Feeling Around in the Dark: Bodily Movement as Multisensorial Experience in Minoan Cavernous Spaces

Maria Mina

Abstract *This contribution focuses on the study of Minoan anthropomorphic figurines, which have been recovered from sacred caves on Crete dating from the Protopalatial to the Postpalatial period (ca. 1900–1070 BCE). The first section discusses sacred caves and the ritual practices that took place within their enclosed spaces. In the second section, figurines are reintroduced into caves, and they are discussed in relation to their context of ritual use, and the associated dark and concealed conditions. In the third section it is proposed that the presence and handling of figurines contributed to the participants' attainment of an altered state of consciousness, which in turn facilitated a multi-sensorial religious experience inside sacred caves. The integrated study of figurines, which considers their active interaction with the spatial setting and the participants, aims to reconstruct movement and ritual practice as a three-dimensional, multisensorial experience of cavernous spaces.*

Sacred Caves in Minoan Religion

Chronologically, the use of sacred caves in Minoan religion spans the Protopalatial period (ca. 1900–1720 BCE), the Neopalatial period (ca. 1720–1470 BCE), and the Post-palatial period (ca. 1470–1050 BCE) (Tyree 2001, 39; for sites mentioned in the text see Fig. 1). Ritual caves paralleled peak sanctuaries during the Protopalatial and Neopalatial periods. Similar finds recovered from peak sanctuaries suggest that there was little difference between ritual practices that took place in caves and peak sanctuaries, with the exception that bronze figurines are far more numerous in caves (Tyree 2013, 181–182 with references).

According to Paul Faure, there are seven criteria for identifying a cave as sacred: (i) the consistent and numerous quantity of distinct offerings (such as ceramic vessels, figurines, libation tables, weapons and double-axes); (ii) the presence of water inside the cave; (iii) traces of fire; (iv) the organisation of the internal space to accommodate cult activities; (v) the awe-inspiring natural features of caves (*e.g.* stalagmites formations); (vi) oral or written traditions surrounding the sacred use of the cave, and (vii) the proximity to a settlement (Faure 1969, 204). Sacred caves can also be distinguished from funerary ones by the lack of human bones (Tyree 2013, 176).

Regarding the location of ritual caves, Loeta Tyree has noted that they were visible from the nearest settlement or palace on a mountainside, or in the case of subterranean caves, contiguous terraces overlooked the surrounding area (Tyree 2001, 40–41). A second point of departure of caves from other locales is that they are situated in the natural environment, often at some distance from the inhabited space. Peter Tomkins (2009, 146) has proposed that caves occupied a liminal position in Minoan religion as the domestic was transformed through its employment in a ritual context. The transportation and collection of objects from other settings (*e.g.* every-day activities in open-air settlements) and their subsequent appropriation in caves, in effect contributed to the enchainment of people and places across time and space in the context of ritualisation practices. Furthermore, caves, owing to their marginal location, existed in nature at some distance from settlements (Tomkins 2009, 146) and may have constituted cosmological spaces occupying an intermediate space between the infinite sky and the chthonic depths.

Entering a cave, therefore, may have marked a walkthrough portal that could lead from daylight to the underworld, a supernatural locale that in many cultures is perceived as the birthplace

Mina, M. Feeling Around in the Dark: Bodily Movement as Multisensorial Experience in Minoan Cavernous Spaces. In: Günkel-Maschek et al. (eds.), *Gesture, Stance, and Movement. Communicating Bodies in the Aegean Bronze Age* (Heidelberg 2024) 129–139
https://doi.org/10.11588/propylaeum.1309.c19823

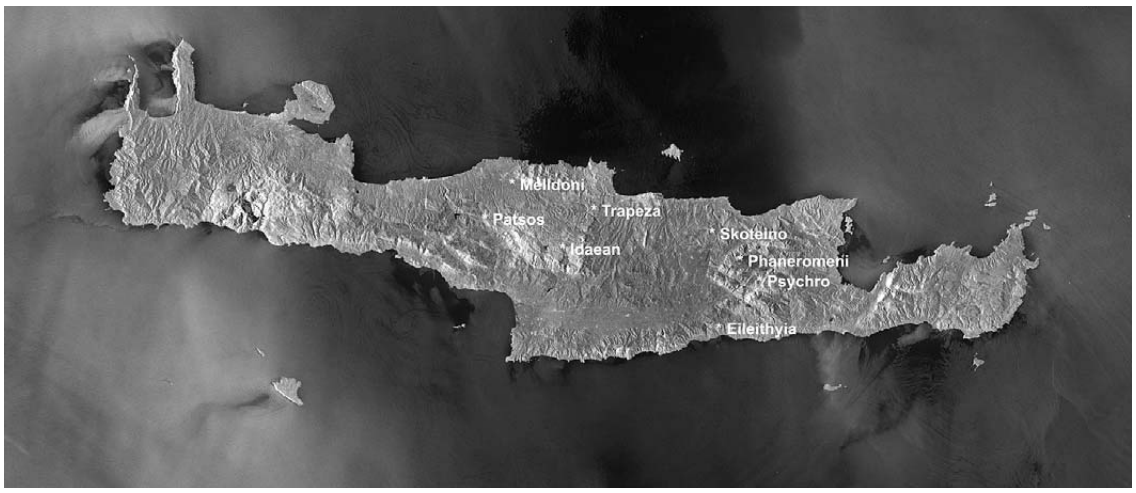

Fig 1. Map showing caves mentioned in the text (map processed by the author; source: European Space Agency ESA, https://www.esa.int/esearch?q=crete).

