

Chapter 15

PREDICTING BEHAVIOR: THE COGNITIVE ORIENTATION APPROACH

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ABSTRACT

The chapter deals with the relation of attitudes and beliefs to behavior, in particular their predictive power in regard to behavior. This issue is of importance in democratic societies, especially in view of the frequent failure to demonstrate relations between attitudes and behavior. Following the description of various attempts to bridge the gap of attitudes and behavior, the cognitive orientation (CO) theory is presented. This is a cognitive-motivational approach with theoretical assumptions and a methodology that enable predicting different kinds of behavior. The prediction is based on cognitive contents representing four types of beliefs (about oneself, reality, norms and goals) referring not directly to the behavior in question but to its underlying meanings, identified by means of a standard procedure. Three studies are described which demonstrate the advantage of the CO theory in predicting behavior over self-reports and personality questionnaires. The studies deal with: initiating contact with others, concentration, and addictive behaviors. In each study a CO questionnaire, specific for the particular behavior, was administered, and the behavior was assessed independently. In all three studies the four belief types predicted significantly the behavior in question. The themes in the CO questionnaire provide insights about the motivational roots of the behavior and thus contribute to the possibility of planning targeted interventions for its prevention and treatment.

Keywords: beliefs, predicting behavior, cognitive orientation, concentration, addiction, social interaction.

1. INTRODUCTION

1.1. The problem

Changing attitudes and beliefs is a common theme in social psychology and is mainly of interest for investigators dealing with public opinion, persuasion and rhetoric. However, in the present context we will deal with changing attitudes and beliefs for the purpose of changing behavior. This should not come as a surprise to anyone who has followed the long history of what came to be called in psychology “attitudes and behavior”. This has become an issue because while beliefs and attitudes are considered as important in all ideologies, religions, and socio-political systems, for a long time studies in psychology have not been able to support the expectation that attitudes and beliefs are related to the behaviors to which they apparently refer. Thus, students who claim that it is dishonest to copy in exams have been observed copying in exams (Corey, 1937), restaurant owners who claimed one should not serve an ethnic group like the Chinese have been observed serving Chinese people when they showed up in the restaurant (LaPiere, 1934). The negative findings have been highly disturbing because they imply that the effort to teach values in education or the struggle for free access to information may be of no importance on the social scene (Kreitler, 2004).

The significance of the negative findings was exacerbated by the theoretical biases rooted in the two major theoretical approaches that dominated the scene at the same time: the behaviorist approach and the dynamic approach, both of which – for very different reasons – relegated cognitive contents to a secondary status, and denied its role in guiding behavior.

Due to the significance of the issue, valiant attempts were made to overcome the disturbing inconsistency by defining conditions under which attitudes could be expected to be related to behavior, for example, reducing maximally the time interval between the assessment of attitudes and behaviors (Davidson & Jaccard, 1979); basing attitudes on direct experience (Fazio & Zanna, 1978); and selecting participants low in self-monitoring (Snyder & Monson,

1975). Studies of this kind, focused on filling the gap between attitudes and behavior with different additional variables have not made much progress in resolving the problem. Neither have the different models of cognitive motivation, all of which assumed that cognitions are related to behavior (see Table 1).

Table 1. Characterization of major models of cognitive motivation.

The Cognitive Motivation Model	Major Assumptions	The Variables that the Model Intends to Account for	Major Explanatory Variables
Expectancy theory (Vroom, 1964)	Choice of a behavioral option depends on rational goal striving	Selecting one behavioral option over another	Valence, Expectancy, and instrumentality define "motivational force"
Expectancy-value theory of achievement (Atkinson & Feather, 1966; Wigfield & Eccles, 2000)	Behavioral choices are the calculated function of expectancy of success and the value placed on success	Achievement behavior in different domains (e.g. education, business)	Expectation of success, subjective task value (incl. value of success), ability beliefs
Goal-setting theory (Locke & Latham, 2002)	Performance is a function of goals (the degree to which they are specific and realistic)	Good execution of tasks	Goals (characterized by being specific, measurable, realistic, attainable, time-bound)
Self-regulation theory (Bandura, 1991)	Optimal performance depends on personal agency	Intentional purposive action, controlled by the self-regulatory system	Self-regulation, self-efficacy, self-monitoring, judgment of one's behavior, affective self-reaction
Theory of reasoned action (Ajzen & Fishbein, 1980)	Behavioral intentions are based on beliefs	Predicting behavior, which is often operationalized as reports about behavior or behavioral intention	Behavioral intention, normative beliefs, behavioral beliefs and control beliefs
Health belief model (Becker, 1974)	Health behavior is a function of a rational weighing of benefits and barriers	Health-related behavior	Perceived susceptibility for illness, benefits of health behavior, barriers, modifying variables
Social Cognition approach (Dweck & Leggett, 1988)	Cognition determines affect that determines behavior, whereby goals are the major factor	Major patterns of adaptive and maladaptive behaviors	Implicit theories, goals and patterns of behavior

