



The Elaborated Intrusion Theory of desire: A 10-year retrospective and implications for addiction treatments



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HIGHLIGHTS

- Both addictive and other cravings involve intrusive thoughts and elaboration.
- Multisensory images typically occur in intense craving.
- Mindfulness strategies can reduce intrusive thoughts and lower desire.
- Competing tasks interfere with elaboration, reducing craving intensity.
- Imagery for abstinence benefits has potential to promote control of substance use.

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ABSTRACT

Introduction: Ten years after the publication of Elaborated Intrusion (EI) Theory, there is now substantial research into its key predictions. The distinction between intrusive thoughts, which are driven by automatic processes, and their elaboration, involving controlled processing, is well established. Desires for both addictive substances and other desired targets are typically marked by imagery, especially when they are intense. Attention training strategies such as body scanning reduce intrusive thoughts, while concurrent tasks that introduce competing sensory information interfere with elaboration, especially if they compete for the same limited-capacity working memory resources. **Conclusion:** EI Theory has spawned new assessment instruments that are performing strongly and offer the ability to more clearly delineate craving from correlated processes. It has also inspired new approaches to treatment. In particular, training people to use vivid sensory imagery for functional goals holds promise as an intervention for substance misuse, since it is likely to both sustain motivation and moderate craving.

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1. Introduction

It is now 10 years since the initial papers describing Elaborated Intrusion (EI) Theory, which maps cognitive and emotional processes that trigger and support desire (Kavanagh, Andrade, & May, 2005; May, Andrade, Panabokke, & Kavanagh, 2004). While EI Theory is a general theory of desire, an initial impetus for our work was to bring together diverse theory and research on addiction within a single motivational framework that explained the cognitive processes underpinning cravings and their impact on addictive behaviors, and research on addictions continues to be a major focus. This paper examines the extent to which EI Theory has achieved its aim, and examines implications for the management of addictive behaviors. We do not provide a

comprehensive review: Rather, we provide examples of research that illustrate the large body of evidence.

EI Theory defines cravings or desires as affectively laden cognitive events, where an object or activity and associated pleasure or relief are in focal attention (Kavanagh et al., 2005, 2013). Importantly, this distinguishes desires from their often unconscious precursors and from potentially correlated but separate phenomena such as intentions or perceived behavioral control, which are frequently confused with desires in research (Kavanagh et al., 2013). Cravings are viewed as intense desires, rather than being qualitatively different, and we argue that addictive substances recruit the same cognitive and biological mechanisms as those serving other appetitive targets, including those underpinning survival, consistent with existing neurobiological work (Robinson & Berridge, 2003).

In common with many other theories of addictive craving, EI Theory (see Fig. 1) argues that physiological withdrawal, environmental and cognitive associations and negative mood are potential triggers of desire, and holds that people are typically unaware of these processes.

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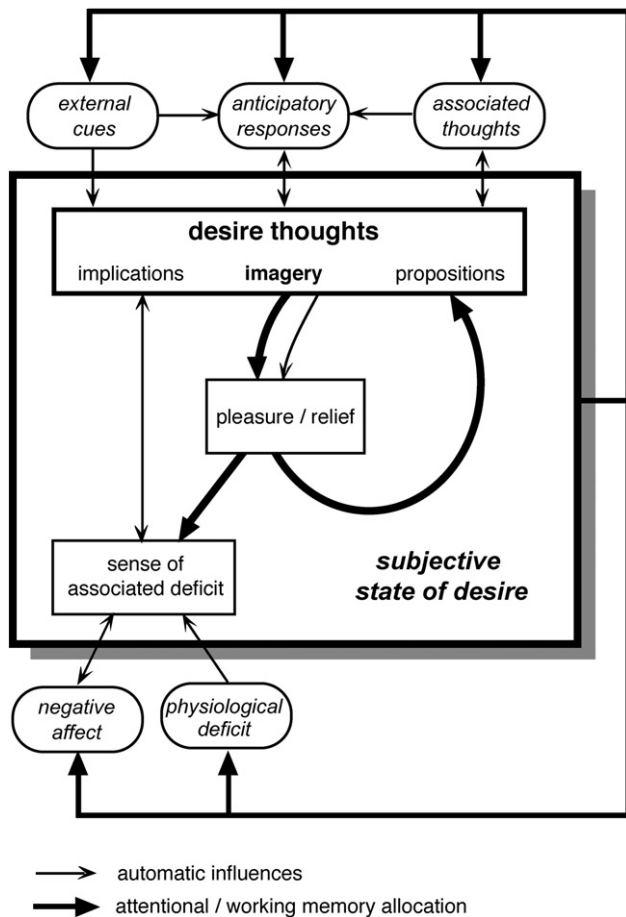


Fig. 1. The Elaborated Intrusion Theory of motivation, showing the contribution of triggers (rounded external boxes), intrusive thoughts ('desire thoughts'), and sensory imagery to desire (central square box). Thick arrows show the controlled processing cycle of conscious imagery and associated affect; thin arrows represent automatic influences on desire. Reprinted from Kavanagh et al. (2005), with permission.

