

Inferential confusion in the worldview of individuals with Obsessive Compulsive Disorder (OCD): a qualitative approach

Edward Jensen García,¹  Guillermina Natera Rey² 

¹ Programa de Maestría y Doctorado en Ciencias Médicas, Odontológicas y de la Salud, Universidad Nacional Autónoma de México, Ciudad de México, México.

² Instituto Nacional de Psiquiatría Ramón de la Fuente Muñiz, Ciudad de México, México.

Correspondence:

Edward Jensen García
Calle Argentinos, No. 15915,
Col. Infonavit Latinos,
22180, Tijuana B.C., México.
Phone: (55) 2514 - 8892 and
(664) 875 - 1717
Email: edward.jensen.garcia@uabc.edu.mx

Received: 31 August 2022

Accepted: 12 April 2023

Citation:

Jensen García, E., & Natera Rey, G. (2024). Inferential confusion in the worldview of individuals with Obsessive Compulsive Disorder (OCD): a qualitative approach. *Salud Mental*, 47(2), 57-64.

DOI: 10.17711/SM.0185-3325.2024.008



ABSTRACT

Introduction. The Inference-based Approach (IBA) is an etiologic, therapeutic research paradigm regarding inferential confusion (IC) as an exclusive metacognitive process of obsessive compulsive disorder (OCD). IC is the rational tendency of individuals with OCD to underrate abstract data and personal experiences and overrate hypothetical possibilities. IC therefore fosters uncertainty and facilitates the justification of obsessive constructs. IBA has noted that qualitative research on IC and the exploration of IC in non-OCD cognitive constructs are required to refine cognitive and therapeutic OCD models. This could help clarify whether OCD treatment by IBA is overlooking non-obsessive IC habits which, if left untreated, could compromise treatment success. **Objective.** To identify the possible influence of IC on non-obsessive, cognitive worldview constructs of individuals with OCD and to compare these constructs with those of individuals without OCD. **Method.** Twenty-five semi-structured, in-depth interviews were conducted, 15 with individuals with OCD and 10 with a comparison group without OCD or OCD symptoms. Data were collected and analyzed using Grounded Theory methodology. **Results.** IC was identified in the non-obsessive cognitive worldview constructs of every participant with OCD. IC was not identified in the comparative group. **Discussion and conclusion.** The results suggest that IC affects the rational composition of non-obsessive cognitive worldview constructs of individuals with OCD. The implications this could have for the cognitive and therapeutic models of OCD are discussed.

Keywords: Obsessive-compulsive disorder, inferential confusion, cognitive construct, metacognition.

RESUMEN

Introducción. La Aproximación Basada en Inferencia (ABI) es un paradigma de investigación (etiológico-terapéutico) que considera a la confusión inferencial (CI) como un proceso metacognitivo exclusivo del TOC. La CI es la tendencia racional, de individuos con TOC, de infravalorar datos abstractos y experiencias personales, y sobrevalorar posibilidades hipotéticas. Por lo que la CI promueve incertidumbre y facilita la justificación de constructos obsesivos. La ABI señaló recientemente que, para refinar el modelo cognitivo-terapéutico del TOC, falta investigación cualitativa de CI y exploración de CI en constructos cognitivos no-obsesivos. Esto podría esclarecer si el tratamiento del TOC, de la ABI, descuida hábitos no-obsesivos de CI que, al no ser atendidos, comprometan el éxito terapéutico. **Objetivo.** Identificar la posible influencia de CI en constructos cognitivos no-obsesivos de cosmovisión (interpretación formal o informal del mundo) de individuos con TOC y comparar a dichos constructos con los de individuos sin TOC. **Método.** Se realizaron 25 entrevistas semiestructuradas a profundidad, 15 a participantes con TOC y 10 a un grupo comparativo sin TOC, ni sintomatología de TOC. Los datos se recolectaron y analizaron mediante la metodología Teoría Fundamentada. **Resultados.** Se identificó influencia de CI en constructos cognitivos no-obsesivos de cosmovisión de todos los participantes con TOC. No se identificó influencia de CI en el grupo comparativo. **Discusión y conclusión.** Los resultados permiten aportar que la CI influye en la composición racional de constructos cognitivos no-obsesivos de cosmovisión de individuos con TOC. Se discuten las implicaciones que esto puede tener en el modelo cognitivo-terapéutico del TOC.

Palabras clave: Trastorno obsesivo-compulsivo, confusión-inferencial, constructo cognitivo, metacognición.

INTRODUCTION

Obsessive-compulsive disorder (OCD) is characterized by the occurrence of obsessions and compulsions (Stein et al., 2016). Obsessions are thoughts, ideas or beliefs experienced persistently and involuntarily (APA, 2013). Compulsions are repetitive behaviors or mental acts a person feels compelled to perform in response to obsessions (Stein et al., 2016). There are common thematic subtypes of obsessions and compulsions, usually classified into four groups: contamination/washing, symmetry/order, unacceptable taboo thoughts/checking, and doubt about accidental harm/checking (APA, 2013). There are also three types of symptomatological introspection: good, poor, and absent. It has been observed that the lower the degree of introspection, the greater the severity of the disorder (Tulaci et al., 2018).

