

The Role of Dopamine in Lacan's Desire

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Abstract: Psychoanalysis is still a dynamic branch of philosophy, but it has been marginalized by psychology and psychiatry due to arguably unfounded hypotheses, thin evidence or stereotypes that lack scientific backing and remain in the sphere of an outdated theory of psychopathology (Paris, 2017). The psychodynamic school has attempted to reinstate the academic rigour of applied psychoanalysis by presenting results from therapy with equivalently positive and lasting effects, when compared to other forms of psychotherapy (Shedler, 2010). Moreover, the interdisciplinary field of neuropsychanalysis has emerged with the aim to investigate which theories of psychoanalysis could be validated through contemporary neuroscience. It was Freud himself who had argued that the early 20th century physiology did not yet have the necessary tools to provide an organic neurological basis for psychoanalysis (Solms & Turnbull, 2011). Almost a century later, Ariane Bazan proposed numerous physiological frameworks that support psychoanalytic definitions, contributing considerably to the development of neuropsychanalysis. Most notably, Bazan and Detandt presented evidence of a striking connection between the Lacanian concept of *jouissance* and the physiology of the mesolimbic dopaminergic pathway (Bazan & Detandt, 2013). This paper sets forth to identify definitive elements of Lacanian psychoanalysis on desire. Lacan had presented coherent definitions for the concepts of desire, *lack in the Other* and *objet petit a* that can be instrumentalized for comparison with the neurobiological findings. The scope of the comparison remains philosophical hence the neurobiological input will only be comprised of significant literature results on brain activity and the connection of social rewards and dopamine with drive, without delving into experimental methodology. The primary goal is to present the resemblance of the *objet petit a* as the object cause of Lacanian desire with the role of the neurotransmitter dopamine in the human brain.

Lacan's Philosophy of Desire

"Desire is always the desire of the Other. Which basically means that we are always asking the Other what he desires."

Jacques Lacan

Lacan presented his desire formula in 1958 with the aim to distinguish desire from the related notions of need and demand. He defines desire as the result of the subtraction of need from demand (Lacan & Fink, 2007, pp. 575-584). Need in this philosophical equation regards the basic biological needs, such as hunger, while demand is the expression of need to some other person. This process begins with infants demanding the presence of the mother and the satisfaction of their needs through non-verbal communication. In later stages of development, the demand to satisfy a need is conveyed through language, subject to the acquisition of societal influences and to the acquisition of language itself. This demand is the request from the Other to acknowledge a basic need and prioritize its satisfaction; it is essentially a demand for attention or love. Desire, however, according to Lacan, "is neither the demand for love nor the appetite to satisfy a need, but the difference that results from their subtraction, the very phenomenon of their splitting (Spaltung)" (Lacan & Fink, 2007, pp. 580). The process of delegating someone as the sole potential satisfier of a need is transcendental, as it transforms the appetite to satisfy a need into wanting the presence of the satisfier to the extent that evades the satisfaction of the need itself. Desire is that wanting for the other's presence, attention and action, when not considering the satisfaction of a need; either because the need is met and the demand for attention persists or because the need is negligible compared to the magnitude of the now much more significant demand for love. In other words, desire is produced when demand goes beyond the request to satisfy a basic need.

For Lacan, desire is always connected with the Other⁹⁰, which means that all drives beyond the satisfaction of basic needs are always

⁹⁰ The capital O is used to stress the very element of otherness in Lacanian discourse. The "other" ranges from simply other people to significant others, such as a parent or a teacher and from there to an even less tangible otherness, in the form of morals, values and significations derived from society, culture, religion etc.

connected with seeking the Other. When not acting to satisfy a need, we act with the intention to connect with or satisfy the Other. "Man's desire is the desire of the Other." (Lacan, 1978/1998). It should be stressed that Lacan's insistence on desire being mediated always through the Other stems from the influence of the Hegelian Master-Slave dialectic. Lacan was exposed to Hegel's philosophy extensively by attending in Paris the popular Alexandre Kojève seminars (1933-1939) on Hegel.

