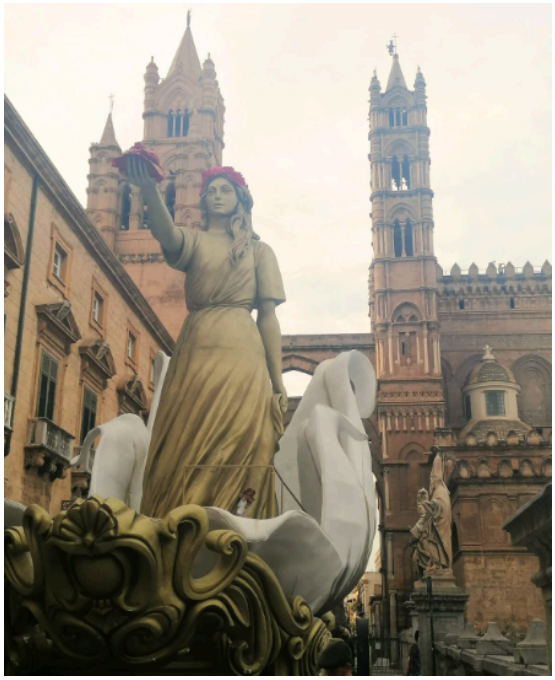
The Therapeutic Role of Chthonic Goddess Cults in Sicily: from Antiquity to Present



By Mary Katherine Loritz

A Dissertation Presented to the Department of Psychosocial Studies

Birkbeck College, University of London

Abstract

The purpose of this dissertation is to analyze the therapeutic and adaptive functions of ritual practices associated with chthonic goddess cults in Sicily from antiquity to the present day. It employs an interdisciplinary approach by combining archaeology, mythology, anthropology, and neuropsychology to examine practices ranging from cave incubation to ritual theatre and ecstatic dance, applying neuroscientific research to analyze how and why historical and modern-day ritual practices have been therapeutic and adaptive. It finds that activities such as ritual performance, music, dancing, and altered states of consciousness conferred biopsychosocial benefits for individuals and their communities by stimulating the release of endogenous hormones such as oxytocin and endorphins, facilitating empathy as well as emotional and physical synchrony through mirror neurons, developing collective myths and identities, and strengthening social bonds. On a species level, these therapeutic functions serve to foster cooperative behaviour, which has been essential for the survival of humanity as otherwise defenseless mammals with the longest maturation period in the animal kingdom.

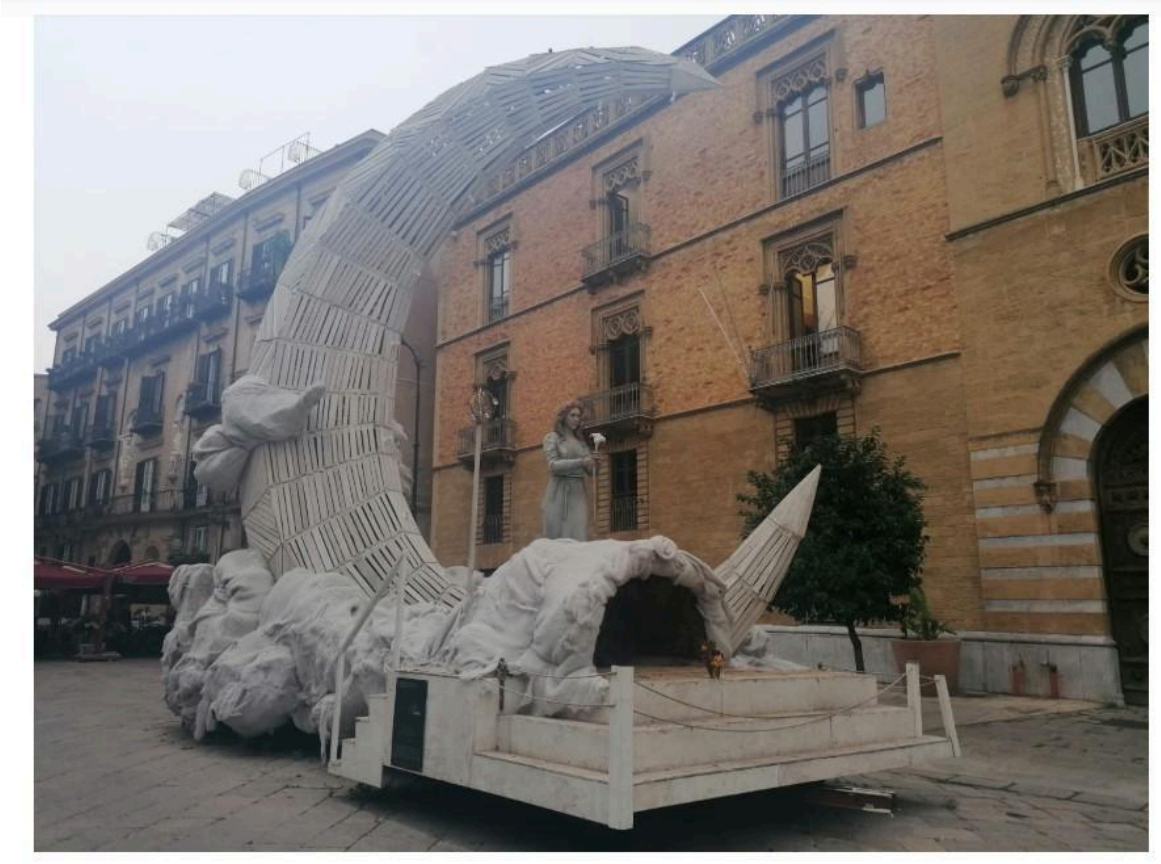
Word count: 11,485

Contents

Chapter 1: Introduction

"The entire island of Sicily is consecrated to Demeter and Persephone," wrote Cicero (Zuntz, 1971 p.70). The poet Pindar went further to say that Sicily belonged exclusively to Persephone: "Sow some splendor on the island, which Zeus… gave to Persephone" (Pindar, 1990).

What first caught my eye when visiting Palermo was a statue of what appeared to be a Greek goddess: wearing a flower crown and holding a lily, a cave below her opened into a crescent moon above. I wondered what a modern tribute to a seemingly pagan goddess was doing in a Catholic country. The flower and the cave brought to mind Persephone. Could it be her?



Float of Saint Rosalia, Palermo

After reading the inscription and looking up words like “santuzza”, I soon learned that the statue was not meant to be Persephone, but Saint Rosalia, a 12th century hermitess. After appearing in visions to Sicilians during the plague of 1624, her bones were unearthed and paraded through Palermo in 1624, bringing an end to the pandemic. However the image of Rosalia as Persephone stuck with me.

As attested by Cicero and Pindar, Sicily was especially sacred to Demeter and Persephone, and it is riddled with the remains of their temples. During Greek times, these temples would have been sites of ritual worship associated with the goddesses. I took the train from Palermo to the southern coast of the island, to the Valley of the Temples in Agrigento, ancient Akragas, where there were at least two temples devoted to the goddesses. The extensive veneration of Demeter and Persephone was apparent from the archaeological museum, where thousands of figurines of the goddesses were on display: two-thousand-year-old ritual votive offerings.

Sicily was a colony of ancient Greece beginning from c.800 BCE until the Romans took control of the island c.241 BCE in the First Punic War (MacKay, 2021). With the decline of Ancient Greece, Sicily endured a series of conquests by the Romans, Carthaginians, Vandals, Byzantines, Vikings, Arabs, Normans, Spanish, and the British over the next two millennia – none of whom were able to establish cultural dominance on the island (Mackay, 2021). Even under the Spanish crown, Sicily remained fragmented and difficult to govern (Ciaramitaro, 2008 pp.238-239). Though a part of Christian Byzantium from the 5th century CE, pagan ritual practices continued in some rural areas of Sicily for at least a millenia, while others were adapted to Catholicism (MacKay, 2021).

I discovered a history of chthonic cults in Sicily spanning from the Neolithic era to modern times, and I have come to see the veneration of Saint Rosalia as a continuation of ancient and even prehistoric goddess cults on the island. In this paper, I will review historical evidence and neuropsychological research to argue that these chthonic goddess cults and the ritual practices associated with them served biopsychosocial functions that were therapeutic and adaptive for both individuals and their communities.

In chapter two, I will begin by sketching out the history and links between these chthonic goddesses and what we know of their associated ritual practices in Sicily. In chapter three, I will introduce biogenetic structuralism and neuropsychology as theoretical frameworks for examining the therapeutic and adaptive functions of these cults and their ritual practices. In chapter four, I will analyse some of the common themes of these ritual activities by applying these frameworks. Finally, I will summarize my findings and present some concluding thoughts by offering comparisons to the present day.

Chapter 2: Chthonic goddess cults

2.1 Hybla

Throughout Sicily the underworld speaks: from St Rosalia's cave on Monte Pellegrino in Palermo, to a continuously erupting Mount Etna, to the elaborate chthonic graves carved into limestone at the Pantalica necropolis.

At the Necropolis at Pantalica, dating from c.1300 BCE to c.800 BCE, almost five thousand cave-like graves were cut into limestone using stone tools; where possible, they face the sunrise (Zuntz, 1971 pp.61-62). Necropoli like these from the Copper and Bronze Ages have been found throughout Sicily (p.62). Graves were carved in the shape of houses, and decorated with food bowls, utensils, and beakers "as though they had assembled for a family feast" (p.62). Later graves were increasingly ornate, with the dead even resting on beds carved into the stone. From the contrast between the dark interiors of the graves and the morning sun greeting them, the themes of death and rebirth at Pantalica are clear: "Enter any one of the graves; you feel as nowhere else, that you are in the womb of the Great Mother, from which the dead will be reborn, mysteriously, for another span in the light above" (p.62).

> The belief that birth is a passage from the darkness of the womb to the daylight appears in numerous literary references and is reflected in the association of 'divine mothers', such as the Earth, with darkness (Ustinova, 2009 p.4).

Not far from Pantalica at the Necropolis of Castelluccio, the great archaeologist of Sicily, Paolo Orsi, discovered doors of tombs decorated with a figure with spiraling breasts and a phallus, depicting the sexual act and fertility, gracing the home of the dead, another indication that for the Sicels (pre-Greek, indigenous Sicilian), death was followed by rebirth. Zuntz (1971) refers to this fertility goddess as the "silent goddess of life and death" (Zuntz, 1971 p.70). He later identifies her with Hybla, the Sicel goddess of land and fertility, who he suggests may have originated in Crete or Malta. Hybla had at least four sites named after her in Bronze Age Sicily. At one of her sanctuaries in the foothills of Mount Etna at Paternò, the priests were renowned for their skill in interpreting omens and dreams (Zuntz, 1971 p.68), and Zuntz argues that Pantalica necropolis was also known as Hybla (p.69), hinting at the goddess's chthonic aspects.