OCD has an average prevalence and frequency rate of between 1% and 2% (Ruscio et al., 2010), with a lifetime prevalence of 2-3% (Sassano-Higgins & Pato, 2015), and is currently believed to affect 4% of the general population worldwide (Mathes et al., 2019). High comorbidity has been observed with the autism spectrum and attention deficit hyperactivity disorder (Anholt et al., 2010). Constant comorbidity with bipolarity, major depression and generalized anxiety has also been observed (Fontenelle & Hasler, 2008). In Mexico City, less than 10% of the population with OCD symptoms seeks help (Caraveo & Colmenares, 2004).

Popular psychodynamic treatments for OCD include Behavioral Therapy, Cognitive Therapy, and Cognitive-Behavioral Therapy (Steketee et al., 2019). The first of these usually relies on exposure with response time and achieves clinical improvement of 36%. The second focuses on cognitive restructuring and usually provides clinical improvement of 56%, while a combination of the two has shown clinical improvement of 48% (Steketee et al., 2019). It has been observed that only 20% of individuals who complete treatment maintain total symptom remission after five years (Steketee et al., 1999).

The cognitive paradigm argues that the etiology of OCD has its roots in the negative appraisal of intrusive ideas, a symptom that is considered central and has been widely observed (Olatunji et al., 2019). In general, the literature has recognized the intrinsic relationship between reasoning (thinking about thinking) or metacognition (cognition about cognition) and OCD (Vallejo & Berrios, 2006). But it is not known whether OCD impacts an individual's reasoning or vice versa (Vallejo & Berrios, 2006). In this regard, it has been observed that theory of mind skills (the understanding of one's own mental state) of individuals with OCD are lower than those of healthy controls (Tulaci et al., 2018). Dysfunctional metacognition has also been observed to be a constant in OCD (Sun et al., 2017).

Another paradigm seeking to contribute etiologically and therapeutically to the study of OCD is the Inference-Based

Approach (IBA; O'Connor et al., 2005). IBA regards OCD as the result of a metacognitive process called inferential confusion (IC; Aardema et al., 2005), also known as reverse inference (Wong et al., 2019). IC is the rational tendency of individuals with OCD to reject abstract data and personal experiences in favor of hypothetical possibilities (Julien et al., 2016). IC therefore facilitates the rational justification of obsessive thoughts (Julien et al., 2016). Due to its results, IC is considered a dysfunctional metacognitive process (Aardema et al., 2005). It has been observed that if IC is induced in healthy individuals, they begin to display obsessive-compulsive symptoms (Wong & Grisham, 2016; 2017).

According to IBA, IC produces an inference called pathological doubt (PD), an intrusive uncertainty that is negatively appraised and leads to compulsion (O'Connor et al., 2005). PD has also been conceptualized as primary obsession or intrusive inference (Aardema & O'Connor, 2003; O'Connor et al., 2005). IC and PD can be exemplified by the following mental exercise: I remember washing my hands several times (personal experience), but my memory may be incorrect (hypothetical possibility). Is it incorrect? (PD). I must wash my hands (compulsion).

Inference-based therapy (IBT) is the therapeutic derivation of IBA and attempts to make an individual with OCD aware of IC and PD so that they can reverse IC and reconsider PD before the compulsion (Aardema et al., 2017). There is empirical evidence that IBT can achieve clinical improvement across OCD subtypes (Julien et al., 2016), and attempts are being made to include it in the psychodynamic treatments available for this disorder (Moritz et al., 2015). Note that IBA and IBT have developed measurement instruments for IC in relation to obsessions and compulsions, which can accurately predict the presence and severity of OCD (Aardema et al., 2009; Wu et al., 2009).

A recent article on IBA declared the need to include qualitative research on IC and explorations of IC in non-obsessive cognitive constructs to refine cognitive and therapeutic OCD models (Aardema et al., 2018). This is because these objectives could help determine whether TBI is overlooking non-obsessive IC habits which, if left untreated, could be compromising the therapeutic success of this paradigm (Aardema et al., 2018). Given the above, the objective of the present research is to identify the possible influence of IC on non-obsessive cognitive worldview constructs (comprising the formal or informal interpretation of the world) of individuals with OCD and to compare them with those of individuals without OCD. The aim is to explore and potentially contribute to the refinement of etiological and therapeutic OCD models. It should be noted that we have chosen to explore the worldview or interpretation of the world of participants to work with the general, inevitable cognitive constructs in the minds of most human beings. Cognitive worldview constructs refer to the complex concepts formally or informally comprising the latter, such as reality or the universe.

METHOD

Design of the study

The method used in this research involved collecting data through in-depth, semi-structured interviews and analyzing them through basic Grounded Theory (GT) strategies. These strategies specifically refer to 1) encoding the data collected and the constant contrast of this encoding, 2) the inductive derivation of conceptual categories based on the resulting encoding and 3) the observation of qualitative constants emerging from conceptual categories (Charmaz, 2010; Timonen et al., 2018). It was decided to work with GT because of its methodological plasticity and inductive potential.