A major shortcoming of the models presented in Table 1 and of similar ones is that they do not deal with predicting actual behaviors but with self-reports of behavior or with intentions for behavior, both of which were shown not to be identical with actual behavior (e.g., Heckhausen & Kuhl, 1985). Further, the models are based on unrealistic and empirically unsupported assumptions about the production of behavior, for example, that "humans are reasonable animals who, in deciding what action to take, systematically process and utilize the information available to them" (Fishbein & Middlestadt, 1989), that behavior is based on a person's deliberate decision, and that cognitive motivation has to be conscious and rational.

1.2. Cognitive orientation: The Theory

Cognitive orientation (CO) is a cognitively-based theory of motivation but it differs from the other models in its assumptions, components, methodology and empirical basis. It provides an account of major processes intervening between input and output designed to enable understanding, predicting and changing behavior. It shares with the other cognitive models the basic assumption that cognitive contents, viz. beliefs, meanings or attitudes guide behavior (see Table 1). But unlike the other models it does not assume that behavior is guided by logical decision-making, or is subject to conscious voluntary control. Instead, it focuses on the major construct of meaning, and shows how behavior proceeds from meanings and clustered beliefs (Kreitler & Kreitler, 1976, 1982). The beliefs may orient toward rationality but also in other directions, and the outcome may seem rational or not regardless of the beliefs that oriented

toward it. Further, the theory focuses on actual, observable overt behaviors as distinct from intentions, self-reported behaviors and commitments or decisions to act.

The CO theory consists of a central core model that refers to molar observable behavior but includes also further specific models that deal with physical health, emotional behavior, cognitive behavior and psychopathology. In the present context we will focus on the original model of molar behavior. There is a large body of data demonstrating the predictive power of the CO theory in regard to a great variety of behaviors, including achievement, responses to success and a failure, coming on time, undergoing tests for the early detection of breast cancer, smoking cessation etc. in different kinds of individuals (Kreitler & Kreitler, 1988), differing in age (4 to over 90), gender, ethnic background, education and IQ level (i.e., retarded individuals) and mental health (e.g., schizophrenics, paranoids) (Kreitler & Kreitler, 1997; Kreitler, Schwartz, & Kreitler, 1987).

The CO is a cognitive theory of motivation designed to enable understanding, predicting and changing behaviors and other outputs in different domains. The major theoretical assumption of the CO approach is that cognitive contents and processes play an active-dynamic role in regard to behaviors. Behavior is considered a function of a motivational disposition, which determines the directionality of behavior, and a performance program, which determines the manner in which the behavior is carried out.

According to the CO theory, the processes intervening between input and output can be grouped into four stages, characterized by metaphorical questions and answers. The first stage is initiated by an external or internal input and is focused on the question “What is it?” which guides the processes enabling the identification of the input by a limited ‘initial meaning’ as either a signal for a defensive, adaptive or conditioned response, a molar action, an orienting response, or as irrelevant.

The second stage is devoted to further elaboration of the meaning of the input. It focuses on the question “What does it mean in general and what does it mean to or for me?” which results in an enriched generation of interpersonally-shared and personal meanings in terms of beliefs, designed to determine whether these beliefs require a behavioral action.