2.2 The Cult of Demeter and Persephone

Diodorus Sicilus, Cicero, Pindar, and Ovid all named the fields surrounding Enna, the "navel of Sicily" as the site of the abduction of Kore by Hades, the Underworld. Beautiful Kore, maiden and daughter of Demeter, goddess of the grain, is picking flowers with nymphs when the Underworld opens beneath her, and Hades takes her away. Demeter wanders the Earth looking for her daughter, lighting pine cones in the fires of Mount Etna to aid in her search. Eventually she is assisted by Hekate, who heard the maiden's cry. In her grief Demeter causes the Earth to go barren, which forces Zeus to negotiate and allow their daughter to reunite with her mother in the Spring. However when Demeter's daughter emerges from Hades, she is transformed – she is no longer Kore, the maiden, but Persephone, wife of Hades and the fierce queen of the dead.

Enna is located on a stunning mountain peak. When I rode by it it was covered in fog. A temple of Demeter was once perched on its cliffs, overlooking Lake Pergusa – also known as "the lake of blood" since it sometimes turns red and emits a sulfurous stench (Rigoglioso, 2005). Enna has been inhabited since at least 4000 BCE, and was likely the site of an ancient goddess cult that predated Greek colonization. In the meadows near Enna a structure from the 5th century BCE

was discovered over two grottoes (Holloway, 1991 p.86). Rigoglioso (2005) speculates that "the presence of circular enclosures, which in Paleolithic and Neolithic Europe symbolized the 'womb' of the female divinity, suggests that [Enna] was probably sacred to a goddess or goddesses from very early times" (Rigoglioso, 2005 p.7).

Zuntz (1971 p.73) argues that when the Greeks settled Sicily, Hybla became Persephone, a goddess of death in her chthonic aspect as Queen of the Underworld, and life and rebirth, as goddess of the Spring. After Greek colonization, Neolithic or Bronze age goddesses would have been replaced by Demeter and Persephone, and worship would have taken place at their temples throughout the island.

Rigoglioso suggests that in earlier versions of Persephone's myth, Kore was not abducted but goes into the Underworld willingly to gain wisdom (Rigoglioso, 2001 pp.x-xi). And in Diodorus's (a native of Enna) retelling of the myth, the fertile fields surrounding Enna opened into a "massive cave" leading into the Underworld, through which the maiden disappeared. Both versions hint that Kore, the maiden, was not abducted but willingly underwent a ritual of katabasis, a hero's journey to the Underworld found in many Greek myths such as those of Odysseus and Orpheus. Katabasis may also refer to literally going to the Underworld through a descent into caves in what is sometimes known as cave incubation, a ritual activity practiced throughout ancient Greece, for example by Pythagoras and his followers, but also within the eremitic Christian tradition, exemplified by Saint Rosalia. Similarly, the caves and circular enclosures found near Enna may have served as "womb-tombs" in which maidens, like Kore, may have hibernated for short or long periods as a part of their initiation rites.

Rigoglioso offers further interpretations of the Persephone myth, positing that the flowers Kore picks before descending to the Underworld are a reference to the psychoactive substances that would have been prepared and ingested as a part of women's initiation rites (2005, p.19). Based on what we know of other rituals during the Bronze and Copper Ages (Guerra-Doce, 2015), it would not be surprising if a women's initiation rite involved nightshades or mushrooms. Regardless of whether psychoactive substances were involved in Neolithic rituals at Enna, the circular enclosures described by Rigoglioso do indicate an incubation ritual as part of a rebirth experience, which in later times could have also served as a mythic recreation of Kore's descent into the Underworld.

The most famous of Greek rites was the Eleusinian Mysteries, a series of rituals involving the reenactment of the myth of Demeter and Persephone. Scholars have proposed that the southern Sicilian settlement of Selinus, home to many Greek temples, was a site of a localized version of the Eleusinian Mysteries due to architectural similarities between the temples of Demeter at Selinus and at Eleusis (Miles, 1998 p.40; Holloway, 1991 p.61). Furthermore, the temple at Selinus was dedicated to Demeter Malophoros, "the fruit-bearer", referencing quinces and pomegranates, which have associations with the Underworld and fertility, underscoring here her connection with Persephone (Stallsmith, 2019 p.75). The propylon of the temple is dedicated to Hekate Propylaia ("the gate-keeper" between the living world and Underworld), and Zeus Meilichios, a serpentine, chthonic aspect of Zeus, who may have been a representation of Zeus as Hades (Stallsmith, 2019 p.81). Both Hekate and Hades were of course central to Persephone's myth. In the Eleusinian Mysteries, the myth of Demeter and Persephone was reenacted with singing, dancing, performances, and a retreat into a cave-like temple.

As described by Rigoglioso and Zuntz, the ritual worship of goddesses on Sicily predates Greek settlement, reaching into the Neolithic and Bronze Ages. And as Zuntz (1971) notes, the fertility goddess Hybla bears striking similarities to Persephone in her associations with death and rebirth. Likewise, her veneration stretched far into the future. According to MacKay (2021), Persephone was worshipped in the southern Sicilian town of Naro well into the Early Modern Period.

2.3 The cult of Dionysus

Though not a goddess, Dionysus is known for his androgynous nature and mostly female devotees, the maenads. He was the son of Persephone and Zeus, murdered by the Titans as a baby to be reborn by the mortal Semele. Dionysus goes back into the Underworld to retrieve his mother Semele after she is killed by Zeus, and she then becomes a goddess. Through his myths and in his capacity as the god of vegetation, Dionysus is intimately tied to the chthonic realm and themes of death, rebirth, and transformation.

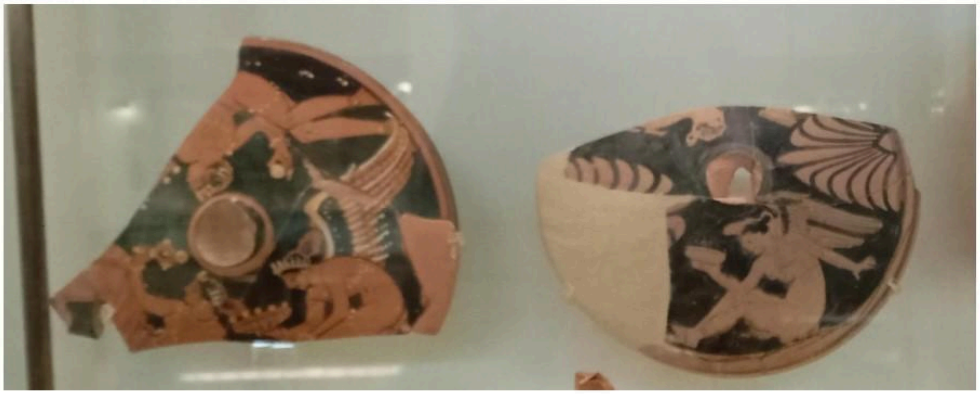
The cult of Dionysus in Italy is well-documented. As the god of wine, as well as ecstatic revelry, and theatre, he was extremely popular, with a long history of worship and a cult that spread throughout Asia and Europe. He was associated with the liminal and marginalized, and especially worshipped amongst women and slaves. His cult became associated with rebellion to such an extent that the Roman Senate cracked down on the Dionysian Mysteries, or Bacchanalia, in 186 BCE, executing thousands of priestesses and devotees and confining its practice:

> Dionysus also loomed large in slave revolts. In addition to being the god of wine and theater, Dionysus was the god of liberation. He was unwelcome to the Romans. In 186 BC the Roman Senate claimed that Italy's widespread Dionysiac groups masked a conspiracy. In a frenzied atmosphere, the Senate drove Romans out of the cult and permitted only women, foreigners, and slaves to worship the god. Dionysus was left to the powerless of Italy, and they embraced him… Both Sicilian slave revolts invoked Dionysus. (Strauss, 2010 p.194)

Dionysian vase c.300 BCE featuring maenads. From the Pietro Griffo Regional Archaeology Museum, Agrigento

In addition to classic, dramatized accounts of Dionysian rituals such as *The Bacchae* by Euripides – in which the disbelieving king Pentheus dresses in drag to join the maenads out of curiosity, and is literally torn apart by his frenzied female relatives – artwork from Sicily can tell us something about the ritual practices of his cult. Dionysian worship is most famously associated with the gatherings of revelers and maenads that involved music, especially drumming, flutes, and chanting, as well as ecstatic dance (Papaioannou and Lykesas, 2012).

I took these photos at the archaeological museum in Agrigento before I knew I was looking for evidence of Dionysian worship in the region. The vases are consistent with other Dionysian vases from Southern Italy c.300 BCE. I was able to analyse the vase above by comparing it with the description of a similar artifact (British Museum, n.d.). Depicted on the vase above, the woman holds a tympanum (drum), and a thyrsus, a wand made of a fennel stalk and pinecone and "the most characteristic symbol" of Dionysus carried by maenads (Adams, 2019 p.10), while the man next to her appears to be brewing a potion. The intoxicant of the revelers may have been wine (Papaioannou and Lykesas, 2012), mushrooms (Ruck, 2019 p.349), or another herb. The top of the vase is decorated with a grapevine. Other wine vessels in the same case are decorated with heart-shaped clusters of grapes and vines.



Phiale c.300 BCE featuring maenads. From the Pietro Griffo Regional Archaeology Museum, Agrigento

On these phiale, or libation vessels, maenads can be seen drinking the ritual sacrament from the same – wine brewed with a mixture of herbs such as opium, cannabis, or henbane (Ruck, 2019). The maenads are sometimes depicted with wings to signify their elevated state. Such imagery may have carried forward into the Middle Ages to inspire fairy cults and folklore. Dionysus´s maenads are widely thought to have inspired the *tarantella*, a popular Southern Italian folk dance (Blackstone, 2009 p.190).

Bejor (1977) argues that at Selinunte, Temple F – traditionally attributed to Athena – was in fact dedicated to Dionysus. His hypothesis is based on the cultic connections between Selinunte and Megara, the Greek city from which the early settlers of Selinunte originated, and the similarities

in architectural features between Temple F and the Dionysian temple at Megara, such as the temple's alignment with the rising sun at winter solstice. Dionysus was an important Megarian deity, where he was worshipped under the epithet Nyktelios (Lord of the Night), associated with the Dionysian festival Nykteria (Bejor, p.445). Celebrated on the winter solstice, the Nykteria was a fertility ritual symbolizing the death and rebirth of the god, a mystery rite that Plutarch also linked to the myth of Osiris' dismemberment and resurrection. Bejor (1977) suggests that Dionysus as a vegetation god – who gradually "dies" and then returns to life after the solstice – would have been important to the Greek inhabitants of Selinunte, a primarily agrarian settlement, to ensure good harvests. Bejor's hypothesis regarding the Nyktelios aspect of Dionysus and his associated ritual at the winter solstice provides compelling evidence for the god's worship in Sicily.

2.4 Las donas de fuera

The "donas de fuera" or "women from the outside" was a cult of women healers in Medieval and Renaissance era Sicily. These women were "thought to be able to transform themselves into animals, and to have the power of flying, curing, and divining" (Henningsen, 2009 p.62). Henningsen (2009) distinguishes them from other "witches" across Europe because their activities were especially linked to fairies and healing, they openly admitted their activities to Spanish inquisitors – not thinking them to be heretical – and denied any association with the devil, and the local population held them in high regard:

> The position of these women as mediators with the fairies was deeply rooted in the Sicilian tradition. The inquisitors were outraged at the fame of these women, and also by the fact that people continued to visit them, even after they had been condemned and were serving their sentence of imprisonment in the grand hospital of Palermo. (Henningsen, 2009 p.64)

According to their testimonies, the donas de fuera would fly on billy goats to distant lands to meet with fairies and the fairy queen. The women would also travel through towns at night,

visiting the homes of their patients and offering blessings (Henningsen, 2009 p.63). The donas de fuera reported having fantastical experiences with the fairies, including sexual affairs. They gathered to go on adventures that, in their testimonies, convey a sense of ritual ecstasy. As the donas de fuera had sexual affairs with fairies, the maenads, in their frenzied states had "delusional fantasies of sexual abandon to the amorous onslaught of hybrid creatures imagined as… goat-men or satyrs, who represented the spirits of the wilderness and its herbal toxins" (Ruck, 2019 p.347).