Participants

Twenty-five participants were interviewed, 15 with a primary diagnosis of OCD and 10 from the general population, without a psychiatric diagnosis or OCD symptoms according to the evaluation instrument: The Obsessive-Compulsive Inventory (OCI-R), validated in Spanish (Malpica et al., 2009). The sociodemographic data of the comparison group (CG) were matched with those of the OCD group (OCDG). Academic levels and disciplines were also matched.

The inclusion criteria for OCD participants were as follows: being between 18 and 60 years old, of either sex/gender, literate (regardless of educational attainment), having a clinician's evaluation that they had no serious problems with their capacity for abstraction, having a primary OCD diagnosis, medium or high scores on the Yale Brown OCD Severity Scale –administered by the clinician during diagnosis–, having at least one of the four basic subtypes of OCD (contamination/washing, symmetry/order, unacceptable taboo thoughts/checking and doubt about accidental harm/checking), understanding and signing the informed consent form, and understanding and answering the in-depth interview. The exclusion criteria for participants diagnosed with OCD were as follows: comorbidity with a cognitive impairment and/or schizophrenia, having been diagnosed with OCD for more than ten years, or scoring low on the Yale Brown OCD Scale (administered by the clinician during diagnosis).

The inclusion criteria for CG participants were as follows: matching the sociodemographic data of the cases they were to be matched with, understanding and signing the informed consent form, and understanding and answering an in-depth interview. The exclusion criteria for CG participants were as follows: OCD diagnosis or obtaining a significant score on the Obsessive-Compulsive Inventory (OCI-R) validated in Spanish (Malpica et al., 2009), administered by the interviewer before conducting the interview.

Procedure

The recruitment protocol for the population diagnosed with OCD was administered at an OCD and Obsessive Spectrum Disorders clinic. Treating physicians referred patients meeting the inclusion criteria for the study to the researcher. During the presentation, the researcher explained the purpose of the study and its ethical dimensions in person, subsequently inviting patients to participate. Those interested made an appointment for the interview with the researcher. Interviews with diagnosed participants were conducted in the meeting room of the clinic.

Several CG participants were university students interviewed in common areas (such as the cafeterias and halls) of their university. During the interviews, the researcher explained the purpose of the study and its ethical dimensions, subsequently inviting the students to participate. University students were chosen because the aim was to find people with similar sociodemographic features to those of the participants with a diagnosis, the majority of whom were young people with a university education. Those interested made appointments for the interview with the researcher. Interviews with the CG participants were conducted in the common areas mentioned earlier.

As a direct benefit, both groups of participants were given a brochure with a simple explanation of the types of reasoning that exist and their most common applications. All participants were told that the indirect benefit was their contribution to the study of the reasoning of individuals with OCD. Recruitment ceased when theoretical sufficiency (saturation) was achieved when new conceptual categories and theoretical-inductive explanations stopped emerging. Interviews were conducted in person, without the participation of third parties. None of the participants cancelled their interviews.

Instruments

The in-depth semi-structured interview is divided into three central worldview topics and questions derived from the latter: 1) Identity and social circle. What can you tell me about yourself? Who do you usually spend the most time with? What can you tell me about them? 2) Ethics. Do you think there is something we should all do? Do you think there is something no-one should do? 3) Worldview. Do you profess any religion? or Do you believe in the supernatural? or Are you an atheist or an agnostic? What do you think about planet earth? What do you think about the universe? What do you think about reality? The instrument was tested in a pilot test. Data collection ended when the information gathered was saturated. The interviews took approximately 60 minutes to administer and were all recorded and transcribed.

Table 1
Criteria for encoding inferential conclusions

Deductive	Abstract P	Blue
	Abstract and Necessary C	
Inductive	Experiential P	Green
	Experiential and Probable C	
Abductive	Abstract or experiential P	Yellow
	Hypothetical C	
Unclassifiable	Incomplete, repeated, vague, interrogative, argumentatively contradictory and jokes	Grey

P = Premise or premises; C = Conclusion.

The assigned encoding is relative to the perspective of a third party;

The epistemological basis from which it is encoded is scientific-inductive.

Analysis

The first procedure in the analysis was to encode the data that had been collected. The information collected was deconstructed into units to facilitate analysis. The encoding included the three categories that had been previously used to explain and deconstruct IC, namely 1) abstract data 2) personal experiences 3) hypothetical possibilities. Each of these three categories refers to the raw material in the three inferential processes: deduction (abstract data), induction (personal experiences or observations) and abduction (hypothetical possibilities; Peirce, 1998).

