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# Apolline divination: hallucinogenic substances or cognitive inputs? The case of the laurel

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## ABSTRACT

The use of laurel in Apolline divination at Delphi has been a prominent area of interest in academic debates over the possible influence of drugs on prophets. Previous analyses revealed the absence of chemicals in the bay capable of altering the human consciousness. In this paper, I argue that the laurel did nevertheless have the power to influence the Pythia's mind through its cognitive impact on divinatory practices. The methodology pursues a cognitive approach that considers the object affordances and the human neural response. The paper concludes that, despite the modality being different from the one proposed in the past, the laurel had a strong impact on divination.

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## Introduction

The focus of this paper is the analysis of the laurel's cognitive impact on Apolline divinatory practices, considering its usage in different times and spaces. The priestesses reportedly chewed laurel leaves before uttering prophecies (Sophocles, *Cassandra*, in vet. Hesiodos, *Theogony*, 30 Di Gregorio = TrGF IV, 575; Lycophron, *Alexandra*, 1–15). On some occasions, the leaves were also burned for the Pythia to make fumigations (Plutarch 3.397a). Scholars have previously suggested that the use of the laurel caused a state of altered consciousness in the oracle that inspired her divinations (Holmberg 1979; Broad 2006; Graf 1979). However, no proof of the laurel containing hallucinogenic substances has been found from the analysis made on the plant (Harissis 2012, 355).

My argument is that whilst the engagement with the laurel affected the mind of the seer, it was not because of the chemical substances contained in its leaves but because of its cognitive agency and evocative properties instead. The case study considered is the Sanctuary of Delphi and the ritual of divination carried out at the Sanctuary in the Archaic and Classical periods.

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## Previous hypotheses on the Pythia's state of mind

A number of former interpretations of Apolline divination in ancient Greece attributed the behaviour of the Delphic oracle to hallucinogenic substances and an altered state of mind (Holmberg 1979; Broad 2006, 194). At the end of this century, the finding of an active fault right below the adyton at Delphi by the hand of the geologist J. Z. de Boer led some scholars to believe that the local tectonic framework could have explained most of the correspondences between the geological feature, the archaeological evidence, and mythology (Piccardi 2000, 653). The analysis by the toxicologist Jeffrey Chanton showed that trace amounts of ethylene could be found inside the active fault (Johnston 2008, 48). The sweet smell of this gas aligns with Plutarch's description of the adyton as sweet-smelling (*Obsolescence*, 437c). Additionally, ethylene can cause an altered state of consciousness during which one can feel a state of euphoria and have out-of-body experiences. Therefore, some scholars interpreted the state of mind of the Pythia as a psychedelic anaesthesia induced by the gases in the adyton (Icaza and Mashour 2013, 1255). However, I agree with Johnston (2008, 49) that several questions still remain open. First of all, the level of gas fluctuates significantly, which means that there were times when the fault was not active. Furthermore, why would this gas only affect the Pythia and not the consultants who were not that far away from the fault as well? Besides, ethylene gas is highly inflammable and explosive: since fires were daily lit at the sanctuary, a consistent presence of this gas would have caused an explosion (see Johnston 2008, 48–49).

Moreover, the hypothesis of a mediumship or possession pertaining to the spectrum of schizophrenia has been described by social anthropologists (De Boer et al. 2001, 707–710; Parke and Wormell 1956, 170; Bowden 2005, 22; Dodds 1951, 70–71; Maurizio 1995; Graf 2009.) However, as Luhrmann comments, psychosis-like experiences are so variable that they are better thought of as a 'cluster of clusters', rather than as lying on a continuum (Luhrmann, 2017, 30). Other scholars suggest that the Greek word for laurel [*daphne*] has been misinterpreted (Harissis 2014). Starting from the claim that the word laurel in ancient Greek could have been a generic term that embraced several plants, he proposes that the plant used by the Pythia should be identified as oleander (Harissis 2014, 355). However, one leaf of this plant has been considered potentially lethal (Harissis 2014, 355). Characteristic features of oleander poisoning include nausea and vomiting, abdominal pain, and diarrhoea, which usually occur within several hours (Barceloux 2008). Increased salivation, burning of the mouth, paraesthesias of the tongue, and hoarseness due to vocal oedema may also develop, as a result of the local effects of oleander extracts (Driggers et al. 1989). As can be observed, collateral effects of ingesting oleander are quite strong and not compatible with repetitive usage, especially considering the risk of death. Moreover, in the primary sources, the prophet is also described and depicted as in a conscious and alert