of everything (Kedar et al. 2021, 196). According to Hesiod, who recounts the myth surrounding the birth of Zeus, Rhea carried her new-born to Lyttos peak of Lasithi massif and from there to a cave in Mount Aigaion, the north-western peak of ancient Dikte (Hogarth 1899/1900, 95). Furthermore, the sacred Eileithyia Cave was dedicated to the goddess of childbirth, Eileithyia, and recovered figurines represented as pregnant women confirm the association between subterranean caves and birth. Although it is not possible to confirm with certainty the connection of childbirth goddess Eileithyia with the cave in the Minoan period, Proto-Geometric figurines representing erotic couples and pregnant women suggest that the goddess' veneration could be traced through the cave's diachronic use (Kanta and Davaras 2010, 28–29). A reference to the goddess on Linear B tablets from Knossos and Pylos could be interpreted as an indication that her worship may have its roots in an earlier Minoan deity of childbirth (Kanta and Davaras 2010, 40 with references).

Moving on to the interior spaces of sacred caves, those used during the palatial era tended to have downward sloping surfaces which retained cold temperatures throughout the year, or they were horizontal (Tyree 2013, 178). The downward sloping caves comprise several chambers at different elevations (*e.g.* Psychro Cave, Skoteino Cave, Melidoni Cave), whereas the chambers in horizontal caves were all situated on the same level (*e.g.* Phaneromeni Cave, Tylissos Cave; see Tyree 2013, 178). Minoan ritual caves were also mostly spacious, which would have allowed ritual practices to take place at their deepest location, as is discussed later.

Faure has observed that stalagmites or the presence of water often marked the focal point for ritual practices and for the deposition of offerings. Such examples include Psychro Cave, Melidoni Cave, Tylissos Cave and Skoteino Cave (Tyree 2001, 41; 2013, 179). In Psychro Cave, for example, two double-axes were inserted in stalagmites to mark the area where offerings were deposited (Tyree 2001, 41). In Skoteino Cave, it is possible animate qualities were projected onto stalagmites due to their alluding form, and a broad stalagmitic surface may have even served as an altar (Tyree 2005–2006, 55). In Minoan religion water in the form of springs or a well must have had symbolic significance as suggested by their association with peak sanctuaries (*e.g.* Jouktas, Kophinas, and Karphi). In the case of the sanctuary of Kato Syme, where the spring runs through part of the shrine, associated offering tables allude to the religious meaningfulness of water as a purifying agent (Peatfield 1995, 223 with references).

The unique conditions that prevailed in the interior space of sacred caves, compared with outdoor locales or open-air settlements, is that they provided a naturally (as opposed to a man-made) concealed setting, a theatre in which activities took place in enclosed conditions. The circumstances that were exclusive to subterranean environments exhibited a combination of special

features (such as limited natural light, humidity, speleological formations, sound effects, etc.) that could not be simulated authentically even in constructed indoor spaces (for instance, pillar crypts or tholos tombs). Regarding the qualities of the sacred cave chambers, those were deep and dark, and it is possible that this choice was deliberate as the lack of natural light was conducive to the attainment of ecstatic trance states which formed part of Minoan cult practices (Tyree 2001, 43, n. 29; Flor-Henry et al. 2017), as discussed in greater detail in the following section.

Anthropomorphic Figurines in Their Context: Space, Ritual Action, and Material Culture

Material traces of ritual activity

The finds associated with ritual activities that were performed inside sacred caves include utilitarian pottery, which nevertheless differs from domestic contexts in that the ceramic assemblage also comprises shapes associated with ritual practices, such as rhyta, or specialised shapes (including chalices, or pottery with appliqué decoration). In addition to vessels, cultic objects were also included, such as anthropomorphic figurines, stone libation tables, and metal votive double-axes (Hogarth 1899/1900, 107, pl. X; Tyree 2013, 176). It is worth juxtaposing the assemblages from sacred caves with the example of 'Tis Ouranias to Phroudi' Cave at Zakros whose finds contained domestic pottery, tools, and animal bones, but no cultic objects (*e.g.* figurines), thus demonstrating the habitational use of its space (Kopaka 2011, 276–278).

The recovery of finds in deep and secluded areas inside caves, confirm that the focus for the performance of ritual activities was removed from the entrance, with limited exposure to natural light (Tyree 2013, 178, 179 with references). The example of Melidoni Cave (Tyree and Kanta 2005) confirms the distinctive features of Minoan sacred caves, but also illustrates the nature and the range of activities that took place inside their walls. Inside Melidoni Cave, a prominent stalagmite and a seasonal water source formed part of a small, enclosed area. The dark, semi-secluded chamber whose walls were framed by stalactites, yielded a considerable number of cooking vessels together with jars, jugs, shallow bowls, cups, and braziers. The cooking pots and other vessels were found in connection to fires that were lit in a confined chamber with a partially open ceiling, which nevertheless could not have served as a kitchen area due to the enclosed, dark, and damp conditions (Tyree 2001, 41; Tyree and Kanta 2005, n. 4).

