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REVIEW

The use of “cognitive” in health terminology. A latent controversy

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Abstract

Background: The adjective «cognitive» has a double meaning and it is used for naming two disciplines with separate activities: Cognitive neuroscience and cognitive psychotherapy. This has an unrecognised impact on the health terminology and the classification systems.

Method: The current use of this term is reviewed in a series of key dictionaries, scientific books, databases (OldMedline and PsycINFO) and specific web searchers (Google Scholar). The history of this term and its etymology is also reviewed and compared to other alternatives (i.e. noetic) as well as its use in international classifications (e.g. the International Classification of Functioning - ICF).

Results: The modern use of the term «cognitive» in Neurosciences can be traced back to Hebb in a 1955 one year before that recorded at official version. The different meaning of this term in psychology can be traced back to the same decade. Departing from the ICF framework of mental functions, «cognitive» can be regarded as a generic term that encompasses both neurocognitive and meta-cognitive functions and should not be used for classification purposes. A hierarchy is suggested for the use of «neurocognitive» in the classification of mental functions.

Comments: The polysemic use of this name reveals a latent controversy in health sciences which has implications for its use in the international classification systems. There is a need to improve the standard definition and the semantic hierarchy of the term «cognitive», «neurocognitive» and other related terms within the context of International Health Terminology Standards Development Organisation (IHTSO).

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PALABRAS CLAVE

Cognitivo;
Neurocognitivo;
Terminología médica

El uso del término «cognitivo» en la terminología de salud. Una controversia latente**Resumen**

Introducción: El término «cognitivo» tiene un doble significado, llegando a denominar disciplinas con actividades diferentes: neurociencias cognitivas y psicoterapia cognitiva.

Objetivo: Se efectúa una revisión del uso actual del término en una serie de diccionarios relevantes, libros científicos, publicaciones indexadas en OldMedline y en PsycINFO, y buscadores específicos (Google Scholar). Se revisa la historia del uso actual del término y la etimología del mismo en relación con otras alternativas (p.ej. noético) y su utilización en clasificaciones internacionales (p.ej. la clasificación internacional del funcionamiento [CIF]).

Desarrollo: Se constata que el uso polisémico del término. En neurociencias se inicia con Hebb en 1955, antes de la atribución aceptada oficialmente. En psicología social y clínica parece independientemente en la misma década. A partir del marco de la CIF de las funciones mentales, «cognitivo» es un término genérico que engloba funciones neurocognitivas y meta-cognitivas o del esquema mental que no es útil para clasificación. Se propone una jerarquía para el uso del término neurocognitivo en terminología de salud.

Conclusiones: El uso polisémico del nombre «cognitivo» ha generado una controversia latente en ciencias de la salud que tiene implicaciones relevantes para su uso en las clasificaciones internacionales. Es necesario mejorar la definición estándar de «cognitivo», «neurocognitivo» y de los términos relacionados en el contexto de la Organización Internacional de Estandares en Terminología de Salud (IHTSO).

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Introduction

The term “cognitive” is used in the health sciences to name two scientific areas with enough differences for them to constitute separate specializations in the health science field: the cognitive neurosciences and cognitive or cognitive-behavioural psychotherapy. The fact that these scientific areas use the same term is a source of terminological confusion in the scientific literature. It poses a problem which exceeds the scope of the term itself and presents an example of the impact of polysemy in the health sciences.

Paradoxically, until now there has not been an authentic debate about the appropriate use of the term or about the problems derived from its double meaning. This does not mean that the problem does not exist: instead it translates into an attitude of “mutual ignorance” which characterizes the two disciplines. Even the most important reviews concerning the use of the term¹ or the origin of “cognitivism” in science² avoid confronting this problem. This situation is in marked contrast to the debates and controversy associated with the use of other terms in the same area of research (for example “neurosis”, “mental retardation” or more recently the term “schizophrenic” itself). In an earlier article³ we pose the problem from an etymological perspective. This review adds a historical analysis of the origin, evolution and current use of the term “cognitive” in the health and social sciences.

