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INTEGRATIVE EXPLORATION OF MORAL JUDGEMENT: WHAT CAN WE LEARN FROM THE DUAL THOUGHT PROCESS?

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Abstract

Dual thought process is a central model in cognitive psychology. It determines two distinct cognitive systems to process information. “System 1” is fast, automatic, intuitive and emotional. “System 2” is slower, deliberative, analytical and logical. This dual thought process model has found applications in many areas, including the area of moral judgement. The duality of thought in moral judgement was objectified through psychological and neuroscientific methodology and determines two distinct processes: a first automatic, rapid affective process corresponding to deontology and emotionally motivated heuristics, and a second slow, laborious deliberative process corresponding to utilitarianism and rationality. These two processes are associated with functional activations of distinct brain regions/networks, highlighting a neurofunctional signature linked with psychological facts. We carried out a PRISMA literature review in order to explore the operationality of this link by identifying its neuroarchitectural and neurodevelopmental bases. We used APA search databases Psycinfos/psycnets, PubMed and Embase/Science Direct, with the keywords ‘moral judgement’ or ‘moral dilemma’ and ‘dual process’, from 2001 to publications of May 2023, in general population. Initially, 959 heterogeneous references were found, and from these, we led a selection process resulting in 16 final references. We found that a complex neuroarchitectural base supports the systems and involves different networks that activate and/or inhibit depending on the characteristics of the moral stimuli. This base has a chronological development and is linked to neurodevelopmental skills (theory of mind, moral emotions, maturation of executive functions including inhibitory control and memory). The latter are: at the origin of functionalities like perspective of justice/ prosocial behavior, react to situational factors in the moral stimulus, and mediate variabilities in the production of moral judgements. The limits of the model to be taken into account are cultural, conceptual and methodological. Thus, the duality of moral judgement appears to be integrative and relevant, and in this context, attention should be paid to neurodevelopmental status and to neurofunctional investigation tools to improve future research methodologies.

Keywords: *Moral judgement, dual process, neuroarchitecture, neurodevelopment, integrative*.

1. Introduction

The dual thought process is a central model in cognitive psychology. It is supported by the dual process theory, which involves two cognitive systems: heuristic (system 1) and deliberative (system 2). This dual model of thinking has found applications in many fields, including moral judgement (Greene et al., 2001). In this context, the duality of thought in moral judgement was objectified through psychological and neuroscientific methodology and determines two distinct processes: an automatic affective process (corresponding to deontology and emotionally motivated heuristics) and a laborious deliberative process (corresponding to utilitarianism and rationality) (Greene et al., 2008). These facts validate the reality of the dual process of moral judgement, and directs toward an operationality based on cerebral neuronal networks.

2. Objectives

We aimed to know more about the operationality and relevance of the dual heuristic and deliberative process applied to moral judgement. We therefore proposed two explicative hypotheses linked to the characteristics of these cerebral networks: a neuroarchitectural hypothesis based on topological and functional networks, and a neurodevelopmental hypothesis based on psychological skills corresponding to the level of cerebral development and serving as mediating variables.

3. Method

We carried out a literature review based on the PRISMA methodology. The inclusion criteria were articles published between 2001 and 2023 on heuristics and deliberations in moral judgement, in general population regardless of age. The exclusion criteria were specific clinical populations and/or specific and exclusive dimensions of moral judgement. The APA search databases Psycinfos/psycnets, PubMed and Embase/Science Direct were used with the keywords 'moral judgement' OR 'moral dilemma' AND 'dual process'. Initially, 959 heterogeneous references were identified, and the selection process led to 16 final references.

4. Results

4.1. Dual moral process neuroarchitecture

Topologically, there are common structures (prefrontal cortex and its sub-regions) and functionally shared structures (inhibition, emotions, theory of mind, etc.) involved in moral dual process. Topologically, structures involved in cognitive and emotional processes are recruited depending on the situation and witness the link between the intuitive and the deliberative networks: lateral prefrontal cortex (Barbey & Grafman, 2011), ventromedial prefrontal cortex (Holyoak & Powell, 2016), inferior frontal gyrus, amygdala, ventral striatum (Hallsson et al, 2018). Functionally, moral productions may result from brain areas involved in decision making and emotions (right dorsal lateral prefrontal cortex, amygdala, insula) (Hallsson et al., 2018) (Chapman & Anderson, 2013), theory of mind (right temporoparietal junction), conflict regulation (anterior cingulate cortex: ACC), inhibitory control (activation of right inferior parietal cortex, precuneus, bilateral anterior cingulate gyrus and ACC) (Buon et al., 2016).