state of mind. The only occasion in which the Pythia is described as frenzied in primary sources is when Plutarch narrates of the prophetess getting mad and ending up killing herself after a ritual that had not been followed correctly (*De Defectu Oraculorum*, 438a–438c). It is evident that the ancient author is describing the episode as something unusual, due to circumstances that were out of the ordinary at Delphi.

This paper argues that the process of divination was not physiologically induced by gases or substances. Instead, we are dealing with a cognitively and culturally mediated process. This does not mean that should further chemical analyses prove in the future that the Pythia and the other prophets were truly affected by hallucinogenic substances, our thesis would become less strong; instead, the combination of the physiological and cognitive experiences would further enhance one another (Frigerio 2023 forthcoming).<sup>1</sup> Specifically, this paper only focuses on the cognitive role of the laurel in Apolline divination, identified as the common substance that goes by the name of laurel, sweet bay – *Laurus nobilis*. Common laurel is still present at the Delphic site nowadays (Frigerio 2023 forthcoming). Moreover, an iconographic study on Greek and Roman statues identified as *L. nobilis* the plant depicted in the shape of wreaths adorning priests and poets, and heroes, including the victors in the Pythian and Olympian Games (Yilmaz et al. 2012).

## Methodology

I start from the concept of the human brain as a ‘prediction engine’ (Seth 2017). It uses the prior expectations in the cortex to look at the reality. In brief, the brain works with the following unconscious mechanism: prediction, error, update (Taves and Aprem 2016, 4). Event models are constructed through the interaction of sensory inputs with stored knowledge (Zacks et al. 2017, 277). This means that our evolved minds interact with our socio-cultural and natural environment which influences how the events are segmented and processed in the future. Our brain is culturally constructed (Bourdieu 1994) and event segmentation can be considered a form of cognitive control (Zacks et al. 2017, 283).

Specifically, in the religious ambit, catechetical instruction and repetitive reinforcement of belief become encoded in our explicit memory system, generating a precise schema of knowledge and a coherent system of beliefs. This system can be described as organised into different categories: once an object has been put in one of them, categorical knowledge provides rich inductive inferences that guide the interactions with it. This phenomenon has been defined as mundane knowledge (Barsalou et al. 2005) as it helps our orientation in the social system and in the world in general. For the Greek people, this system was composed by the set of myths, religious beliefs, and ritual performances they grew up with. As claimed by Jennifer Larson, at birth the mind-

brain is not a blank slate but possesses blueprints for discrete, interlocking systems which govern perception, learning, and memory. These systems constrain, guide, and shape our perception and our reading of reality (Larson 2016, 3). Embracing Anderson's (2001) ambitious work which aims at understanding what it was like to be ancient Athenians through the application of 'ontological history', this work aims at reconstructing the categories in the mind of the Greek people related to the laurel plant to place the evidence we have from the past in the correct cultural categories.

In order to do so, the methodology followed takes into consideration three major factors: the cultural and ontological background<sup>2</sup> of the case study, an object's agency with its cognitive stimuli, and the human neural response to these stimuli. As for the former, this paper looks at the laurel plant through the filter of primary sources. The attempt is to use ancient texts as close as possible to the Classical period. In the cases where this has not been possible, later authors are considered if enough elements exist to hypothesise that they are putting into words uses and customs that are proved by archaeology to exist in the previous centuries too.