To summarise the ritual activities that were performed inside sacred caves, the presence of transportation and storage vessels (amphorae, narrow or wide necked jars and pithoi) indicate that cult practices presupposed the transference and storage of food and liquid for future visits (Tyree 2013, 180 with references). The presence of spouted jars, cup rhyta and "communion cups" reveal that pouring and drinking formed part of the ritual practices during the palatial phases (as in the case of Kamares, Psychro, Amnisos and Skoteino). The consumed liquids may have included water (for example, from the deepest area of Psychro), or wine (Hogarth 1899/1900, 98; Tyree 2001, 45 with references; 2013, 179 with references). Cult activities during the Protopalatial period involved also cooking or heating as indicated by evidence from Melidoni, Skoteino and Kamares caves which yielded tripod cooking pots associated with ashy deposits, as well as signs of use and wear on the Kamares cooking pots (Tyree 2013, 179 with references). Food consumption also formed part of ritual behaviour as suggested by evidence of animal bones, cooking and eating-related equipment in association with fire pits, as illustrated by the caves of Melidoni, Skoteino and Kamares (Tyree 2001, 45 with references; 2013, 179).

Evidence suggests that the rituals that took place inside caves during the Neopalatial period were formally organised, as attested at Psychro Cave where part of the upper cave is paved, and a stand for offerings and libation tables were recovered (Hogarth 1899/1900, 98; Tyree 2001, 46). To conclude, it is possible that cult activities during the Protopalatial and Neopalatial periods remained largely unchanged, with certain differences regarding primarily organisational aspects (Tyree 2001, 46).

Anthropomorphic figurines and their connection to sacred space

Regarding the use of anthropomorphic figurines inside caves, evidence suggests that their transportation is associated with Protopalatial burial rites. Such examples include the small burial at Elenes Amariou Cave, which most probably was used for funerary deposition, and produced an assemblage comprising several figurine fragments possibly attached to a plaque (Tyree 2013, 176). Other examples come from the Agios Charalambos Cave where a considerable number of figurines in a variety of materials, were also connected to burial deposits. These finds were shaped as either anthropomorphic or amorphous figures, half of which could be used as pendants (Betancourt et al. 2008, 572). It appears, therefore, that figurines were already being transferred to caves in connection with burial rites before they were incorporated into ritual activities that took place in sacred caves. The introduction of figurines into sacred caves can be placed in the Neopalatial period, as suggested by the available archaeological data.

A review of the available evidence demonstrates that bronze figurines held a special place in the assemblages recovered from sacred caves. They are also known as 'votary' figurines because of their association with sacred spaces (such as peak sanctuaries), but also because their gestures and postures have been understood as an expression of their veneration to the deities (Morris and Peatfield 2001, 105, 107). The use of bronze figurines in sacred caves spans the Neopalatial–Postpalatial period. In terms of quantity, Tyree's study estimates that of the known figurines, thirty date to the Neopalatial period, seven to the Final Palatial and thirty-six to the Postpalatial period. These finds were recovered from the Idaean Cave, Patsos, Phaneromeni, Psychro, Skoteino, Trapeza Tylissou and Eileithyia caves (Tyree 2001, 41, 46, table 1). Bronze figurines, due to their prestigious material, have been interpreted by many scholars as votive offerings by elite community members, and their recovery from caves suggests the involvement of the elite in the associated ritual practices (Tyree 2013, 181–182). Moreover, the fact that not all sacred caves have produced bronze figurines confirms the restricted use of such prestigious paraphernalia.

Apart from bronze figurines, clay examples have also been recovered from sacred caves. Tyree (2013), in an article that aims to define the nature of Bronze Age sacred caves on Crete, presents data drawn from several studies which corroborate the presence of clay figurines among the associated assemblages. Regarding their distribution, a study carried out by Donald Jones (1999, 5–7), which comparatively analysed assemblages from cave and peak sanctuaries, has concluded that clay figurines are clearly associated with peak sanctuaries (often occurring in thousands), whereas there are significantly fewer in caves. Other clay models which are numerous in peak sanctuaries, but show a limited or no connection with caves, include clay votive limbs and animal figurines. The differences noted in the assemblages between peak sanctuaries and caves would suggest, therefore, that different types of ritual activities were performed in those spaces (Tyree 2013, 181–182 with references).

Examples of clay figurines from Protopalatial and Neopalatial sacred caves include one male figure from Chosto Nero, six figurines from Psychro Cave, as well as a shoulder fragment of a large female figure (Tyree 2013, 181–182 with references). Eileithyia Cave has also produced several fragmentary clay figurines dating to the Neopalatial period, the LM III phase and to the Subminoan phase, which are consistent with the diachronic ritual use of the cave (Kanta and Davaras 2010, 84, 92–93, 98–101, nos. 86–88, 91–99). An exceptional find, reported to have been found in the same cave, is a clay model of a rectangular structure which incorporates part of a compound, as well as two holes where a large standing figurine would have rested (Kanta and Davaras 2010, 89, 94, no. 89). The find in question suggests a differential use to the smaller bronze figurines. The size of the (missing) clay figurine would suggest that it would have held a more prominent place within the sacred space. Another difference from the smaller bronze figurines is that it could stand upright with the support of the base, which also would have not encouraged its manipulation.

Aside from bronze and clay figurines, Neopalatial lead examples are also known from Eileithyia Cave, including a lead male figurine with a disc-shaped headdress (Kanta and Davaras

2010, 89, no. 81). Also of special interest is a lead amulet representing a female body in the standing posture with both hands clutched and resting on the chest (Kanta and Davaras 2010, 89, no. 82). A gold parallel known from Gournia with bent elbows and hands resting by the sides of the head (Kanta and Davaras 2010, 89, pl. 32) suggests the use of such objects in living contexts, prior to their deposition in ritual caves.