A positive answer initiates the third stage focused on the question “What will I do?” The answer is based on relevant beliefs of the four following types: a) Beliefs about goals, which refer to actions or states desired or undesired by the individual (e.g., “I want to be respected by others”); b) Beliefs about rules and norms, which refer to social, ethical, esthetic and other rules and standards (e.g., “One should be assertive”); c) Beliefs about oneself, which express information about the self, such as one’s traits, behaviors, habits, actions or feelings (e.g., “I often get angry”) and d) General beliefs, which express information about reality, others and the environment (e.g., “The world is a dangerous place”). The beliefs refer to deep underlying meanings of the involved inputs rather than their obvious and explicit surface meanings. The scoring of the beliefs is based on assessing the extent to which they support or do not support the indicated action. If the majority of beliefs in at least three belief types support the action, a cluster of beliefs is formed (“CO cluster”), orienting toward a particular act. It generates a unified tendency which represents the motivational disposition orienting toward the performance of the action.

When a motivational disposition has been formed, the next stage is focused on the question “How will I do it?” The answer is in the form of a behavioral program, which is a hierarchically structured sequence of instructions specifying the strategy and tactics governing the performance of the act. There are four basic kinds of programs: a) Innately determined programs, e.g., controlling reflexes; b) Programs determined both innately and through learning, e.g., controlling instincts or language behavior; c) Programs acquired through learning, e.g., controlling culturally shaped behaviors and d) Programs constructed ad hoc, in line with relevant contextual requirements

1.3. Cognitive orientation: The methodology of behavior prediction

In the present context we will focus on a major advantage of the CO theory which is that it provides the theoretical and methodological tools for predicting behavior.

A large body of research demonstrates the predictive power of the CO theory in regard to a great variety of behavioral domains and types of participants. Predicting behavior by means of the CO theory enables mostly correct identification of 70%-90% of the participants manifesting the behavior of interest (Drechsler, Brunner, & Kreitler, 1987; Figer, Kreitler, Kreitler, & Inbar, 2002; Kreitler & Casakin, 2009; Kreitler, Bachar, Cannetti, Berry, & Bonne, 2003; Kreitler & Kreitler, 1991; Kreitler, Shahar, & Kreitler, 1976; Tipton & Riebsame, 1987). The success of the predictions is based on applying the standard procedure based on the CO theory (Kreitler, 2004). The theoretical construct applied for predicting behavior is the motivational disposition. The strength of the motivational disposition for a behavior is assessed by means of a CO questionnaire, which examines the degree to which the participant agrees to relevant beliefs orienting toward the behavior in question. The relevant beliefs are characterized in terms of form and contents. In form, they refer to the four types of beliefs, namely, beliefs about goals (e.g., "I would like never to come late"), about rules and norms (e.g., "One should try never to be late"), about oneself (e.g., "Sometimes I come late to a lesson or meeting"), and general beliefs (e.g., "Coming late produces a bad impression on others. In contents, the beliefs refer to the meanings underlying the behavior in question (called "themes").

The themes of a particular CO questionnaire are identified by means of a standard interviewing procedure applied in regard to pretest subjects who manifest the behavior in question and to control subjects who do not manifest it. The procedure consists of interviewing the participants about the meanings of relevant key terms of the behavior followed by sequential (three times) questions about the personal-subjective meanings of the given responses (Kreitler & Kreitler, 1990). Repeating the questions about the meanings reveals deeper-layer meanings. Those meanings that recur in at least 50% of the interviewees with the behavior of interest and in less than 10% of those without it are selected for the final questionnaire. The outcome of this procedure is that the beliefs in a CO questionnaire do not refer directly or indirectly to the behavior in question but only to the themes that represent the underlying meanings of this behavior. Validity of the CO questionnaire is confirmed if it enables the prediction of the behavior also in the second sample. For example, themes that concern coming late are "respect for others", and "deciding on priorities".

The themes and belief types define together a prediction matrix, with the belief types as headings of the columns and the themes in the rows. Thus, a CO questionnaire usually consists of four parts presented together in random order. Each part represents one of the four belief types, and contains beliefs referring to different theme-contents. Participants are requested to check on a 4-point scale the degree to which each belief seems true (or correct) to them. The major variables provided by the CO questionnaire are scores for the four belief types and for each of the themes.

2. STUDIES OF PREDICTING BEHAVIOR BY THE COGNITIVE ORIENTATION METHOD

The following descriptions of studies are designed to demonstrate the predictive power of the CO theory in regard to behavior as compared with other alternatives.