In terms of object agency, the analysis relies on Malafouris' claim that objects have agency (2013, 136).<sup>3</sup> This position has been further corroborated by recent anthropological studies which have argued that objects are not passive reflections of the society, but active participants that shape the social practices (Knappett 2005; Johannsen, Jessen, and Jensen 2012; Anderson 2018). In line with these new theories, this paper resists the Cartesian perspective and claims that agency also pertains to objects being expressed in many different affordances (Ibidem), things that the objects can give to people to exploit.<sup>4</sup> Those properties can be of various types. They can be spatial assets, which are the physical features of an object, easily noticeable through sight and touch. This could be used to facilitate perception, guide an action through space, seek attention, etc. Material culture may also have symbolical features (Roepstorff 2008; Malafouris 2010). It can help with concretising the abstract. The agency of the object can also be conjugated in evocative properties, which means that they can raise emotions or remind the user of a concept or experience. In this paper, the laurel plant is going to be analysed considering all the affordances it could offer to the prophet and the consultants during the ritual of divination in Classical Greece at Delphi.

Eventually, the human brain and body's responses to the object agency will be analysed, by applying some basic rules of modern neuroscience that explain the human brain's reaction to the material world.<sup>5</sup> Specifically, the theories proposed by Malafouris (2013) and Vaesen (2014) will be the starting point for the reading of the use of the laurel proposed. Firstly, this innovative methodology allows us to shed new light on the involvement of the laurel in Apolline divination. The cognitive approach offers an alternative reading allowing insights into how this behaviour might be considered rational. Furthermore,

independently from the case study, this paper's findings about the use of the laurel plant in prophecy indicate the value of such an innovative approach and invite future research into other aspects of material culture present at sanctuaries.

## The laurel at Delphi

### *The Pythia as Daphne*

Among its numerous uses, it is common knowledge that, in Ancient Greece, the laurel was sacred to Apollo. In the primary sources, the description of Apollo often includes the laurel (*GP* II, IX.525; Euripides, *Ion*, 422–424; Callimachus, *Iambi*, 69). According to Diodorus Siculus, it was Apollo himself who discovered the laurel (1.4–5),<sup>6</sup> whilst it is Pausanias who narrates that the most ancient temple dedicated to Apollo in Delphi was first made of laurel (V.9).<sup>7</sup> However, my analysis of this sacred plant aims to further develop the investigation of its role in the process of divination.

A first strongly evocative affordance of the laurel plant must be ascribed to its mythological background. The myth of Apollo and Daphne gives an aetiological account for the association of the laurel with Apollo (Pausanias 8.20.1; Ovid, *Metamorphoses* 1). Hit by one of Eros' golden arrows, Apollo was bursting for love for Daphne, who had been hit by the lead arrow instead. Wanting to remain unmarried and pure for the rest of her life, the nymph was running away from Apollo who chased after her and desired her body. At this point, the most popular version of the myth narrates that Daphne's father, the river Peneus, turned her into a laurel tree to save her virginity (West on Hesiodos, *Theogony* 344; Ovid, *Metamorphoses* 1, 452). From this moment on, Apollo made the plant sacred to him and vowed to wear it as clothing.

It is yet to be noticed that this version of the myth is quite late. These sources offer the final description of a mythological character whose origins are more complex and part of a wider picture, well analysed in Fontenrose's (1981) classic study.<sup>8</sup> He makes a compelling case for the origins of Daphne tracing back to the figure of Artemis Daphnaia, who then became known in the tale as Daphne and was considered a distinct person. She is, like Artemis, leader of a band of maiden huntresses (Fontenrose 1981, 50). In another version of the myth (Diodorus 4.66.5–6), Daphne is the name of Teiresias' daughter who was offered to Apollo at Delphi when the Epigonoi reduced Thebes (Fontenrose 1981, 50). According to the tale, she had more mantic skills than the father himself and as an inspired speaker of oracles she was called the Delphic Sibyl, also known as Herophile. In a hymn attributed to Herophile, the Delphic prophetess calls herself Artemis and claims to be Apollo's wedded wife, his sister, and his daughter (Pausanias 10.12.2). Additionally, according to Eustathios (on Dionysios Per. 416), Daphnis was the daughter of Ladon and Ge; being the

first woman on earth, she also became her mother's promantis at Delphi before the advent of Apollo. This figure also probably has the same origins as Daphne – Herophile – Artemis (Fontenrose 1981, 50).

