

# Explanatory Psychological Models of Obsessive Functioning: Systematic Review of Mancini's Cognitive Model and Theoretical Review of Young's Maladaptive Cognitive Schemas Model

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**Abstract:** *Obsessive-compulsive disorder is one of the most common, debilitating, and expensive illnesses for the medical systems focusing on mental health. Given the heterogeneity specific to obsessive-compulsive symptomatology, experts have proposed several explanatory models over time to point out the mechanisms leading to such pathology. This research study – organised into two parts – analyses existing empirical data regarding two explanatory cognitive models of obsessive functioning, namely Mancini's cognitive model and Young's schemas and dysfunctional modes model. The first part comprises three systematic reviews with three qualitative analyses and a meta-analysis regarding the three main hypotheses of Mancini's model. The meta-analyses have shown an average-sized effect of deontological guilt in the emergence of OCD-like behaviours in the non-clinical population compared to inducing altruistic guilt. However, the qualitative analyses suggest evidence regarding the association between disgust, Not Just Right Experience (NJRE) and OCD symptomatology. The second part of the research comprises a theoretical review of the studies focusing on Young's schema therapy mode model to explain obsessive mental functioning. The present research studies on the topics are scarce, but they suggest that the two cognitive models point out accurately the mechanisms of obsessive functioning. Findings also show that there are attempts to reunite the two models in a more complex explanatory model. The aspects above may lead to the development of more effective intervention protocols for this type of pathology.*

**Keywords:** *OCD, Mancini's model, Young's maladaptive schemas, review, meta-analysis.*

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## 1. Introduction

Usually chronic (two-thirds of the cases become chronic) (Prelipceanu, 2018), with the onset between 11-28 years old and reported in studies within various countries as affecting 1.2% to 3% of the population (Abramowitz et al., 2017), obsessive-compulsive disorder (OCD) is often complicated by multiple first-axis comorbidities (major depression – in a third of the cases, Tourette syndrome, specific phobias, panic disorder, generalised anxiety, eating disorders, schizophrenia) or second-axis comorbidities (avoidant, dependent, borderline, obsessive-compulsive, passive-aggressive, histrionic personality disorder) (Izzat et al., 2021; Piraianu et al, 2021; Prelipceanu, 2018). The Diagnostic and Statistical Manual of Mental Disorders, fifth edition (DSM–5) defines OCD by the presence of obsessions, compulsions, or both. Obsessions represent recurrent and persistent thoughts, urges, or impulses that are experienced as intrusive and unwanted. In most individuals, they cause marked anxiety or distress that they attempt to ignore, suppress, or neutralise using various types of mental or behavioural compulsions. The entire process is debilitating, time-consuming and impairs significantly important areas of functioning (American Psychiatric Association, 2013). DSM 5 dedicates a whole chapter to obsessive spectrum disorders, which includes (besides OCD) body dysmorphic disorder, compulsive hoarding disorder, excoriation [skin-picking] disorder, body-focused repetitive behaviour disorder, and obsessional jealousy (American Psychiatric Association, 2013). Given the heterogeneity specific to obsessive-compulsive symptomatology, experts have proposed several explanatory models over time to point out the mechanisms leading to such pathology. The models assessed in this study are based on appraisal theories assumption, according to which the proximal determinants of people's behaviours are their specific purposes (needs, desires, etc) and beliefs (cognitions, representations, assumptions) (Castelfranchi & Paglieri, 2007). Furthermore, emotional states result from the individuals' subjective evaluation, which includes the signification and attributions associated with a situation (Scherer, 1999).

### *1.1. The cognitive model of OCD proposed by Mancini*

In conformity with the evaluative theories, Mancini's model includes three significant purposes of patients with OCD: avoiding deontological guilt; preventing or neutralising the contamination with factors perceived as disgusting (Rachman, 2006); avoiding the discomfort produced by the sensation of not just right experience (NJRE) (Coles et al., 2003). The

subject interprets the event as a threat, depending on the first evaluation (the common denominator of the various sensations – contamination/NJRE being the threat of being guilty deontologically). The consequence is the first order Attempted Solutions (AS1), a complex, automatic reaction comprising negative emotions (anxiety, disgust, and fear of guilt), cognitive processes (selective attention and memory, orientation of hypothesis testing), and observable behaviours (e.g., verifications, reassurances, etc) or mental behaviours (mental compulsions, ruminations, etc) (Luca et al., 2020). They usually have a paradoxical effect because they determine a generalisation (increase in the number/types of events considered threatening, reinforced belief concerning the threat, increase in the value of the threatened purpose, and increase in the efficiency of Attempted Solutions). The second part of the model introduces meta-evaluation or second order Evaluation comprising mainly the criticism brought by the patient against the first evaluation and Attempted Solutions, generally self-deprecating and self-accusatory, leading to the worsening of symptoms (Mancini, 2017).

### ***1.2. Young's model in obsessive functioning***

In conformity with the evaluative theories, Mancini's model includes three significant purposes of patients with OCD: avoiding deontological guilt; preventing or neutralising the contamination with factors perceived as disgusting (Rachman, 2006); avoiding the discomfort produced by the sensation of not just right experience (NJRE) (Coles et al., 2003). The subject interprets the event as a threat, depending on the first evaluation (the common denominator of the various sensations – contamination/NJRE being the threat of being guilty deontologically). In cognitive psychology, a schema is defined as a way to organise reality, as an abstract plan serving as a guide for interpreting the information and solving problems. According to the theory on which Schema Therapy (ST) is based, the frustration of basic emotional needs in childhood and adolescence leads to dysfunctional schemas. When a schema is activated by similar situations with the ones experienced before, the individual is flooded with intense negative affects. He tries to adapt to them by using three coping strategies, representing the foundation of maladaptive behaviours: accepting the schema, overcompensating, or avoiding it. In the revised model of Schema Therapy, Young and his colleagues differentiate between 18 early maladaptive cognitive schemas grouped into five fields, depending on the basic needs that were not satisfied: disconnection and rejection, impaired autonomy and performance, impaired limits, overdirectedness, overvigilance and inhibition (Young et al., 2003).