To elucidate the connection of figurines with the sacred space of caves, we will refer briefly to the example of Skoteino Cave, an important sacred cave, which illustrates well the range of finds that were associated with bronze figurines. The cave produced three bronze anthropomorphic figurines, as well as a collection of artefacts that included ceramic pots of utilitarian character, numerous sherds decorated with appliques, as well as vessels identified on a functional basis as rhyta (Tyree et al. 2008, 179). The assemblage of Skoteino Cave, therefore, suggests that anthropomorphic figurines formed part of ritual activities that involved the consumption of food and wine, the preparation and mixing of substances, as inferred by the presence of a variety of ceramic shapes.

Regarding the recovery location of bronze figurines, they were discovered in a small ritual chamber situated deep within the cave (Tyree 2001, 42). In fact, several Minoan bronze figurines of Neopalatial date suggest that these were often deposited deep inside caves (Tyree 2001, 41). The location of the associated activities in the cave's adyton would suggest that a limited number of select participants would have been allowed to engage in ritual action. We can tentatively suggest that these actors may have constituted members of the elite through their connection with prestigious goods, such as bronze figurines, libation tables or double axes, also recovered from peak sanctuaries. To corroborate the hypothesis, the presence of metal imitations of weapons has been interpreted as evidence for depositional practices performed by groups with political and economic authority (Platon 2013, 157). As a note of caution, however, these objects were not exclusively restricted to community members of high status as suggested by the presence of similar finds in households of various tiers (Haysom 2018, 22).

Apart from the concealed areas of caves, figurines were also found near the entrances of sacred caves (Tyree 2001, 41). Evidence would suggest, therefore, that ritual activities may have also taken place around and at the entrance of the sacred caves, and that the positioning of figurines at the mouth of the cave may have marked the passageway into a sacred space. Alternatively, worshippers arriving or leaving sacred caves may have deposited figurines near the entrances as offerings to deities, as witnesses to their visit, or even as effigies of 'guards' protecting their sacred space.

The Multi-Sensorial Experience of Sacred Caves

In this section an attempt is made to reconstruct the experience of sacred caves on the part of the participants through the stimulation of their senses. It is proposed that the presence and handling of figurines contributed to the participants' attainment of an altered state of consciousness, which in turn facilitated a multi-sensorial religious experience inside sacred caves.

Caves constitute a theatre where their distinct qualities trigger the senses and in turn inform the human experience of their subterranean spaces. The special morphology and conditions prevailing in caves also contribute to the creation of altered states of consciousness in connection to their enclosed spaces and the activities that took place between their walls, as demonstrated by a study by Yafit Kedar and colleagues (2021). One such activity is the burning of torches, which when practiced inside deep and dark caves can cause a decrease in oxygen levels. Limited oxygen supply can induce a state of hypoxia which increases dopamine hormone levels and are in turn responsible for causing hallucinations and out-of-body experiences (Kedar et al. 2021, 181–183). It has been observed that increased dopamine concentrations in the brain can generate dreams and hallucinations, both of which are associated with out-of-body experiences and sensations, such as flying and floating (Kedar et al. 2021, 186 with references).

The enclosed subterranean environment, which was conducive to esoteric experiences, may also explain why caves were chosen in antiquity for oracular activities, as suggested by Yulia Ustinova (2009). Divination could have been achieved through the attainment of hallucinatory states, visions, and revelations which experiments have shown were caused by sensory deprivation and the reduction of external stimuli (Ustinova 2009, 265, 267 with references). Mystics and ascetics, who sought social isolation inside caves in their quest for enlightenment, could reach ecstatic states through the limitation of external stimuli, which contributed to disturbed perceptions of body image, accompanied by auditory and visual hallucinations (Ustinova 2009, 268–269 with references).

To reconstruct the conditions that may have prevailed inside prehistoric sacred caves, we can draw inferences from tests that have been carried out in Skoteino Cave on Crete. Analysis has revealed that carbon dioxide values generally remained below toxic levels, which nevertheless could be increased with the use of hearths, torches or lamps, the number of participants in relation to the available space, and in connection to the distance from the entrance (Tyree et al. 2009, 60).

Underground spaces would have also affected vision, as natural light entering their depths would have been limited. The penetration of natural light would have differed, however, in relation to the time of the day and the season of the year, periodically illuminating different parts of the cave through a glowing beam of light. The limited amount of light that entered caves was conducive to the illusory perceptions of their spaces by creating shadows, or by emphasising impressive speleothems (Tyree 2001, 44; Tyree et al. 2009, 61).

Apart from vision, other senses were also affected inside caves. The osphretic and palatable stimuli associated with the food prepared and consumed inside caves further enhanced the sensorial experience of their settings (Skeates 2013, 212). Moreover, the consumption of hallucinogenic substances and alcohol is also believed to have contributed to the ecstatic states that participants of ritual practices could attain. The variety of storage jars, pouring and drinking vessels recovered from sacred caves on Crete suggests that alcohol is likely to have formed part of Minoan ritual activities (Tyree et al. 2009, 45). Although the consumption of narcotic substances cannot be unequivocally proven, it is possible that the Minoans were aware of the psychotropic qualities of opium. Finds such as a small limestone capital from the Palace at Knossos in the shape of a poppy capsule, the goddess from the Late Minoan sanctuary at Gazi wearing a headdress decorated with incised poppy capsules, as well as a Minoan-style gold ring from Mycenae depicting a female figure clasping a bunch of opium poppies, suggest that the Minoans had access to opium (Tully and Crooks 2015, 137 with references).