The mythological associations of the laurel are fundamental to understanding its agency in the prophetic process. During divination, the Pythia carried laurel branches in her hands and wore a laurel wreath (Fontenrose 1978; Haughton 2008; Johnston 2008; Howatson 2013, 192); this, I argue, allowed her to identify herself with Daphne. Further correspondences between the two could reinforce this identification. Firstly, the Pythia's need to be chaste and pure corresponds with the virginal status of the nymph. In addition, despite her being an old woman,<sup>9</sup> the prophetess was wearing the dress of a maiden (Tully 2008, 4; Graf 2009, 64), an aspect that matches the nymph's young age. Furthermore, there are multiple myths in the cultural background of ancient Greek people where a god has sexual intercourse with a human being in the shape of an animal or a natural element; in this specific case, Apollo transforms himself into the sacred gas, which the Ancient Greeks identified as a sacred pneuma, coming out from the fault in the adyton. This interpretation finds support in the ontological background of Classical Greece. The advent of philosophy will lead, during the Classical period, to a progressive denial of the anthropomorphism of divinity. The world of nature has always been inseparably associated with the world of the Greeks. If in the beginning it was the manifestation of the gods, a means through which the god could be worshipped, or also a gift from the anthropomorphic gods and goddesses relegated to the top of the Olympus, now nature becomes the divinity itself (Kingdon 2001). As a result, the re-enactment of the chaste Pythia personifying Daphne, who was finally reached and owned by Apollo, was probably appealing to the eyes of worshippers of that time. In the moment of their physical encounter, the priestess, united to Apollo, was inspired by the god and spoke for his desire. Especially considering that ritual re-enactment is an expedient which is often used in religious rituals, as it happens, for instance, during the Catholic Christian mass, which includes the re-enactment of the Last Supper. The Greeks were especially familiar with this typology of ritual, considering that Greek religion is full of examples of ritual re-enactments (e.g. the re-enactment of Persephone's descent into the Underworld, the re-enactments of Asclepius miraculous healings, etc.).

The Pythia's personification as Daphne is possible if we consider that the brain always keeps track of any changes in body shape and postures to guide actions in space. In normal conditions, we are always fully aware of the position of our body in the surrounding environment (Vaesen 2012). To enable this, the brain updates its representation of the body, the so-called body schema. It has been suggested that the body schema is plastic, which means that it can incorporate external objects (Vaesen 2012). In other words, the laurel branch and wreath worn by the priestess inside the adyton could be incorporated into



her body schema. As previously described, the Pythia was wearing a laurel wreath whilst holding a laurel branch. We have already mentioned the mnemonic power of this specific kind of tree, which evokes the myth of the nymph chased by Apollo. The leaves on the body of the Pythia and the branch in her hands have the capacity to break the temporal simultaneity and spatial coincidence of her body which is now entwined with the essence of the laurel. If we think of a knight, the act of a man grasping the sword is more than a mechanical one, but also an act of incorporation 'which provides a new basis for self-recognition and self-awareness' (Malafouris 2018, 100): from a simple man carrying a sword, one recognises himself in the figure of the knight. Similarly, the Pythia is subject to the same process of recognition through objectification: from a woman dressed in laurel leaves, she is the first one who recognises herself in Daphne.