Another central concept of Young's model is the mode (i.e., a specific mental state after schema activation). There are several types of modes describing a person's intrapsychic dynamic: Child modes (parts that express needs and emotions (e.g. the vulnerable, alone, abused, neglected, sad, furious, impulsive child, etc), Parent modes (parts that represent introjected parental voices – the critical, punitive, demanding parent), the specific Coping modes (submissive-unassertive mode, Avoidance mode – characterised by isolation, dissociation, behavioural avoidance, Attack/Overcompensator mode – violent, critical, judging) (Rădulescu et al., 2020; Tenore et al., 2018). Whereas a schema reflects a unidimensional theme, a mode reflects numerous schemas and coping styles active at a certain point.

This research proposes to analyse the existing empirical data regarding the two cognitive models proposed for obsessive functioning.

## **2. The analytical research framework**

To reach the goal of this research, we organised it into two parts. The first part includes three systematic reviews meant to analyse the main hypothesis argued by Mancini's model: (1) inducing deontological guilt, compared to inducing other types of emotions or to neutral induction, determined the onset of obsessive-compulsive trends in the non-clinical population, (2) there is an association between deontological guilt and disgust, in the non-clinical population and (3) there is an association between deontological guilt and NJRE, in the non-clinical population. The second part of the research comprises a theoretical review that focused on presenting the studies supporting Young's explanatory model of obsessive functioning.

## **3. Method**

### ***3.1. Searching strategies and selection of studies***

We identified the potential research studies by using keywords (controlled vocabulary) in the following databases: PubMed, LILAC (<https://lilacs.bvsalud.org/en/>) LILACS (health information from Latin America and the Caribbean countries), Science Direct, WEB of Science, Scopus, Springer, Nature Journals. To limit the publishing bias, we also searched in the ProQuest databases. In addition, we conducted a manual search starting from the bibliographies of research studies.

For the systematic review, we selected the studies that met the following inclusion criteria: (1) adult, nonclinical population (hypotheses 1, 2 and 3); (2)

experimental design with or without a control group (hypothesis 1), correlational studies, and experimental or quasi-experimental designs with or without a control group (hypotheses 2 and 3) ; (3) intervention: inducing deontological guilt using diverse methods (hypothesis 1); (4) obsessive traits measured: hand washing, checking, ordering behaviours, action avoidance, propensity toward structure, propensity toward staying out of moral dilemmas, concern for danger avoidance (hypothesis 1); (5) language of publication: English, French, Italian (hypotheses 1, 2 and 3).

In the theoretical review dedicated to Young's model, we did not apply inclusion criteria, given the small number of research studies and their heterogeneity. Thus, we analysed all the studies identified in the databases mentioned above. We used keywords for the search regarding the model in question.

### ***3.2. Data extraction***

For the three systematic reviews within the first part of the research, the data extracted for the analysis of the three hypotheses were the publication year, the sample characteristics (number of subjects, gender, age), research design, induction of deontological guilt, modality of measuring disgust, OCD-like trends measured and the measuring tools, controlled variables, statistical data (means, standard deviations, F, t, p).

In the second part, which includes the theoretical review of Young's model, we analysed the studies globally.

## **4. Results**

### ***4.1. Hypothesis 1***

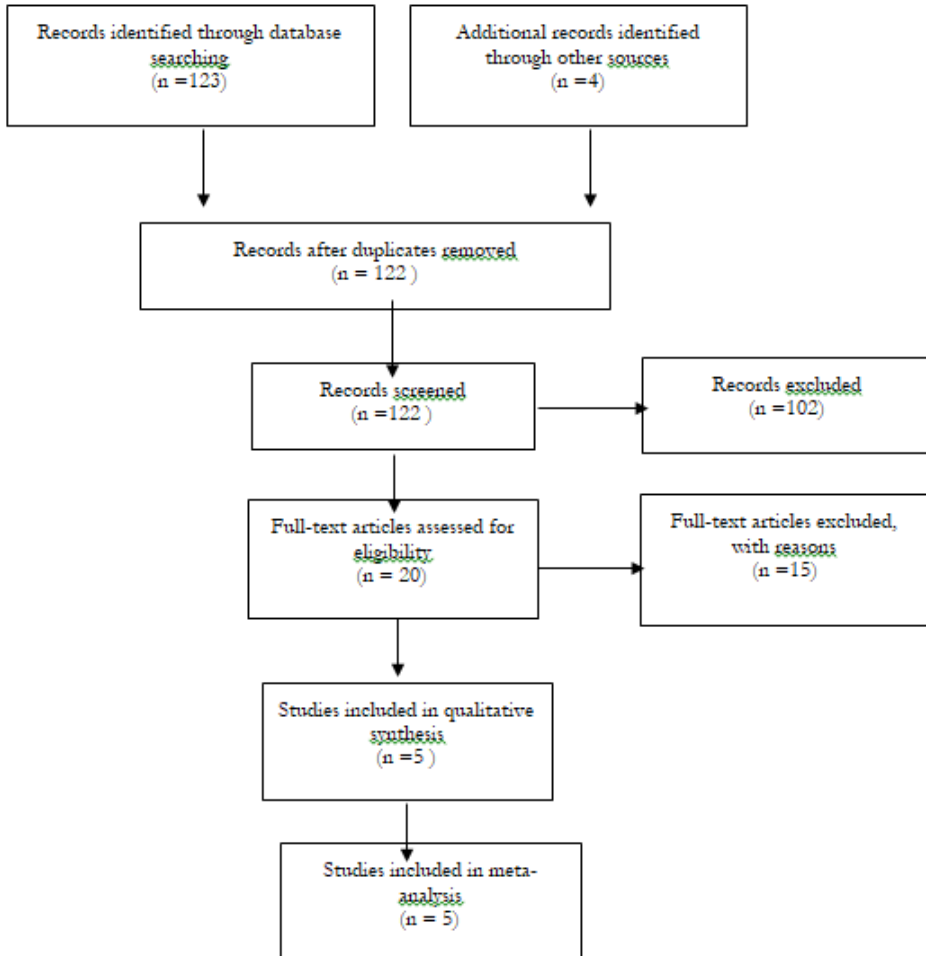
#### ***4.1.1. The characteristics of the studies***