Initial awareness sometimes even follows an anticipatory conditioned response such as salivation. These triggers increase activation of drug-related representations in memory, via automatic associative processes, and this priming increases the likelihood of an apparently spontaneous thought about substance use intruding into consciousness. For example, Berry, Andrade and May (2007) showed that the extent of priming of food-related words was associated with the frequency of intrusive thoughts about eating. Even in addicted samples, intrusive thoughts about drug use sometimes come and go without triggering elaboration (Kavanagh, May, & Andrade, 2009). However, if the target is associated with pleasure or relief, or the thought elicits a greater awareness of deprivation, cognitive elaboration is likely to ensue. Elaboration may be semantic or focus on physiological sensations, but the cognitive heart of desire is affectively charged sensory imagery that simulates the experience of target acquisition and consumption. This mental imagery of the target and its acquisition serve to ready the individual for target-directed behavior. This focus on imagery is a distinguishing feature of EI Theory.

Sensory imagery is important in motivating target-directed behavior, because it conveys some of the pleasure or relief of the real thing. More vivid and realistic images convey greater pleasure, and help us choose between different possible versions of the target, but they make us more acutely aware of the separation between our current state and our desired state. Thus desire imagery is briefly pleasurable but, if the desire remains unfulfilled, ultimately aversive. This negative emotion motivates us to achieve our desire and change our current situation. As we progressively approach the target, the increasingly rich

cues serve to heighten the vividness of consumption imagery, giving acquisition even greater urgency and attentional priority.

EI Theory has been widely cited in recent theories of addiction (e.g. Caselli, Nikcevic, Fiore, Mezzaluna, & Spada, 2012; Skinner & Aubin, 2010) and food cravings (e.g., Ferriter & Ray, 2011; Kemps & Tiggemann, 2010) and is increasingly being referred to in the wider psychopathological (e.g., Holmes & Mathews, 2010; Roskow-Ewoldsen, 2006; Treasure, Crane, McKnight, Buchanan, & Wolfe, 2011; Watkins, 2011) and motivational literatures (e.g., Hofmann, Schmeichel, & Baddeley, 2012; Hofmann & Van Dillen, 2012). Its breadth of appeal and explanatory power rests upon its general approach to desire as a cognitive motivational state, bringing together automatic, bottom-up associative processes and controlled, top down cognitive processes.

This breadth is reflected in the wide range of contexts where EI Theory is cited. Wray, Gass and Tiffany (2013) acknowledge its explanation of weak relationships between craving and relapse to smoking, in its contention that the relationships are moderated by attentional allocation, competing incentives, mood and self-efficacy. Lovibond and Colagiuri (2013) turned to EI Theory for a cognitive explanation of people learning Pavlovian associations between cues and chocolate rewards, despite long delays. Schlauch, Gwynn-Shapiro, Stasiewicz, Molnar and Lang (2013) drew on EI Theory to advocate a greater focus on positive affect in craving and addiction research, while Gollwitzer and Sheeran (2006) recruited it to explain why desirable distractions can divert people from their intentions to achieve goals, arguing that motivated behavior involved shielding goal striving from unwanted influences.

Crucially, EI Theory has provided the theoretical basis for a large body of research, which has substantiated its key predictions and inspired important advances in assessment and intervention.

2. Evidence on key propositions of EI Theory

2.1. Distinction of intrusive thoughts and elaboration

A central proposition of EI Theory is its distinction between intrusive thoughts about a target and their subsequent elaboration. Automatic associative processes that operate outside awareness can, when other cognitive demands allow, break through into consciousness, giving rise to the subjective perception of a thought as spontaneous (May et al., 2004). This apparent spontaneity serves to orient attention towards the thought and any related stimuli, giving it further potency. Evidence for the distracting effects of intrusive thoughts is given by Sayette, Schooler and Reichle, (2010), who found that smokers deprived of nicotine for 6 h were more prone to mind-wandering while reading than non-deprived smokers, with smoking-related thoughts distracting them from the primary task.

EI Theory does not predict whether particular triggers have greater precedence, but individual differences in their weighting may be expected. Schmidt, Eulenbruch, Langer and Banger (2013) found that the craving of alcohol dependent patients was associated with greater tension reduction expectancies, but only when they had poor interoceptive awareness (indexed by heart rate estimation). The authors argued that cognitive triggers (here, alcohol expectancies) become more important when somatic perception is less acute, and that mindfulness training may address this problem.

EI Theory predicts that attentional biases will increase the likelihood of consciously noticing drug cues or experiencing an intrusive thought about the drug, but other factors (e.g. salience, concurrent cognitive load) will determine whether attention to the thought is maintained. These predictions have been supported. While there is an association between craving and substance-related attentional bias (Field & Cox, 2008), the relationship is weak and primarily occurs when craving is intense and direct measures of attention are used (Field, Munafò, & Franken, 2009). Attentional biases to addictive cues appear mainly to operate following awareness: they do not appear at subliminal, pre-

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