Contrasting encoding enabled it to be adapted to the needs of the data collected (Charmaz, 2010). This happened when attempts were made to delimit the location of inferential premises. Participants did not communicate these premises (as a logic teacher does in their class), merely their inferential conclusions. In general, the data collected made it possible to observe that: 1) the necessary conclusion of deduction is derived from and refers to abstract data, 2) the probable conclusion of induction is derived from and refers to personal experiences, and 3) the possible conclusion of abduction is derived from information considered or perceived as anomalous and refers to hypothetical possibilities.

Each type of inferential conclusion was underlined with a color and interpreted from the specific perspective of the encoder, in accordance with the encoding criteria shown in Table 1. Interpretative records were also made for each encoding, which contain clarifications or observations about them. Opinion verbs such as “I believe,” “I think,” and “I feel” are common filler words and were interpreted as such.

Another analytical procedure was the inductive derivation of conceptual categories based on the encoding, which creates the conceptual basis of all GT (Charmaz, 2010). The conceptual categories (CC) obtained reflect the metacognitive trends that constantly accompanied the three types of inferential conclusion. The CCs that are part of the resulting GT are those that achieved theoretical sufficiency. The CCs were closely linked to the type of conclusion and group, as can be seen in Table 2.

The CC of deductive conclusions was theoretical and conceptual derivation, in other words, a coherent or faithful derivation regarding the theory, concept or any other abstract data from which it was deduced. Common theoretical-conceptual sources of these deductions included humanistic principles, legal theories, religious theories, philosophical theories, scientific theories, and newspaper articles. This also included coherent conceptual management, such as coherent analogical management, coherent exemplification, accurate definition, conceptually faithful citation, and tautological derivation.

The CC of inductive conclusions was testimonial, such as conclusions that appear to be drawn from personal experiences or observations that cannot be contrasted by the encoder. The CC of abductive conclusions was hyperbolic, in other words, exaggerated hypothetical possibilities. The types observed were hyperbolic infallibility (exaggerated faith in a hypothetical possibility), hyperbolic association (exaggerated correlation), hyperbolic reduction (reductionist exaggeration), hyperbole about other people’s behavior (exaggerations about others) and affective hyperbole (exaggeration due to emotional bias).

The fifth analytical procedure was the observation of qualitative constants emerging from conceptual categories, in other words, the location of general and subjective trends intrinsically related to the CC. Two qualitative constants were identified: 1) the absence of influence of IC on non-obsessive worldview constructs and 2) the presence of influence of IC on non-obsessive worldview constructs.

Reliability and validity

Following Johansson (2019), the method used adhered to five GT reliability and validity standards: 1) the sample size made it possible to induce conceptual categories and qualitative constants and saturate them theoretically; 2) What was observed in the population of interest was triangulated

Table 2
Conceptual categories by group and type of inferential conclusion

	<i>Deductive</i>	<i>Inductive</i>	<i>Abductive</i>
Comparison group	Theoretical deductive	Testimonial inductive	No conceptual category
OCD group	Theoretical deductive	Testimonial inductive	Hyperbolic abductive

with a comparative group; 3) The results were relevant to the paradigms concerning the object of study; 4) Inductive correspondence with the object of study allowed theoretical grounding; and 5) Conceptual coherence existed between the study objective and the results. In Grounded Theory, the above translates into the potential to replicate the study or its results (using similar methodologies).

Ethical considerations

This research project was reviewed and authorized by the Research Ethics Committee (CEI) of the Ramón de la Fuente Muñiz National Institute of Psychiatry (INPRFM) on August 14, 2018: CEI/C/049/2018. Before beginning the interviews, all participants were given and read the informed consent and participation agreement forms. Since the interviews did not discuss highly sensitive topics and were only administered to patients under treatment whose mental state was considered stable by the treating physician, the research involved minimal risk.

RESULTS

Presence and absence of IC by issue and group

The influence of IC on the non-obsessive cognitive worldview constructs of all OCDG participants was identified. This happened when they discussed the concepts in their worldview: religion, God, supernatural phenomena, atheism, and agnosticism and when they talked about planet Earth, the universe and reality. The influence of IC was also noted when certain OCDG participants discussed ethical concepts, although this was not observed in the majority of the OCDG. No influence of IC was identified when the OCDG reflected on their identity and social circle. No influence of IC was found on any of the cognitive constructs of the CG (Table 3).

Absence of IC in the identity and social circle of both groups

When the identity and social circle of the participants were discussed, no IC was observed in either group. In their answers to the questions, both groups showed a tendency to use clusters of inductive-testimonial conclusions, in other words, theories derived from, referring to and comprising

personal experiences or observations about themselves or members of their social circle:

OCDG-AL19: *"I really enjoy life" "I mean recently or in the past three years" "since I met my partner" "we have traveled to different parts of the country" "we have camped" "and I liked that a lot" "We were on a beach in BCS" "where you can see part of the Milky Way" "and then it was great" "I felt part of the universe in the sea."*

CG-AL19: *"Well, I'm about to finish my degree" "I'm already working in the field I did my degree in" "and I have two kittens."*

OCDG-BL18: *"My father is one of the hardest working people I know" "I know that his childhood was hard financially" "he was one of 12 children and I feel this meant he had to work from the time he was a child" "I think I am proud of him."*