After applying the searching strategy mentioned above, we identified 127 potential studies, and after removing duplicates, 122 remained, for which we scanned the abstracts. Among them, 102 were excluded because they did not answer our research question. Among the 20 remaining studies scanned integrally, 15 were rejected because they failed to meet the inclusion criteria. Finally, five studies were analysed (Fig. 1). The five studies meeting the inclusion criteria mentioned above were published in 2014-2019, and they included 342 subjects (70% women), with a mean age of 23.2 (university students or graduates, Italian). The data extracted from the five

studies are featured in Tab. 1. In three of the five studies, inducing deontological guilt used scenarios previously validated on other samples. In one study, induction involved recounting an autobiographical situation where guilt had been experienced; the independent evaluators made the difference between deontological guilt and altruistic guilt. In another research, induction initially involved a scenario followed by recounting.

In all the five studies, manipulation was evaluated using VAS scales (0-100) through which the subjects self-assessed their emotional state, discriminating between several emotions pre- and post-induction. In all five studies, the subjects were naive concerning the purpose of the research. The obsessive tendencies measured in the studies included were as follows: checking (visual scanning latency from baseline), in conditions of certainty and uncertainty, cleaning (behaviour observation checklist – number of cube faces cleaned, number of checks, spray use frequency, behaviour planning time, accuracy score), propensity toward inaction in moral dilemmas, compared to control scenario, total obsessive tendencies (measured using the Revised Padua Inventory), ranking and cleaning (error-related negativity, doubts, perceived responsibility, hesitation and checking, time, errors, modifications, perceived task difficulty, discomfort). Two studies included a control group. In the rest of the studies, the comparison groups were those where deontological guilt was induced. One study, comprising a control group, included a comparison group where shame was induced as an emotion. None of the studies reported data completely (effects, means and standard deviations). On a general note, there were no statistical data on reporting the absence of a significant effect and on the means of groups in case of a reported significant effect. The parasite variables controlled throughout the studies were as follows: depressive symptomatology (4 studies), anxiety as a trait (4 studies), obsessive-compulsive symptomatology (4 studies), guilt as a trait (1 Study), scrupulosity (1 Study), altruism (1 Study), propensity toward disgust (1 Study). A study (D'Olimpio & Mancini, 2016) of the five selected had a 2x4 design. Comparisons were made with the control group (the group where shame was induced and that where altruistic guilt was induced). The authors measured propensity toward inaction in moral dilemmas (D'Olimpio et al., 2013), unlike neutral scenarios and overall obsessive tendencies. However, in what concerns the obsessive tendencies, the effect of deontological guilt was insignificant, but no statistical data were reported. Another study (D'Olimpio, & Mancini, 2014) included two types of research on different samples. The authors compared the group where deontological guilt was induced, in what concerns a ranking task (i.e., cleaning) with a control group and one where altruistic guilt was induced.

From these two pieces of research, we only analysed the obsessive tendencies measured through hesitations and checks during the task. We considered the other measurements reported (namely, evaluation of discomfort during the task, perceived degree of responsibility, modification need) to be indirectly related to the obsessive tendencies.



**Fig. 1.** PRISMA Flow Diagram

Source: authors' own conception

**Tab. 1.** Characteristics of the studies analysed

Study	Sampled characteristics	Controlled vb.	Comparison group	OCD-like tendencies/ measurement	Mean, std dev., t, F, p, $\eta^2$
Giacomantonio et al., 2019	100 students (75% women; Mage=20.94, SD=4.09)	None	Vs altruistic guilt (low and high uncertainty)	Visual check/ visual scanning latency - from baseline	<b>Uncertainty</b> VLS (Dg) (M = 9531, SD = 1971) VLS (Ag) (M = 9332, SD = 2274) F (1, 90), = 4.60, p=.035, $\eta^2$ = .05 <b>Certainty</b> VLS (Dg) (M = 5339, SD = 1102) VLS (Ag) (M = 5578, SD = 1485) F (1, 90), = 4.47, p=.037, $\eta^2$ = .05.
Ottaviani et al., 2018a	61 subjects (30 women, 31 men) mean age = 27.1 + 5.5 years old, between 18 – 44 years old)	-Altruism -Scrupulosity -Depression -Anxiety as trait -Propensity toward disgust -OCD symptoms -Guilt as a trait	Vs altruistic guilt	Checking/Cleaning task/ Behaviour observation checklist	<b>No. of cube faces cleaned</b> (F(1,54)=6.45, p<.02; $\eta^2$ =.10; MVd: 10.32, MVa: 8.34) <b>No. of checks</b> (F(1,54) = 15.24, p<.001; $\eta^2$ = .22; MVd: 2.11, MVa: .62) <b>Spray use frequency, time, behaviour planning, accuracy score</b> no difference between groups reported, missing data
D'Olimpio & Mancini, 2016	38 subjects (27 women, between 19-30 de years old, Mage = 24.13, SD = 3,3)	-Depression -Anxiety trait -OCD symptoms	Vs altruistic guilt, shame, control group	Propensity toward inaction in moral dilemmas/adaptation after trolley dilemma  OCD tendencies / The Revised Padua Inventory	<b>Propensity toward inaction:</b> (F(3,34) = 3.72, p=.02; $\eta^2$ =0.25; MVd /Sd Dg (moral scenario): 0,28/0,15 MVd/SdVd (control scenario):0,48 /0.24 MVa /Sd Ag (moral scenario):