The fairies apparently also taught these women the healing arts, which they used to serve their communities (Ostling, 2018 p.28). This is another commonality with Dionysian maenads, who were said to use their hollowed thyrsi wands to collect herbs (Ruck, 2019 p.348-349), and through this process would likewise have become knowledgeable healers. And for both groups of women, it is likely through their knowledge of herbs that they achieved their trance-like ecstatic states and visions.

It was known by the inquisitors that witches did not leave their homes when they engaged in such activities (Henningsen, 2009 p.59). "Witches" throughout Europe were thought to apply "the witch's ointment", a salve containing some combination of nightshades such as henbane or mandrake, as well as other psychoactive plants (Müller, 1998 p.622). While nightshades can easily be lethal, in smaller doses they were used in the ancient world as pain relievers, while in larger doses they were known to induce delirium and waking visions (Müller, 1998). This is one plausible explanation for the women's supernatural experiences. Others suggest that these stories are merely folklore, while Henningsen proposes that these women may have had a natural method for inducing collective, lucid dreams. Reports of fairy women, as well as witches and healers, continued into 20th century Sicily (Chapman, 1971 pp.198-210).

2.5 Saint Rosalia

Saint Rosalia was a 12th century Norman hermitess from a noble family claiming Charlemagne as an ancestor. When she was a teenager Rosalia retreated to live in a cave in Quisquina, later relocating to a cave on Monte Pellegrino just outside of Palermo. Rosalia withdrew from society to escape an arranged marriage (Schwendener, 2021). According to legend, angels led her to the

cave, where she inscribed into the wall that she had been led to live there by her love for Jesus Christ (Filipczak, 1989).

In 1624 – five centuries later – Palermo was overtaken by a plague, and the already canonized Rosalia appeared in visions to Sicilians across the island. In one such vision, Saint Rosalia revealed the location of her remains to a sick woman, and they were subsequently uncovered by Jesuits (Jay, 2021). First a painting of Saint Rosalia, and then her remains, were paraded around the city, and the plague ended shortly thereafter in 1625. Saint Rosalia has since been the patron saint and protectress of Palermo. Ever since, festivals have been held in her honor in midsummer, and the Palermitani also make a pilgrimage up Monte Pellegrino to visit her cave shrine every year on the night of 3 September.

The connections between Persephone and Rosalia are hardly obscure. Both are maidens carrying flowers who descend to the Underworld. Both are transformed through their experiences: Persephone becomes the Queen of the Underworld, and Rosalia becomes a saint. Both ultimately bring forth life and hope, through the sprouts of Spring or the end of the plague. And we do not have to go far back to find explicit connections between Saint Rosalia and Persephone. Wherry and Thomas (1905) describe an account of the festival of Saint Rosalia in Palermo from 1826:

> On July IIth the car, a huge structure 30 metres high and 22 broad, is drawn through the streets by twenty yoke of oxen. On its summit stands Santa Rosalia, a slender girlish figure robed in white and wreathed with roses. Surrounding her are groups of angels, and conspicuous among a crowd of allegorical figures are Ceres, the earth mother, and a crowned man with a falcon on his wrist, the tutelary genius of the city. (Wherry and Thomas, 1905 p.250)

The angels surrounding Rosalia would have been those who guided her to the cave in her legend. The reference to Ceres, or Demeter, is clear, while the crowned man with a falcon could have represented Zeus or Hades. And the festivities of Saint Rosalia were apparently revelrous, in a way that might remind us of pagan rituals and festivals.

The present-day celebrations dedicated to Saint Rosalia in Palermo are elaborate, with a street festival, fireworks, theatrical productions, a procession through the city, and a pilgrimage to Saint Rosalia's tomb in her cave on Monte Pellegrino.

In the chapters that follow I will use a biogenetic structuralist and neuropsychological approach to discuss some of the common elements of these rituals associated with chthonic goddess figures, and how they may have contributed to the well-being of the individuals and groups who practiced them.

Chapter 3: A biogenetic structuralist and neuropsychological approach to ritual

For this dissertation, my methodology will apply the frameworks of biogenetic structuralism and neuropsychology to explore how the practices of the aforementioned goddess cults have been therapeutic and adaptive for the individuals and groups involved. Neuropsychology explains how rituals promote individual well-being, while biogenetic structuralism explains why they are adaptive and promote species survival in the long-term.

Biogenetic structuralism is a theoretical framework developed by Laughlin and d'Aquili (1974) that integrates neurobiology, anthropology, and phenomenology to explain the adaptive nature of the human brain and behavior. According to this framework, humans live in "cognized" or subjective environments—internal representations of the world that are constantly updated. These cognized environments allow individuals to act on their "operational" or objective, material environments, which can never be fully known (Laughlin, 1990). Rituals are technologies that transform the operational environment through intentional action (Laughlin, 1990 p.18).

Biogenetic structuralism provides a foundation for understanding how rituals function as adaptive mechanisms that improve individual and group well-being, performance, and

cooperation. Ritual activities such as drama, music, and dance *entrain* the neurophysiology, emotions, and even thoughts of group members. Symbols and myths also "entrain the individual's neurocognitive organization" inducing and interpreting experiences for individuals (Winkelman, 2010 p.217). By synchronizing individual and group cognized environments, rituals restore group equilibria, reducing conflict (Lex, 1979 p.146), and increasing the capacity for coordination and cooperation amongst group members, which is critical for survival (d'Aquili et al., 1979 pp.155-156).

Neuropsychology draws on neuroscience and neurochemistry to explain "the complex relationship between brain and behaviour" (Andrewes, 2015). A component of neurobiology, neuropsychology complements biogenetic structuralism by examining the specific brain mechanisms underlying ritual practices and their therapeutic effects. Altered states of consciousness (ASCs), neuroplasticity, and neurochemistry are some aspects of neuropsychology that I will apply to the rituals in this study. ASCs may be induced through any number of ritual practices including music and movement, and are also associated with the ingestion of psychoactive substances common in many rituals. Neuroplasticity is a concept central to neuropsychology and an important aspect of brain health. On a physiological level it is correlated to the strength and number of the brain's neurons, dendrites, and synapses. A healthy brain contains more neurons, dendrites, and synapses, and is better able to make new connections, learn, and adapt (de Sousa Fernandes, 2020). I will also be looking at neurochemistry, or how neurotransmitters such as serotonin, dopamine, and oxytocin are modulated during ritual processes and their therapeutic effects.

One limitation on my analysis is the very limited source material available for some of these cult practices. For example, little to no scholarship exists on the rituals associated with the goddess Hybla. And while much has been written about the Eleusinian and Dionysian Mysteries, little is known about them in their Sicilian context despite evidence of their observance there, and so I have extrapolated what we know about these rites from Greece and Southern Italy. Another limitation is the range of topics covered in this study, which may compromise depth in some places, but aims to give a comprehensive picture of ritual activities, their therapeutic functions, and adaptive social role.

Chapter 4: Adaptive and therapeutic dimensions of ritual practice

In this chapter, I explore how ancient and modern Sicilian rituals share common neurobiological mechanisms that contribute to their therapeutic and adaptive functions. I organize these rituals by activity, analyzing how each one supports psychological well-being and social cohesion from an evolutionary and neuropsychological perspective.

The first theme I identified was the retreat into darkness, examining how dream, trance, and contemplative states are therapeutic and adaptive. Next, I discuss ritual performance and reenactment, and how drama and storytelling facilitate empathy, theory of mind, and social bonding through mirror neurons. Next, I examine music and dancing, the neurobiological mechanisms through which they facilitate health, well-being, and bonding, and as well as group cooperation through mimesis and synchrony. Then, I briefly look at altered states of consciousness. Finally, I will look at how rituals create a sense of belonging through social bonding, and why this is critical to humans′ survival as social beings.

4.1 Cave incubation and contemplative practices

The descent into darkness through cave incubation, katabasis, or trance states has long been associated with transformation, renewal, and healing. From ancient Sicilian goddess cults to Christian hermits like Saint Rosalia, retreating into the depths has been a powerful ritual act symbolizing death and rebirth.

The Greek philosopher and mystic Pythagoras, who settled in Southern Italy, was known to hibernate in caves, and this practice became a cornerstone of the wisdom he imparted to his followers. His disciple Parmenides founded the Eleatic School, where initiates spent days or weeks in a subterranean chamber called a cryptoporticus, dreaming and contemplating the natural world in silence. Inscriptions at the site reveal that initiates signed their names with the epithet phôlarchos (‘lord of the den’), signifying their mastery of the power of darkness

(Ustinova, 2009, p. 192). This tradition extended to Sicily, where Empedocles of Akragas, a disciple of Parmenides, was renowned for his shamanic abilities to heal, control the weather, and even raise the dead (Ustinova, 2009 p.210). Rosalia also retreated to live in a cave and emerged as a mystic, and was sought out by villagers for her spiritual abilities (Il Festino di Santa Rosalia, n.d.). Prayers and pilgrimage are practices that remain part of her veneration today.

The presence of buildings above caves and the circular enclosures near Enna described in chapter two suggest that cave incubation may have been a part of cultic practices during Sicily's Neolithic and Bronze Ages, possibly linked to women's initiation rites. Incubation was also practiced as a part of the cult of Asclepius, the Greek god of medicine, at Asclepieia, the Hellenistic equivalent of hospitals, of which there was one in Akragas (Askitopoulou et al., 2002; Adornato, 2019). Patients there would spend time in underground chambers, and dream of the god or one of his daughters, who would communicate the course of treatment needed to heal them. The donas de fuera also entered dream or trance-like states through which they received healing wisdom, and the worship of the Bronze Age goddess Hybla was also connected to dreaming (Henningsen, 2009; Zuntz, 1971 p.68).

The psychological and neurobiological effects of darkness may help to explain the persistence of these ritual activities. Melatonin, a hormone produced in response to darkness, is one of the most powerful antioxidants known. It reduces oxidative stress and inflammation, offering protection against diseases ranging from kidney and liver disorders (Markowska et al., 2023; Che et al., 2023) to cancer (Talib et al., 2021) and neurodegenerative conditions (Bocheva et al., 2024). Melatonin also acts as a neurotrophic factor, supporting neurogenesis and neuroplasticity (Romero et al., 2023), and has anxiolytic properties (Repova et al., 2022). By inducing sleep and enhancing REM sleep, melatonin facilitates dreaming, which supports memory consolidation, emotional processing, and problem-solving (Walker and Stickgold, 2010), as well as creativity and insight (Zhang, 2016).

