticipation of negative outcomes and the need to feel able to cope with them, in addition to the need to gain emotional self-control in front of intense arousal. Thus, people with low levels of Harm Avoidance are probably less concentrated on worries about the harm that can derive from the "Desired Object". In turn, they can be better orientated on the 'desired target'. Differently to us, Manfredi and colleagues [37] in a previous study on temperament and ruminative brooding and worry, found that high levels of Harm Avoidance might facilitate the use of ruminative brooding and worry. Differences should not surprise. Ruminative brooding and worry are two types of recurrent, dysfunctional and rigid negative thinking respectively associated to depression and anxiety. Both these two types of thinking encompass a component of apprehensive expectation of possible negative outcomes in the future. Thus, a temperamental profile characterized by a high tendency to respond intensely to previously established signals of aversive stimuli probably increases risk for apprehensive expectation typical of ruminative brooding and worry. On the contrary, negative apprehensive expectation does not characterize directly DT. In fact, DT focused on the elaboration of a desired target and is characterized by positive target-related experience and self-motivational statements. Finally, people that are temperamentally predisposed to respond intensely to signals of reward and to maintain behavior previously associated with reward or with relief of punishment seem to be at high risk for AR. Manfredi and colleagues [37] found an association between Reward Dependence and brooding. The authors hypothesized that since Reward Dependence has been associated with persistence in goal pursuing, this persistence may lead to difficulties in the process of goal disengagement in the event of a loss or of a frustrating event. These difficulties could contribute to the enhancement of "recurrent pondering" on own problems or own negative emotional states that is typical of brooding [66] but also of AR, which can be defined as the tendency to think over and over anger inducing past events [13-17].

Significant correlations have been found between trait anxiety and DT/AR, state anxiety and AR, although anxiety variables did not enter as predictors in our regressions. Probably the mental activation derived from these two kind of dysfunctional cognitive processes contributes to increase levels of anxiety in subjects. Dysfunctional thinking could act as triggers for anxiety. Clearly, future studies should better investigate this issue. It should be note that this is a clinical sample and this could have influenced results.

In addition to this, our results indicated interaction effects for the variables Maternal Overprotection and Harm Avoidance in influencing DT and for Maternal Overprotection and Reward Dependence in influencing AR. The presence of interaction effects is in line with recent literature on gene-environment co-action mechanisms, such as gene-environment correlations, showing that there may be genetically-influenced individual variation in exposure to risky/protective environments [67]. Genetic propensities could be correlated with individual differences in experiences. In other words, what seem to be environmental effects can reflect a genetic influence because these experiences are influenced by genetic differences among individuals [67]. A mechanism of relevance in relation to our findings could be the significant correlation that occurs when individuals, on the basis of their genetic propensities, evoke reactions from other people on the basis of their genetic propensities [68].

The results of this study must be considered in the light of several limitations. First, the measure of perceived parental style was retrospective. The design is cross-sectional and this constitutes an important limitation. A longitudinal study is probably a more adequate design to investigate the causal relationship between temperament/parental style and thinking process, and their association over time. Second, our measures could be influenced by errors due to social desirability and self-report biases. Third, the small sample size together with the high number of variables which were analyzed may represent another shortcoming.

## Conclusion

The results of this study had several clinical implications, primarily connected to the implementation of preventive intervention programs to reduce the vulnerability to emotional stress. In particular, the knowledge of environmental and temperamental risk factors can help in identifying subjects at a high risk for DT and AR, in order to prevent psychopathology connected with these thinking processes. An early identification of adolescents at high risk can promote their inclusion in specific programs aimed to increase their competences, adaptive coping strategies, and to restructure the first forms dysfunctional thinking. In particular, specific cognitive-behavioral programs focused on cognitive reconstruction and anger management could help these subjects. For example, Anger Rumination may serve as a warning signal, that an individual may be about to engage in an aggressive act and thus may need an intervention [69]. The ruminative modus operandi can be disrupted through the use of several techniques such as thought-stopping and thought-switching [70]. Thought-stopping involves recognizing an inappropriate thought and (silently) yelling 'STOP' then breathing deeply and exhaling slowly whilst counting backwards or focusing on a neutral image. In addition, cognitive-behavioral techniques may be used to make an individual more aware of the dysfunctional thinking process and then reframe it into more adaptive cognitions. Verbal reattribution of metacognitive beliefs about Desire Thinking and techniques to directly treat desire thinking and attentional shifting could be implemented to reduce the risk of excessive drinking behavior and relapse after successful treatment.

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