A study conducted by Margarita Díaz-Andreu and Tommaso Mattioli (2016) has suggested that awe-inspiring acoustic phenomena could also arouse the senses inside cavernous spaces. Such phenomena could be responsible for generating intense experiences and lasting memories through the production of echoes (waves of sound bounced off a hard surface), resonance (the amplification of sound), and reverberation (increase of sound levels, distortion and intelligibility of speech as repeated sound waves reflect off surrounding surfaces) (Díaz-Andreu and Mattioli 2016, 1049–1050). Sound tests that were carried out inside Skoteino Cave, with the assistance of a professional singer, revealed that the voice diffused clearly to the lower levels and the result was paralleled to the clarity and tone achieved in a fine concert hall (Tyree et al. 2009, 61). Additionally, altered states of consciousness could be reached in areas of complete darkness through the repetitive employment of a rattle, sistrum or drum, but also through the echo of rhythmic chanting (Tyree 2001, 43).

Another difference between open-air settings and subterranean spaces with their confined chambers, narrow passageways, and the unique morphology of their enclosing walls, is that they can impose a particular way of bodily movement. The notion of kinesthesis, which can be defined as bodily awareness of space through the movement and position of body parts, can provide insights into the corporeal experience of cavernous environments on the part of the

participants involved in cave-bound ritual practices (Skeates 2013, 209). One form of bodily movement through which cavernous spaces could be experienced involved rhythmic dancing or gestural and postural comportment that instigated ecstatic states of consciousness.

An alternative way of experiencing caves could be gained through the sixth sense, which presupposed the activation of the participants' intuition or their instinctive awareness that did not rely on the five senses. Such metaphysical experiences could include the epiphany of a spirit or religious figure evoked in underground spaces (Skeates 2013, 214–215). Relevant to the sixth sense, as discussed later, is the attainment of ecstasy through gestures and postures elicited by the visual and haptic interaction with anthropomorphic figurines (Morris and Peatfield 2004, 52–54). Such out-of-body sensations, which were fuelled through the engagement of all senses, contributed to the mystical experience of caves.

The sense of touch also enhanced the experience of sacred caves. One way participants could gain a tactile sense of caves was through their fingers and hands, as they ran them over the hard, moist, or smooth texture of surfaces. A haptic experience of cavernous spaces could further be complemented through the handling of objects that were transported and employed between their walls (Skeates 2013, 211). Objects that would have been sensed through the outer surface of the body would have included the vessels used for the heating, pouring, and drinking, together with the texture and temperature of the consumed substances. Anthropomorphic figurines would also have been handled by participants (especially as their size allowed such manipulation), and their modelled postures and gestures may have alluded to the appropriate comportment assumed by participants. The handling of objects would have served to authenticate or materialise the ritual performance through the correct order of anticipated actions (such as presenting the offerings, heating and drinking substances, or playing instruments).

In an attempt to connect figurines to the performed ritual practices and the existential experiences of the adorants, it is proposed here that the transportation of figurines into caves contributed significantly to the effective performance of ritual activities by instigating bodily movement and trance-inducing postures through a reverse mirror image. A key idea to the argument is that figurines constituted representations of the adorants. Christine Morris and Alan Peatfield have convincingly argued that the deposition of votive body parts at peak sanctuaries was connected to supplication practices for healing. Votive body parts were also deposited in later periods at the shrines of Asclepius and at Greek Orthodox churches in the form of 'tamata'; in fact, Christian 'tamata' are believed to be a continuation of ancient practices (Teske 1985, 208; Morris and Peatfield 2004, 45).

Actual figurines may have constituted representations of the worshipping participants who visited sacred caves (Myres 1902/3; Morris and Peatfield 2006, 46). Apart from body parts, 'tamata' can also take the form of effigies which are depicted on metal plaques or wax models, and they represent the worshippers who offer them to the church when they plead for their healing (Teske 1985, 214). Moreover, the offering of representative 'tamata' give worshippers the opportunity to insert themselves in religious cosmology and forge their relationship with the divine as ecclesiastical architecture and art encapsulate the value system of the Orthodox dogma (Teske 1985, 214, 220).

Following on from the idea that 'tamata' represented the worshipers, we can tentatively suggest that figurines transported to sacred caves may have served as self-reflective 'eidola' of participants. An important difference from the static representations of 'tamata', however, is that Minoan figurines were modelled by comparison in a relatively animated state as they featured a set of postures and gestures (with their varieties) through which adorants expressed veneration (see Morris and Peatfield 2001, 105, 107). Figurines, therefore, as self-reflective effigies of the participants were likely to have a two-directional interaction with the participants: on one hand they may have mirrored the comportment adorants assumed in the ritual setting of a sacred cave, and on the other they may have elicited the appropriate gestures and postures conducive to an effective religious experience. It is possible that the handling of figurines and the visual awareness

of their vivid gestures and postures (especially in the case of larger models supported by a base) could instigate bodily movement on the part of the participants. Even in the dimmed environment of caves, the light emanating from torches or lit hearths in their deepest chambers, under certain conditions may have amplified the size of figurines as their shadows were reflected against their surrounding walls.