2.1. Study 1: Predicting the initiation of contacts with others

2.1.1. Introduction. Initiating contact with others is an indispensable although insufficient component of social relations. As emphasized by Levinger (1983), who described the life-line of relationships, it is the first step toward creating a relationship or some kind of a social interaction. Making contact consists in rendering acquaintance possible. It includes a presentation of oneself as at least a potential partner for some kind of interaction; it expresses interest in the other and provides an arena for manifesting various interpersonal skills, such as verbal and nonverbal communication, listening and decision making (Berscheid, 1999). Major factors affecting the formation of contacts are physical proximity (Festinger, Schachter, & Back, 1950) and similarity (Harvey & Pauwels, 2009), both of which were used in shaping the

experimental situation (see 2.1.3.). Promoting the formation of contacts is of prime importance in different domains of life, including getting social support, creating families, working in groups, etc.

2.1.2 Objectives of the study. The objectives of the study were first, to test the hypothesis that belief variables defined in terms of the CO theory would enable predicting the behavior of initiating contacts with others; and secondly, to examine the predictive power of two further measures in regard to the same behavior: The Affiliative Tendency Scale, which is a personality measure assessing positive manifestations of affiliation, and the Social Interaction Anxiety Scale assessing the negative impact of an emotional barrier like anxiety on social interactions.

2.1.3. Methods of the study. The participants were 15 students, undergraduates of the faculty of social sciences at Tel-Aviv University (mean 23.2 yrs, $SD=2.2$) of both genders (8 women, 7 men). They were invited to participate in a psychological study. The first part consisted in asking them to sit in a waiting room waiting to be invited to the lab. The waiting lasted for 10 minutes and took place in a room in the presence of other students whom they did not know. In each group there was one experimental subject and nine non-experimental students who were simply asked to play a passive role (i.e., respond when addressed but not to initiate contacts). The non-experimental subjects resembled the experimental ones in being students in the faculty of social sciences, as well as in age (mean 22.9 yrs, $SD=2.6$) and gender (8 women and 7 men). They participated in the 15 groups that were formed for the assessment of initiated contacts. An experimenter, who was a hidden observer outside that room, noted the number of occasions when the experimental subjects initiated communications with the other students. This provided the data for the dependent variable. The subjects were then invited into the lab and examined on a perception task that was irrelevant in regard to the present study. Two months later three questionnaires that provided the independent measures of the study were administered to the subjects by other experimenters in the context of various questionnaires of other studies. The three additional measures were: (a) CO Questionnaire of forming relationships, which included 10 items in each of the belief types referring to 10 themes (e.g., trust, self-disclosure) (Azuri, Tabak, & Kreitler, 2013) [the Cronbach's alpha reliability coefficients of the four belief types were in the range of .80-.88]; (b) The Affiliative Tendency Scale by Mehrabian (1994) which included 26 items with responses on a 9-point scale; and (c) The Social Interaction Anxiety Scale (Mattick & Clarke, 1998) which included 20 items with responses on a 5-point scale. Only in the disclosure session after the completion of the whole experiment the subjects and experimenters were told about the hypotheses of the study and the relations between its different parts. .

2.1.4. Results of the study. No significant differences were found between the genders in any of the variables. The results showed significant correlations between the number of initiated contacts and the four belief types (r ranging .52-.67) (see Table 2). There were nonsignificant correlations between the number of initiated contacts and the scores on the Affiliative Tendency scale, the self-report questionnaire and Social Interaction Anxiety Scale, as well as between the latter and the scores of the CO questionnaire. Additionally, the experimental subjects were divided into two groups: those who initiated contacts above the group's mean, and those who initiated contacts below it ($M=2.53$, $SD=1.50$). In line with the CO theory and previous studies (see 1.3), the hypothesis was that the subjects with above-mean contacts should score in at least 3 of the belief types above the group's mean. The means were 3 ($SD=.89$) and 1.22 ($SD=.67$), respectively [$t=4.42$, $p<.05$].

Table 2. Pearson correlation coefficients of scores on the four CO belief types, affiliative tendency and self-report of forming relations with the number of observed contact formations.

CO: Beliefs about Self	CO: Beliefs about Norms	CO: Beliefs about Goals	CO: General Beliefs	Affiliative Tendency	Social Interaction Anxiety Scale
.52*	.67**	.59*	.64**	.40	-.33

*p<.05 **p<.01

2.1.5. Conclusions of the study. The study on predicting initiation of communication with others should be considered as preliminary and serves mainly the purpose of demonstrating the predictive power of a questionnaire constructed according to the CO methodology. The results show that the behavior of communicating with unfamiliar others in a waiting-room situation was correlated significantly with the scores of four belief types defined by the CO theory, whereas it was not correlated with two personality measures of affiliation and anxiety of social interactions.

