



How emotional traits and affective temperaments relate to cocaine experimentation, abuse and dependence in a large sample

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HIGHLIGHTS

- ▶ Much of the trait differences were related to cocaine experimentation.
- ▶ Control and coping scores reduced with increased cocaine involvement.
- ▶ Anger, desire and impulsivity were increased in cocaine groups.
- ▶ Cyclothymics and euphorics were overrepresented proportionally to drug involvement.
- ▶ The effects of cocaine may only aggravate previous dysfunctional traits.

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ABSTRACT

The contribution of specific traits in cocaine experimentation, abuse and addiction is not yet clear. Our aim was to evaluate how temperament was associated with cocaine experimentation, abuse and dependence using a recently developed scale for the assessment of emotional traits (e.g. anger, volition) and affective temperaments (e.g. cyclothymic). An anonymous web-survey provides the optimal means to evaluate sensitive issues such as drug related behavior in the general population. *Methods:* The data was collected by the Brazilian Internet Study on Temperament and Psychopathology (BRAINSTEP), which included the Affective and Emotional Composite Temperament Scale (AFECTS) and the Alcohol, Smoking and Substance Involvement Screening Test (ASSIST). The final sample consisted of 28,587 subjects (26.6% males, mean age = 30.8 ± 9.8 yrs). Trait analysis was controlled for age, gender, ethanol and marijuana use. *Results:* For emotional traits, Caution, Coping and Control were significantly lower in the cocaine-using groups when compared to controls, particularly in those with cocaine dependence. Anger and Desire increased in relation to the degree of cocaine involvement. The associations with Emotional Sensitivity and Volition were less robust. For affective temperaments, greater cocaine use was related to a lower proportion of stable types (obsessive, euthymic and hyperthymic) and the anxious type, and to a higher proportion of cyclothymic and euphoric temperaments in both sexes. *Conclusions:* Specific externalized and unstable traits were associated with cocaine related behavior. Addressing these traits may be important for recovery and prevention strategies.

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1. Introduction

Personality traits and vulnerability to cocaine use, abuse and addiction are influenced by a combination of environmental and hereditary factors (Cloninger, Svrakic, & Przybeck, 1993; Kreek, Nielsen, Butelman, & LaForge, 2005). Personality traits have been implicated in drug related behavior, but their role in drug experimentation, drug abuse and the development of addiction is not yet clear because most studies have only compared patients with cocaine abuse or addiction with healthy controls.

Several personality models and dimensions have been investigated in relation to cocaine abuse and addiction. High impulsivity has been reported in many of the studies of humans (Coffey, Gudleski, Saladin, & Brady, 2003; Fernandez-Serrano, Perales, Moreno-Lopez, Perez-Garcia, & Verdejo-Garcia, 2012; Kjome et al., 2010) and it is related to increased cocaine self-administration in animals (Anker, Perry, Gliddon, & Carroll, 2009; Belin, Mar, Dalley, Robbins, & Everitt, 2008; Dalley et al., 2007; Perry, Larson, German, Madden, & Carroll, 2005). Another trait commonly associated with cocaine addiction is Zuckerman's sensation seeking, which is related to excitement and a search for thrilling experiences (Ball, Carroll, & Rounsaville, 1994; Patkar et al., 2004). Of note, impulsivity and sensation seeking traits do not differentiate individuals with cocaine abuse from those with cocaine dependence, but abusers have more suspiciousness and unpleasant responses to the self-administration of

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cocaine compared to dependents (Walsh, Donny, Nuzzo, Umbricht, & Bigelow, 2010). Also, impulsivity, and the inability to stop an ongoing action, are part of the endophenotype for chronic stimulant usage, but sensation seeking is likely to be an effect of stimulant drug abuse (Ersche, Turton, Pradhan, Bullmore, & Robbins, 2010; Ersche et al., 2012).

We have recently developed an integrative temperament model that conceives specific emotional traits (Cloninger et al., 1993) and global affective types (Akiskal et al., 2005), named the Affective and Emotional Composite Temperament (AFECT) model (Lara & Akiskal, 2006; Lara, Pinto, Akiskal, & Akiskal, 2006; Lara, Bisol, et al., 2012). In this model, emotional traits work as a system composed of Activation, Inhibition, Sensitivity, Coping and Control. Activation is conferred by Volition (positive affect, motivation, energy), Desire (impulses, indulgence) and Anger (emotional intensity and aggressive behavior). Inhibition is modulated by fear (worry, shyness, fearfulness) and caution (prudence, carefulness, risk-avoidance). Emotional Sensitivity corresponds to vulnerability to interpersonal attrition (e.g. criticism, rejection) and to events (pressure, frustration, traumas). Coping refers to how the individual faces and solves problematic situations, which will eventually lead to personal evolution. Control is the ability to monitor the environment (attention) and to make adequate adjustments for adaptation (sense of duty, discipline, planning), i.e. executive functions. The interaction of these independent emotional traits produce a prevailing mood and behavioral pattern, the affective temperament, which can be classified into twelve types: depressive, anxious, apathetic (internalized types), cyclothymic, dysphoric, volatile (unstable types), obsessive, euthymic, hyperthymic (stable types), irritable, disinhibited, and euphoric (externalized types) (for further details see Lara, Bisol, et al., 2012). The affective temperament approach provides a more general perspective on temperament and reflects how mood and behavior tend to be over time, which adds to the concept of specific emotional traits. For example, the cyclothymic affective temperament is characterized by mood swings and disproportionate emotional reactions, which are postulated to result from the interaction of specific emotional traits, such as high emotional sensitivity, desire and anger combined with low control and coping (Lara, Bisol, et al., 2012). Thus, the assessment of emotional traits provides a dimensional, specific and detailed evaluation whereas the classification of categorical affective types offers a global perspective of temperament and mood, which is particularly useful for straightforward communication. These complementary approaches are unique to the AFECT model and scale.