The same cultural background described earlier also pertained to the spectators. However, it is worth mentioning that scholars do not agree on whether the prophetess was seen by enquirers. The majority of the literature claims that despite the adyton only being a couple of stairs lower than the room where the spectators were waiting for the prophecy, the Pythia was performing behind curtains and, therefore, she would not have been visible to the worshippers (Parke 1967; Broad 2006; Graf 2009). However, other scholars argue that people saw her directly during the process of divination. A fifth-century Attic vase that depicts Aegeus consulting Themis (in the figure of the Pythia) provides evidence for the worshipper's direct encounter with the Pythia (Bowden 2005, 27). In this image, the consultant stands in front of the prophetess and can clearly see her during the consultation.<sup>10</sup>

The idea of the Pythia not being seen by the spectators aligns with the figures of the priests reporting the words of the prophetess and with the idea of the uniqueness of the union between the god and the woman. Yet, none of the arguments can be claimed to be conclusive. In the case of the Pythia not being seen by the consultants, the cognitive processes induced by the laurel branches in the mind of the spectators would be less effective than in the latter option. However, it is also reasonable to assume that people roughly knew what was going on behind the curtains. They had been told stories about the Pythia and the literature demonstrates that they were aware of the involvement of the laurel in the process of divination (*Greek Anthology* 9.525; Callimachus *Hymns* 2; Euripides *Ion*; Pausanias 5.9). Laurel wood was also used as fuel of the sacred hearth (Parke and Wormell 1956, 26), which means that the pleasant smell of the burning plant surrounded the consultants, providing a sensory cue to evoking both the visual image of the plant in the mind's eye as well as mythological associations. Furthermore, although they did not enter the adyton with the prophetess, the consultants participated in the ritual procession from the sacrifice on the altar outside the temple to the cellar of the temple (Parke 1967, 82), where they saw her entering the room. The fact that the worshippers

may not have seen the priestess during the process of divination itself does not mean they did not see her before or after the contact with Apollo; the cognitive effect could be just as powerful even if played out in the mind's eye.

### *Other affordances of the laurel*

The laurel was often associated with the idea of poetical inspiration (Parke and Wormell 1956, 26). Notably, a late authority even claims that the laurel itself when burnt served to induce prophecy (*GP* 11.2; Parke and Wormell 1956). From the fifth century BCE onwards, there is evidence that chewing the laurel leaves was supposed to bring a person into touch with the gods; as such, it was frequently used by prophets and poets to invoke inspiration (*Ibidem*). While chemical analysis has proven the laurel does not contain hallucinogenic substances in a quantity that is high enough to alter a person's consciousness (Graf 2009, 67), I argue that the process of divination could have nevertheless been influenced by the plant's reputed inspirational property. The later third-century BCE poet Callimachus highlights the clarifying effect of this plant: 'A word more clear should be spoken from the laurel branch' (*Hymn* 4, 94). The existence of this belief already in the fifth century (Euripides *Ion*, vv. 422–424; Euripides *Andromache*, vv. 295–297) opens the possibility that chewing the laurel could have had a placebo effect on the Pythia causing her to believe that the plant was helping her to be infused with inspiration from the god.

The medical literature of that time highlights a further reason for the importance of the involvement of the laurel in the ritual: the plant is mentioned more than once in the Hippocratic corpus (dated to between the end of the fifth century and the beginning of the fourth century BCE) (Craik 2014, 229).<sup>11</sup> References to the plant identify the following uses: to help with expelling a fetus after an abortion (*Barrenness*, 29); to help in case a woman fails to become pregnant (*Nature of Women*, 7); as a medication in case a woman's uterus twisted upon itself (*Diseases of Women* 2, 280); and to broaden the mouth of the uterus (*Superfetation*, 32). Therefore, at that time, the laurel was believed to have properties that helped women with gynaecological disorders, specifically issues that concerned the obstruction of the vagina. In this regard, it is also noteworthy that it was a belief in Ancient Egyptian medicine that all the orifices of a woman's body were connected and communicated through an open channel. The Egyptian medical papyri<sup>11</sup> claim that the channel between the vagina and the mouth had to be free from obstructions, otherwise the woman could not conceive. They also report that the bodily channel of a woman was free if it was possible to smell from her mouth the garlic put in her vagina the day before (Nifosi 2019). This belief is also found in the Hippocratic tradition and in Soranus' *Gynecology* (I.IX.35), in a period following the Archaic and Classical. However, as this information was already known in Egypt since at least the late Dynastic period (seventh to fourth century BCE), it suggests that it