Man's very desire is constituted, he tells us [meaning Hegel], under the sign of mediation: it is the desire to have one's desire recognized. Its object is a desire, that of other people, in the sense that man has no object that is constituted for his desire without some mediation. (Lacan & Fink, 2007, pp. 148)

In Hegelian terms, Lacan's surplus demand for love, beyond basic need, is a demand for the recognition of one's desire, which transcends the importance of satisfying the need. The subject primarily strives for the recognition of the Other; there is no desire derived exclusively from the self. Lacan praises Hegel for conceiving that "each human being is in the being of the other" (Lacan & Jacques Alain Miller, 1991, p. 72). No motivation to act is exclusively sourced from oneself, instead the aim is to act in such a way that the subject's presence is recognized by another person. Incentives and actions are formed as such to comprehend what action would lead the Other to recognize one's desire. Desire is directed towards another Desire (the Other's Desire) which is finally a desire for recognition, Kojève says, when analysing Hegel's *Phenomenology of Spirit*. Consciousness, the idea of oneself, is the result of interaction with others and is mediated by the obtained recognition from those others. (Alexandre Kojève & Queneau, 1980). Motivation to act, and eventually motivation to be in a certain way, is always mediated by the Other's expectation. The subject acts in such ways to meet external expectations and achieve recognition. No act, beyond those that target satisfying basic needs, has a purely internal source and eventually one's desire is fully alienated in the Other. Lacan says this clearly, in a way reminiscent of Kojève and, of course, Hegel: "Desire is always the *desire of the Other*. Which basically means that we are always asking the Other what he desires." (Lacan, 2008, p. 38).

When we do not precisely know what is expected from us to be recognized, we try to guess what the Other desires and we try to act ac-

cordingly. What could be perceived as a self-desire is always in some form an effort to interpret the *desire of the Other* and internalize it by making it our own desire before acting upon it. There is no pure self-sourced social desire, even though one might perceive feeling motivated by internal drives. A potential feeling of desire coming from within is the result of a process of unconsciously asking the Other what he desires [from us] to recognize us. The subject first asks a question and then it internalizes it by forming desire. The answer to the question “What do you want?” is the cause of desire, what Lacan calls *objet petit a* (or *objet a*) (Neill, 2011). The *a* stands for *autre* (other); the concept has been developed out of the Freudian *object* (*objet*) and Lacan's reference to otherness. Lacan insisted that *objet petit a* remains untranslatable, acquiring the status of an algebraic sign (Lacan & Sheridan, 2010). The use of the term object is metaphorical and symbolic. *Objet petit a* is the object cause of desire, a fantasy that provides the subject with a sense of wholeness, as if it were attained it would allow the fulfilment of the *desire of the Other* and resolve the sense of lacking formed by the separation from the Other. This process begins in childhood, when the child wants to be the mother's sole point of attention, but the mother's desire always goes beyond the child; some part of her desire is not related to the child, as she herself is a subject lacking, which feels separated from the Other (Fink, 1997). By pursuing the *objet a*, the child behaves in ways that reinstate the mother's recognition and full attention. It addresses the separation and division from the mother and fantasizes of a state of completeness, after having fulfilled her desire. The *objet a* is an action or a condition that would ideally allow for a complete unity with the Other; it is a fantasy that forms the expectation of recognition, it is the incentive to act upon Other's desire.

Building on Freud's drive theory, the *objet petit a* is one of Lacan's most significant contributions to psychoanalysis, distinctively focusing on the significance of the external stimulus coming from otherness. Lacan's breakthrough was to suggest that the expectation of others on how one should be unconsciously pushes the subject towards conformity which, in turn, is instrumental for motivating any action beyond the urge to satisfy basic needs. As we cannot always be the others' centre of desire, we are constantly experiencing a sense of lacking, which is triggering the need to feel complete and hence it forms desire. If the subject was not lacking, there would be no force to change anything, no

motive to be. Lacking and the need to feel connected with others is what stimulates behaviour. The *objet petit a* is the fantasy action or behaviour that would suffice to fulfil the others' desire, the expectation that the void of lacking would be filled.

The Neuroscience of Lacan's Desire

*"Once you understand the power and peril of dopamine,
you will better understand the human condition itself."*