Apart from vision, touch is the other sense through which movement may have been transferred from figurines to the ritual participants. The term 'haptics' refers to active touch, which is typically used for object recognition through tactile interaction (Reed and Ziat 2018, 2, 12). Haptic perception, or somesthesis, refers to our ability to inform our knowledge through touch, and to explore our environment through our fingers and bodies. Haptic perception, however, goes beyond static touch and it involves the active exploration of objects and their surfaces through our hands and bodies. Such a perception entails kinaesthetic and proprioceptive information, the latter referring to the awareness of our own body, that is the body's ability to sense its location, movements, and actions (Reed and Ziat 2018, 2–3). In the case of dark, low-lit sacred caves, we can appreciate the necessity of haptic perception in the performance of cult activities through the handling of objects, such as figurines.

Research carried out in neuroscience has explored 'mirrored touch' synaesthesia, a form of synesthetic experience that elicits conscious tactile experiences in the perceiver through the combined engagement of vision and touch. Tests that were carried out revealed that the observation of another person being touched is experienced as tactile simulation on the observer's own body through overactivity in the neural system (Blakemore et al. 2005, 1571). What is proposed, therefore, is that we can explain the effect of a tactile trigger on others through the somatosensory mirror system, which identifies observed touch with felt touch (Blakemore et al. 2005, 1581).

The above findings could be relevant for the perception of figurines in the context of ritual action that was performed inside sacred caves. This is even more pertinent if we consider that figurines depicted the human form in gestures and postures that involved tactile touch of the body (*e.g.* hand-to-head gesture). The observation, therefore, of an (or even their own) 'eidolon' being touched, combined with the tactile experience through the figurine's handling, may have elicited the simulation of analogous sensations and actions in the participants' bodies. According to the proposed hypothesis, the handling of figurines, in combination with their visual perception through 'mirrored touch' synaesthesia (which would have generated a reverse mirror effect), could have enabled the transferal of movement to the participants.

The two-directional connection between figurines and participants becomes more relevant as the modelled gestures and postures are believed to be instrumental to the attainment of ecstatic states in Minoan religious experience. In recent years, it has been established in archaeology that the mind-body union holds a central position in shamanic practice and an embodiment approach aims to capture the physical action which contributes to the attainment of altered states of consciousness, and the communication with the otherworld. Caroline Tully and Sam Crooks (2015, 131) have argued that Minoan religious practices were characterised by shamanistic traits and involved the use of narcotic substances, somatic performance, altered states of consciousness, metaphysical communication with spirits and ancestors, therianthropic metamorphosis, and supernatural journeying.

Morris and Peatfield (2006, 52–53) and Tully and Crooks (2015, 136 with references) have linked the formalised, repeated repertoire of physical gestures of Minoan figurines recovered from ritual caves and peak sanctuaries with the work by anthropologist Felicitas Goodman. Goodman (1986, 1988, 1990) experimented with various restrictive body postures derived from ethnographic examples of shamanistic rituals in combination with 'sonic driving' (that is the repetitive application of sound) and found that they generated altered states of consciousness (Tully and Crooks 2015, 138). Drawing on Goodman's hypothesis, it is postulated that gestures and postures modelled by Minoan figurines, if held for extended periods of time, represented one

method by which ritual participants could achieve a trance state in Minoan ritual experience (Tully and Crooks 2015, 131, 136, 139, 152).

Morris and Peatfield, drawing on the anthropological work on shamanic practices, have proposed that specific bodily postures performed by the ritual participant could have generated a trance-like state through which Minoan spirits and deities were encountered. The extrasomatic states could be achieved through rhythmic movement and gestures, but also through sensory deprivation, sound and fasting (Morris and Peatfield 2006, 40–41). Depictions of the gestures and postures on gold rings (*e.g.* the Isopata gold ring), combined with the postural variety demonstrated by anthropomorphic figurines from peak sanctuaries (especially Atsipades Korakias peak sanctuary) suggest that the figurines depicted ritual postures which in a Minoan ritual experience generated altered states of consciousness, trance-induced epiphany, healing, and divination (Morris and Peatfield 2006, 42–43, 45–46, 48–50, 53).

The tests carried out by Erin McGowan in a darkened room with the use of a sistrum are particularly relevant for the use of figurines inside sacred caves, as the conditions were intended to assimilate those prevailing in a subterranean context. The results revealed that the gestures experienced by the participants led to altered states of consciousness of visual and aural complexity. Included amongst the tested postures were the hand-to-head and the folded-hands-on-the-chest gestures, which are also modelled by figurines recovered from caves (McGowan 2006, 40, 45, 49–50). Most participants in McGowan's experiment reported visual experiences while holding these postures, and even suffered aural distortions or sensations of heat, dizziness and numbness. Overall, it was noted that 86 % of the participants experienced visual phenomena, such as eyes and birds, which parallel the Minoan iconography of epiphany. It cannot be ruled out, therefore, that Minoan postures and gestures have the potential to generate visual effects, and ancient adorants may have relied on these postures for an efficient summoning of a deity through visionary experiences in a ritual context (McGowan 2006, 45, 47; Rimell 2021, 32–33).

If we examine the main gestures and postures modelled by Minoan figurines, it is possible to suggest that they could induce ecstatic states in Minoan ritual experience. Although the hand-to-head gesture does not have ethnographic parallels for its trance-inducing properties, its depiction in ritual ecstasy and epiphany scenes on Neopalatial gold rings (*e.g.* Isopata gold ring) demonstrates its association with extrasomatic religious experience (Tyree 2001, 42). The hands-to-chest gesture associated with female figurines and sacred caves (Psychro) (Hitchcock 1997, 113, 118, table 9.1, fig. 3) has also been identified as a trance posture through ethnographic parallels and experimentation by Goodman (1990) and Belinda Gore (1995). Experiments have revealed that this gesture was employed to gain extra energy for physical acts or for healing (Tyree 2001, 42, n. 26 with references, 47 with references). Following on from the understanding of gestures and postures in the context of Minoan religion, it is possible that the transportation and employment of figurines inside sacred caves was conducive to religious experiences through the visual and haptic interaction of their modelled bodily comportment. Moreover, it is possible that the employment of more than one figurine inside caves provided a theatre of interacting miniature eidola, perhaps eliciting the appropriate and expected choreography performed by participants' bodies.