CG-BL18: *"He is ten years older than me" "he works in a car dealership" "he is almost never there" "we support each other a lot."*

Absence of IC in the Ethics of the CG and the majority of the OCDG

When the ethics of participants were discussed, no IC was observed in the CG, or in the majority of the OCDG. When they answered the questions, most participants tended to do so through clusters of deductive conclusions that they derived theoretically or conceptually, in other words, theories derived from and referring to pre-existing abstract information on the topic. Common deductive conclusions regarding this topic refer to norms or criteria derived from religious, legal, or humanistic theories. The following example shows how an OCD participant answers the question: Do you think there is anything no one should do? with a cluster of deductive conclusions that appear to derive from pacifism (no wars, no weapons):

OCDG-OL18: *"wars, weapons" "because there is a lot of death" "many families are sad" "when they lose a loved one."*

In the following example, the first conclusion appears to be derived from a humanistic theory. In the second conclusion, the first one is compared with a specific humanist source from which the latest theoretical deductions are conceptually and coherently derived:

CG-OL18: *"try to be good to others and yourself" "as Benito Juárez used to say (respect for the rights of others means peace)" "So do as you see fit, but without harming others" "I believe that this is a basis any society should have."*

Table 3
Inferential confusion for each group and worldview topic

	Identity and social	Ethical	Cosmological
Comparison group			
OCD group		Inferential confusion	Inferential confusion

Lack of IC in CG worldview

No IC was identified when the CG addressed the issue of worldview, since all the participants answered the questions with clusters of deductive and inductive conclusions. In other words, they expressed theories consisting of coherent theoretical-conceptual derivations and personal experiences. In the following example, a participant answers a follow-up question about her concept of God. Note how she alternates two inductive-testimonial conclusions and one deductive-conceptual one:

CG-EL18: *"That's the way I was raised" "there are things that happen that I have learned to associate with God" "someone else might attribute that to luck or any other strange force of nature" [coherent exemplification].*

In this other example, the participant used two adjectives to describe the universe, and then referred to the source of information from which he had derived these descriptions, which he did through induction:

CG-AL19: *"The universe is very big" [theoretical-conceptual derivation] "it is unknown" [theoretical-conceptual derivation] "I believe that from watching documentaries" [testimonial induction].*

Presence of IC in the ethics of certain OCDG participants

When the topic of ethics was discussed, IC was identified in seven of the 15 OCDG participants. When answering questions on this topic, these participants showed a tendency to group together hyperbolic abductive conclusions. In other words, they expressed theories consisting (mainly) of hypothetical possibilities that tend to be exaggerated:

OCDG-EL18: *"I am very attached to Vygotsky's theory [inductive-testimonial] which says that human beings learn through experience" [hyperbolic reduction]. "So you can't tell a person not to do something, because maybe that's what they learned" [hyperbolic association] "if a person was taught to kill as a child and kills, the fact that they learned to do so does not mean that it is right" [hypothetical example] "People just have to learn to live the way their nature tells them and not how they have learned or how they have been taught" [hyperbolic association].*

To clarify this point, consider the following points. In the second conclusion in the previous example, Vygotsky's theory is hyperbolically reduced to two elements (experience-learning). In the third conclusion, this reduction (experience-learning) is hyperbolically associated with the need not to repress behavioral aspects. In the fourth conclusion, a hypothetical example is provided (abductive conclusion by definition). And in the fifth conclusion, it is hyperbolically associated with the previous conclusions and the need to reject external influence (education in all its forms).

A similar metacognitive process can be observed in the following example:

OCDG-UL18: *"Well, I say we shouldn't have a rule, because we are all different" [hyperbolic reduction] "No we shouldn't, because it depends on the person" [hyperbolic reduction] and "on what they feel" [hyperbolic reduction].*

The first conclusion fails to consider behavioral rules that prevent crimes or violations of rights, or ideas such as the law of the strongest or inequalities derived from the difference between human beings. The second overlooks individuals who may decide to harm others for numerous reasons. The third ignores negative feelings or dangerous individuals with emotions. Note the fallibility that accompanies hyperbolic abductive reasoning.

Presence of IC in the OCDG worldview

Dealing the worldview topic, IC was identified in all OCDG participants. Well, all the OCDG participants answered questions on this topic by grouping together hyperbolic abductive conclusions, in other words, they expressed theories consisting of (mainly) hypothetical possibilities that were exaggerated. The following example shows one of these abductive concentrations. The participant was sharing his view on religions:

OCDG-AL18: *"Well, they are all the same" [hyperbolic reduction] "but with different rules" [hyperbolic reduction] "they are all based on a religion" [hyperbolic reduction] "and divisions were made" [hyperbolic infallibility] "I imagine that they started off as friends and then they became enemies" [hyperbolic reduction] "and each one created their own religion based on their own point of view" [hyperbolic reduction].*

These abductive conclusions are extremely fallible because of their hyperbolic nature. For example, the idea that all religions are the same clashes with the counterarguments that can be deduced from broad historical, religious, and social-scientific literature (widely disseminated by different media) or induced from personal experiences or observations with religions or religious social circles.