					<p>0.50/0.20            MVa/SdVa (control scenario):0.48 /0.26            MShame /Sd Shame (moral scenario): 0.41/0.16            MShame/SdShame (control scenario):0.64 /0.27            MControl /Sd Control (moral scenario): 0.68/0.44            MControl/ Sd Control (control scenario):0.52 /0.17  <b>Obsessive tendencies (total score):</b>            (F(3, 34) = 2.52, p=.07; <math>\eta^2</math> = 0.18)</p>
Mancini & Gangemi, 2015	70 students (58 women, Mage 21,2 years old, between 18-24 years old)	-Depression -Anxiety trait -OCD symptoms	Vs altruistic guilt	Propensity toward inaction in moral dilemmas/adaptation after trolley dilemma	t(68)= 5.33, p<.0001)
D'Olimpio & Mancini, 2014	<b>Study 1:</b> 29 subjects (21 women, Mage-24.13 years old SD = 3.3, between 19–30 years old)	-Depression -Anxiety trait -OCD symptoms	Vs altruistic guilt and control group	<p>Checking/Ranking task/ Behaviour observation checklist</p> <p>Doubts/ 7-point self-assessment Likert Scale</p> <p>Error-related negativity/ 7-point self-assessment Likert Scale</p>	<p><b>Error-related negativity:</b> F(2, 26) = 3.61, p&lt;.05, <math>\eta^2</math> = .22.)  <b>Doubts</b> F(2, 26) = 0.21, p=.82, <math>\eta^2</math> = .02  <b>Hesitation and checking (checking beh.):</b> F(2, 26) = 3.09, p&lt;.05, <math>\eta^2</math> = .16</p>

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<p><b>Study 2:</b> 44 subjects (30 women, M age = 25.00 years old, SD = 4.21, between 19–39 years old)</p>	<p>-Depression -Anxiety trait -OCD symptoms</p>	<p>Vs altruistic guilt and control group</p>	<p>Cleaning/Cube cleaning task/Behaviour observation checklist</p> <p>Doubts/ 7-point self-assessment Likert Scale</p> <p>Error-related negativity/ 7-point self-assessment Likert Scale</p>	<p><b>Error-related negativity:</b> F(2, 29) = 4.42, p=.02, <math>\eta^2 = .23</math></p> <p><b>Doubts</b> F(2, 29)=4.41, p=.02, <math>\eta^2 = .23</math></p> <p><b>Checking:</b> F(2, 41) = 13.17, p=.001,<math>\eta^2 = .39</math>.</p>
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Source: authors' own conception

#### ***4.1.2. Quantitative analysis***

For the quantitative analysis, we used the Comprehensive Meta-Analysis version 2. We estimated the effect size by calculating the Hedges coefficient ( $g$ ) that controls reduced sample bias (Hedges & Holkin, 1985). Considering the small number of studies and their heterogeneity degree, we chose the fixed-effect model. The meta-analysis comprised data from six studies across five papers (one of the papers contains two studies, with different samples). In all the studies, the effect of deontological guilt on obsessive-compulsive tendencies was calculated compared to altruistic guilt. Only in two studies including a control group (neutral induction) and one study including shame as a comparison, the meta-analysis estimated the effect of deontological guilt induction on the emergence of obsessive tendencies, compared to altruistic guilt induction, in the non-clinical population.

The total sample included in the analysis comprises 249 subjects (134 GD, 115 GA) with a mean age of 22.6. The design was 2x2; the comparison groups were those where altruistic guilt was induced. The main result of the meta-analysis is featured in Fig. 3. Hence, we obtained a total statistically significant result of a mean size ( $g=0.78$ , 95% CI [.546-1.022],  $p<.0001$ ), with heterogeneity evidence in the results ( $Q(6) = 28.435$ ,  $p = .000$ ,  $I^2 = 78.89$ ) of deontological guilt on obsessive tendencies compared to altruistic guilt, among the nonclinical population.

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Model	Study name	Subgroup within study	Statistics for each study								Sample size		Hedges's g and 95% CI					Weight (Fixed)	
			Hedges's g	Standard error	Variance	Lower limit	Upper limit	Z-Value	p-Value	Group-VD	Group-VA	-4.00	-2.00	0.00	2.00	4.00	Relative weight		
	Giacomanto	Ceritudine	0.180	0.279	0.078	-0.367	0.727	0.645	0.519	25	25						18.93		
	Giacomanto	Inceritudine	0.092	0.279	0.078	-0.454	0.638	0.330	0.741	25	25						18.99		
	Ottaviani,	Blank	0.876	0.265	0.070	0.356	1.395	3.305	0.001	30	31						20.99		
	D'Olimpio,	Blank	1.201	0.522	0.272	0.179	2.223	2.302	0.021	9	7						5.42		
	Mancini, F.,	Blank	1.273	0.262	0.069	0.760	1.787	4.860	0.000	40	30						21.47		
	D'Olimpio,	Blank	3.135	0.648	0.420	1.865	4.405	4.837	0.000	13	8						3.51		
	D'Olimpio,	Blank	0.940	0.371	0.138	0.212	1.667	2.532	0.011	17	14						10.69		
Fixed			0.784	0.121	0.015	0.546	1.022	6.460	0.000										