Daniel H. Pink

Inspired by primatology studies from 1969 to 1990, the now widely accepted "social brain hypothesis" suggests that primates developed unusually large brains for body size, compared to other vertebrates, due to the social complexities of living in groups (Dunbar, 2016). Various studies confirmed a strong correlation of the brain neocortex size with group size in primates, while strategies of deception and coalition formation in those groups have temporarily termed the theory as "Machiavellian intelligence hypothesis" (Dunbar, 1998). Still, neither coalition formation and tactical deception, nor the number of social interactions per se, have been fully sufficient predictors of human brain size. In fact, it was pairbonded relationships that have been the most critical factor of brain evolution for anthropoid primates compared to the smaller relative brain size of other vertebrates (Shultz & Dunbar, 2007). By pairbonding, the literature refers mainly to reproductive relationships between males and females that are monogamous for a lasting period, but not necessarily for a lifetime. The reason pairbonded relationships contributed significantly to brain evolution is likely related to the need to develop mentalizing abilities to coordinate with one's mate on issues of nutrition and caretaking of offspring. Thus, primates were exposed to a process of developing a theory of mind through perspective-taking. It should be noted that simple non-reproductive bonded relationships have also likely contributed to that process. Still, pairbonded monogamy is now seen as the most significant growth factor for brain size and social cognition in humans (Dunbar, 2009). To sum up, even though the cognitive evolution likely began with basic ecological challenges, i.e. the need to satisfy basic needs such as finding food (Shultz & Dunbar, 2007), the large relative size of the human brain is the result of survival and reproduction mentalizing processes, where a critical factor is peer-coordination.

Bonded relationships have affected not only brain size but also incentives and reward mechanisms. The social brain hypothesis suggests that the brain grew in size as a result of and relative to the number and complexity of social relationships. Group size and particularly bonded relationships have been the most significant factors for brain size increase, which in turn unleashed significant computational power for humans. The disproportionate amount of executive brain power that became available with evolution allowed for highly sophisticated social behaviour to develop (Dunbar & Shultz, 2007). The neural basis of decision-making behind such social behaviour has been in increasing focus for neuroscience. Recent significant results suggest that social and monetary rewards share the same neural basis, a “common neural currency” that guides incentives, decisions and eventually behaviour (Izuma et al., 2008). In other words, the human brain and particularly the striatum area processes social reputation equivalently to basic material rewards. In Lacanian terms, the *desire of the Other* or the desire for the recognition by the Other triggers the same reward-related brain area as the fulfilment of a material basic need. Moreover, the same brain area was not triggered when the positive social feedback regarded a third party, but only when it was directed to the subject of the experiment (Bhanji & Delgado, 2013). This establishes that eliciting positive feedback from others has a positive effect similar to that of basic material rewards.

A complementary finding of major significance comes from a similar experiment which recorded the effect of being liked by peers and suggested that the magnitude of the positive brain effect is correlated with how important the person providing the feedback is (Davey et al., 2009). In Lacanian terms, the benefit of achieving the Other’s recognition depends on how highly we regard that given Other. Striatum activity does not only increase when we are liked or achieve good reputation, but also when we see that public opinion agrees with our own, or when our preference agrees with that of an expert, which constitutes another salient indirect form of recognition by others (Bhanji & Delgado, 2013), (Klucharev et al., 2009), (Campbell-Meiklejohn et al., 2010). This suggests the existence of a physiological basis for the Lacanian desire of the Other, that recognition is sufficient to activate the brain’s reward circuit and hence the prospect of recognition would motivate behaviour accordingly. However, it should be stressed that,

even though Lacan proposes the superior significance of desire over basic needs, neuroscience cannot yet confirm this. As mentioned above, the literature does confirm that social recognition in the form of good reputation, being liked and conforming with others is a sufficient reward trigger for the same brain area triggered by the fulfilment of basic needs. It also confirms that the reaction to recognition is directly proportional to the significance of the person providing the positive feedback. But there is no clear indication on the issue of which type of reward, social or material, has a significance priority.

A remarkable finding is that the striatum activity increases even at the mere presence of others which creates an expectation for a positive outcome, subject to a specific observed behaviour. We tend to alter our behaviour in the presence of others, likely trying to create a positive image and eventually elicit a social reward as described above. For example, adolescents tend to make riskier decisions when their friends are watching, while charitable donations are more generous when seen by others, as opposed to charity in anonymity (Bhanji & Delgado, 2013). This phenomenon is very significant for our understanding of incentives related to social reward. Recent neuroscientific findings allowed us to understand that drive is formed at the conception of a potential benefit, i.e. when we form the expectation that a specific preference or behaviour will lead to a reward, and not necessarily when an expected reward is in fact delivered.