The following example contains another abductive concentration. The participant began with this line of reasoning after being asked about her notion of reality:

OCDG-EL18: *"In life there is something that warns you what is going to happen" [hyperbolic infallibility] "and it depends on you whether you pay attention to it or not" [hyperbolic infallibility] "I don't really know what it is" [infallibility hyperbolic] "I don't know if your life is already predetermined" [rhetorical abduction] "you have a slight possibility of changing it" [hyperbolic infallibility] "but you are almost always going to go down the same path" [hyperbolic infallibility].*

The theory can be summarized as follows: the future can be predicted by "something" that continuously conveys this predictability to us, and it is our choice whether we answer these messages. According to the participant, she is not talking about predestination, which in addition to its originality, confirms that these are not deductive conclusions derived from a pre-existing esotericism.

The following example shows another abductive cluster. The participant was answering the question: What do you think about the universe?

OCDG-CL19: “we are insignificant people (in the material sense)” [hyperbolic infallibility] “but spiritually, we can be one with the planet” [hyperbolic association]. “Be consistent with what you say, what you think, and what you do” [hyperbolic association].

One can see that there was an abrupt conceptual association. Although it is common to hear that the vastness of the universe makes many people feel small, for this mental association, the concept of insignificant people is not commonly used (since it seems to imply significant people). Note that the hyperbolic associations are repeated from one conclusion to the next.

The following example contains another abductive cluster. In this case, the participant was answering the question: What do you think about planet Earth?

OCDG-FL19: “We don’t deserve it” [hyperbolic infallibility] “because we have already damaged it too much” [hyperbolic infallibility] “I would be happy if humanity became extinct right now” [hyperbolic infallibility].

It is possible to observe a hyperbolic association between the question and the answer, since rather than focusing on the concept of planet-Earth, the participant concentrated on an ontological, moral evaluation of the relationship between humanity and the Earth. The high abductive fallibility previously observed, due to the hyperbolization of each conclusion, is also repeated. For example, the idea of not deserving planet Earth at an individual and collective level is accompanied by multiple implications (ontological, epistemological, and bioethical).

In general, the results can be summarized as follows. For each worldview topic addressed, from the point of view of social identity, ethics or cosmogony, there was a higher concentration of abductive conclusions (Figure 1).

This concentration of abductive conclusions reflects the presence of inferential confusion in non-obsessive cognitive constructs of the OCDG.

DISCUSSION AND CONCLUSION

Each of the participants’ answers categorized as an inductive-testimonial conclusion, from the perspective of a third party, concerns personal experiences or observations that cannot be corroborated. But based on the principle of charity (the best possible interpretation) and given that inductive conclusions are based on personal experiences or observations, the truth of this type of conclusions was deduced as probable. At the same time, each deductive conclusion refers to a necessary conclusion, but a deductive conclusion is not necessarily true. This is because deductive truth is as fallible as the theory or concept from which given abstract data are deduced (Negro, 2018).

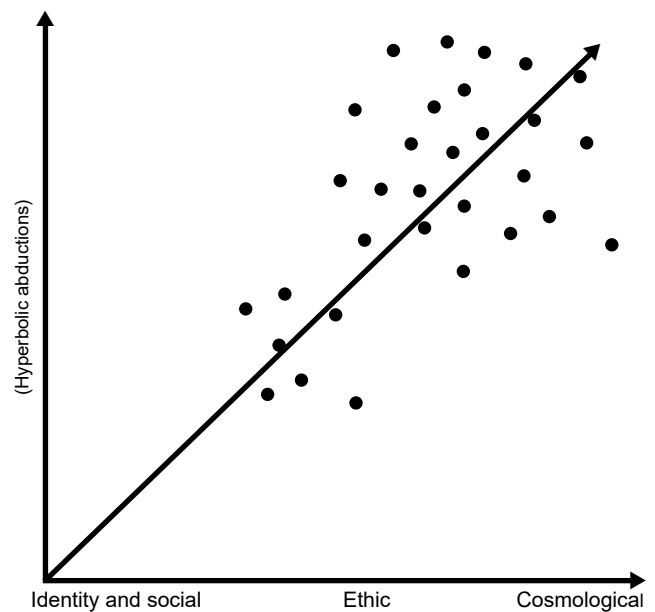


Figure 1. Hyperbolic abductions based on worldview themes in the OCD Group.

Each answer categorized as hyperbolic abductive, despite being significantly fallible and following the principle of charity, must be deduced as possible. Regarding the clusters of hyperbolic abductive conclusions or IC, the following should be clarified: IC is the continuous tendency to abduce, even when it is better to deduce or induce. In other words, the problem is not abducting or doing so sometimes, but doing so constantly and indiscriminately.