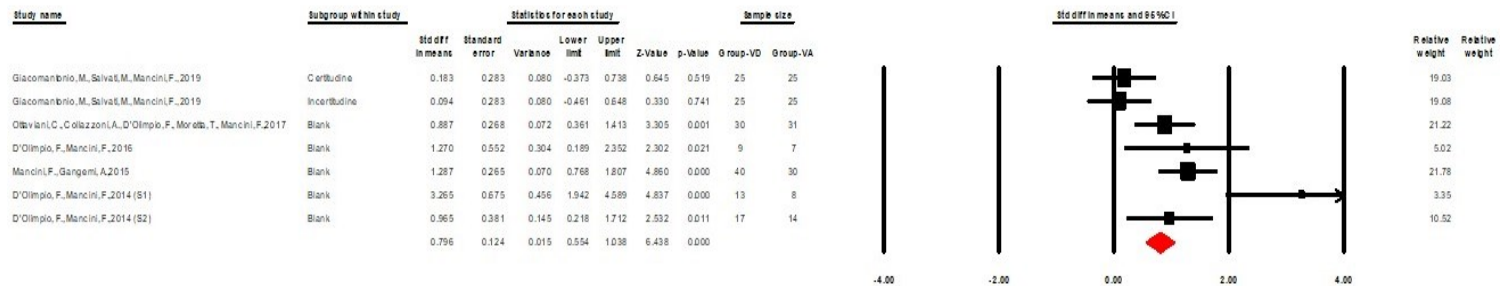


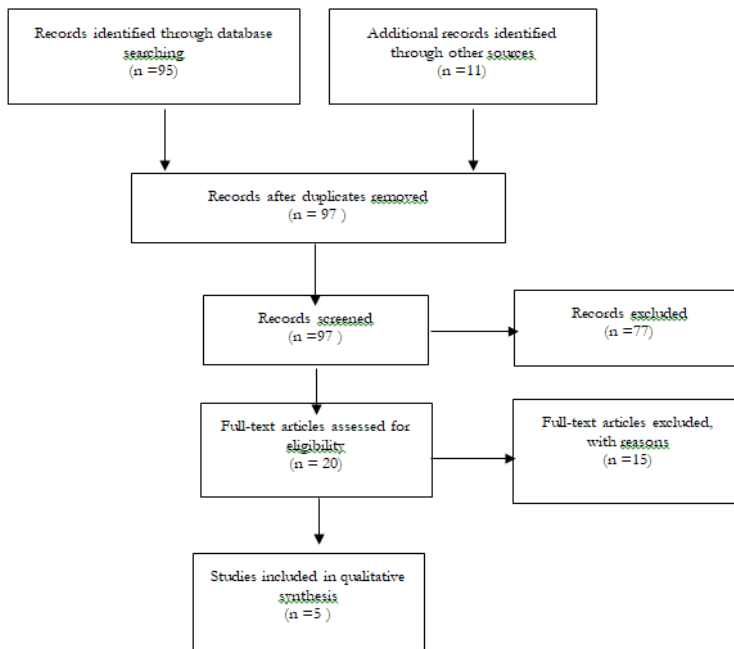
Fig. 2. Results of the meta-analysis  
 Source: authors' own conception

## 4.2. Hypothesis 2

### 4.2.1. Characteristics of the studies

After applying the searching strategy mentioned above, we identified 106 potential studies, and after removing duplicates, 97 pieces of research remained, for which we scanned the abstracts. Among them, 77 were excluded because they did not answer our research question or because the guilt concept measured did not correspond to the deontological guilt as defined above. Among the 20 remaining studies scanned integrally, 15 were rejected because they failed to meet the inclusion criteria. In nine, disgust was not a directly measured variable or it was not included in the analysis. In five, they did not measure deontological guilt distinctly. In one, there was a clinical population sample). Finally, five studies were analysed (Fig. 3).

Given the heterogeneity of the studies (caused by the multiple research designs, by very different measurements of disgust and deontological guilt), we did not carry out any quantitative analysis of the data. The studies analysed were published in 2008-2018; they included 264 subjects (152 women), with the mean age 31.5 years old. The data extracted from five studies are featured in Tab. 2.



**Fig. 3.** PRISMA Flow Diagram

Source: authors' own conception

Two of the studies selected (Ottaviani et al., 2018; Schaich Borg et al., 2008) are neuropsychological. They bring a series of arguments regarding the correlation between the deontological field, deontological morality and disgust. Hence, it may be suggested that the transcranial stimulation of a cerebral area specifically correlated with the processing of disgust in many neuroimaging studies, the insula, respectively, induce besides disgust an accentuation of the moral sense within the deontological field but not within the altruistic field. At the same time, Schaich Borg et al. (2008) report that the same brain area was activated only as a response to the processing of incestuous stimuli but not of pathogenic or nonsexual sociomoral stimuli. Mancini (2017) listed the incestuous stimuli among the stimuli inducing deontological guilt. Furthermore, the research with fMRI scans discriminates between pathogenic and sociomoral disgust, reporting different representations of them in the brain. Hence, the activity of the amygdala and two regions from the occipital lobes was more intense in the processing of pathogenic stimuli compared to sociomoral stimuli. In addition, we noted statistically significant differences between the two groups in the cerebral activity of regions within the orbitofrontal cortex and the precuneus. In the processing of the sociomoral stimuli, we observed a more intense activity in the medial prefrontal cortex, the bilateral temporoparietal junction, areas of the temporal gyrus, precuneus, dorsolateral prefrontal and dorsal anterior cingulate cortex (Ottaviani et al., 2013). It is worth mentioning that – whereas the scans have shown different neural pathways in the processing of pathogenic stimuli in comparison to the incestuous ones – subjects reported the same level of disgust on the self-assessment scales (Schaich Borg et al., 2008). An experimental study that assessed the effect of inducing deontological guilt compared to altruistic guilt on perceived disgust identified the same discrepancy between the physiological and self-assessment measurements regarding the intensity of perceived disgust (Ottaviani et al., 2018a). In this study, the case of self-assessment, the subjects did not report significant differences regarding perceived disgust, but the authors noted the effect for the group where deontological guilt was induced when they measured disgust using physiological measurements, namely HRV (vagal-mediated HR variability). In addition, the induction of disgust seems to favour omissive choices in moral dilemmas (Basile et al., 2011a; Basile et al., 2017a; Tenore & Serrani, 2013), while the deontological answers within moral dilemmas associate a higher frequency of experiencing disgust and fear, compared to the utilitarian answers (associating a higher frequency of living regret) (Szekely & Miu, 2014). It is worth noting, though, that studies thus far assessing the correlation between deontological guilt

and disgust are scarce (Basile & Mancini, 2011b). The studies selected in our analysis suggest rather than prove a correlation between the two concepts, if we consider that only in two of the five pieces of research, deontological guilt was measured or manipulated directly. In addition, three of the five studies do not assess any potential parasite-variable, such as depression, anxiety, propensity toward disgust, guilt as a trait, proven to correlate significantly with obsessive (Mancini, 2018) functioning, which could have influenced the results significantly. In addition, we highlight the failure to report the complete statistical data mainly for the refuted hypotheses.