might similarly have been known in Archaic Greece too. As such, it is likely that, in the mind of the enquirers, the sacred gas entering the Pythia was coming out of her mouth in the shape of words without encountering any obstacles.

This aspect brings our attention not only to the centrality of the female anatomy in Delphi's process of divination but also to the modality of the encounter between the god and the prophetess. In fact, the tripod upon which the Pythia sat was positioned right above the opening in the earth from which the sacred smoke representing Apollo emanated (Parke and Wormell 1956, 19). If the laurel opens up the main channels in a woman's body and in a healthy body the genitals were believed to be directly connected to the mouth, we could argue that whatever entered the genitals would come out from the mouth. In medical literature, this was the case for smoke from fumigations, while in this case it is Apollo himself as smoke, coming out from the mouth of the Pythia. Modern theories of gender studies revealed that to understand the body as a partly imaginary entity is to suggest that the body has no definite boundaries with its surroundings (Bolsø 2007). Specifically, these studies demonstrated the existence of a symbolism connected to an image of the female body as opened. To recognise one's body as a woman and to live one's body as a woman means to experience this within the framework of symbolic images of the female body as potentially open and boundaryless (Bolsø 2016). Consequently, in the specific case of the Pythia, we could even talk about symbolical penetration. The body of the Pythia, conceived as open, as highlighted by the medical literature, was symbolically penetrated by the god. Therefore, the presence of the laurel might also have been seen as an ulterior aid for the Pythia to welcome Apollo inside her body. In fact, not all the laurel's associations presented in this section would have been present to the mind of each worshipper as it would have depended on their age, gender, and culture. However, each aspect makes the plant fundamental for a successful rite of divination.

### **Event segmentation theory and the role of the laurel in Apolline divination**

Event segmentation theory allows for the interpretation of the laurel during divination as it explains that the perceptual system spontaneously segments activity into events as a side effect of trying to anticipate upcoming information (Zacks et al. 2017). The human brain makes use of perceptual predictions that represent the state of the world in the near future in order to anticipate the future and to plan appropriate action (Zacks et al. 2017, 273). These predictions are then constantly compared with what actually happens and are consequently updated. In short, the human brain works with the following unconscious mechanism: prediction, error, update (Taves and Asprem 2016, 4). One of the features of event segmentation, and the most relevant for this analysis, is

that it depends on prior knowledge: event models are constructed through the interaction of sensory inputs with stored knowledge (Zacks et al. 2017, 277). This means that our evolved minds interact with our socio-cultural and natural environment which influences how new events are segmented and processed in the future. This is the concept of the culturally constructed brain, already explained by Bourdieu with the concept of habitus as defined in the methodology section.

Some scholars have claimed that the human brain is essentially a prediction engine (Clark 2013) and that what we perceived of the world is 'the brain best hypothesis' (Howhy 2007, 322). Despite being very clear about the impact of sequential predictions on the way we look at reality, these are probably exaggerations of the actual process that goes on in our brains in the contact with reality. The procedure by which we enter into contact with reality considers four variables: a pre-existing event schema (which is what we defined as sequential prediction); a stimulus; the environment; and the referent specific knowledge (Taves and Asprem 2016, 14).

Notably, the knowledge that is truly culture-specific plays an important role in event processing. For instance, knowing that deceased people manifest themselves under the shape of ghosts makes a subject more likely to believe that weird things they sense or feel can be ghosts (Ibidem, 7). Along the same lines, due to what is defined as confirmation bias, the human brain tends to interpret the evidence in ways that favour existing beliefs (Larson 2016, 374). This means that people try to support their hypotheses by searching for evidence that favours it. In this case, the way the spectators looked at the laurel is biased by their belief that the plant is one of the means by which Apollo contacts the human world.