Method

The definition of the adjective “cognitive” and the nouns derived from it have been reviewed in three Spanish dictionaries, the *Diccionario de Uso del Español*,

Medtradiario and the *Diccionario de la Real Academia Española (DRAE)*, and in 6 English technical dictionaries (*Merriam Webster Medical Dictionary*, *Wikipedia*, *WordNet*, *Columbia Electronic Encyclopedia*, *Oxford Dictionary of Computing* and the *Penguin Dictionary of Psychology*). We conducted a historical review of the use of the term, based on publications included in *PsycINFO* from 1927 to 1960 (201 citations) and in *OldMedline* during the same period (96 citations), and of its subsequent use by means of specific web-based search engines (*Pubmed* and *Google Scholar*). Key publications on the history of the origin of the use of the term in the health sciences were also consulted and a review of the history of the use of the term in scientific books was conducted as well.

Results**Current use of the term “cognitive” in the health sciences**

The *Diccionario de La Real Academia Española*⁴ defines this adjective as “pertaining or relative to knowledge” (also indicated in the electronic dictionary *Medtradiario*)⁵. As often happens with scientific terminology, this definition bears little resemblance to its technical usage. To understand how it is currently used we need to resort to the English literature which employs the term. Here we can distinguish a series of technical meanings for the adjective “cognitive”, some of which are inclusive, whilst others are exclusive:

1. Refers to mental functions in general
 - a. Refers to mental functions which are associated with the processing of information (see cognitivism).

- i. Refers to intellectual mental functions which are associated with information processing
 - “related to or being aware of intellectual activity (such as thinking, reasoning, remembering, imagining or learning words)”⁶
 - “Cognition (psychology): knowledge as a result of intelligence”⁷.
- ii. Refers to “non-intellectual” mental functions associated with information processing.

Its use also presents different meanings as a result of the formation of simple or compound nouns such as “cognitivism”, “cognitive science(s)”, “cognitive neuroscience(s)” or “cognitive psychology”. Thus we have:

1. Cognitivism
 - a. The theory which sustains that mental functions can be understood by means of scientific methods and that these functions can be described as information processing models.⁸
2. “Cognitive” Science
 - a. A group of disciplines which study the human mind.⁹
 - b. The multidisciplinary study of the mind and/or intelligence^{10,11/} multidisciplinary study of the mind and the nature of intelligence.
 - c. The field of multidisciplinary research which includes artificial intelligence, cognitive psychology, linguistics, neurosciences and philosophy.¹²
3. “Cognitive” Neuroscience
 - a. A branch of neuroscience and biological psychology which is concerned with the study of the neuronal mechanisms which underlie cognition (sometimes seen as part of cognitive science). It overlaps with “cognitive psychology”. (...) While cognitive psychologists seek to understand the mind, cognitive neuroscientists concern themselves with studying how mental processes occur in the brain. The two areas influence one another mutually and continually, given that an understanding of mental structure can lend support to theories about how the brain works and viceversa (adapted from the electronic publication, Wikipedia).
4. “Cognitive” Psychology
 - a. A branch of psychology which is concerned with mental processes (perception, thought, learning and memory), especially with respect to internal events which occur between the perception of a stimulus and the appearance of a behaviour.⁶
 - b. An approach to psychology which emphasises internal mental processes.¹³
 - c. A school of psychology which examines internal mental processes such as problem-solving, memory and language.¹⁴
 - d. A psychological science which studies cognition. i.e. the mental processes underlying behaviour. This discipline covers a wide range of scientific domains, such as memory, attention, perception, the representation of knowledge, reasoning, creativity and problem-solving. It differs from previous schools of psychology in the

following: 1) its use of the scientific method and rejection of introspection as a valid research method (in opposition to phenomenological and freudian methods); 2) It presupposes the existence of interior mental states (such as beliefs, desires and motivations) (as opposed to former behavioural psychology). There is a school of cognitive psychology which includes the study of behaviour (cognitive-behavioural psychology) (adapted from the electronic publication, Wikipedia).

5. “Cognitive” Neuropsychology

- a. A branch of neuropsychology which studies how the structure and function of the brain are related to specific psychological processes: research on perception disorders, memory, language, thought, emotion and action in neurological patients. The word cognitive is interpreted as referring to the higher levels of perception, memory and the most central aspects of the control of action.

This list of meanings enables us to confirm that the term “cognitive” is currently used to name areas which are mutually exclusive, however much they might be interrelated. Although there is a generic definition which might be acceptable to the scientific community as a whole (mental functions associated with information processing), the fact is that cognitive psychology and cognitive neuroscience/ neuropsychology use the term to refer to functions which are related to their specific sphere of activity. To understand this situation we need to review the origin of the current use of the term “cognitive”.

