

Magic and Mind: Toward a New Cognitive Theory of Magic, With Special Attention to the Canonical and Apocryphal Acts of the Apostles

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This study aims to establish a new cognitive scientific theory of magic and connect such theorizing with the evaluation of instances of magical practice in the canonical and apocryphal Acts of the Apostles. On both fronts, promising steps have been taken in the past years. As for the theoretical debate, two recent essays/articles have introduced new insights about magic from the perspective of the cognitive science of religion. In his contribution to an important collection of essays on *Current Approaches in the Cognitive Science of Religion*, Jesper Sørensen applied Gilles Fauconnier and Mark Turner's conceptual blending theory to examine people's conceptualization of magic.¹ In a chapter of his recent book, Ilkka Pyysiäinen has criticized Sørensen's complete dismissal of the distinction between magic and religion, and introduced a new way to use such a dichotomy fruitfully within the cognitive paradigm.²

As far as the canonical and apocryphal Acts of the Apostles are concerned, the long-standing neglect of them as sources for ancient magic has been somewhat compensated for by Hans-Joseph Klauck's short monograph on magic in Acts³ as well as Jan Bremmer's highly

¹ J. Sørensen, "The Morphology and Function of Magic' Revisited", in: I. Pyysiäinen and V. Anttonen (eds), *Current Approaches in the Cognitive Science of Religion*, London and New York, Continuum, 2002, 177-202. In his recently published monograph, *A Cognitive Theory of Magic*, Walnut Creek and Lanham, AltaMira Press, 2006, Sørensen developed his former suggestions into a whole-sale theory.

² I. Pyysiäinen, *Magic, Miracles, and Religion. A Scientist's Perspective*, Walnut Creek and Lanham, AltaMira Press, 2004, 90-112.

³ H.-J. Klauck, *Magie und Heidentum in der Apostelgeschichte des Lukas*, Stuttgart, Verlag Katholisches Bibelwerk, 1996; published in English as *Magic and Paganism in Early Christianity. The World of the Acts of the Apostles*, trans. B. McNeil, Edinburgh, T&T Clark, 2000.

informative essay on “Magic in the Apocryphal Acts of the Apostles”.⁴ Whereas various contributions to the present volume are continuing the discussion of this intriguing subject,⁵ my essay will specifically treat examples from these writings in connection with cognitive theory. In the first part of my essay I will briefly address the classical problem of magic and religion. The second part will call attention to the hitherto neglected difference and interaction between storytelling and magical practice, and focus on magic as competence. The third part will examine the performance of magic, paying attention to the explanatory mechanisms that magical practice utilizes. The fourth part will suggest a particular form of operant conditioning as a possible source of the magical manipulations. The final part brings together these components in a new cognitive theory of magic.

1. Magic and Religion⁶

The much-debated dichotomy of “religion” and “magic” has been first proposed by representatives of the intellectualist school of religion studies, E.B. Tylor (1832–1917) and James G. Frazer (1854–1941). Although the views of Tylor and Frazer were different in many respects, both of them associated “magic” with an earlier, primitive stage of human thought, whereas religion with a later, more developed stage.⁷ Once established by these scholars, the dichotomy of religion and magic has underlain the work of generations of theorists in religious studies, such as W. Wundt, G. van der Leeuw, É. Durkheim, M. Mauss, M. Weber, and W.J. Goode – although the exact meaning of the terms has changed from time to time.⁸ In

⁴ J.N. Bremmer, “Magic in the Apocryphal Acts of the Apostles”, in: J.N. Bremmer and J.R. Veenstra (eds), *The Metamorphosis of Magic from Late Antiquity to the Early Modern Period*, Leuven and Paris, Peeters, 2002, 51-70.

⁵ See mainly T. Nicklas’ article in the present volume.

⁶ For more information regarding the topic see also D.E. Aune’s article in the present volume.

⁷ For recent overviews, see H.S. Versnel, “Some Reflections on the Relationship Magic-Religion”, *Numen* 38 (1991) 177-197; P. Stevens, “Magic”, in: D. Levinson and M. Ember (eds), *Encyclopedia of Cultural Anthropology*, 3, New York, Holt, 1996, 721-726; J. Middleton, “Theories of Magic”, in: Lindsay Jones (ed), *Encyclopedia of Religion*, 8, Detroit and New York, Thomson Gale, 2005, 5562-5569.