**Tab. 2. Characteristics of the studies analysed**

Study	Sampled characteristics	Controlled vb.	Tip Study	Disgust/ VD/measurement	Results
Ottaviani et al., 2018b	37 subjects (25 women, Mage=26.78 (5.04) years old)	-Altruism -Scrupulosity -Depression -Anxiety trait -Propensity toward disgust -OCD symptoms -Moral system -Emotional state	Experiment of pre- post-induction with a control group  <b>Intervention:</b> Inducing disgust through transcranial stimulation the island with electric current.	-Physiological measurement of disgust (vagally-mediated HR variability -HRV)  -Measurement of disgust through a word completion task  -Dg measurement by appraising scenarios involving the deontological field vs the altruistic field	-Transcranial stimulation effect on morality in the deontological field: active ( $11.55 \pm 1.21$ ) vs neutral stimulation ( $11.22 \pm 1.37$ ); (Cohen's d = .26)  No stimulation effect on morality in the altruistic field: active ( $11.73 \pm 1.54$ ) vs neutral ( $11.83 \pm 1.74$ )  Combined effect stimulation x vignette field on morality: (F(1, 36) = 3.51, p=.06, $\eta^2 = .10$ )
Ottaviani et al., 2018a	61 subjects (30 women, M age = 27.1 + 5.5 years old; between 18 - 44 years old)	-Altruism -Scrupulosity -Depression -Anxiety trait -Propensity toward	Experiment of 2X3X2 Group (Dg vs Ag) X Time (baseline vs induction vs	-Physiological measurement disgust (vagally-mediated HR variability -HRV)	Significant increase in HRV only in Dg, pre vs post induction: ( $39.6 \pm 23.7$ vs $42.9 \pm 24.6$ )



		<p>disgust -OCD symptoms -Guilt as a trait -Current emotional state</p>	<p>cleaning task) X Guilt (Dg vs Ag)</p> <p><b>Intervention:</b> Induction Dg, respective Ag through validated scenarios</p>	<p>-Self-assessment-VAS scales (0-100)</p>	<p>No significant effect on self-assessed disgust: (Time: <math>F(2, 116) = .30</math>, <math>p = .74</math>; <math>\eta^2 &lt; .01</math>; Group: <math>F(1, 58) = .04</math>, <math>p = .83</math>; <math>\eta^2 &lt; .01</math>; Group X Time: <math>F(2, 116) = .38</math>, <math>p = .69</math>; <math>\eta^2 &lt; .01</math>)</p>
Szekely & Miu, 2014	63 subjects (55 women, Mage 23.2 ± 4.6 years old)	-None	Frequency analysis	<p>Deontological or utilitarian answer to the moral dilemmas</p> <p>Dominant emotion during the task: Five-point Likert Scale</p>	<p><b>Fear</b> was significantly more often experienced in the deontological vs utilitarian choices (25.93% vs 13.85%).</p> <p><b>Disgust</b> was significantly more often experienced in the deontological vs utilitarian choices (4.09% vs 1.95%)</p> <p><b>Regret</b> was significantly more often experienced the utilitarian vs deontological choices (3.20% vs 0.53%)</p>
Basile et al., 2017b	58 participants (42 women, Mage-53.5)	None	Experiment of 2x2 Group (G)	Propensity toward inaction in moral	<b>Moral dilemma condition:</b>

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	years old)		induced disgust vs G induced fear) X Type of dilemma (moral vs neutral)	dilemmas/adaptation after trolley dilemma	Significant difference concerning omissive choices between GD (21) and GF (9); (X2 [1]=9.93; p < 0.03)  <b>Neutral dilemmas condition:</b> There are no significant differences (failure to report statistical data)
Schaich Borg et al., 2008	45 men (Mage- 25 ± 6 years old)	-None	Experiment of 4X2/Pathogenic (P) vs Incest (I) vs Moral nonsexual (M) vs Neutral (N) in induction vs resting state  Induction through the memorising / sentence remembering task	Neural correlates /fMRI scans	-Pathogenic and sociomoral disgust are not represented identically in the brain,  -The processing of incest stimuli compared to the processing of moral nonsexual stimuli involve different but overlapping neural pathways.  -The processing of pathogenic stimuli compared to incest stimuli involve different neural pathways, though the subjects