4.2. Characteristics of the dual system of moral judgement

Moral and social heuristics are characterized by a deductive mechanism (Hoffrage & Marewski, 2015), by attribute substitution from generalized prototypical situations (Sunstein, 2005), they are reinforced by repetition, as well as by gratifying moral prosocial behaviors and mutual cooperation (Decety & Yoder, 2017). They are revisable, interact with the deliberative system (Sunstein, 2005), and generate "reflexive equilibrium" (consistency between judgments at all levels of generality) or "weak consequentialism" (taking into account both utilitarian consequences and deontological considerations in the overall assessment of what should be done) (Sunstein, 2005) or "quasi-rationality" responses of a dual nature (more or less equilibrium between deliberation and intuition) (Hoffrage & Marewski, 2015). Moral emotions such as empathy and moral disgust also vary the prosocial response and influence moral heuristics: empathy leads to a prosocial proximity and deactivates utilitarian moral judgement (Babcock et al., 2017) and disgust leads to a withdrawal behavior and influence the severity of moral judgement (Chapman & Anderson, 2013) (Russell & Giner-Sorolla, 2013).

4.3. The mediating variables in the duality of moral thought

The mediating variables could be associated with neurodevelopmental skills (theory of mind, maturation of executive functions, social experiences), while others are associated with the moral situation itself and the characteristics of the subject exposed to it. Theory of mind participates in conditioning the generalization of initial moral concepts with cognitive changes in children (Wainryb, 2004). Executive functions such as memory linked to an act of justice (Decety & Yoder, 2017) and planning (Kambam & Thompson, 2009) are necessary for certain intuitive judgements. Other developmental skills, such as the justice perspective (Decety & Yoder, 2017), activate deliberation or maintain heuristics, using justice-oriented memory and conceptual elaboration (Hallsson et al., 2018). Moral identity (Carlo & Padilla-Walker, 2020) is also necessary for mature moral judgement based on heuristics, and is shaped by prosocial behavior in adolescence. Other non-neurodevelopmental factors have influence such as moral framing (Sunstein, 2005) that alters moral intuitions and creates specific generalized aversion heuristics. Then, spontaneous sympathy for intuitive evaluations modifies moral decisions and the psychological distance between the individual and the event to be judged influence the deliberation (Hoffrage & Marewski, 2015). Lastly, situational factors, linked to the presentation of the situation or affecting the judge or observer lead to a variation of utilitarian moral judgements (Klenk, 2021).

4.4. Limits of the duality of moral thoughts

There are conceptual limitations such as the supposed universal nature of dual thinking (Sachdeva et al., 2011) and the "deontological coherence" (Holyoak & Powell, 2016), providing a simplistic conception of the dual moral thoughts. Methodological limitations (Malle, 2021) concern the use of binary oppositions between deontology and utilitarianism, or the restrictive use of moral dilemma scenarios, or on the failure to take into account the different categories of moral judgement. Finally, situational factors such as causal interactions could modify utilitarian moral judgements (Klenk, 2021).

5. Discussion and conclusion

This review mainly found data on heuristics and may contain a methodological bias (choice of key words) that may have limited access to more deliberative data. Despite this, the understanding of the operationality of the dual heuristic and deliberative process of moral judgement was improved. Both hypotheses: neuroarchitectural (topological and functional cerebral components) and neurodeveloppemental (dynamics of cognitive and emotional skills development for processing moral information) are necessary to make the process work. However, other complementary parameters had to be taken into account: the complex interactions between the two systems, non-neurodevelopmental mediating factors, and the cultural/methodological/conceptual limits. These findings provide a better view of the relevance of the dual process of moral judgement as a model for future studies and precautions to take when using it as a model in a context of integrative research methodology.

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