The crucial neurotransmitter for regulating motivation related to future rewards is dopamine, with dopamine neuronal axons extending in the striatum area (Schultz, 1998). Dopamine activity and, in general, motives with respect to rewards (social or material) are governed by a prediction error mechanism; more reward than expected generates a positive dopamine response, as much reward as expected comes with no response and less reward than expected leads to a negative response. Most importantly, dopamine neurons show a strong positive response when exposed to a predictive stimulus and the conception of a potential reward, prior to its expected delivery (Figure 1), (Schultz, 2016). The latter is aligned with the finding that the simple presence of others encourages behaviour that would yield a social reward.

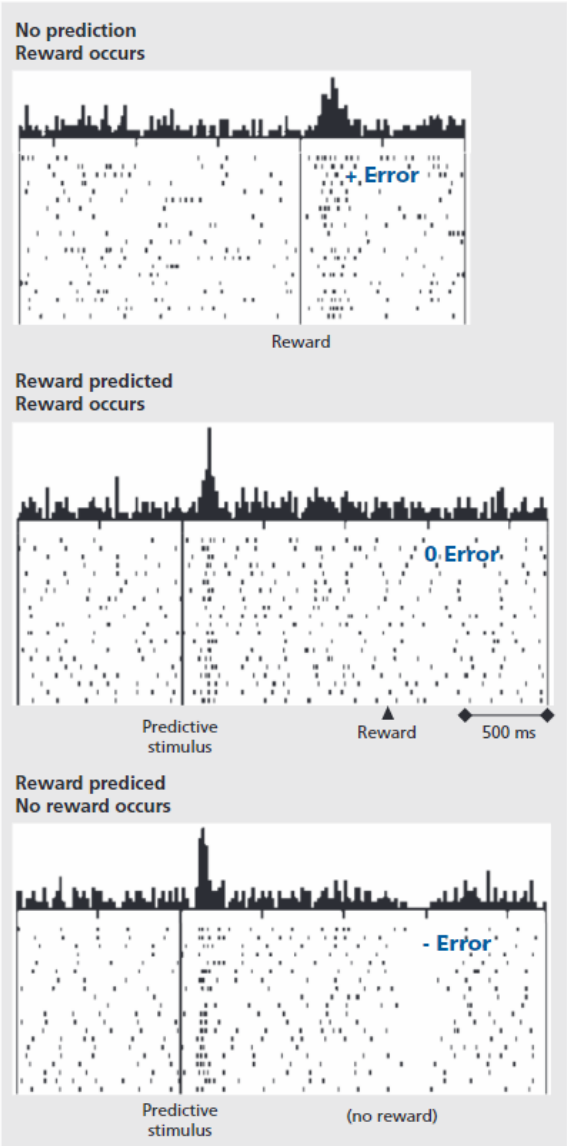


Figure 1, (Schultz, 2016)

Dopamine is essential for regulating wanting, while the expectation of the delivery of a social reward is what generates motivation to act in a way to achieve the perceived reward. As we have already seen, social rewards are sufficient cues to trigger wanting. In Lacanian terms, the wanted social reward is the *desire of the Other* and the *objet petit a* is what needs to be attained to achieve that goal. Comprehending what the Other wants from us serves as the neurobiological cue that allows the conception of the *objet petit a*. The motivation of the subject to seek the recognition of the Other is generated when it occurs to the subject what the *objet petit a* is; what is that act or behaviour that, if pursued, would fulfil the *desire of the Other* and thereby provide the subject with a sense of completeness. However, dopamine neurons will not respond if a reward is delivered as expected, or depression will result if the reward is lesser than expected (or if not delivered); this is consistent with the prediction error mechanism described above and showed in Figure 1. Even if the social reward is better-than-expected (a positive prediction error), the positive dopamine reaction fades very fast and only a fresh motive for a novel social reward, greater in magnitude or different in nature, would generate drive.

A striking and very relevant neurobiological finding was that the large and robust dopamine midbrain systems mediate only the “wanting”, the desire, and that the feeling of “liking”, the pleasure, is instead mediated by more fragile and anatomically tiny hotspots in the brain (Berridge & Robinson, 2016). Those hotspots are stimulated by a different set of neurotransmitters (such as opioid and endocannabinoid neurotransmitters) and are restricted from the much larger dopamine system that generate intense “wanting”. For example, the pleasure hotspot of the nucleus accumbens is only one cubic centimetre and comprises only 10% of the nucleus accumbens’ volume. The remaining 90% is disconnected from enhancing pleasure, but can still cause intense “wanting”. The two systems are complementary and a mere stimulus (cue) is sufficient to disrupt the brittle “liking” network and send the subject into a reward-seeking loop⁹¹.