Research has found that nature therapy and solitude have therapeutic effects (Naor and Mayseless, 2020). Such retreats into solitude also offer an opportunity for contemplative practices such as prayer and meditation, which can alleviate anxiety, depression, and pain (Goyal et al., 2014; Winkelman, 2010). Contemplative practices can also improve individuals' capacity

for empathy, self-awareness, emotional regulation, and prosocial behaviour (MLERN, 2012; Böckler et al., 2018), making them more effective parents and cooperative group members, thus conferring an adaptive advantage.

4.1.1 Katabasis: death and rebirth

Cave incubation was also a means of practicing katabasis, a symbolic journey to the underworld and back, undertaken by gods, heroes, and initiates into mystery cults to attain wisdom, immortality, or spiritual renewal. In ancient Greek thought, the Underworld (Hades) was both a literal and metaphorical space—a realm of the dead and a subterranean world accessible through caves. These dark, damp spaces were often likened to wombs, with "physical contact with the earth inside the caves, and the feeling of being within its entrails in the most tangible sense," being central to this ritual practice (Ustinova, 2009 p.4). Reemergence into sunlight would have symbolized rebirth, and therefore there existed a strong connection between caves, fertility, and chthonic cults.

> The simulation in the rites of passage of the two major natural transitory states in human existence, death and birth, enhanced the importance of a newly acquired state of being; birth, the most important revelation in human existence, was mimicked in initiation rites through manipulation of darkness. (Boutsikas, 2017 p.52)

The themes of death and rebirth are also central to rituals of initiation, in which participants undergo a symbolic death and emerge transformed. From a biogenetic structuralist perspective, this temporary separation from the group allows for a change in the operational (physical and social) and cognized environments of group members, who notice their absence and anticipate their return, as well as the environments of the initiates, who experience a shift in perception and status (Laughlin, 1990). Those who underwent katabasis, like Pythagoras and Empedocles, often returned with shamanic abilities, revered for their wisdom and healing powers (Ustinova, 2009 p.210), while Persephone emerged from her journey as a queen. Zuntz's (1971) analysis of the necropolis at Pantalica and the goddess Hybla also emphasizes the fascination with death and rebirth in Bronze Age Sicily.

The adventures of the donas de fuera also took place at night, at fantastical gatherings under a cover of darkness, with a retreat into another world through a trance or dream state, with a transformation of the participant upon waking. Saint Rosalia also underwent katabasis, through her journey into caves as a hermitess, and being unearthed and in a sense “resurrected” to save the plague-besieged residents of 1624 Palermo. In modern day Palermo, Jay (2021) describes the annual pilgrimage up Monte Pellegrino to Saint Rosalia’s tomb in the cave where she lived and died. Jay emphasises the contrast between the hot and bright exterior with the cool, dark cave, and coming into contact with the image of Rosalia in the cave, which may for some exhausted participants evoke a sense of entering the Underworld, or the land of the dead, while reemergence may evoke a sense of rebirth.

Living well and overcoming fear of death were principal benefits of mystery cults, through whose rites initiates “learn the grand principles of philosophic life, and gain, not only the art of living agreeably, but of dying with a better hope" (Cicero, 1928 2.31). Like the Eleusinian Mysteries, the Dionysian Mysteries offered initiates a better afterlife, as “the god's own myth of death and rebirth served as a model for the initiate's hope of immortality, and the ecstatic rituals were believed to unite the soul with Dionysus, ensuring eternal joy and liberation" (Burkert, 1985 p.292).

4.2 Ritual performance and reenactment

> A tragedy, then, is the imitation of an action that is serious and also, as having magnitude, complete in itself… with incidents arousing pity and fear, wherewith to accomplish its catharsis of such emotions. (Aristotle, trans. Butcher, n.d.)

Aristotle proposed that theatre was therapeutic by evoking feelings that allow for catharsis, or a purification through emotional release. Drama provides a safe container for emotional processing and expression, develops theory of mind, and promotes empathy and bonding between group members (McDonald et al., 2020). Rituals dedicated to the goddess Persephone and her mother Demeter as well as to Saint Rosalia contain elements of reenactment. Reenacting myths physically through pilgrimages, dance, and processions is a powerful way of

building affinity with deities, ancestors, and other group members by eliciting similar physical and emotional responses.

4.2.1 The neuropsychology of drama

Neuropsychologically, dramatic catharsis may work through mirror neurons. Mirror neurons are those that are activated in our brains both when we are performing an action, as well as viewing or imagining someone else performing an action, or even having an emotional response (Keysers and Gazzola, 2009). While mirror neurons were previously thought to be primarily located in brain regions responsible for motor control, thus facilitating mimicry – for example in dance – if we understand "all neurons that respond during the execution and perception of a particular actions [to be] 'mirror neurons'", then there is evidence they exist throughout the brain (Keysers and Gazzola, 2009). Research into mirror neurons has shown that they are not only active in physical actions and imitation, but that by watching or even reading about others' emotional states we can vicariously feel them (Keysers and Gazzola, 2009). For example, "viewing facial expressions that convey emotions, be it disgust, happiness, pain, or a combination of different emotions, activates regions of the anterior insula and adjacent frontal operculum" (Keysers and Gazzola, 2009), brain regions that play a key role in emotional processing, self-awareness, and social interactions. Iacoboni (2009) writes that neural mirroring also explains theory of mind and empathy, or how we understand others, and "makes intersubjectivity possible, thus facilitating social behavior."

Through the mirror neuron system, theatrical displays and the reenactment of myths would have evoked vicarious emotion in participants, inducing feelings of empathy, a deep bond, and even a sense of apotheosis, or becoming one with the god. Watching dramatic performances also releases endorphins, and eliciting intense and shared emotions between people strengthens prosocial attitudes and social bonds (Dunbar et al, 2016; Chung et al., 2024; Cheong et al., 2023). Social bonding, in turn, stimulates the release of oxytocin (Carter, 2014), which promotes trust and cooperative behaviours (Kosfeld et al., 2005). Social bonding also facilitates a sense of safety and belonging, which have adaptive benefits, for example in helping individuals to overcome traumatic experiences (Charuvastra and Cloitre, 2008).

4.2.2 The pilgrimage of Saint Rosalia

The annual procession of Saint Rosalia's relics around the city in July, and the pilgrimage to her cave on Monte Pellegrino in September, are one form of ritual reenactment. While many Palermitani of various faiths walk up Monte Pellegrino on the night of 4 September, some pilgrims retrace Saint Rosalia's journey to Palermo from her original cave in Quisquina, imitating her search for a life of solitude close to God (Notarstefano and Gristina, 2021).

Jay (2021) describes their journey:

> The physical exertion required to arrive there, combined with the movement from open vista in daylight to the cool, moist, and dim enclosed interior of the mountain would have heightened the corporeal experience of pilgrims. Their bodies would have been highly attuned for the encounter with this most sacred of space. To then be confronted with an image of Rosalia in the moment of both her death and later discovery would have allowed the participants to bear witness to both of these events and create their own memories of these significant histories.

For participants, engaging in the pilgrimage might evoke a sense of identification with Rosalia herself, those who first unearthed her during the 1624 plague, or ancestors who walked the same path in her remembrance. It also connects pilgrims to each other and strengthens their identity with the city of Palermo (Salerno, 2024).

4.3.3 Thesmophoria

Osek (2018) discusses the ritual reenactment of myths at the Thesmophoria, a 10-day festival for married women that was practiced throughout the Hellenistic world, including at Akragas and at Syracuse (Imposa et al., 2024; Osek, 2018). The Thesmophoria was dedicated to Demeter under her eponymous epithet, meaning the "law-giver". Demeter is regarded as the law-giver as the goddess of the harvest and grain, because, according to Sextus Empiricus, "people in ancient times practiced cannibalism until the Thesmophoroi Goddesses (i.e. Demeter and Kore) civilized

them, by giving the earth fruit, and laws against murder and eating flesh" (Osek, 2018 p.286). To represent this pre-civilized state, participants in the Thesmophoria "ate only cakes—made of white sesame seeds, myrtle berries, and poppy seeds with herbs" (Osek, 2018 p.287).

Women at the Thesmophoria also famously made raucous jokes, imitating the servant women who, in the Homeric Hymn to Demeter, had made the goddess laugh, easing her grief:

> Unsmiling, not partaking of food or drink, she sat there, wasting away with yearning for her daughter with the low-slung girdle, until Iambê,[18] the one who knows what is dear and what is not, started making fun. Making many jokes, she turned the Holy Lady's disposition in another direction, making her smile and laugh and have a merry thûmos. (Nagy, n.d.)

Nagy (n.d.) notes that this anecdote represents the iambic tradition, "a ritual discourse that provokes laughter and thereby promotes fertility," thus connecting the Thesmophoria, which continues the iambic tradition, also to themes of death, rebirth, and fertility. Laughter lowers stress hormones (Yim, 2016) and stimulates the release of endorphins (Dunbar, 2012a), therefore iambic or ritual humour can also be a way of releasing tension, relieving anxiety, and promoting social bonding. By imitating the goddess and other characters of her myth, participants would have developed a sense of connection to Demeter and the archetype of the mother.

4.4.4 Ritual performance in the Eleusinian Mysteries

An excavation of Demeter's sanctuary at Gela unearthed 41 Rhodian masks with her image and many lamps, indicating theatrical ceremonies took place here at night, although we do not know as a part of which rite (Holloway, 1991 pp.57-58). As discussed above, a version of the Eleusinian Mysteries is suspected to have taken place at the temple of Demeter Malophorus in Selinus (Martin, 1994 p.131). However, despite the architectural similarities between the site at Eleusis and the site at Selinus, and although there is archaeological evidence of ritual activity (Holloway, 1991 p.61), there are no written records describing the rite here, so I will base my analysis on what we know of the rite at Eleusis.

The Eleusinian Mysteries began with a 10-day pilgrimage from Athens to Eleusis, during which participants acted out the mysteries with interpretive dances and choral singing. Upon arrival at the temple, the first night of the Mysteries involved the priests and priestesses acting out the myth, while initiates gathered with torches outside the temple in imitation of Demeter's search for her daughter (Bremmer, 2014 p.8). On the second night there was a theatrical performance carried out by the clergy with a frightening scene followed by epopteia-a mystical vision revealing the secrets of the goddesses (Bremmer, 2014 p.11). This vision was likely evoked by a performance including a chthonic wedding, a harvest, and the birth of a child, thought to be Dionysus (Bremmer, 2014 p.12).

Both participating in and watching these emotionally intense reenactments with others would have strengthened the empathy and bonds of initiates both with the gods and one another, and enhanced their sense of group identity, belonging, and meaning (Cheong et al., 2013; Lambert et al., 2013). Such dramatic performances may have also served to purge the fear of death from initiates, who were then taken along a journey of redemption and shown symbols of life after death, or rebirth.

4.4.5 Ritual reenactment in the Dionysian Mysteries

Dionysus had many rituals and festivals dedicated that varied according to time and place. In the Dionysian rituals known as the Orgia or Bacchanalia – for which there is evidence from the third century vases in Akragas – maenads in their frenzied state are reported to have engaged in tearing apart (sparagmos) and eating (omophagia) the flesh of raw animals (Papaioannou and Lykesas, 2012), as depicted in Euripides' *The Bacchae*. Though this may only be a metaphor to obscure their actual activities of doing the same with herbs (Ruck, 2019), it was nevertheless part of a ritual reenactment of the myths of Dionysus, as the Titans tore him apart and ate him. In doing so, the revelers are also said to have become one with the god (Ruck, 1982 p.253).