History of the use of the term “cognitive” in science

Despite the excellent reviews on this topic,^{2,10,1,16-18,8} in the opinion of the author, an analysis of the links between the use of the term “cognitive” in the basic sciences, neurology and neuropsychology, on the one hand, and social psychology, clinical psychology and psychiatry on the other, has not yet been conducted.

The use of the term “cognitive” throughout the twentieth century was reviewed by C.D. Green in 1996.² It was first used in the philosophy of science, by A.J. Ayer, amongst others, to describe propositions which could be described as true or false (“cognitive significance”). This use of the term lacked psychological or cerebral connotations. In fact, none of the 44 citations of this adjective in psychology publications prior to 1950 corresponds to any of the current uses of the term.

From 1950 to 1960 there are 157 citations, the content of which refers to the exploration of intellectual functions (mental retardation and deterioration), neurophysiological functions and psychological functions (e.g. related to thought). In fact, in this decade we first see the use of the term to define: 1) a new multidisciplinary area which studies mental processes (cognitive science); 2) a new approach to understanding mental phenomena and the treatment of certain mental disorders (cognitive theory - cognitive therapy). Thus, mental functions associated with information processing have been studied from two completely different perspectives throughout the history of

the sciences. On the one hand, we can trace the history of a “medical” perspective linked to memory and associated with the so-called “cognitive paradigm”,¹⁹ which led to the “cognitive revolution” in the 1960s² and, in turn, gave rise to cognitive neuroscience a decade later.¹⁶ On the other hand, there is a “mental” perspective with links to dynamic thought processes associated with the so-called “cognitive theory”, which, in the 1960s, gave rise to cognitive therapy.²⁰ We review both historical processes below.

The cognitive revolution and its consequences

In the USA there is an official version of the history of the origin of the scientific field of “cognitive science”, which describes three precise causes and a date for when it began: 11 September, 1956. In 1948 Norbert Wiener formulated cybernetic theory and Claude Shannon proposed his information theory. That same year Karl Lashley gave a conference during the “Hixon” Symposium on “Cerebral mechanisms of behaviour” held by the *California Institute of Technology* which refuted the postulates of Skinner’s behavioural psychology (accepted as fact until then in the USA). Using this as a starting point, the psychologist, G.A. Miller, and the linguist, N. Chomsky, presented a new scientific postulate during their respective conferences at the Symposium on Information Theory held at the MIT on 11 September, 1956; it was the same year that Marvin Minsky and his colleagues, Newell, Simon, McCarthy and Shannon, at another gathering at Dartmouth College, established “artificial intelligence” as a new area of knowledge.^{2,8,16,17} We should point out that neither Miller nor Chomsky used the term “cognitive” in the aforementioned presentations. The term consolidated itself following the creation of the Bruner Centre for Cognitive Studies in Harvard in 1960.¹⁷

Vauclair and Perret,²¹ amongst others, have pointed out that this version of the history fails to mention the development of cognitive science in Europe, where the influence of Skinner’s behaviourism was then virtually inexistent and there was a very advanced conception of cognitive science from a mathematical and computational point of view (e.g. A. Turing) and from the point of view of clinical medicine and human research. The main influences here were L.S. Vigosky and A. Luria in Russia and Jean Piaget, who founded the International Centre of the Epistemology of Genetics in Geneva in 1955.²¹ The relevance of these authors in the history of the cognitive neurosciences is unquestionable. However, and, although Piaget mentions “cognoscitive processes” in his work,²² it cannot be said that the terminology that European authors used has prevailed in science today.

There are other relevant historical factors in North America itself which usually go unmentioned. In 1946 Edwin Boring described a 5-step operational model for objectifying mental processes and transforming them into a computational system. Furthermore, the Canadian, Hebb, published a seminal article in 1955²³ on criticism of Skinner’s behavioural model and the importance of linking mental functions to cerebral substrates (e.g. the connection between motivation and the brain’s activation or arousal system). Hebb repeatedly mentions the “cognitive functions” associated with the generation of motivation and its pathological correlate: anxiety. He also refers to

cognitive processes as being “ideational... representative or mediatory” and mentions the existence of cognitive processes associated with the idea of the *Self*. Thus, in his article Hebb establishes a clear connection between physiological and psychological terms.

This is the cortical feedback to the arousal system, expressed in physiological terms or, in psychological terms, the immediate drive value of cognitive processes, without the intervention of intermediaries.²³

(In physiological terms this is the cortical biofeedback component of the activation system or, in psychological terms, the immediate value of the control of cognitive processes without intermediaries).