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					report similar levels of disgust in the processing of both stimuli  -The insula was activated only in the processing of incestuous stimuli but not of pathogenic or nonsexual sociomoral stimuli.
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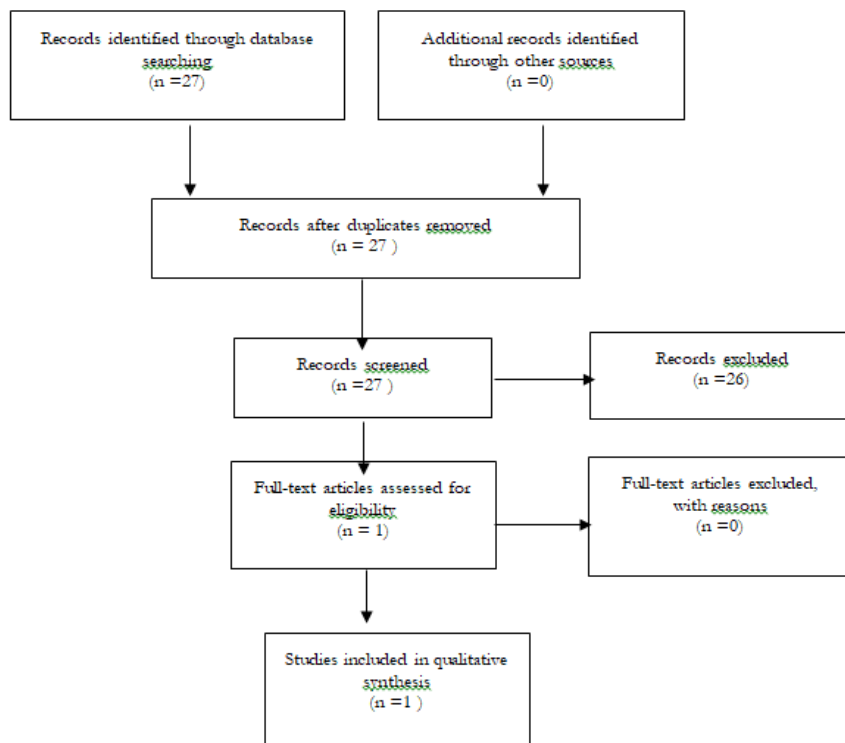
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Source: authors' own conception

### 4.3. Hypothesis 3

#### 4.3.1. Characteristics of the studies

After applying the searching strategy mentioned above, we identified 27 potential studies, but 26 were excluded because they did not answer our research question. Finally, we analysed one study (Fig. 4), which excluded the possibility of quantitative data analysis. The study was published in 2008, and it includes a sample of 104 students (58 women) with a mean age of 25.3 years old. The data extracted are featured in Tab. 4. Whereas the research reports a significant effect of inducing guilt on NJRE sensation, guilt as a trait plays a significant role in the effect of inducing the affective state. In addition, it is worth noting that induction concerns a global affective guilt state, without any discrimination between deontological and altruistic guilt. We believe further studies are necessary to determine the extent to which there is an association between deontological guilt and “not just right experience”.



**Fig. 4. PRISMA Flow Diagram**

Source: authors' own conception

**Tab. 3.** Characteristics of the study

Study	Sampled characteristics	Controlled vb.	Type of Study	Disgust/ VD/measurement	Results
Mancini, Gangemi, et al., 2008	<p><b>Study 1:</b> 104 students (58 women, Mage - 25.3 years old (SD - 5.2))</p>	-OCD symptoms	Experimental 2x2/Guilt group (high trait) vs Guilt group (low trait) x Induction guilt (state) vs Neutral induction	<p>-Measurement of guilt as a trait- The Trait Guilt Inventory</p> <p><b>Guilt state induction:</b> through autobiographic remembering.</p> <p>Measuring guilt state – State Guilt Inventory</p> <p>NJRE State-NJRE survey questionnaire</p>	<p>-Main effect of induction on NJRE</p> <p>(F(1, 100) = 14.77, p&lt;0.001). (MGguilt = 11.03, SD = 5.4 vs MGcontrol = 6.93, SD =4.39).</p> <p>-Main effect of guilt as a trait on NJRE</p> <p>(F(1, 100)=15.4, p&lt;.001), (MGvhigh=11.03, SD = 5.43 vs MGvlow=6.93, SD = 4.39</p> <p>-Interaction effect of induction and guilt as a trait:</p> <p>(F(1, 100) = 4.57, p&lt;.05); significant dif.</p>

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					only in the group with guilt as a high trait (M = 7.9, SD = 4.69, t(50) = -4.08, p<.001). Induction had no effect on NJRE in the group with low guilt M = 6.28, SD = 4.13; t(50) = -1.25, ns)
<b>Study 2:</b>  110 students (69 women, Mage= 24.9 (SD = 3.9)	-None	Experiment of 2X3/ Guilt group (high trait) vs Guilt group (low trait)/Guilt group (state) vs Victimising group vs Control group (neutral induction)	Measurement of guilt as a trait- The Trait Guilt Inventory  <b>State induction:</b> through autobiographic remembering.  Measurement of guilt state – State Guilt Inventory  NJRE State-NJRE survey questionnaire  Victimisation feeling (feeling like a victim) – VAS 0-100 scale	-Main effect of induction on NJRE  (F(2, 104) = 7.17, p<.001). (MGv.high= 6.26, SD = 7.04 vs MGcontrol = 8.69, SD = 4.55, t(71)=-5.4, p<.001) vs MGvict =9.59, SD=5.21, t(73)=4.65, p<.001).  -Main effect of guilt as a trait on NJRE (F(1, 104) = 11.17, p<.001), (MGvhigh=14.62, SD = 6.9 vs MGvlow =8.91, SD = 5.08	

					<p>-Interaction effect of induction and guilt as a trait: (<math>F(2, 104) = 4.11, p &lt; .01</math>); significant dif. only in the group with guilt as a high trait (<math>M = 18.48, SD = 6</math>) vs control (<math>M = 9.25, SD = 4.67, t(39) = -4.81, p &lt; .001</math>) vs victimisation (<math>M = 10.27, SD = 4.73, t(38) = -4.12, P &lt; .001</math>)</p> <p>Induction had no effect on NJRE in the group with low guilt</p>
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Source: authors' own conception