Thus, event segmentation can be considered a form of cognitive control, modulating cognitive control and memory maintenance (Zacks et al. 2017, 283). During the ritual of divination, the spectators make contact with each and every piece of material culture, including the laurel, through the filter or the aid of prior cultural knowledge. Moreover, socially guided experiences and interpretations not only influence individuals' cognition, they also align cognition among participants, creating the so-called shared or social metacognition, which is when individuals jointly evaluate thoughts and make decisions together (Schjødt and Jensen 2018, 320). Usually, this is created through the reading of the same books (e.g. the Bible for Christians), the narrations of the same set of stories (e.g. the myths in Ancient Greece), etc. Through teaching and practice, the same world-views are adopted amongst most of the community. This taught belief is a metacognitive guidance that introduces a guiding principle for how individuals understand and reflect on their own thoughts (Schjødt and Jensen 2018, 320).

These mechanisms influenced and guided the ritual of divination at the sanctuaries of Apollo in ancient Greece too. Generally, the consultants shared the same metacognitive guidance when dealing with divinatory practices, because of belonging to the same religious system, supported by the same

doctrines. The knowledge and belief described with regard to the laurel branches created strong expectations through which the consultants evaluated the laurel in the hands of the Pythia.

## Conclusion

As stated, objects can activate areas of our brain by causing some sort of uncontrolled response. We do not have direct command over the ideas and emotions that objects generate in our mind at first sight (Johannsen, Jessen, and Jensen 2012; Knappett 2005). Inside the adyton at the Sanctuary of Delphi, each one of the objects involved in divination possesses strong mnemonic potential (Frigerio 2023 forthcoming). Material culture is not simply decorative in the room but has a consistent cognitive biography. The evocative properties of laurel derived from the rich mythological background helped the Pythia to identify with Daphne, the nymph loved and chased by Apollo. Additionally, it suggested the idea of divine inspiration, an aspect that might have had a placebo effect on the mind of the prophet. Furthermore, according to the medicine of that time, it physically opened the channels of the female body to make it ready to welcome Apollo in the shape of the sacred gas. In conclusion, I argue that the laurel plant influenced the mind of the prophet and of the enquirers due to its proper agency and not to hallucinogenic substances.

At Didyma, where Apolline divination was carried out in Hellenistic times, laurel branches were not only worn by the oracle, but they were also everywhere in the adyton (Frigerio 2023 forthcoming). In this case, there is no mention of the prophet chewing or inhaling the smoke from laurel fumigations, the power of the laurel laid on its visual impact and symbolic agency instead. A further testimony of how with the pass of time the bay tree is straightforwardly associated with the prediction of the future is the Greek Magical Papyri (Graeco-Roman Egypt, 100 BCE/400 BCE). In this collection of magical spells, formulae, hymns, and rituals, many sections are indeed dedicated to the forecast of the future and to the attempt of contacting Apollo. In these cases, the laurel (*PGM* I.262–347; *PGM* II.1–64; *PGM* 11.64–183; *PGM* III.282–409) always appears as a powerful instrument fundamental in reaching the goal. Particularly interesting in this regard is *PGM* III.282–409. Indicated as a ritual to perform with the aim of bringing foreknowledge, the passage describes a procedure that involves the use of a tripod, a table of laurel wood, a figurine of Apollo laurel-crowned, and a bowl of water.

We are dealing here with Graeco-Roman Egypt, in a timeframe that goes from 100 BCE to 400 BCE, which is extremely distant both temporarily and geographically from the ritual of divination that was performed in Delphi during the Classical period. Nevertheless, we still find the laurel in a ritual carried out to forecast the future. The people engaging with these objects did not have the same habitus pertaining to the pilgrims at Delphi. Furthermore, they were now

chosen from the wealthiest families, as if the role had become an honorific title. At the same time, the laurel itself lacked all the mythological background and evocative properties it previously had. However, it assumed a strong allegorical power that connected it to the capability of foreseeing the future.