Conclusion

In conclusion, it is proposed that approaching the modelled gestures and postures of figurines as more than static representations of religious comportment allows us to capture their interaction as three-dimensional objects with their handlers and viewers on multiple levels. The transportation of anthropomorphic figurines into caves, the visual stimuli generated by their presence, as well as their manipulation, would have elicited bodily movement on the part of the participants or attendees, which subsequently would have contributed to an altered state of consciousness. If we consider the presence of figurines with both male and female anatomical traits which equally feature trance-inducing states, we can tentatively suggest that sacred caves were not gender-exclusive spaces, assuming gender was related to phenotypical sex. The choice of bronze and lead figur-

ines, however, in connection to caves may be interpreted as evidence for the involvement of elite participants in cave-bound rituals, which is also consistent with the caves' limited space.

Finally, the physical and cultural context within which these animated objects were employed is another aspect that needs to be taken into consideration when examining the interactive property of figurines to elicit movement. Cavernous spaces would have generated spiritual experiences that paralleled those attained in peak sanctuaries, as suggested by Morris and Peatfield (2004). Nevertheless, the seclusion, privacy and exclusiveness imposed by the liminal and narrow spaces of caves, combined with the multi-sensory stimuli in their subterranean backdrop, may have generated qualitatively different experiences to those produced in an open-air setting. Moreover, caves may have served as unique sacred topoi where participants could claim their place in the chthonic, as opposed to the celestial cosmology of peak sanctuaries.

Acknowledgements
I would like to thank the anonymous reviewer whose constructive comments have helped improve this manuscript.

References

Betancourt, Ph. P., C. Davaras, H. M. C. Dierckx, S. C. Ferrence, J. Hickman, P. Karkanas, P. J. P. McGeorge, J. D. Muhly, D. S. Reese, E. Stravopodi, and L. Langford-Verstegen. 2008. "Excavations in the Hagios Charalambos Cave: a preliminary report." *Hesperia* 77: 539–605.

Blakemore, S.-J., D. Bristow, G. Bird, C. Frith, and J. Ward. 2005. "Somatosensory activations during the observation of touch and a case of vision-touch synaesthesia." *Brain* 128 (7): 1571–1583.

Díaz-Andreu, M., and T. Mattioli. 2016. "Archaeoacoustics of rock art: quantitative approaches to the acoustics and soundscape of rock art." In *CAA 2015: Keep the revolution going: proceedings of the 43rd annual conference on computer applications and quantitative methods in archaeology,* edited by S. Campana, R. Scopigno, and G. Carpentiero, 1049–1058. Oxford: Archaeopress.

Faure, P. 1969. "Sur trois sortes de sanctuaires crétois." *BCH* 93 (1): 174–213.

Flor-Henry, P., Y. Shapiro, and C. Sombrun. 2017. "Brain changes during a shamanic trance: altered modes of consciousness, hemispheric laterality, and systemic psychobiology." *Cogent Psychology* 4 (1). https://doi.org/10.1080/23311908.2017.1313522.

Goodman, F. D. 1986. "Body posture and the religious altered state of consciousness: an experimental investigation." *Journal of Humanistic Psychology* 26: 81–118.

Goodman, F. D. 1988. *Ecstasy, ritual and alternate reality: religion in a pluralistic world.* Bloomington: Indiana University Press.

Goodman, F. D. 1990. *Where the spirits ride the wind. Trance journeys and other ecstatic experiences.* Indiana: Bloomington.

Gore, B. 1995. *Ecstatic body postures. An alternate reality workbook.* Rochester, Vermont: Bear & Co.

Harner, M. 1990. *The way of the shaman.* San Francisco: Harper & Row.

Haysom, M. 2018. "Mass and elite in Minoan peak sanctuaries." In *Popular religion and ritual in prehistoric and ancient Greece and the eastern Mediterranean,* edited by G. Vavouranakis, K. Kopanias, and Ch. Kanellopoulos, 19–28. Oxford, UK: Archaeopress.

Hitchcock, L. 1997. "Engendering domination: a structural and contextual analysis of Minoan Neopalatial bronze figurines." In *Invisible people and processes: writing gender and childhood into European archaeology,* edited by J. Moore and E. Scott, 113–130. London: Frances Pinter Publishers.

Hogarth, D. G. 1899/1900. "The Dictaean Cave." *BSA* 6: 94–116.

Jones, D. 1999. *Peak sanctuaries and sacred caves in Minoan Crete: a comparison of artifacts. SIMA-PB* 156. Jonsered: P. Aströms.

Kanta, A., and C. Davaras. 2010. *ΕΛΟΥΘΙΑ ΧΑΡΙΣΤΗΙΟΝ. Το Ιερό Σπήλαιο της Ειλειθυίας στον Τσούτσουρο*. Irakleio: Editions Athanasia Kanta and Costis Davaras.