The frescoes at the Villa of the Mysteries outside Pompeii, first discovered in 1910, give us a window into the highly performative nature of this ritual as it was performed in Southern Italy in the 1st century CE. Adams (2019) analyses the frescoes at the Villa in some detail, from the Greek dress of the initiating priestess, to the extra offerings carried by the non-participant

servant, to the mirror into which Dionysus looks before he dies, seeing the reflection of his Titan slayers. In a very different ritual setting than that of the maenads, these upper-class participants, primed with the blueprint of the ritual activity through the detailed depictions on the walls, would similarly reenact the story of Dionysus – dying like him and becoming one with him (Adams, 2019).

Theatre was popular throughout the Greek world, with many theatre festivals dedicated to Dionysus in Athens. Amphitheaters in both Akragas and Syracuse in Sicily, as well as coins featuring Dionysus from these cities suggest that similar festivals took place in Magna Graecia (Holloway, 1991). A lead sheet displaying a Dionysiac scene of satyrs associated with the Anthesteria, a three day festival celebrating the arrival of Spring with wine and theatre, was discovered near Enna (Holloway, 1991 p.66). Theatre is also central to the contemporary festival of Saint Rosalia, as attested by the numerous shows and plays that ran during her 400th anniversary celebration in 2024. Theatre remains a Christmas ritual across Italy, with comedies produced every year for the holiday (Prato, 2020).

Like reenactments, watching theatrical performances facilitates empathy and theory of mind through the mirror neuron system (McDonald et al., 2020), as well as bonding with other spectators by stimulating intense emotions (Chung et al., 2024; Cheong et al., 2023). Comedies, for their part, alleviate tension through laughter and by challenging social hierarchies (Dunbar et al., 2016).

While the donas de fuera did not (to our knowledge) reenact their adventures with the fairies, they did tell their stories to one another. As with reenactment, this would have provided the women the opportunity to relive their experiences, whilst evoking similar feelings in the listener and strengthening social bonds.

Humanity's evolved capacity for symbolization through language and art give us certain cognitive and emotional capacities for understanding our lives and the universe in narrative terms and look for hidden meanings, which we create through culture, including through myths and stories (Winkelman, 2010 p.268). When we reenact these through drama, we bring them to life and make them a part of our felt reality. Participating in a collective story through reenactment offers a sense of meaning and place in society by connecting individuals with

archetypal figures and each other through mimesis and emotional synchrony. Music and dance were also central components of rituals in the ancient world, including dramatic reenactments, and function therapeutically through similar neuropsychological mechanisms.

4.5 Music and dancing

> I need hardly observe that among the ancient mysteries not one is to be found that does not include dancing. Orpheus and Musaeus, the best dancers of their time, were the founders of these rites; and their ordinances show the value they attached to rhythm and dance as elements in religion. To illustrate this point would be to make the ceremonial known to the uninitiated: but so much is matter of common knowledge, that persons who divulge the mysteries are popularly spoken of as 'dancing them out.' (Lucian, 1905)

Music and dance are culturally universal (Dunbar, 2012). They were a ubiquitous feature of ancient Greek rituals (Papaioannou and Lykesas, 2012), as folk dances are of today's festivals. However the ritual dances of antiquity were often more interpretive and a part of ritual reenactments, with dancers engaged in storytelling by acting out myths. Papaioannou and Lykesas (2012) write that dance was "a ritual and was used as a means of protecting people and avoiding evil… a form of rite and direct communication with the gods" (p.68).

4.5.1 Neuropsychology of music and dance

Music is likely to have evolved out of harmonious vocal calls between mother and child, a bond which needs to stay strong throughout the latter's long maturation period (Dunbar, 2012; Winkelman, 2010 p.264). Both listening to and making music stimulate the release of endorphins and oxytocin, while decreasing cortisol levels, producing a relaxing effect (Tarr et al., 2014; Harvey, 2020). Pearce et al. (2015) found that choral singing facilitates social bonding up to six times faster than other activities. These neurobiological effects, along with the rhythm of music, help to coordinate and entrain the emotions and behaviour of individuals in groups, intuitively synchronizing intentions enhancing group cohesion (Winkelman, 2010 p.263). Lex (1979) writes

that rhythmic stimulation produces trance states by entraining "biological rhythms, synchronizing these to respond to environmental exigencies" (p.120).

Music provides auditory cues that enable groups to move synchronously, and this synchronous movement–dance–also facilitates empathy and social bonding through mimesis and the mirror neuron system (Iacoboni, 2009; Chung et al., 2024). Reddish et al. (2013) found that synchronous movement combined with shared intentionality significantly increases cooperative behaviour. Dance may have been an important step in the development of humans' unique "expressive capacity of mimesis, the ability to intentionally represent through imitation" (Winkelman, 2010 p.261). A meta-analysis by Noetel et al. (2024) found dancing to be the most effective intervention for depression, outpacing other physical activities such as yoga and running as well as SSRIs. As an intense form of physical activity, dance boosts mood by releasing endorphins, reducing stress and aggression, improving cognition, and increasing neuroplasticity, which favours short and long-term adaptation by enhancing our capacity for learning (Hossain et al., 2024; de Sousa Fernandes et al., 2020). While endorphins are classically thought of in their analgesic capacity as endogenous opioids, they are also central to social bonding in primates (Dunbar et al., 2016).

When rhythm is combined with movement, amplifications in the intensity of either stimulates corresponding increases in exertion and endorphins, enhancing positive affect and lowering pain sensitivity (Dunbar et al., 2012b). It follows that music and dance facilitate prosocial behaviour by reducing the likelihood of aggression and increasing social engagement by promoting group synchrony, lowering stress, improving mood, and increasing tolerance for pain, including rejection (Dunbar et al., 2012b). This is corroborated by a study by Fischer et al. (2013), which found that "ritual synchrony increases perceptions of oneness with others, which increases sacred values to intensify prosocial behaviors." Gujing et al. (2019) found that music and dance training enhanced functional connectivity both within the insula, a brain region associated with interoception, self-awareness, and emotional processing, and between the insula and brain regions associated with cognition. This increased functional connectivity was also correlated with higher empathy.

Drumming and dancing are also displays of excessive fitness, "vigorous activity that signals one's location to others - both allies and potential enemies [and] is seen as an indicator of

vigilance, excessive fitness, and a readiness to act" (Winkelman, 2010 p.238). They also serve to release frustration, tension, and other emotions, as they did for our primate ancestors (p.235). Nightfall "rituals" by chimpanzees involve noise-making and physical displays that serve to bring together members of the group and deter predators, who may perceive the group not as a collection of individual animals of prey, but one loud, gigantic organism (Winkelman, 2010 pp.238-239). Early human rituals may have served similar purposes, but evolved with rhythmic, mimetic elements into music and dancing. In addition to the bonding functions of music and dance, this protective function would also have been therapeutic as the unity of the group and show of strength would have reduced individual fear (Eisenberger, 2013).

4.5.2 Dancing in Sicily

> The dances of the Eleusinian mysteries and of the Thesmophoria seem to have portrayed, by choreography and gesture, how Persephone plucked flowers with her companions in a green meadow; how she spied a lovely flower (or flowers) apart from the others, and, wandering away, was seized and carried off by Pluto; how her companions, and later her mother, sought her far and wide. (Lawler, 1944 p.78)

As described in this passage, dances in honor of the goddess Persephone and her mother were a central feature of their festivals, of which there were many in Sicily. In addition to the Thesmophoria and the probable observation of the Eleusinian Mysteries at Selinus, the people of Syracuse observed the one-day Koreia (in which bulls were thrown into the spring of Kyane to celebrate the maiden's return), and the Anthesphoria, or flower-picking festival, to observe her abduction into Hades (Osek, 2018 p.284). During the Anthesphoria, ritual dances were "performed by women singing a popular song, about gathering roses, violets, and wild celery" in imitation of Kore (Osek, 2018 p.285).

These dances were not aimless movements, but expressive, performative, and meaningful. Performative dances combine the therapeutic benefits of theatre and dance, integrating mimesis, music, and movement with storytelling to "transport the spectators in imagination to the mythological scene" (Lawler, 1944 p.80). Music and dance were also a part of the Eleusinian Mysteries, with "singing of hymns accompanied by pipes" (Bremmer, 2014 p.6) during the

pilgrimage and a nocturnal dance by torchlight upon initiates' arrival at Eleusis (Rassia, 2023 p.111). The singing of hymns is also an important part of Saint Rosalia's procession today. The combination of these modalities should have the capacity to evoke empathy and catharsis by activating mirror neurons, endorphins through movement, social bonding through singing (Pearce et al., 2015), and shared meaning through storytelling (Teasdale et al., 2021), contributing to a stronger sense of group identity and belonging.

> Through ecstatic music and dance Dionysus brought together the existence of his mortal believers with its elusive depths, initiating people in the mystic games of the gods… everyone got drunk, sang and danced, trying to communicate with him in this way. (Papaioannou and Lykesas, 2012 p.69)

Dionysus's maenads are often portrayed dancing in a frenzy to drums and flutes. This ecstatic dance is widely thought to have induced trance-like states and a sense of unity between the group and with the god (Papaioannou and Lykesas, 2012 p.69). Increases in intensity of rhythm and exertion would have increased the release of endorphins, endogenous opioids that would have allowed them to dance through the night without feeling pain or fatigue. Frenetic dancing, calling out the god's name, "outrageous acts" and general mania were also likely a way for the women who gathered to release tension (Papaioannou and Lykesas, 2012 p.70).

Contemporarily, traditional folk dances are a part of many Sicilian festivals. The most famous of these is the *tarantella*. In Southern Italy and Sicily, "tarantism" was a melancholic condition thought to be caused by spider bites, whose cure was ecstatic dancing along to music, practiced for thousands of years in the region (Blackstone, 2009 p.184). Numerous scholars have linked this tradition to pre-Christian cult traditions associated with the god Dionysus in Magna Graecia (Blackstone, 2009 p.190), which were largely tolerated under Byzantine rule (Weiss, 2019 p.117). During both the Dionysian rite and in tarantism, the "the briskly beaten tambourines provide an unmistakable rhythmic pulse that stimulates individuals to enter a trance state" (Blackstone, 2009 p.191). Weiss (2019) describes a celebration of the Madonna at the Sanctuary of Our Lady of Polsi in Calabria, near Sicily, which was previously a site of worship of Demeter and Persephone (p.112). Although tarantella is now practiced primarily in the context of festivals, in the early 20th century girls would "dance along the entire route… night and day" (Weiss, 2019 p.114) in a pilgrimage to the site.

In Christian times, tarantism has been associated with possession, and tarantella music, played by men, was "the medium that diagnoses and cures, one that restores order by creating the pathway… to the… peace of catharsis" (Weiss, 2019 p.122) through dance. While many scholars discuss the therapeutic function of tarantism, Weiss (2109) further argues that the phenomenon was one stemming from repression, and that ecstatic dance relieves this through therapeutic movement and by providing women with "a culturally sanctioned context for breaching gender and other social boundaries" (p.127). Winkelman (2010) notes that in dance, "the expressive liberation of repressed emotions allows for a rebound effect of tranquility" (p.192).