All this should lead to the inclusion, in the current history of the origin of the term “cognitive”, of this Canadian scientist, who is also now regarded as one of the founders of cognitive psychology.

Following this initial phase in the 1950s, this meaning for the term “cognitive” has been increasingly used and further extended by the appearance of compound terms to describe the new disciplines associated with this field. The term “cognitive psychology” came into general use after the publication of the book *Cognitive Psychology* by Ulrich Neisser in 1967.²⁴ Neisser is an adherent of Miller’s model and emphasizes the analogy between brain functions and computational information processing. His work focuses on the study of language and IQ. The term “cognitive neuroscience” was coined at the end of the 1970s by G.A. Miller and M.S. Gazzaniga in New York in the taxi that was taking them to a meeting of scientists from the Universities of Rockefeller and Cornell in order to promote a joint effort to investigate how brain activity enables mental functions to occur.¹⁶ Another popular term in the same scientific field is “cognitive neuropsychology”, which was coined by T. Shallice in the 1980s. The development of cognitive neuroscience and the expansion of this meaning of “cognitive” means that today to speak of “cognitive neuropsychology” is redundant (see previous section). Paradoxically, nowadays it would only be meaningful to speak about “cognitive neuropsychology” if we are referring to the neuropsychology of “cognition” or “mindset”, as it is defined by the second meaning for the term cognitive and which we will now look at. In fact, Shallice himself was thinking along these lines.¹⁵

In short, the focus of “cognitive” neurosciences¹⁶ can be defined on two levels. At the first level we have the mental functions, which were formerly known as “intellectual” or “higher” functions. Amongst these we can include attention, orientation, manipulative and spatial functions, memory, learning and language, analytical functions such as calculation, executive functions such as planning, executive functions and the control of action. These are the “classical” functions which are studied by neuropsychology. All those mental functions which can be investigated experimentally, neurophysiologically and structurally, or computationally, with the aim of using them as a prism for looking at mental processes as a whole, as the subject of study of the “cognitive” neurosciences, can be placed on a second level.¹⁶ In short, this second definition would encompass aspects of the term which are used in clinical psychology and which we will discuss below, in so far as the

link between neurocognition and psychological functions indicated by Hebb²³ is gradually being deciphered by means of neuropsychological and neuroimaging techniques.

Cognitive theory in social psychology and clinical psychology

The use of the term “cognitive” in social and clinical psychology has had a completely different history, which largely explains the current double meaning of the term. As in the previous case, the origin of the use of the term “cognitive” emerges in the 1950s in the USA, but it refers to another group of “internal mental processes”, such as thoughts, attitudes, beliefs and values. Its first usage in social psychology essentially refers to the system of beliefs on which attitudes are based,²⁵ although this use is inaccurate.¹ After the publication of Asch’s work and that of other social psychologists such as Festinger²⁶ and Heider,²⁷ the term cognitive has been used profusely in social psychology, with the conceptualization of “cognitive styles” in the 1970s¹ and other components of the *Self* like self-efficiency and the concept of self. Finally, Atchley included these “interior mental functions” in a broader construct known as “mindset” or “internal mental structure”.²⁸ This large second group of mental functions associated with information processing is primarily concerned with the processing of content. It includes functions such as the concept of self, goals, attitudes, values, beliefs, knowledge, temperament and character, preferences, skills, defence mechanisms, confrontational styles or automatic thoughts. Recently we conducted a review of the concept of “mindset”, its different components and how they are related.²⁹

How has the concept “cognitive” made the jump from social to clinical psychology? Although the cognitivists who played a key role in this process and who are still alive should be asked this question, it is not difficult to trace the exchanges that included the term “cognitive” between the social psychologist Festinger and the clinical psychologists Albert Ellis and Aaron T. Beck, given that irrational beliefs were common research material for all of them.

After studying the flying saucer cult, while he was working with a Wisconsin group, and a series of social experiments, in 1956 Leon Festinger coined the term “cognitive dissonance” to describe a state of opposition between two cognitions (defined as attitude, emotion, belief or value). To summarise, when two cognitions are sustained and there is a conflict between them, one enters a state of cognitive dissonance and is ignored or minimized by the subject. Although Festinger’s experiments were criticized in their day, they have been very important in the development of the psychology of decision-making and preferences. The term “cognitive dissonance” is used in clinical medicine in relation to automatic thoughts.