The latter may justify why desire is more intense and frequent,

⁹¹ Dopamine’s “wanting” functionality is now understood to be the primary brain system underlying addiction.

compared to fewer moments of pleasure, and possibly explains why Lacan suggests that the subject's *lack* and desire for the *objet petit a* is the prevalent human condition. Dopamine controls an intense continuous reward "wanting" loop, disconnected from experienced pleasure, while even the effects of dopamine positive prediction errors are comprised of short-lived excitement spikes. For psychoanalysis, this means that the conception and pursuit of the *objet petit a* causes a positive, sometimes even ecstatic, dopamine reaction, but a longer-term completeness with the Other is never achieved. Similarly, the sense of Lacanian *lack in the Other* lies in the fact that "wanting", the desire for the *objet petit a*, is never-ending and separate from pleasure (the "liking"). For dopamine neurons, any act that will lead to a social reward which needs to be updated continuously to generate fresh drive, irrespective of any brief effect on "liking" and feelings of pleasure. The *objet petit a*, mediated by dopamine, needs to be reviewed perpetually, while the completeness with the Other, a pleasure feeling of having fulfilled the *desire of the Other*, can never be achieved steadily with a lasting effect. Desire and pleasure are neurobiologically separate!

Objet petit a is then that unattainable (non-)object which is simultaneously impossible and necessary in order for the subject to come to, and to continue to, be constituted as a subject. The movement of desire can then be understood to take the form of a perpetual slippage from one object, thing or aspect of a thing, to the next; a perpetual search for that which caused the desire in the first place but which, as it does not exist as such, can never be (re)found. (Neill, 2011, pp. 58)

The feeling of *lack* in Lacanian psychoanalysis is reflected in the unattainability of the *objet petit a*, which in turn is a potential reflection of the continuous dopamine "wanting" and its separation from "liking". Dopamine leads to a search for ever greater (or different) rewards irrespective of pleasure. The dopamine reward prediction error is a reinforcement learning mechanism that facilitated survival and the desire to continue being, but pleasure is determined by a different brain network; dopamine is a blessing of motivation for more life, but also a curse of continuous lacking at the same time; lacking the next reward, lacking the next instance of recognition by the Other.

Conclusion

This paper presented Lacan's theory of desire by defining *desire of the Other* and the related concept of the *objet petit a* as the object cause of desire that addresses the subject's *lack in the Other*. It further introduced the "social brain hypothesis" according to which human brain evolution has been driven by group and pairbonded relationships. The hypothesis suggests that coordination with peers (others) led humans to develop the disproportionate brain size they exhibit compared to other animals. Peer feedback has been instrumental for the current anatomy of the human brain, which likely impacted the processing of the interaction with others and the resulting behaviour formation. In fact, the brain striatum activity increases with social rewards, demonstrating similar response to the delivery of material rewards, which provides a fitting physiological basis for Lacan's theory of desire. After establishing that acknowledgement from others constitutes a sufficient motivation trigger, this paper presented the dopaminergic reward prediction error mechanism that mediates human behaviour with respect to reward triggers. Finally, I suggested that the conception of the *objet petit a* resembles the role of dopamine in processing cues that generate continuous "wanting". The major finding of neurobiology is that "wanting" is a dopamine-mediated, reward-seeking process that is disconnected from the brain systems that determine pleasure, "liking". This dominant role of "wanting" in brain neurochemistry and its separation from "liking" likely justifies the feeling of *lack* and the unattainability of the *objet petit a*; the feeling of the subject's incompleteness and the continuous desire for recognition, the *desire of the Other*.

Looking forward to future research, Lacan had suggested that anxiety is generated when we do not know what the Other wants from us (Lacan, 2016), which suggests that the subject cannot formulate a comprehensive *objet petit a*. Neurobiologically, this would mean an inability to form realistic predictions or to conceive reward stimuli, which could subdue dopaminergic activity for long periods. Moreover, the incentive salience of the Other may lead to pathological dopamine-mediated "wanting" to seek the *desire of the Other*, resembling addictive behaviour, which could also lead to elevated anxiety (Bazan & Detandt, 2013). A recent study in fact suggests that a dopamine prediction error perspective in psychotherapy may have a positive effect when treating fear and anxiety (Papalini et al., 2020). Future studies should further investigate the role of dopamine in anxiety and a potential connection of the incentive sensitization theory of addiction with Lacanian *desire*.

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