Addiction Theories and Constructs: A new series

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Addiction Theories and Constructs is a new series that aims to provide a forum for addiction researchers to propose and discuss constructs, models and theories that can help advance our understanding of the field. It is hoped that this series will contribute to the development of 'ontologies', computational tools that make shared conceptual frameworks explicit in order to reduce fragmentation, clarify constructs, and thereby advance the field.

Addiction is launching a new series that aims to advance our understanding and methods in our field through presentation and discussion of theories and constructs. The field of addiction struggles with a lack of clarity over many of its core constructs, with unresolved disputes over ways of representing and understanding the phenomena within its scope, and even debate over what falls within that scope (1). Models and theories are expressed in many different ways using language that is often ambiguous. Terms are used without their definitions being clear and often different terms are used for the same construct. Finding and interpreting theoretical propositions in the literature is fraught with difficulties as is comparing theories and models. They way that studies are reported often makes it difficult or sometimes impossible to know exactly what was done and what was found. Extracting information for purposes of evidence synthesis is laborious and inefficient because of the variety of ways that a given type of information is expressed (2).

Decades of experience tell us that imposing a single conceptual model or framework on the field is unrealistic and would hamper critical discourse. However, the current lack of clarity is not acceptable either. A solution to this problem that has proved successful in other fields of study is to develop formal 'ontologies'. These are now widely used in biological, physical, social and medical sciences (3) They are ways of representing knowledge that provide greater clarity and coherence than natural language (4) and facilitate linkages across domains of study and disciplinary approaches. They represent consensus where it exists and clarify the basis for divergence of conceptual frameworks where this exists.

In philosophy 'ontology' refers to a branch of metaphysics dealing with the nature of being. In information science 'ontologies' are sets of clearly defined classes in a topic area together with their properties. The information science version of ontologies is what we are referring to here. Properties are expressed in terms of relationships between the classes. Classes represent 'entities' that can be objects (e.g. people with alcohol use disorder), processes (e.g. smoking cessation attempts) or

attributes (e.g. alcohol dependent). Each class is uniquely identified and given a formal definition and one or more labels, which may represent different usages within different communities.

In the field of addiction, multiple perspectives are not only possible but desirable. Ontologies address this by allowing people to uniquely identify a construct and definition even though they may want to use a label that is also being used by other people for a somewhat different construct. In this way, it is not a necessarily a problem that a label such as 'craving' is associated with multiple definitions (e.g. 'a psychological state involving experience of strong urges to engage in a behaviour', or 'a physiological process involving a strong drive to restore homeostasis'), because each definition will refer to a unique entity with its own unique ID; anyone wanting to use the label 'craving' can make clear which meaning they are referring to by selecting the ontology class with the appropriate definition, and it will be clear from the ontology formalisation how the different entities relate to each other.

Ontologies are already widely used in fields of study related to addiction. The 'Gene Ontology' has revolutionised biology by providing a unified way of representing knowledge in terms of molecular functions, cellular components and biological processes (5). The Cochrane collaboration has developed its PICO ontology to capture key components of clinical trials and their reporting, including in the field of addiction (6). Just this year the New England Journal of Medicine published a ground-breaking article showing how clinical ontologies can provide a basis for precision medicine (7).

Table 1 shows grouped examples of entities that may be included in addiction ontologies. These are not intended to be exhaustive but are all legitimate topics for articles in the new series.

Table 1: Examples of entities that may form part of addiction ontologies

Addiction products and producers	Things to which individuals may be addicted and organisations or groups that may produce these, e.g.: cigarettes, gambling websites, heroin, smokeless tobacco, cocaine, nicotine, alcohol, beer, tobacco industry, drug cartel
Addiction components and processes	Processes, objects and attributes that are invoked to explain and describe addiction, and its causes and consequences, at individual and group level, e.g., craving, neuronal receptor, dopamine, social norm, self-esteem, poverty, tobacco-related mortality
Addiction measures	Processes, objects and attributes used to assess (quantitatively or qualitatively) addiction components and processes, e.g., Severity of Dependence Questionnaire, salivary cotinine, Fagerstrom Test for Cigarette Dependence, diagnostic interview
Addiction interventions	Interventions (and associated entities such as techniques and settings) intended to prevent, treat, mitigate, or mitigate the harmful effects of addictive behaviours, e.g., motivational interviewing, varenicline, methadone, cognitive behavioural therapy, tax increases, mass media campaigns, goal setting
Addiction populations	Classes of individuals and groups, and their attributes, defined in terms of properties linked to use of addiction products, or to addiction components, processes, or interventions, e.g., cigarette smoker, tobacco user, person with Substance Use Disorder, binge drinker, proportion of injecting drug user, AA group, treatment-seeking drug user

Addiction involves many constructs that are not addiction-specific and the series will cover these constructs and associated ontologies to the extent that they are relevant for our field. The Human Behaviour Change project (HBCP) is developing an ontology (the Behaviour Change Intervention Ontology [BCIO]) to underpin the extraction of key information from evaluations of behaviour

change interventions (2). Cochrane's PICO ontology clearly has relevance (6) as do ontologies such as SNOMED-CT (an ontology of clinical terms) (8), MESH (an ontology of biomedical terms) (9), a number of developing public health ontologies (10), and ontologies relating to emotion and mental functioning (11).

The first article in the series presents the methods and findings from a Delphi study identifying seven constructs that are core to our diagnosis and understanding of addiction (12). We hope that researchers from a wide range of perspectives will engage with us and contribute articles that will create a much more unified science of addiction as a basis for more rapid development than has been possible to date.

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