Weiss (2019) argues that midsummer pagan rituals involving ecstatic dance such as maenadism were gender reversal rituals that offered a temporary relief for women from their duties under patriarchy (p.127), in which women were "called away from their chores… [to] cry out and wildly dance in their passion for Dionysus" (Ehrenreich, 2006 pp.37-38). Gender inequality has been identified as a factor that increases the risk of depression for women (Bracke et al., 2020; Rungreangkulkij et al., 2019), and has certainly been present from Hellenistic to modern times. Yet, social reproduction clearly depends on the survival and well-being of women. When women cease to perform their productive and caretaking duties – as Demeter did – families and communities cannot function. Therefore, temporary reprieves from patriarchal order have historically been tolerated, for example within maenadism as well as women's only festivals such as the Thesmophoria. From a biogenetic structuralist perspective, we could say that such rituals are adaptive for society as a whole by restoring women's health.

4.6 Altered states of consciousness (ASCs)

Altered states of consciousness (ASCs) are important neuropsychological and adaptive aspects of ritual (Lex, 1979). Winkelman (2010) argues that ASCs are universal to all cultures (p.4). Psychoactive herbal mixtures, known as *pharmaka*, was an ubiquitous part of the ancient world, and did not carry the same stigma as they do today. A type of fungi was likely a part of the Eleusinian and Dionysian Mysteries (Adams, 2019; Ruck, 2019), the dreams at Asclepieia are thought to have been opium-induced (Askitopoulou et al., 2002), and the lucid dreams of the

donas de fuera may have been induced by a "witches ointment" containing nightshades such as henbane and other herbs. The excavation of a farmhouse outside of Pompeii revealed a mixture of henbane, opium, cannabis, and other psychoactive herbs preserved at the bottom of a vat, suggesting such a combination was in use in the region from at least the first century (Ciaraldi, 2000). These substances would have enhanced the ritual experience by inducing visionary experiences and synchronizing the brain waves and emotional states of participants.

Of course, herbs, fungi, and wine are not the only ways to induce ASCs. Music and dance, as well as meditation, or intense exercise in pilgrimages, can also create altered states. Winkelman (2010) writes that visionary states may be achieved through a "reduction of other inputs… "[or] just the opposite, high levels of sensory (drumming) and bodily (dancing) stimulation" (p.32). Music and dance may induce ASCs by increasing oxytocin and endorphins and entraining our brain wave frequencies (Tarr et al., 2014; Winkelman, 2010 p.193). Praying or meditating is another way of slowing down brain wave patterns to alpha and theta frequencies (Winkelman, 2010 p.154).

Traditionally used in medicine as analgesics, there is little to no research available on possible benefits of nightshades or opium for mental health, due to their toxicity and potential for abuse, respectively (Alizadeh et al., 2014). However, many recent studies have shown that in ritualized settings psychedelic compounds such as psilocybin and lysergic acid diethylamide (LSD) – which were very likely a part of Hellenistic mysteries (Ruck, 2019 p.346) – produce mystical experiences including feelings of oneness (Ko et al., 2022), promote prosocial behaviour (Rodriguez Arce and Winkelman, 2021), and create long-lasting therapeutic improvements in mood as well as brain health, enhancing neuroplasticity by upregulating brain-derived neurotrophic factor, which facilitates the growth of neurons (de Vos et al., 2021). A counter-argument for these effects, however, can be found in Kettner et al. (2021), who argue that it is not the substances involved but primarily a sense of *communitas*, a "transcendent state in which all community members become equal," facilitated by shared experiences, emotional synchrony, and social bonding during ritual that is responsible for the positive psychological outcomes in such studies.

4.7 Belonging and protection

> Psychosocial healing is a component of human cooperation that comprises empathy, mirroring, emotional contagion, self-regulation, and mentalizing; it also recruits symbolic processes requiring shared meanings of symbols. (Rodríguez Arce and Winkelman, 2021)

Winkelman (2010) argues that millions of years ago, severe droughts affected hominin populations, leading to adaptations that enabled group survival through social bonding (p.84). He proposes that one of these adaptations was a greater sensitivity to endogenous opioids that would have enhanced our sense of connectedness and belonging (Dunbar, 2023).

According to Winkelman (2010), humans' capacity for symbolic representation allowed us to imagine and communicate a belief in spirit entities. These positive and protective entities may in turn "allow for the same dynamics as secure attachment with a caregiver and elicit the benefits associated with secure attachments" (Winkelman, 2010 p.249). A shared belief in deities may also allow humans to extend group identity and bonds beyond family members, as cross-cultural studies have found that shared spiritual beliefs promote cooperation among group members (Wilson, 2002). Religious behaviour, at least, has "contributed to the evolution of the human propensity to help other humans" (Winkelman, 2010 p.246) by "aligning the prosocial inclinations of individuals" and coordinating behaviour through "the common emotional and behavioral manipulation of intentions and motivations" (p.250). As we have seen, religious rituals also create a sense of belonging, which itself may enhance the perception of the meaningfulness of life (Lambert et al. 2013).

Many aspects of the rituals outlined above facilitate social bonding and feelings of belonging. This also affords greater feelings of protection or safety, as raucous gatherings do for chimpanzees. Isolation was deadly for our ancient ancestors, as it is today. Social isolation is associated with higher levels of stress and increased morbidity and mortality (Cacioppo et al., 2015), and is detrimental to health, cognition, and happiness (Cacioppo et al., 2009).

> From the family and the couple with children, to kinship and neighbourly relationships, from those within the confraternities to the municipal administration; all the different

> forms of union seek confirmation of the truthfulness and authenticity of their bonds in their participation in the same rite, and in the consecration of the bond that unites them. The days of the festival therefore mark the rightfulness, and above all, the consecration of both the ideals and the bonds that they bring, once placed under the symbolic aura of the saint's protection. (Salerno, 2024 p.3)

Here, Salerno highlights how the festivities of Saint Rosalia bring together diverse groups within the city, emphasising how they promote social cohesion and community values, and offer a sense of belonging. She mentions how the rituals unite the Palermitani under the common protection of the saint, illustrating Winkelman's proposed dynamic whereby deities provide the same safety found in secure attachments. The protective aspect of these rituals also make sense as an evolved form of the nightfall chimpanzee gatherings described by Winkelman (2010), as many thousands of people moving in synchrony would intimidate any potential predator.

Salerno (2024) details the contemporary festivities associated with the Saint Rosalia:

> In practice, the festival of 14 July, the civil festivity best known to tourists and observers that attracts entertainment professionals and mobilises huge resources, is the basis from which grows an enormous devotional redemptive movement that mobilises the volunteers of the confraternities on the evening of 15 July and the night of 4 September. (Salerno, 2024 p.5)

Like those today, the processions in honor of Saint Rosalia after the plague brought the people of Palermo together after a long period of isolation, in which there were strong fears not only of death but of having their families "destroyed" if one member became ill (Jay, 2021). Jay (2021) writes that the processions in honour of Saint Rosalia after the 1624 plague were a "means of healing for the city". Fear was a major part of the plague of 1624. If a member of a family became ill, they would be quarantined in hospitals with little hope of survival, and this separation was thought to destroy the family itself (Jay, 2021). Thus the fear of the plague was not limited to the fear of dying, but a very real fear of familial breakdown and isolation.

What we know of the donas de fuera from its documentation by the Spanish Inquisition in Palermo tells us that it was an association of wild women healers. The adventures they relate are

not solitary, but tell of groups of women travelling together – from house to house with the fairies to heal their patients, and traveling by billy goat to larger gatherings of fairies and fairy women. From contemporaneous reports we might conclude that the fairy women, under the influence of nightshades, were in a trance or dream state and physically solitary during these adventures. However, after visiting the fairy world, when they saw each other in the human world, the women "discussed [their journeys] almost endlessly" (Henningsen, 2009). Their rituals gave them special experiences through which they could form strong social bonds with each other, and the knowledge of healing they received from the fairies in their visions provided them with opportunities for social connection and status in the broader community.

Healing activities are also associated with social bonding (Winkelman, 2010 pp.239-240). Winkelman (2010) notes that chimpanzees do not tend to the injured if they are unrelated in the wild, but will do so in captivity (p.241). Tending to the sick and wounded is empathic behaviour that stimulates endorphins and immune responses, and stronger beliefs in the treatment and those administering it corresponds to better outcomes (Winkelman, 2010 p.240). Therefore the healing activities engaged in by the donas de fuera, such as treating their patients with herbs, would have released endorphins and strengthened community bonds, while a belief in the fairy world would have increased the confidence in the treatment for both the women and their patients, thus improving outcomes.

Martin (1994) discusses the anti-individualistic nature of Hellenistic society, noting that in Greek literature to be alone was to be lost, and people from across the Greek world who were far from their original home might find their place in one of the many mystery cults (pp.126-128). In fact, Martin (1994) suggests that individualism is a very modern invention. While of course there were heroes and gods in ancient times that had strong personalities or achieved great feats, before modern times the sense of identity would have been much more connected with their city community. If a sense of belonging is a strong buffer against anxiety, we can better understand the anxiety of the 21st century as the product of an atomised and hyper-individualistic capitalist culture.

Social connection protects against fear (Eisenberger, 2013). Individuals exposed to prolonged isolation secrete more stress hormones (Capaccio et al., 2015), which also helps to explain why chronically isolated individuals may exhibit more antisocial behaviours. This makes sense, as

even in the absence of predators, isolated individuals have not historically been able to provide for themselves, and this is especially true for humans, who have the longest maturation period of the animal kingdom. By providing opportunities for togetherness and social support, rituals from antiquity to the present-day festivities of Saint Rosalia act as a buffer against isolation and anxiety.

Chapter 5: Conclusion

From the prehistoric veneration of Hybla to Dionysian revelries and the pilgrimage of Saint Rosalia, over the past three millenia, the practices associated with chthonic goddess cults have brought Sicilians together. Common aspects of these cultic rituals include contemplative practices and altered states of consciousness; the storytelling and mimesis found in drama and the reenactment of myths; the rhythm, movement, and synchrony that typify music and dance; and a sense of belonging and group identity that are built through collective activity and common belief. Analyzing these practices through the lens of biogenetic structuralism and neuropsychology provides insight into how they are therapeutic and adaptive. On an individual level rituals may be healing through releasing tension, enhancing mood, providing meaning, supporting immunity, and increasing neuroplasticity. However, what stood out in my analysis was their role in fostering social bonding and cooperation.

Human beings developed complex rituals to facilitate our survival as a group, as we are otherwise quite vulnerable animals. The cooperative capacity of human beings may have evolved out of a period of common hardship that made us more sensitive to endogenous opioids than other primates so that we would take care of group members beyond our immediate kin. Ritual activities strengthen social bonds by stimulating hormones such as endorphins, oxytocin, and vasopressin, and by entraining the minds of participants with similar brain wave patterns, neurotransmitters, and emotional states. Through these neuropsychological mechanisms, rituals serve to develop and maintain group identity and support synchrony, supporting cooperative behaviours that help ensure group survival.