2.2. Study 2: Predicting the behavior of concentration

2.2.1. Introduction. Concentration is the ability to coordinate action parts in a conscious manner despite internal and external distractions so that both quick and accurate performance of a task is made possible (Westhoff & Hagenmeister, 2005). Some investigators assume that it is a subprocess of attention (Kinchla, 1992; Mikulas, 2002), others consider it as a cognitive effort preceding performance, independent of attention (Westhoff & Hagemeister, 2005), and still others consider it as a combination of different kinds of attention, such as divided attention, control and switching (Moosbrugger, Golghammer, & Schweizer, 2006; Schweizer, 2006). It has been shown to be related positively to mindfulness (Mikulas, 2002) and negatively with boredom (Kass, Wallace, & Vodanovich, 2003) and ADHD (Shaw & Giambra, 1993). In any case, concentration is viewed increasingly as a kind of behavior or skill that can be enhanced through learning (Krawietz, Mikulas, & Vodanovich, 2007). It is of great importance in a variety of domains, including sport (Moran, 1996), and creativity (Jackson & Csikszentmihalyi, 1999). Despite being called by James (1890/1950, p. 424) “the very root of judgment, character and will”, little is known about its motivational bases.

2.2.2. Objectives of the study. The objectives of the study were first, to test the hypothesis that the four belief types of the CO theory would predict concentration as assessed by a standard test and secondly, to examine the predictive power of a validated and reliable questionnaire assessing concentration. The hypotheses were that the four belief types would be correlated with the scores on the concentration test, whereas the self-report questionnaire assessing concentration tendencies would not.

2.2.3. Method of the study. Forty students, 20 men and 20 women, 17-18 years old participated in the study. The performance and questionnaire measures were administered separately, 2-3 weeks apart, in random order, in a classroom group session. The dependent measures were scores obtained on a standard cancellation test (Mesulam, 2000). This test has the advantage that its performance variables do not depend on cognitive and educationally-determined skills (Brucki & Nitrini, 2008). The subjects were presented an A-4 sheet of paper on which there were 60 small nonverbal randomly arranged stimuli and were asked to cross each empty (i.e., non-filled) circle with a single slanted line and not to cross any other stimuli. After 3 minutes the task was interrupted and the sheets were collected. The scores were the number of correct responses (i.e., number of empty circles crossed) and the number of mistakes (i.e., the number of stimuli other than the empty circle that were crossed). In addition two questionnaires were administered. One was the CO questionnaire of concentration (Kreitler & Yaniv, 2013) which included four parts, referring to the four types of beliefs with 15 items in each. The Cronbach’s alpha reliability coefficients of the four belief types were in the range of .79 to .85. The items referred to themes, such as missing out opportunities, being constantly aware of everything that happens around you, sticking to one’s decisions, and wasting time, that

were identified in a prior study as meanings underlying concentration. The second questionnaire was the Concentration Scale by Krawietz and colleagues (2007) which included 49 items, with a 7-point response format, assessing the quality of one's concentration abilities.

2.2.4. Results of the study. There were no significant differences between the genders in any of the variables of the study. The dependent measures were the number of correct responses and the number of mistakes computed as a proportion of the total number of responses. The mean of correct responses was 22 (SD=3.4). Pearson correlation coefficients between the four belief types and the total number of responses were all positive and significant ($p < .01$): .45, .38, .54, .50 for beliefs about self, norms, goals and general beliefs, respectively. The correlation with the score on the concentration scale was lower and barely significant ($r = .31$, $p = .051$). A regression analysis with the four belief types as predictors yielded a significant F value (4.57, $df = 3, 38$, $p < .01$) and $R^2 = .54$. The results for the measure of proportion of mistakes out of the total number of responses were similar for the four belief types: all correlation coefficients were significant and negative, as expected: -.39, -.43, .52, -.49, $p < .01$, for beliefs about self, norms, goals and general beliefs, respectively, but the score of the concentration scale was not correlated with it significantly.