We have recently developed and validated the Affective and Emotional Composite Temperament Scale (AFECTS), which is a brief self-reporting scale for the simultaneous assessment of these emotional traits and affective temperaments (Lara, Bisol, et al., 2012; Lara, Ottoni, et al., 2012). The following factors compose the emotional section: Volition, Desire and Anger (Activation); Fear and Caution (Inhibition); Emotional Sensitivity, Coping and Control. These distinctions are important in order to study the role of the specific traits that are often mixed in other models, such as impulsivity and sensitivity to stress in neuroticism; Desire (excitement), impulsivity and low Control (planning) in sensation-seeking and novelty seeking. The AFECTS also has a section with twelve short descriptions of the affective temperaments (e.g. cyclothymic, euthymic) in which the volunteers chose the one that fits best to their profile. This strategy allows a categorization of the overall affective temperament.

Face-to-face studies on sensitive issues such as illicit drug use are prone to underreporting. However, data collected by computer can enhance the validity for sensitive, intimate, moral and personal issues when compared to anonymous pen and paper methods (Turner et al., 1998), face-to-face (Gosling, Vazire, Srivastava, & John, 2004), and telephone interviews (Cuijpers, van Straten, & Andersson, 2008). Especially when accessing research websites from remote personal computers, respondents may feel more anonymous and private and less concerned about how they appear to others. Online data regarding other measures and topics is remarkably consistent with offline data

(Buchanan & Smith, 1999; Hewson & Charlton, 2005) and Internet users are similar to nonusers when considering measures of adjustment, social interaction and personality traits (Gosling et al., 2004). Also, the Internet provides a mean to enhance the motivation of the participants (e.g. immediate personalized feedback) and to also insert validity checks, which significantly increase the response rates preserving data quality (Edwards et al., 2009). Finally, almost all respondents prefer Web-based versions to mailed questionnaires and telephone interviews, or they had no preference in such matters (Rankin et al., 2008; Touvier et al., 2010). Based upon this evidence, web-based questionnaires can even be considered the gold standard for issues prone to social desirability bias, especially in population studies.

We have designed a large web-survey to collect data on psychological and psychiatric measures called the Brazilian Internet Study on Temperament and Psychopathology (BRAINSTEP) (Lara, Ottoni, et al., 2012). This research website includes the AFECTS and the Alcohol, Smoking and Substance Involvement Screening Test (ASSIST). Our aim was to evaluate how emotional traits and affective temperaments are associated with cocaine experimentation, abuse and dependence in the general population, allowing a more dimensional understanding on the relationship between temperament and cocaine related behavior. Our hypothesis was that externalized emotional traits (low Inhibition and Control, high Anger, Desire and Sensitivity) and affective types (e.g. euphoric temperaments) would be strongly associated with cocaine related behavior, including experimentation.

2. Methods

2.1. Participants

All participants gave their electronic informed consent before completing the scale. This form was elaborated to fulfill the requirements of the National Health Council of Brazil (Resolution 196/1996) and the Code of Ethics of the World Medical Association (Declaration of Helsinki). Their participation was voluntary and they could cancel their participation at any moment without justification. The study was approved by the Institutional Review Board of Hospital São Lucas from Pontifícia Universidade Católica do Rio Grande do Sul.

The data presented is part of a large web-based survey named BRAINSTEP, which was broadcasted in National media, such as TV news and major newspapers to recruit volunteers. Their incentive for participation was to receive a report on their temperament profile and likelihood of having a psychiatric disorder based on screening instruments for 19 disorders. Volunteers answered by Internet (www.temperamento.com.br), the Affective and Emotional Composite Temperament Scale (AFECTS), the Alcohol, Smoking and Substance Involvement Screening Test (ASSIST) and demographic variables, among various other scales and questionnaires. To ensure the reliability of the data, questions checking for attention were inserted within the instruments and throughout the system. Also, at the end of the system, there were two specific questions on the degree of attention and sincerity of the volunteer while completing the instruments. Only those who stated being attentive and sincere throughout the study and had correct answers in the attention validity items were included. The initial sample was 56,685 volunteers, but only 36,431 passed all of these validity checks.

2.2. Instruments

2.2.1. Affective and Emotional Composite Temperament Scale (AFECTS)

The AFECTS (see Lara, Bisol, et al., 2012 for the complete scale) consists of the following sections:

- 1) Emotional section: 52 seven-item multiple choice questions for the emotional dimensions of Volition, Anger, Inhibition, Sensitivity, Coping, and Control (8 items each) and Desire (4 items). The questions are scored from 1 to 7 and the total score of each dimension is the

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