The insight that rituals evolved to facilitate cooperation is hardly new. Although I aimed to provide a comprehensive analysis of the adaptive role of ritual by engaging with biogenetic structuralism, I discovered more recent literature on rituals and cooperation late in the research process that I was not able to adequately integrate into my analysis. For example, Lang, 2024 discusses the evolutionary role of "ritualized, cooperative signals" in some detail by engaging with paleoarchaeology, and Lang et al. 2017 may provide additional insight into this process. Future studies exploring the adaptive functions of ritual may benefit from engaging with these sources. Nevertheless, the present study adds to existing literature by including a detailed analysis of how ritual practices promote well-being at both the individual and group level by applying current neuroscientific research to specific historical examples.

Over the course of the capitalist epoch, collective rituals have been marginalized as traditional cultures have been suppressed or replaced through colonialism. And in the past century, collective rituals have increasingly been replaced by solitary activities facilitated by consumer technologies. This trend seems especially prominent in the anglophone West, while other countries may be experiencing a cultural renaissance. Of course, Westerners are not completely devoid of ritual; for example, the rave culture of the 1990s could be seen as a modern form of maenadism, and there has been a revival of pagan traditions since the 20th century, as well as a widespread adoption of Eastern practices such as meditation and yoga. Still, the trend towards isolation is worrying as it undermines prosocial and cooperative behaviours. In a world where competition is championed, the fact that humans evolved collective ritual behaviour over millions of years to facilitate cooperation underscores the importance of recovering and reviving traditions and rituals outside of the dominant ideologies of capital and nation, which tend to emphasize aggressive individualism. Analyzing collective rituals or therapies in the West, as well as developing new ones based on the mechanisms described in this study, would be an interesting direction for future research.

Bibliography

Adornato, G. (2019) 'Cityscape and the Asklepieion at Akragas: contextualizing a late Hellenistic statue of Asklepios', In: Trümper, M., Lappi, T. and Adornato, G. (eds.) *Cityscapes of Hellenistic Sicily: proceedings of a conference of the Excellence Cluster Topoi: the formation and transformation of space and knowledge in ancient civilizations*. Berlin: Topoi, pp. 219-237.

Alizadeh, A., Moshiri, M., Alizadeh, J., and Balali-Mood, M. (2014) 'Black henbane and its toxicity - a descriptive review', *Avicenna journal of phytomedicine*, 4(5), 297–311.

Andrewes, D. (2015) Neuropsychology: From Theory to Practice (2nd ed.). Psychology Press. https://doi.org/10.4324/9781315652481

Aristotle, trans. Butcher, S.H. (n.d.) Poetics. Available at: https://www.authorama.com/the-poetics-7.html (Accessed: 15 December 2024).

Askitopoulou, H., Konsolaki, E., Ramoutsaki, I.A. and Anastassaki, M. (2002) 'Surgical cures under sleep induction in the Asclepieion of Epidauros', *International Congress Series*, Vol. 1242, pp. 11-17. Elsevier.

Bocheva, G., Bakalov, D., Iliev, P., and Tafradjiiska-Hadjiolova, R. (2024) 'The vital role of melatonin and its metabolites in the neuroprotection and retardation of brain aging', *International journal of molecular sciences*, 25(10), 5122. https://doi.org/10.3390/ijms25105122

Böckler, A., Tusche, A., Schmidt, P. et al. (2018) 'Distinct mental trainings differentially affect altruistically motivated, norm motivated, and self-reported prosocial behaviour', *Scientific Reports*, 8, 13560. https://doi.org/10.1038/s41598-018-31813-8

Boutsikas, E. (2017) 'The Role of Darkness in Ancient Greek Religion and Religious Practice', in Papadopoulos, C. and Moyes, H. (eds.), *The Oxford Handbook of Light in Archaeology*, Oxford Handbooks, https://doi.org/10.1093/oxfordhb/9780198788218.013.2 (Accessed: 18 March 2025)

Boutsikas, E. (2020) *The Cosmos in Ancient Greek Religious Experience: Sacred Space, Memory, and Cognition*. Cambridge: Cambridge University Press.

Bracke, P., Delaruelle, K., Dereuddre, R. and Van de Velde, S. (2020) 'Depression in women and men, cumulative disadvantage and gender inequality in 29 European countries', *Social Science and Medicine*, 267, p.113354.

Bremmer, Jan N. (2014) *Initiation into the Mysteries of the Ancient World*, De Gruyter, Inc.ProQuest Ebook Central, http://ebookcentral.proquest.com/lib/bbk/detail.action?docID=3572232.

Burkert, W. (1985) *Greek Religion*. Cambridge: Harvard University Press.

British Museum. (n.d.) 'Bell krater. Museum number 1869,0602.1', Available at: https://www.britishmuseum.org/collection/object/G_1869-0602-1 (Accessed: 14 December 2024).

Cacioppo, J.T., Cacioppo, S., Capitanio, J.P. and Cole, S.W. (2015) 'The neuroendocrinology of social isolation', *Annual Review of Psychology*, 66, pp. 733–767. doi:10.1146/annurev-psych-010814-015240.

Cacioppo, J.T. and Hawkley, L.C. (2009) 'Perceived social isolation and cognition', *Trends in Cognitive Sciences*, 13(10), pp. 447–454. doi:10.1016/j.tics.2009.06.005.

Carter, C.S. (2014) 'Oxytocin pathways and the evolution of human behavior', *Annual Review of Psychology*, 65, pp. 17–39. doi:10.1146/annurev-psych-010213-115110.

Charuvastra, A. and Cloitre, M. (2008) 'Social bonds and posttraumatic stress disorder', *Annual review of psychology*, 59, 301–328. https://doi.org/10.1146/annurev.psych.58.110405.085650

Che, Z., Song, Y., Xu, C., Li, W., Dong, Z., Wang, C., Ren, Y., So, K. F., Tipoe, G. L., Wang, F., and Xiao, J. (2023). 'Melatonin alleviates alcoholic liver disease via EGFR-BRG1-TERT axis regulation', *Acta Pharmaceutica Sinica*. B, 13(1), 100–112. https://doi.org/10.1016/j.apsb.2022.06.015

Cheong, J.H., Molani, Z., Sadhukha, S. and Chang, L.J. (2023) 'Synchronized affect in shared experiences strengthens social connection', *Communications Biology*, 6(1), p. 1099. doi:10.1038/s42003-023-05461-2.

Chung, V., Mennella, R., Pacherie, E. and Grezes, J. (2024) 'Social bonding through shared experiences: the role of emotional intensity', *Royal Society Open Science*, 11(10), p. 240048. doi:10.1098/rsos.240048.

Ciaraldi, M. (2000) ‘Drug preparation in evidence? An unusual plant and bone assemblage from the Pompeian countryside, Italy’, *Vegetation History and archaeobotany*, 9, pp.91-98.

Cicero. (1928) *De Legibus* (C. W. Keyes, Trans.). Harvard University Press. *Retrieved from* https://topostext.org/work/752" (Accessed: 18.03.25).

Ciaramitaro, F. (2008) 'Virrey, gobierno virreinal y absolutismo: El caso de la Nueva España y del Reino de Sicilia' [‘Viceroy, government, and absolutism: the case of New Spain and the Sicilian kingdom’], *Studia Historica: Historia Moderna*, 30, pp. 235–271.

d’Aquili, E., Laughlin, C. and McManus, J. *The spectrum of ritual: A biogenetic structuralist analysis*. New York: Columbia University Press, pp. 117–151.

de Sousa Fernandes, M.S. et al. (2020) 'Effects of physical exercise on neuroplasticity and brain function: a systematic review in human and animal studies', *Neural Plasticity*, 2020, p. 8856621. doi:10.1155/2020/8856621.

de Vos, C. M. H., Mason, N. L., and Kuypers, K. P. C. (2021) ‘Psychedelics and neuroplasticity: A systematic review unraveling the biological underpinnings of psychedelics’, *Frontiers in psychiatry*, 12, 724606. https://doi.org/10.3389/fpsyt.2021.724606

Dunbar, R.I.M. (2012) 'On the evolutionary function of song and dance', in Bannan, N. and Mithen, S. (eds.) *Music, Language and Human Evolution*. Oxford: Oxford University Press, pp. 201–214.

Dunbar, R.I.M. et al. (2012a) 'Social laughter is correlated with an elevated pain threshold', *Proceedings of the Royal Society B: Biological Sciences*, 279, pp. 1161–1167. doi:10.1098/rspb.2011.1373.

Dunbar, R.I.M., Kaskatis, K., MacDonald, I. and Barra, V. (2012b) 'Performance of music elevates pain threshold and positive affect: implications for the evolutionary function of music', *Evolutionary Psychology*, 10, pp. 688–702.

Dunbar, R.I.M. et al. (2016) 'Emotional arousal when watching drama increases pain threshold and social bonding', *Royal Society Open Science*, 3(9), p. 160288. doi:10.1098/rsos.160288.

Dunbar, R.I.M. (2023) ‘The origins and function of musical performance’, *Frontiers in Psychology*, 14, https://doi.org/10.3389/fpsyg.2023.1257390

Eisenberger, N.I. and Cole, S.W. (2012) 'Social neuroscience and health: neurophysiological mechanisms linking social ties with physical health', *Nature Neuroscience*, 15(5), pp. 669–674. doi:10.1038/nn.3086.

Eisenberger, N.I. (2013) 'Social ties and health: a social neuroscience perspective', *Current Opinion in Neurobiology*, 23(3), pp. 407–413. doi:10.1016/j.conb.2013.01.006.

Eisenfeld, H. (2016) 'Life, death, and a Lokrian goddess. Revisiting the nature of Persephone in the gold leaves of Magna Graecia', *Revue internationale et pluridisciplinaire de religion grecque antique*, (29), pp. 41-72.

Filipczak, Z. Z. (1989) 'Van Dyck's Life of St Rosalie', *The Burlington Magazine*, 131(1039), 693–698. http://www.jstor.org/stable/883988

Fischer, R., Callander, R., Reddish, P. and Bulbulia, J. (2013) 'How do rituals affect cooperation? An experimental field study comparing nine ritual types' *Human Nature*, 24, pp.115-125.

Goyal, M. et al. (2014) 'Meditation programs for psychological stress and well-being: a systematic review and meta-analysis', *JAMA Internal Medicine*, 174(3), pp. 357–368. doi:10.1001/jamainternmed.2013.13018.

Guerra-Doce, E. (2015) 'Psychoactive Substances in Prehistoric Times: Examining the Archaeological Evidence', *Time and Mind*, *8*(1), 91–112. https://doi.org/10.1080/1751696X.2014.993244

Henningsen, G. (1990) 'The ladies from outside: an archaic pattern of the witches' sabbath', in Ankarloo, B. and Henningsen, G. (eds.) *Early Modern European Witchcraft: Centres and Peripheries*. Oxford: Clarendon Press.

Henningsen, G. (2009) 'The Witches' Flying and the Spanish Inquisitors, or How to Explain (Away) the Impossible', *Folklore*, 120(1), pp. 57-74.

Hippolytus of Rome (n.d.) *The Refutation of All Heresies, Book V*. Available at: https://www.earlychristianwritings.com/text/hippolytus5.html (Accessed: 20 February 2025)

Iacoboni, M. (2009) 'Imitation, empathy, and mirror neurons', *Annual Review of Psychology*, 60, pp. 653–670. doi:10.1146/annurev.psych.60.110707.163604.