2.2.5. Conclusions of the study. The dependent measure in this study reflected performance. The higher the number of correct responses within the time allotted to the task, the higher the concentration of the subject. Accordingly, as expected, this performance measure was predicted by the four belief types. All four belief types were correlated with the number of correct responses. Also the questionnaire measure was correlated significantly with the performance measure. The four belief types provided information about the underlying motivation for the concentration score. However, the correlation with the concentration questionnaire provided information that the extent of concentration the subject manifested in the cancellation task matched to a certain degree the extent of concentration that he or she manifested usually in other domains of daily life, e.g., watching television, or listening to someone talk. Hence, the two questionnaires provided different kinds of information about the tendency for concentration.

2.3. Study 3: The cognitive orientation of addictive behaviors

2.3.1. Introduction. Addiction is defined by the DSM-IV as a maladaptive pattern of substance use leading to clinically significant impairment or distress, manifested in behaviors concerning work, family and social interactions (American Psychiatric Association, 2000). Addiction consists in recurrent exposure to some substance, whereby its absorption is experienced as pleasurable and its withdrawal as unpleasant. The major characteristics of addiction are increasing tolerance for the substance, continued compulsive use of the substance despite possible awareness of its negative consequences, and inability to stop the ingestion of the substance by means of a personal decision. This definition applies to various substances, including alcohol, tobacco and some psychoactive drugs. In recent years the concept of addiction has been expanded to include also behavioral dependency which may be manifested in regard to gambling, work, sex, the internet and exercise.

The major theories of addiction may be summarized in terms of the four following approaches. According to the medical approach, addiction is due to neurotransmitter imbalance in the brain and should be treated by eliminating drugs or using antagonist drugs. According to the social approach addiction is a learned behavior due to peer pressure and conformity so that its reduction may be attained by changing social norms, including legal means. According to the personality-based approach addiction reflects tendencies, such as impulsivity and weak self-control (Thombs, 2006). According to the psychodynamic approach, addiction is an inadequate coping strategy with underlying psychological problems that need to be treated for abolishing the addiction (Robinson & Berridge, 2003; Shaffer, LaPlante, & Nelson, 2012).

It is evident that addiction has biological, social and psychological components. The purpose of the present chapter is to describe the cognitive orientation (CO) approach to

addiction that may enable an integration of the different approaches to addiction and shed light on the phenomenon from a new perspective.

2.3.2. Objectives of the study. The purpose of the study was to test the construct validity of the CO questionnaire of addictive behaviors in terms of its ability to discriminate between a group of individuals with addictive behaviors and a control group. This procedure is based on the “known-groups” validation method described already in Cronbach and Meehl’s (1955) seminal paper on construct validity. The hypothesis was that the scores of the CO questionnaire would differentiate significantly between the two groups. It was expected that this would provide insights into the motivational sources of addictive behavior, which could be applied in targeted interventions.

2.3.3. Method of the study. The study sample included 124 individuals, 62 of whom were addicted to alcohol or drugs and 62 who were not addicted. Each of the two groups included 31 males and 31 females, in the age range of 25 to 40, who had over 12 years of education.

The items in the CO questionnaire referred to the following 10 themes, identified in a pretest sample in line with the standard procedure (see 1.3.): (a) rejection of limitations concerning oneself (e.g., avoiding restrictions, rejecting self-control, striving for complete freedom); (b) rejection of the possibility of changes in oneself; (c) avoidance of external emotional expressions (e.g., of anger expressions); (d) unclarity in self-definition (e.g., unclarity in regard to gender identification, self-identification, or differentiation between the external and internal self); (e) identification with the other (e.g., extreme empathy, to the limit of blurring the boundaries of the self); (f) boredom (e.g., most things are uninteresting); (g) total absorption in one's activity (e.g., absorption to the point of forgetting one's physical needs); (h) responsibility only toward oneself (e.g., no sense of responsibility in regard to one's parents or society); (i) withdrawal from coping (e.g., sense of helplessness in regard to life); (j) focusing on pleasure and enjoyment (e.g., Pleasure is the very essence of life; I would not like to live if I lost my ability to enjoy).

The themes were phrased as beliefs of the four types. The questionnaire included four parts, with 15 beliefs in each of the belief types (e.g., “I would like to be free of any obligations in life”). Each belief had four response alternatives: very true, true, not true, not at all true. The Cronbach's alpha reliability coefficients of the four belief types ranged from .85 to .96. The intercorrelations of the four belief types ranged from $r=-.10$ to $r=.33$. The subjects were recruited from three centers for the treatment of addiction and conformed to the criteria of addiction by the DSM. The controls were selected from individuals in the same environment (students and workers) who resembled the group with addictions in age, gender distribution and level of education. The questionnaires were administered unanimously.