The strengths of the study are the reliability and validity of the method. At the same time, one of its limitations is not having explored better internal triangulation through in-depth analysis of the interpretive records that justified the encoding. This triangulation would also have benefited from the collaboration of more researchers. The second limitation is the limited transferability of results since the answers were encoded by type of inferential conclusion rather than type of inferential process. The third limitation is the absence of a conceptual category referring to the abductive conclusion used by the CG. Future research should therefore increase the internal triangulation of the method by analyzing the interpretive records that justify the encoding and contrast the latter with more collaborators.

Finally, IBA has shown that IC facilitates the justification of obsessive-compulsive beliefs (Julien et al., 2016) and that it can induce OCD symptoms in healthy patients (Wong & Grisham, 2016; 2017). This led the paradigm to hypothesize that IC could be affecting non-obsessive constructs of individuals with OCD (Aardema et al., 2018). These results corroborate this concern, as they show that IC also affects non-obsessive constructs of people with OCD. It can therefore be concluded that the results confirm the

etiological model of IBA and warn of the impact of IC on non-obsessive constructs of individuals with OCD in the IBT therapeutic model.

Financing

None.

Conflict of interests

The authors declare that they have no conflict of interest.

REFERENCES

- Aardema, F., & O'Connor, K. (2003). Seeing white bears that are not there: Inference processes in obsessions. *Journal of Cognitive Psychotherapy: An International Quarterly*, 17(1), 23-37. doi: 10.1891/jcop.17.1.23.58270
- Aardema, F., O'Connor, K. P., Delorme, M. E., & Audet, J. S. (2017). The Inference-Based Approach (IBA) to the treatment of obsessive-compulsive disorder: An open trial across symptom subtypes and treatment-resistant cases. *Clinical Psychology & Psychotherapy*, 24(2), 289-301. doi: 10.1002/cpp.2024
- Aardema, F., O'Connor, K. P., Emmelkamp, P. M. G., Marchand, A., & Todorov, C. (2005). Inferential confusion in obsessive-compulsive disorder: The inferential confusion questionnaire. *Behavior Research & Therapy*, 43(3), 293-308. doi: 10.1016/j.brat.2004.02.003
- Aardema, F., O'Connor, K. P., Pélissier, M. C., & Lavoie, M. E. (2009). The quantification of doubt in obsessive-compulsive disorder. *International Journal of Cognitive Therapy*, 2(2), 188-205. doi: 10.1521/ijct.2009.2.2.188
- Aardema, F., Wu, K., Moulding, R., Audet, J. S., & Baraby, L. P. (2018). The relationship of inferential confusion and obsessive beliefs with specific obsessive-compulsive symptoms. *Journal of Obsessive-Compulsive and Related Disorders*, 18, 98-105. doi: 10.1016/j.jocrd.2018.03.004
- American Psychiatric Association [APA]. (2013). *Diagnostic and Statistical Manual of Mental Disorders: DSM-5* (5th ed.). doi: 10.1176/appi.books.9780890425596
- Anholt, G. E., Cath, D. C., van Oppen, P., Eikelenboom, M., Smit, J. H., van Megen, H., & van Balkom, A. J. L. M. (2010). Autism and ADHD symptoms in patients with OCD: Are they associated with specific OC symptom dimensions or OC symptom severity? *Journal of Autism and Developmental Disorders*, 40, 580-589. doi: 10.1007/s10803-009-0922-1
- Caraveo, J. J., & Colmenares, E. (2004). The epidemiology of obsessive-compulsive disorder in Mexico City. *Salud Mental*, 27(2), 1-6. Retrieved from <https://www.redalyc.org/articulo.oa?id=58222701>
- Charmaz, K. (2010). *Constructing Grounded Theory: A practical guide through qualitative analysis*. London, UK: Sage Publications.
- Fontenelle, L. F., & Hasler, G. (2008). The analytical epidemiology of obsessive-compulsive disorder: Risk factors and correlates. *Progress in Neuro-Psychopharmacology & Biological Psychiatry*, 32, 1-15. doi: 10.1016/j.pnpbp.2007.06.024
- Johansson, C. B. (2019). Introduction to Qualitative Research and Grounded Theory. *International Body Psychotherapy Journal*, 18(1), 94-99.
- Julien, D., O'Connor, K., & Aardema, F. (2016). The inference-based approach to obsessive-compulsive disorder: A comprehensive review of its etiological model, treatment efficacy, and model of change. *Journal of Affective Disorders*, 202, 187-196. doi: 10.1016/j.jad.2016.05.060