Kedar, Y., G. Kedar, and R. Barkai. 2021. "Hypoxia in Paleolithic decorated caves: the use of artificial light in deep caves reduces oxygen concentration and induced altered states of consciousness." *Time and Mind: The Journal of Archaeology, Consciousness and Culture* 14 (2): 181–216.

McGowan, E. R. 2006. "Experiencing and experimenting with embodied archaeology: re-embodying the sacred gestures of Neopalatial Minoan Crete." *Archaeological Review from Cambridge* 21 (2): 32–57.

Morris, C., 2001. "The language of gesture in Minoan religion." In *Potnia. Deities and religion in the Aegean Bronze Age, proceedings of the 8th International Aegean Conference Göteborg, Göteborg University, 12–15 April 2000,* edited by R. Laffineur and R. Hägg, 245–251. *Aegaeum* 22. Liège and Austin: Université de Liège and University of Texas at Austin.

Morris, C., and A. Peatfield. 2001. "Feeling through the body. Gesture in Cretan Bronze Age religion." In *Thinking through the body. Archaeologies of corporeality,* edited by Y. Hamilakis, M. Pluciennik, and S. Tarlow, 105–120. New York: Kluwe Academic/Plenum.

Morris, C., and A. Peatfield. 2004. "Experiencing ritual: shamanic elements in Minoan religion." In *Celebrations: sanctuaries and the vestiges of cult activity. Selected papers and discussions from the Tenth Anniversary Symposium of the Norwegian Institute at Athens,* 12–16 May 1999, edited by M. Wedde, 35–58. Bergen: Greig Medialog.

Morris, C., and A. Peatfield. 2012. "Dynamic spirituality on Minoan peak sanctuaries." In *Archaeology of spiritualities,* edited by K. Rountree, C. Morris, and A. Peatfield, 227–245. New York: Springer.

Myres, J. L. 1902/3. "Excavations at Palaikastro II. The sanctuary-site of Petsofa." *BSA* 9: 356–387.

Peatfield, A. 1995. "Water, fertility, and purification in Minoan religion." In *Klados: essays in honour of J. N. Coldstream,* 217–227. *BI CS* Suppl. 63. Oxford: Oxford University Press.

Platon, L. 2013. "The uses of caves in Minoan Crete: a diachronic analysis." In *Stable places and changing perceptions: cave archaeology in Greece,* edited by F. Mavridis and J. Tae-Jensen, 155–165. Oxford: Archaeopress.

Reed, C. L., and M. Ziat. 2018. "Haptic perception: from the skin to the brain." *Reference Module in Neuroscience and Biobehavioral Psychology.* https://www.sciencedirect.com/science/article/pii/B9780128093245031825.

Rimell, B. 2021. *The Minoan epiphany: a Bronze Age visionary culture. Archaeological evidence for ecstatic ritual and altered states of consciousness in Cretan prehistory.* Xibalba Books. https://www.biroz.net/xibalbabooks/research-minoan-epiphany.htm.

Skeates, R. 2013. "Making sense of the Maltese Temple Period: an archaeology of sensory experience and perception." *Time and Mind: The Journal of Archaeology, Consciousness and Culture* 1 (2): 207–238.

Teske, R. T. 1985. "Votive offerings and the belief system of Greek-Philadelphians." *Western Folklore* 44 (3): 208–224.

Tomkins, P. 2009. "Domesticity by default: ritual, ritualization and cave-use in the Neolithic Aegean." *OJA* 28 (2): 125–153.

Tully, C., and S. Crooks. 2015. "Dropping ecstasy? Minoan cult and the tropes of shamanism." *Time and Mind: The Journal of Archaeology, Consciousness and Culture* 8: 129–158.

Tyree, L. 2001. "Diachronic changes in Minoan cave cult." In *Potnia: Deities and religion in the Aegean Bronze Age, proceedings of the 8th International Aegean Conference Göteborg, Göteborg University, 12–15 April 2000,* edited by R. Laffineur and R. Hägg, 39–50. *Aegaeum* 22. Liège and Austin: Université de Liège and University of Texas at Austin.

Tyree, L. 2013. "Defining Bronze Age ritual caves in Crete." In *Stable spaces – changing perception: cave archaeology in Greece,* edited by F. Mavridis and J. T. Jensen, 176–187. Oxford: Archaeopress.

Tyree, L., and A. Kanta. 2005. "Cooking pots: in the depths of Minoan sacred caves." Paper read at the International Conference Cibo per Gli Uomini, Cibo per Gli Dei (Food for Men, Food for Gods), *The Archaeology of Ritual Meal in The Greek World, Piazza Armerina, Sicily.*

Tyree, L., A. Kanta, and H. L. Robinson. 2008. "Evidence for ritual eating and drinking: a view from Skoteino Cave." In *Dais. The Aegean feast. Proceedings of the 1th International Aegean Conference, University of Melbourne, Centre for Classics and Archaeology, 25–29 March 2008,* edited by L. A. Hitchcock, R. Laffineur, and J. Crowley, 179–185. Liège and Austin: Université de Liège and University of Texas at Austin.

Tyree, L., C. F. McCoy, A. Kanta, D. Sphakianiakis, A. Stamos, K. Aretaki, and E. Kamilaki. 2009. "Inferences for use of Skotino Cave during the Bronze Age and Later based on a speleological and environmental study at Skotino Cave, Crete." *Aegean Archaeology* 8 (2005/6): 51–63.

Ustinova, Y. 2009. "Cave experiences and ancient Greek oracles." *Time and Mind: The Journal of Archaeology, Consciousness and Culture* 2 (3): 265–286.