2.3.4. Results of the study. The data for the whole sample was analyzed together because there were no significant differences between the genders in any of the variables of the study. The mean scores of the four belief types differed significantly between the groups of the addicted and the controls (see Table 3). As expected, the scores of the addicted group were higher than those of the control group.

Table 3. Means, SDs and t-test values for the four belief types in the groups of addicted and control subjects.

Beliefs	Group with Addiction		Control Group		t-test
	Mean	SD	Mean	SD	
About self	48.2	5.3	42.2	4.2	6.986****
About norms	66.9	8.7	58.3	5.4	6.647****
About goals	60.5	8.6	55.3	7.7	5.700***
General beliefs	40.5	5.6	36.6	4.7	4.200****

*** $p < .001$ **** $p < .0001$

A stepwise discriminant analysis with the four belief types as predictors yielded a correct identification of membership in one or the other group of 88.3%, which constitutes an improvement of 38.3% over the 50% correct identification on the basis of chance alone. The predictors with the highest contribution to the discriminant function were the beliefs about self and norms, followed by beliefs about goals and general beliefs in the fourth rank.

The themes that proved to differentiate most significantly between the addicted and control groups were rejection of limitations concerning oneself, rejection of the possibility of changes in oneself and unclarity in self-definition. A comparison of the means of the 10 themes in the two subsamples of drug and alcohol addicted in the addiction group showed that the drug-addicted subjects tended to score higher on the themes of rejection of limitations, boredom, and focusing on pleasure and enjoyment; the alcohol-addicted subjects tended to score higher on the themes of rejection of the possibility of changes in oneself, avoidance of external emotional expressions and withdrawal from coping.

2.3.5. Discussion and conclusions of the study. The results show that the CO questionnaire differentiated significantly between the groups of the addicted and non-addicted subjects. This finding provides support for the construct validity of the CO questionnaire in terms of the “known-groups” procedure. It also suggests that the CO questionnaire represents adequately the underlying motivationally-relevant themes for addiction. The themes provide insight into the psychological dynamics of addictive behaviors. These seem to be mainly rejection of limitations and obligations, which include denying responsibilities and duties toward others, and a blurred self-identity, which includes unclarity about one's gender, identity and even one's internal emotional world. Notably, the findings suggest the ability to differentiate by means of scores on the themes of the CO questionnaire between different types of addiction – drug and alcohol addiction. Future studies may confirm this possibility also in regard to other kinds of addiction and examine the conception of a general core tendency for addiction, relevant in regard to addictions in general.

One important implications of the study is that there is a cluster of motivationally-relevant beliefs orienting toward addiction. Hence, it may be possible to use the questionnaire in order to identify individuals or groups at risk for becoming addicted. The early identification could help in applying preventive interventions. Another implication is that the identified cluster of motivationally-relevant beliefs enables developing targeted psycho-social interventions for treating successfully addicted individuals, either as a prime therapeutic tool or as an adjunct to other treatments.

3. CONCLUSIONS

The three described studies deal with three kinds of behavior – a one-time situational-bound behavior, behavior reflecting test performance, and habitual prolonged behavior. The CO approach enabled predictions of behavior in the three cases. Thus, the studies demonstrate the validity of the major conclusion that the prediction of behavior may indeed be made on the basis of cognitive contents, but that these contents need to be of a special kind, namely, they need to represent beliefs of the four different kinds and to refer to themes of meanings underlying the behavior in question rather than directly to that behavior. Further, since actual behavior is not identical to self-reported behavior, the cognitive predictors of the latter cannot be the same as of the former. Notably, a careful analysis of the early attitude-behavior studies showed that in cases when the attitude questionnaires included statements referring to at least three of the belief types defined in the framework of the CO theory the predictions of behavior were at least partly significant (Kreitler, 2004).

The three studies show that the prediction of behavior is better when it is based on the methodology of the CO theory as compared with standard personality questionnaires in the investigated domains. Moreover, the CO questionnaires provide information about motivational bases of the investigated behavior that may improve both the theoretical models of the behaviors, as well as be applied for targeted intervention, when necessary.

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