Cognitive therapy developed at the end of the 1950s from the work of two disillusioned psychoanalysts: Albert Ellis and Aaron T. Beck. Ellis developed a model based on the identification of irrational beliefs and their replacement by rational thoughts, and on the relationship these beliefs have with the emotions (in a nutshell negative experiences generate irrational beliefs

which, in turn, have consequences on the behaviour and emotions of the subject). The result of all this was rational emotive therapy, whose first publication dates from 1957. A few years later A.T. Beck formulated his “cognitive theory” of depression, in which he emphasized the need to identify irrational automatic thoughts (formerly called “attitudes”) in these patients. This gave rise to “cognitive-behavioural” techniques or therapy.^{5,20,30} Therefore, the meaning of the term “cognitive” in clinical psychology and psychiatry is derived from social psychology and not cognitive psychology, as Miller and Neisser, amongst others, defined it. This second meaning of the term continues to be used in clinical practice, despite the wide acceptance of the former. In fact, this point of contact between social and clinical psychology remains open. The term “mindset” and other related terms have been included in clinical therapy.³¹ Curiously, therapists themselves seem oblivious to the conceptual “dilemma” in the use of the term cognitive. There are also new areas of social psychology which have continued to develop the term “cognitive” in this field, causing new controversies and disagreement (for example: discursive psychology³²).

Some proposals concerning the polysemy of the term cognitive

Cognoscitive versus cognitive

At the end of the 1970s and in an attempt to clarify this terminological confusion, Professor Antonio Lobo used the term “cognoscitive” to name the Spanish version of the most widely used test for detecting the deterioration of intellectual functions in Medicine (“Mini Mental Status”). Inspired by a European tradition going back to Piaget and sustained by its use in Spanish,⁷ he called the Spanish version of this test: the “cognoscitive mini-exam”.^{33,34} This proposal constitutes the most prominent attempt to solve the problem to date in our language, given that the name was chosen with the explicit aim of differentiating the evaluation of intellectual (cognoscitive) functions from psychological (cognitive) functions associated with the mindset. In fact, the *DRAE* includes the term “cognoscitive” (“that which is capable of knowing”). This meaning is also found in the dictionary of conflicting medical terms.⁵ The alternative might be questionable from an etymological viewpoint, as both adjectives correspond to the same Latin verb *COGNOSCERE* (to know). On the other hand, Professor A. Lobo’s proposal failed to gain acceptance in the medical literature and the problem has only got worse in the three decades since his publication.

Cognitive versus noetic

In 2004 we suggested the use of the term “noetic” for naming functions associated with the mindset.³ The reasons for this proposal derived both from the prior use of the term in English and from its etymological root. Although it has been used very little, the term “noetic” has occasionally been used to refer to both intellectual functions (language, praxes, calculation, etc.)³⁵ and to functions associated with the content of thought.³⁶ From a practical point of view, the enormous development of the cognitive neurosciences

would justify the conservation in this field of the term “cognitive”.

In addition, there is solid justification for the use of the term “noetic” with its Greek root to refer to the mental functions related to the “internal mental structure”.

As in its current usage, the Greek root *Noo-* had two meanings: “the ability to think, intelligence, spirit, thought” and, in the adjective *noetikós*, “endowed with intelligence”. Anaxágoras employs the former meaning of *noós*, *nous*, “the ability to think, intelligence, ...” when he proposes the *nous* as the absolute governing principle. Homer, however, uses a second meaning, which is closer to our idea of the “soul”, “heart”, “mentality” and which emphasises intimate particular-personal aspects of our nature and focuses precisely on particular inclinations of the soul and ways of thinking. For its part, the verb *noéo* (which means “to penetrate the spirit, perceive through the senses, understand by reflexion...”) shows this precise meaning: “be aware of his own spirit”, “to have good sense”; and, when this verb is used, it alludes to an interpretation on the part of the subject in question and there is an emphasis that the activity of *noéo* takes place in his mind (*phréna*) or in his spirit (*thymós*). This makes the use of the adjective “noetic” feasible for naming functions associated with the mindset, even in its compound use (cognitive-noetic functions versus cognitive-intellectual functions). However, the presentation of this proposal in various cognitive psychology forums has resulted in outright rejection from this quarter.^o

“Cognitive” versus “neurocognitive”