Concluding, this paper not only sheds new light on the involvement of the laurel in the process of divination, giving an insightful explanation of its role in the ritual. In fact, the methodology applied in this research also represents an innovation and renovation of the field of archaeology by being a consistent contribution to the field of cognitive archaeology, which is currently still under development. Specifically, going beyond the application of socio-psychology and behavioural sciences, which are still vastly applied here, this methodology saw a big involvement of neuroscience, which offers the approach a more scientific grounding. Extremely important in terms of contribution to the field is the fact that this same methodology can be applied to further case studies with the aim of solving open dilemmas in more than one archaeological ambit, especially regarding rituals, religion, traditions, and social behaviour.

## Notes

1. See Frigerio (2023 forthcoming) for more on the analysis of all the aspects that affected the mind of the Pythia and the pilgrims.
2. I follow the definition of ontological background described in Lloyd (2004) and Descola (2014).
3. Contra Gell (1998). Gell's insistence on intentionality as a criterion for agency restricted this property to humans. Subsequent studies, such as Malafouris (2013), which rely on a less restrictive definition of agency, however, are far more compelling.
4. When referring to agency pertaining to objects, we are not referring to intentional agency but to the mere capacity of having an impact on reality in general and on the human mind in this case.
5. Applying modern neuroscience to the ancient brain is possible because from the historical period considered to the present, the human brain has not been subject to substantial changes. Studies have proved that the major modifications to the human brain happened during the development from *Homo habilis* to *Homo erectus* and, finally, to *Homo sapiens*, whose brain is almost the same as those of contemporary people (Schachner 2012); 'Anatomically at least, our brains differ little from those of the people who painted the walls of the Chauvet cave all those years ago' (Robson 2011); 'Humans in ancient times were much like humans today, at least in terms of basic biological and psychological mechanisms' (Geertz 2016).
6. 'And it was Apollo, they say, who discovered the laurel, a garland of which all men place about the head of this god above all others' (Diod. Sic. 1–2.34 [trans. Oldfather 1933]).
7. 'They say that the most ancient temple of Apollo was made of laurel' (Pausanias 5.9 [trans. Jones, 1935]).
8. Fontenrose J., *Orion: The Myth of the Hunter and the Huntress*, University of California Press, 1981.
9. According to Diodorus Siculus, originally, the Pythia was a young virgin. However, after the kidnapping and rape of the young prophet made by Echebrates the Thessalian out

of desire for her, the Delphians determined that in the future a parthenos would no longer deliver oracles, but a woman, older than 50 years (Diodorus Siculus 16.26.6).

10. Aegeus consulting the oracle. Attic red figure Kylix, c430–440 BCE, Berlin Museum, inv. 2538 (Mendoça de Carvalho and Bowden 2011).
11. P. Carlsber VIII verso, col. 1 xx + 4-x + 6. Iversen 1939: 1–31. See also the similar P. Kahun 3, 17.19, case 28 in Westendorff 1999: 434, n. 768.

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No potential conflict of interest was reported by the author.

## Notes on contributor

*Giulia Frigerio* completed her bachelor's degree at the Università degli Studi di Pavia as a Fellow of Borromeo's College (Pavia, Italy). Following that, she attended her master's degree at the University of Oxford, UK. There, guided by her supervisor Prof. Chris Gosden, she became passionate about Cognitive Archaeology, an interest that she further developed thanks to her PhD that she obtained in January 2022 at the University of Kent. With Dr Efrosyni Boutsikas as supervisor, Giulia Frigerio applied the cognitive approach to the investigation of Apolline divination at Delphi, Claros, and Didyma in order to shed new light on the case study.

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