#### ***4.4. Schemas and modes specific to obsessive functioning***

Initially developed for interventions in personality disorders, especially cluster B disorders (borderline and narcissistic), ST has also been extended to support patients with other cluster personality disorders and to patients whose pathology is included on the first axis. They include obsessive spectrum disorders. However, the studies concerning the particularities of obsessive functioning from the perspective of dysfunctional cognitive schemas and modes are very scarce. Moreover, they regard generally comparisons with comorbid pathologies. In what concerns early dysfunctional schemas, the patients with OCD report higher scores in schemas of Dependence/Incompetence, Vulnerability to danger, Abandonment and Low self-control compared to the patients with eating disorders and patients with chronic pain (Voderholzer et al., 2014). Other schemas associated with OCD were social isolation, emotional deprivation, undeveloped self, entitlement, subjugation, need for validation, negativism/passivity and unrealistic standards (Atalay et al., 2008). Compared to the patients with bipolar disorder and with schizophrenia, the patients with OCD report higher scores in the schemas of vulnerability to harm, emotional inhibition, unrealistic standards, self-sacrifice, emotional deprivation, and social isolation (Khosravani et al., 2018). In what concerns the result of cognitive-behavioural therapy, it appears that low responsiveness in OCD treatment is predicted significantly by high scores in failure and emotional inhibition schemas (Thiel et al., 2014). In what concerns the specific modes of obsessive functioning, the number of the studies is even lower. Hence, the vulnerable child mode, angry child mode, punitive parent, exigent parent, as well as overcompensation schemas (perfectionist/overcontrol, grandiosity) and avoidance mode manifested as the detached protector, and the self-calming modes were associated with OCD and obsessive personality (Arntz, 2012; Basile et al., 2017b; Gross, 2012; van Wijk-Herbrink et al., 2108). Several recent studies tried to integrate the two models of cognitive theories (Tenore et al., 2018). Their purpose was to elaborate therapeutical interventions targeting not only the reduction of specific symptomatology but also the dysfunctional cognitive schemas as causes for symptomatology. According to the authors, this would increase the efficiency of the treatment and it would prevent the numerous relapses experienced by patients with OCD.



## 5. Conclusions

The purpose of this research was to analyse as comprehensive as possible the researches concerning obsessive-compulsive functioning from the perspective of the two cognitive models: the model proposed by Mancini and the model of dysfunctional schemas and modes proposed by Young. To this end, we analysed three research questions in agreement with the main assumptions of Mancini's model and a classic theoretical review, motivated by the scarce number of studies published concerning Young's model.

The systematic reviews – the first ones, to our knowledge – concern Mancini's model and they comprised three qualitative analyses and a meta-analysis that included six studies. The results pointed out an average-sized significant effect of deontological guilt on the emergence of obsessive tendencies, compared to altruistic guilt ( $g=0.78$ , 95% CI [.546-1.022],  $p<.0001$ ). However, we should interpret it cautiously. We must consider the small number of studies and implicitly the small total sample and the fact that it included Italian subjects as a majority. This aspect entails a possible influence of the Catholic religion on deontological values – when interpreting this result. The result is consistent with the findings of previous studies concerning the role of deontological guilt in obsessive-compulsive disorder conducted on the clinical population. One of the main limits of this research is that the result reflects an effect only in comparison with altruistic guilt. For comparisons with control groups or other affective states, several future studies are necessary. In what concerns the association of deontological guilt with disgust, the results significantly suggest such a connection highlighted even by neuroimaging studies, but the heterogeneity of the studies – derived from the different designs, the distinct conceptualisations of disgust and morality – is very high. Hence, future studies are necessary to point out more clearly the correlation between this type of guilt and disgust. It seems that the correlation between deontological guilt and NJRE has been the least studied – we identified only one study on a non-clinical population concerning the relationship between guilt and NJRE. It reports an effect of inducing guilt on NJRE – thus, it is difficult to estimate the nature and power of association between the two concepts in the case of obsessive functioning.

In what concerns the quality of the studies analysed in our research, it is worth noting that they have several significant limits. We refer mostly to the ways of measuring obsessive tendencies (some studies were based on behaviour observation checklist, subjective in evaluation), as well as to the lack of controlling parasite-variables (depression, anxiety as a trait, guilt as a

trait, propensity toward disgust) proven to have strong correlations with obsessive-compulsive symptomatology. However, the quality of the studies is affected precisely by the heterogeneity of obsessive-compulsive functioning (a wide array of obsessive and compulsive subtypes in what we define as obsessive-compulsive). Hence, a generalisation of the findings concerning all the types of obsessive and compulsive tendencies is extremely difficult, considering that most studies measure these tendencies only in what concerns common subtypes (checking, washing, inaction in moral dilemmas), but it is still highly challenging to study cognitive compulsions or aggressive or sexual obsessive thoughts.

Following the theoretical review that concerned the conceptualisation of mental obsessive functioning from the perspective of Young's model, the studies published thus far outline a specificity of this type of mental functioning in what concerns both the maladaptive cognitive schemas and the characteristic modes. All the studies made comparisons between various clinical populations or the nonclinical population and the patients with OCD. Another characteristic is that most studies are correlational. Hence, the main early dysfunctional schemas for which patients with OCD report higher scores are those of dependence/incompetence, vulnerability to harm, abandonment, low self-control, emotional deprivation, failure, social isolation, undeveloped self, entitlement, subjugation, need for validation, negativism/passivity and unrealistic standards. Whereas – in what concerns dysfunctional schemas – there is a low specificity for the patients with OCD, regarding the modes, the most specific mode for obsessive-compulsive functioning seems to be the perfectionist-overcontrol overcompensation type, along with the exigent parent mode. The other modes for which the patients with OCD report to which scores are vulnerable child mode, angry child mode, detached protector, grandiosity, punitive parent modes.

As a general conclusion of our research, we believe that – whereas evidence supports the two explanatory cognitive models for obsessive functioning – further research is necessary. It is necessary to clarify the mechanisms through which deontological guilt, disgust, NJRE, dysfunctional cognitive schemas and adjustments to them make the difference between the functional and the dysfunctional in an obsessive mental organisation. .

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