- Malpica, M. J., Ruiz, V. M., Godoy, A., & Gavino, A. (2009). Inventario de obsesiones y compulsiones-revisado (OCI-R): Aplicabilidad a la población general. *Anales de Psicología*, 25(2), 217-226. Retrieved from <https://revistas.um.es/analesps>
- Mathes, B. M., Morabito, D. M., & Schmidt, N. B. (2019). Epidemiological and clinical gender differences in OCD. *Current Psychiatry Reports*, 21(5), 36. doi: 10.1007/s11920-019-1015-2
- Moritz, S., Dietl, C., Kersten, J. F., Aardema, F., & O'Connor, K. (2015). Evaluation of Inference-Based Therapy (doubt therapy) as a self-help tool for obsessive-compulsive disorder. *Journal of Cognitive Psychotherapy*, 29(4), 315-330. doi: 10.1891/0889-8391.29.4.315
- Negro, A. (2018). Wittgenstein on the Scandal of Deduction. In G. M. Mras, P. Weingartner, & B. Ritter (Eds.). *Philosophy of Logic and Mathematics*: Vol. XXVI. (Issue 1, pp. 1-6).
- Olatunji, B. O., Christian, C., Brosos, L., Tolin, D. F., & Levinson, C. A. (2019). What is at the core of OCD? A network analysis of selected obsessive-compulsive symptoms and beliefs. *Journal of Affective Disorders*, 257, 45-54. doi: 10.1016/j.jad.2019.06.064
- O'Connor, K., Aardema, F., & Pélissier, M.-C. (2005). *Beyond reasonable doubt: reasoning processes in obsessive-compulsive disorder and related disorders*. England, UK: John Wiley & Sons.
- Pearce, C. S. (1998). Deduction, induction, and hypothesis. In M. R. Cohen (Ed.), *Chance, love, and logic: Philosophical essays* (pp. 131-153). Nebraska, USA: University of Nebraska Press.
- Ruscio, A. M., Stein, D. J., Chiu, W. T., & Kessler, R. C. (2010). The epidemiology of obsessive-compulsive disorder in the national comorbidity survey replication. *Molecular Psychiatry*, 15(1), 53-63. doi: 10.1038/mp.2008.94
- Sassano-Higgins, S. A., & Pato, M. T. (2015). Obsessive-compulsive disorder: diagnosis, epidemiology, etiology, and treatment. *Focus*, 13(2), 129-141. doi: 10.1176/appi.focus.130211
- Stein, D. J., Kogan, C. S., Atmaca, M., Fineberg, N. A., Fontenelle, L. F., Grant, J. E., Matsunaga H., Reddy, Y. C. J., Simpson, H. B., Thomsen, P. H., van den Heuvel, O. A., Veale, D., Woods, D. W., & Reed, G. M. (2016). The classification of obsessive-compulsive and related disorders in the ICD-11. *Journal of Affective Disorders*, 190, 663-674. doi: 10.1016/j.jad.2015.10.061
- Steketee, G., Eisen, J., Dyck, I., Warshaw, M., & Rasmussen, S. (1999). Predictors of course in obsessive compulsive disorder. *Psychiatry Research*, 89(3), 229-238. doi: 10.1016/S0165-1781(99)00104-3
- Steketee, G., Siev, J., Yovel, I., Lit, K., & Wilhelm, S. (2019). Predictors and moderators of cognitive and behavioral therapy outcomes for OCD: A patient-level mega-analysis of eight sites. *Behavior Therapy*, 50(1), 165-176. doi: 10.1016/j.beth.2018.04.004
- Sun, X., Zhu, C., & So, S. H. (2017). Dysfunctional metacognition across psychopathologies: A meta-analytic review. *European Psychiatry*, 45, 139-153. doi: 10.1016/j.eurpsy.2017.05.029
- Timonen, V., Foley, G., & Conlon, C. (2018). Challenges when using Grounded Theory: A pragmatic introduction to doing GT research. *International Journal of Qualitative Methods*, 17, 1-10. doi: 10.1177/1609406918758086
- Tulaci, R. G., Cankurtaran, E. Ş., Özdel, K., Öztürk, N., Kuru, E., & Özdemir, İ. (2018). The relationship between theory of mind and insight in obsessive-compulsive disorder. *Nordic Journal of Psychiatry*, 72(4), 273-280. doi: 10.1080/08039488.2018.1436724
- Vallejo, J., & Berrios, G. E. (2006). *Estados obsesivos* (3a ed.). Barcelona, España: Masson.
- Wong, S. F., & Grisham, J. R. (2016). Inverse reasoning processes in obsessive-compulsive disorder. *Journal of Anxiety Disorders*, 47, 75-82. doi: 10.1016/j.janxdis.2016.12.005
- Wong, S. F., & Grisham, J. R. (2017). Causal role for inverse reasoning on obsessive-compulsive symptoms: Preliminary evidence from a cognitive bias modification for interpretation bias study. *Journal of Behavior Therapy and Experimental Psychiatry*, 57, 143-155. doi: 10.1016/j.jbtep.2017.06.001
- Wong, S. F., Aardema, F., & Grisham, J. R. (2019). Inverse reasoning processes in obsessive-compulsive disorder: Replication in a clinical sample. *Journal of Anxiety Disorders*, 63, 1-8. doi: 10.1016/j.janxdis.2019.01.005
- Wu, K. D., Aardema, F., & O'Connor, K. P. (2009). Inferential confusion, obsessive beliefs, and obsessive-compulsive symptoms: A replication and extension. *Journal of Anxiety Disorders*, 23(6), 746-752. doi: 10.1016/j.janxdis.2009.02.017