In recent years, and in the context of the development of large groups or metacategories for reviewing international classifications,^{37,38} the use of the term “neurocognitive” has gained a new popularity for referring to mental functions which used to be called “intellectual” or “higher” mental functions. The term “neurocognitive” is justifiable from the point of view of the historical evolution of this family of terms and allows us to differentiate the areas of study of the two disciplines in dispute, as well as encouraging generic usage of the term “cognitive” in its double sense, which includes other functions which are “meta-cognitive”, “noetic”, or “related to the mindset”. This use is in consonance with the origin of the modern meaning of “cognitive” dating from Hebb, who, in 1955,²³ included aspects of the *Self*, which characterise the use of the term in social and clinical psychology, and of the neurosciences. This term can also fit into the conceptual map of the mental functions discussed below without any problems.

Conclusions

This list of meanings and the historical review which has been conducted enables us to distinguish two perspectives

with different meanings for the adjective “cognitive” which are in current use:

1) The Neuroscientific perspective

Defined on two levels according to Gazzaniga,¹⁶ it encompasses, on the first level, traditional intellectual functions and, on the second level, “all those mental functions which can be studied experimentally, neurophysiologically and structurally, or computationally, with the aim of using them as a prism for looking at mental processes as a whole”. This second level would include some of the functions which are now studied in social psychology and which, within this framework, are now regarded as “metacognitive functions of behavioural regulation”.^{37,38}

2) The cognitive psychotherapy and social psychology perspective

Defined as those mental functions associated with the “mindset”,²⁷ which include the concept of self, goals, attitudes, values, beliefs, knowledge, temperament and character, preferences, skills, defence mechanisms, confrontational styles or automatic thoughts.

With respect to the controversy between the two perspectives, an interesting paradox is worthy of mention: while the field of study related to the second meaning of the term “cognitive” (mindset) has been practically ignored by the basic neurosciences until very recently, clinical psychotherapy has based itself primarily on the concept developed by social psychology, which has had a great impact on therapeutic research and clinical practice.

3) An inclusive perspective in the context of a conceptual map of the mental functions

From an integrative approach, the terms “cognitive” and “neurocognitive” can be included in the framework of the conceptual map of “mental functions” outlined in the International Classification of Functioning³⁹ and which, although it has been developed in the version of the ICF for Children and Youth (ICF-CY),⁴⁰ still needs to improve its semantic precision and formal ontology. By way of example, the definition of “intellectual functions” in the ICF (Code b117) encompasses “all the cognitive functions” which are not specifically defined in the classification system. Therefore, the ICF conceptual map has yet to be drawn up. The view can be taken that “cognition” is a generic term that refers to higher or “high-level” mental functions which are related to both neurocognition and the mindset, or other frameworks, and this is why its use in naming or defining diagnostic categories is not recommended.

On the other hand, a hierarchical order adapted from the ICF-CY⁴⁰ can be established, according to which “neurocognitive functions” are part of mental functions and include generic functions, such as orientation and intelligence, and specific functions like orientation, attention, memory, calculation, language and other “high-level” (neuro)cognitive functions (abstraction, execution, judgement, problem-solving and other functions).

Within the scope of generic neurocognitive functions, the definition of “intellectual” function is inaccurate and

^oThis proposal has also suffered the “Translation Effect”. In its English version which can be accessed in PubMed the title is as follows: “Cognitive”: a term in discussion. “Non ethic”, a homeric solution.

should be modified in the ICF. It needs to be borne in mind that the use of the term “intelligence”, “intellectual activity” or “intellective or intellectual functions” is questionable whilst there is no internationally accepted definition of “intelligence” and “intellectual functions”⁴¹ and it is relevant to the preparation of the new definition of “intellectual development disorders” in future ICD and DSM classifications.

In fact, the operative and consensual definition of the term “cognitive” and its derivatives is indispensable for the development of future versions of ICD-11 and DSM-V, both in terms of the definition of various individual disease categories (e.g. dementia or mental retardation/ intellectual disability) and for their grouping into supraordinal types or meta-categories, as has been suggested for “neurodevelopment” disorders or the group of “neurocognitive” disorders.^{37,38}

This polysemy must also be resolved in the context of the *International Health Terminology Standards Development Organisation* (IHTSO) and in formal ontology systems (for example SNOMED-CT), as health ontology has developed its own use of the term “cognition” in this scientific field.⁴³ It needs to be remembered that the IHTSO and SNOMED are, in turn, associated with the review of disease classification itself.⁴⁴

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