Il Festino di Santa Rosalia (n.d.) History of Saint Rosalia. Available at: https://ilfestinodisantarosalia.it/en/search/-/search/attrazione/attrattore-storia-di-santa-rosalia-def (Accessed: 10 March 2025).

Jay, E. (2021) 'Hollow, hallowed body: Santa Rosalia and the reconstruction of identities in Palermo during the 1624 plague', *Ars Longa Journal*, (1).

Kearns, E. (2010) *Ancient Greek Religion: A Sourcebook*. Malden, MA: Wiley-Blackwell.

Kettner, H., Rosas, F. E., Timmermann, C., Kärtner, L., Carhart-Harris, R. L., and Roseman, L. (2021) 'Psychedelic communitas: Intersubjective experience during psychedelic group sessions predicts enduring changes in psychological wellbeing and social connectedness', *Frontiers in pharmacology,* 12, 623985. https://doi.org/10.3389/fphar.2021.623985

Keysers, C. and Gazzola, V. (2009) 'Expanding the mirror: vicarious activity for actions, emotions, and sensations', *Current opinion in neurobiology,* 19(6), pp. 666–671. https://doi.org/10.1016/j.conb.2009.10.006

Ko, K., Knight, G., Rucker, J. J., and Cleare, A. J. (2022) 'Psychedelics, mystical experience, and therapeutic efficacy: A systematic review', *Frontiers in psychiatry*, 13, 917199. https://doi.org/10.3389/fpsyt.2022.917199

Kosfeld, M., Heinrichs, M., Zak, P. J., Fischbacher, U., and Fehr, E. (2005) 'Oxytocin increases trust in humans', *Nature*, 435(7042), 673–676. https://doi.org/10.1038/nature03701

Lambert, N. M., Stillman, T. F., Hicks, J. A., Kamble, S., Baumeister, R. F., and Fincham, F. D. (2013) 'To belong is to matter: sense of belonging enhances meaning in life', *Personality and social psychology bulletin*, 39(11), 1418–1427. https://doi.org/10.1177/0146167213499186

Lang, M., Bahna, V., Shaver, J. H., Reddish, P., and Xygalatas, D. (2017) 'Sync to link: Endorphin-mediated synchrony effects on cooperation', *Biological psychology*, 127, 191–197. https://doi.org/10.1016/j.biopsycho.2017.06.001

Lang, M. and Kundt, R. (2024) 'The evolution of human ritual behavior as a cooperative signaling platform', *Religion, Brain and Behavior*, 14(4), pp.377-399.

Laughlin, C.D. and d'Aquili, E.G. (1974) *Biogenetic Structuralism*. New York: Columbia University Press.

Laughlin, C.D. (1990) 'Ritual and the symbolic function: a summary of biogenetic structural theory', *Journal of Ritual Studies*, 4(1) pp.15-39.

Lex, B.A. (1979) 'The neurobiology of ritual trance', in D'Aquili, E., Laughlin, C. and McManus, J. (eds.) *The spectrum of ritual: A biogenetic structuralist analysis*. New York: Columbia University Press, pp. 117–151.

Lucian (1905) The Dance (De Saltatione). Translated by Fowler, H.W. and Fowler, F.G. Oxford: Clarendon Press. Available at: https://topostext.org/work/344 (Accessed: 20 March 2025).

Mackay, J. (2021) *The Invention of Sicily: A Mediterranean History*. London: Verso.

Markowska, M., Niemczyk, S., and Romejko, K. (2023) 'Melatonin treatment in kidney diseases. *Cells*, 12(6), 838. https://doi.org/10.3390/cells12060838

Martin, L.H., (1994) 'The Anti-Individualistic Ideology of Hellenistic Culture', *Numen*, 41(2), pp.117-140.

McDonald, B., Goldstein, T.R. and Kanske, P. (2020) 'Could acting training improve social cognition and emotional control?' *Frontiers in Human Neuroscience*, 14, p. 348. https://doi.org/10.3389/fnhum.2020.00348

Miles, M. (1998) 'The propylon to the sanctuary of Demeter Malophoros at Selinous', *American Journal of Archaeology*, 102(1), pp.35-57.

Mind and Life Education Research Network (MLERN) (2012) 'Contemplative Practices and Mental Training: Prospects for American Education', *Child development perspectives*, 6(2), 146–153. https://doi.org/10.1111/j.1750-8606.2012.00240.x

Müller, J.L. (1998) 'Love potions and the ointment of witches: Historical aspects of the nightshade alkaloids', *Journal of Toxicology*, 36(6), pp.617-627.

Nagy, G. (n.d.) Homeric Hymn to Demeter (translation). Available at: https://chs.harvard.edu/primary-source/homeric-hymn-to-demeter-sb/ (Accessed: 14 December 2024).

Naor, L., and Mayseless, O. (2020), 'The Wilderness Solo Experience: A Unique Practice of Silence and Solitude for Personal Growth', *Frontiers in psychology*, 11, 547067. https://doi.org/10.3389/fpsyg.2020.547067

Notarstefano, G. and Gristina, S. (2021) 'Eco-sustainable routes and religious tourism: an opportunity for local development. The case study of Sicilian routes', In *Tourism in the Mediterranean Sea* (pp. 217-239). Emerald Publishing Limited.

Ostling, M. (2018) *Fairies, demons and nature spirits: "small gods" at the margins of Christendom.* Palgrave Macmillan.

Pindar (1990) *Odes*. Translated by D.A. Svarlien. Available at: https://www.perseus.tufts.edu/hopper/text?doc=Perseus:abo:tlg,0033,003:1 (Accessed 21 Mar. 2025).

Prato, P. (2020) 'Santa Claus is coming to Italy: Updating the debate about Americanization', In Minardi, E. and Desogus, P. (eds.), *The Last Forty Years of Italian Popular Culture: Andare al Popolo*, p. 139-158.

Reddish, P., Fischer, R., and Bulbulia, J. (2013), 'Let's dance together: synchrony, shared intentionality and cooperation', *PloS one*, 8(8), e71182. https://doi.org/10.1371/journal.pone.0071182

Repova, K., Baka, T., Krajcirovicova, K., Stanko, P., Aziriova, S., Reiter, R. J., and Simko, F. (2022) 'Melatonin as a potential approach to anxiety treatment', *International journal of molecular sciences*, 23(24), 16187. https://doi.org/10.3390/ijms232416187

Rodríguez Arce, J. M., and Winkelman, M. J. (2021) 'Psychedelics, sociality, and human evolution', *Frontiers in psychology*, *12*, 729425. https://doi.org/10.3389/fpsyg.2021.729425

Romero, A., Morales-García, J. Á., and Ramos, E. (2023) 'Melatonin: a multitasking indoleamine to modulate hippocampal neurogenesis', *Neural regeneration research*, 18(3), 503–505. https://doi.org/10.4103/1673-5374.350189

Ruck, C.A. (1982) 'The wild and the cultivated: Wine in Euripides' Bacchae', *Journal of Ethnopharmacology,* 5(3), pp.231-270.

Ruck, C. A. (2015) 'The Cave of Euripides', *Time and Mind*, 8(3), 279–302. https://doi.org/10.1080/1751696X.2015.1066127

Ruck, C.A. (2019) 'Entheogens in ancient Times: Wine and the rituals of Dionysus', In *Toxicology in Antiquity,* Academic Press, pp. 343-352).

Rungreangkulkij, S., Kotnara, I., Rujiraprasert, N. and Khuandee, N. (2019) 'Gender inequality identified as an underlying cause of depression in Thai women', *Journal of international women's studies*, 20(7), pp.395-407.

Schwendener, M. (2021) 'Witches, painters, and saints: Reconsidering Anthony van Dyck's Saint Rosalie paintings and Italian Sketchbook in the era of COVID-19', *Res: Anthropology and Aesthetics*, *75*(1), pp.282-290.

Salerno, R.M. (2024) 'Internal secularisation at the festival of Saint Rosalia', *Religions*, 15(1), p.126.
Stallsmith, A.B. (2019) 'A divine couple: Demeter Malophoros and Zeus Meilichios in Selinus', *Journal of Ancient History*, 7(1), pp.62-110.

Strauss, B. (2010) 'Slave wars of Greece and Rome' In V. D. Hanson (Ed.), *Makers of Ancient Strategy: From the Persian Wars to the Fall of Rome* (pp. 185–205). Princeton University Press. https://doi.org/10.2307/j.ctv6zdcgk.12

Talib, W. H., Alsayed, A. R., Abuawad, A., Daoud, S., and Mahmod, A. I. (2021) 'Melatonin in cancer treatment: Current knowledge and future opportunities', *Molecules*, 26(9), 2506. https://doi.org/10.3390/molecules26092506

Tarr, B., Launay, J., and Dunbar, R. I. (2014) 'Music and social bonding: "self-other" merging and neurohormonal mechanisms', *Frontiers in psychology*, 5, 1096. https://doi.org/10.3389/fpsyg.2014.01096

Teasdale, B., Maguire, L., Budelmann, F., and Dunbar, R. I. M. (2021) 'How audiences engage with drama: Identification, attribution and moral approval', *Frontiers in psychology*, 12, 762011. https://doi.org/10.3389/fpsyg.2021.762011

Ustinova, Y. (2009) *Caves and the Ancient Greek Mind: Descending Underground in the Search for Ultimate Truth*. Oxford Academic. https://doi.org/10.1093/acprof:oso/9780199548569.003.0005,

Ustinova, Y. (2013) 'To live in joy and die with hope: Experiential aspects of ancient Greek mystery rites', *Bulletin of the Institute of Classical Studies*, 56(2), 105–123. http://www.jstor.org/stable/44254135

Walker, M. P., and Stickgold, R. (2010) 'Overnight alchemy: Sleep-dependent memory evolution', *Nature Reviews Neuroscience*, 11(3), 218-230.

Weiss, S. (2019) *Ritual Soundings: Women Performers and World Religions.* Urbana: University of Illinois Press.

Winkelman, M.J. (2010). *Shamanism, Second Edition: A Biopsychosocial Paradigm of Consciousness and Healing*. Praeger.

Winkelman, M., 2015. Shamanism as a biogenetic structural paradigm for humans' evolved social psychology. *Psychology of Religion and Spirituality*, 7(4), p.267.

Wherry, A., and Thomas, N. W. (1905) 'The Dancing-Tower Processions of Italy', *Folklore*, 16(3), 243–259. http://www.jstor.org/stable/1253946

Whitehouse, R. (2016) 'Between symbol and senses: the role of darkness in ritual in prehistoric Italy', In: Dowd, M. and Hensey, R., eds. *The Archaeology of Darkness*. Oxford: Oxbow Books, pp. 25-38.

Yim, J. (2016) 'Therapeutic benefits of laughter in mental health: A theoretical review', *Tohoku journal of experimental medicine*, 239(3), 243–249. https://doi.org/10.1620/tjem.239.243

Zhang, W. (2016) 'Memory processing during sleep: The beneficial role of dream experiences in emotional memory consolidation', *Current Opinion in Behavioral Sciences*, 7, 74-79.

Zuntz, G. (1971) *Persephone: Three essays on religion and thought in Magna Graecia*. Oxford: Clarendon Press.