⁸ Cf. note 5 above; J. Braarvig, “Magic. Reconsidering the Grand Dichotomy”, in: D.R. Jordan, H. Montgomery and E. Thomassen (eds), *The World of Ancient Magic. Papers from the First International Samson Eitrem Seminar at the Norwegian Institute at Athens, 4-8 May 1997*, Bergen, Norwegian Institute at Athens, 1999, 21-54; Pyysiäinen, *Magic...*, 91-96.

subsequent theorizing about religion, however, the distinction between magic and religion has become a suspicious principle. For example, Claude Lévi-Strauss argued that it serves to mark off (assumedly inferior) outsiders from ones' (assumedly superior) own culture: for example, the Zande people (living in south-Western Sudan and accurately studied by E.E. Evans-Pritchard) claim that surrounding people are more involved in magic than themselves, similarly as Westerners call other cultures superstitious.⁹ The condemnation of the distinction made between religion and magic has become especially widespread under the influence of the postmodern.¹⁰ According to this view, "magic" is an ethnocentric and pejorative term, a Western projection about non-Westerners, an invention of the Victorian middle-class to the purpose of self-definition against colonial subjects and domestic peasants, and a tool that serves for social discrimination.

More recently, however, scholars have warned that the colonial and ethnocentric misuse of the term "magic" does not necessarily mean it is altogether useless as a category for the study of culture.¹¹ Thus the distinction between religion and magic might serve to express the different attitudes, goals, and social positions of their performers,¹² the direction of supernatural causation, or the motivational and contextual sides of "magico-religious" practice.¹³ A look at the origins of the word in classical Greek culture might also help us to judge more adequately the analytical potential of the term "magic". As Jan Bremmer argues, in the fifth and fourth centuries BC the term *magos* (magician) was a term of abuse in Greek tragedy, rhetoric, and earlier philosophy, whereas it was neutral or positive with the historians and Aristotelian philosophy.¹⁴ According to Herodotus, the Persian Magi were specialists in

⁹ C. Lévi-Strauss, *The Savage Mind*, Chicago, Chicago University Press, 1966, 220-228; Middleton, "Theories...", 5568.

¹⁰ Cf. H. Kuklick, *The Savage Within. The Social History of British Anthropology, 1885-1945*, Cambridge, Cambridge University Press, 1991; J.Z. Smith, "Trading Places", in: M. Meyer and P. Mirecki (eds), *Ancient Magic and Ritual Power*, Leiden, Brill, 1995, 13-27; B. Kapferer, *The Feast of the Sorcerer. Practices of Consciousness and Power*, Chicago, University of Chicago Press, 1997; Braarvig, "Magic..."; 21-27; Pyysiäinen, *Magic...*, 94-96.

¹¹ Braarvig, "Magic..."; E. Thomassen, "Is Magic a Subclass of Ritual?", in: Jordan *et al.* (eds), *The World of Ancient Magic...*, 55-66; J.N. Bremmer, "Magic and Religion", in: J.N. Bremmer and J.R. Veenstra, *The Metamorphosis of Magic...*, 267-271; Pyysiäinen, *Magic...*, 96.

¹² Braarvig, "Magic...", 51-53.

¹³ Pyysiäinen, *Magic...*, 96-112.

¹⁴ J.N. Bremmer, "The Birth of the Term 'Magic' ", in: J.N. Bremmer and J.R. Veenstra, *The Metamorphosis of Magic...*, 1-11.

interpreting dreams (1.107-108, 120, 128; 7.19) and celestial events (7.37), offered libations (7.43), and performed sacrifices (7.113-114, 191). As Bremmer remarks, the classical Greek association of magic with the Persians, among whom Magos was a frequent proper name, also provides interesting insights about the role of magic in the creation of “the other”.¹⁵ Whereas the Persians were representing “the other” in Athenian rhetoric, on account of their despotism, slavishness, luxury and cruelty, which were the exact opposite of Greek virtues, at the same time the Greeks were highly impressed by them and imitated them in many spheres of life. To these observations we can add a piece of evidence from the New Testament that reveals positive attitude toward Magi. In the infancy narrative of the Gospel of Matthew, we read about three Magi (*magoi*) who came from the East to Jerusalem to find adore (*proskynein*) the newborn king of the Jews (Matthew 2.1-2). When they saw that the star they were following had stopped over the place where Jesus was born, they “rejoiced with very great joy” (v. 10, *echarêsan charan megalên sfodra*). As Ulrich Luz rightly observed, this scene suggested for contemporary readers a positive image of the Magi and their astrological wisdom. They do not need to convert from any godless practice but from the very beginning they are doing the right thing in the eyes of Matthew and his readers.¹⁶

In the canonical and apocryphal Acts, “magicians” are employed as stock adversaries of the apostles. Two magicians are featured in the canonical Acts: Simon and Bariesus (or Elymas). In Acts 8.9, Simon is introduced as a practitioner of magic (*mageuôn*) in the city of Samaria (rebuilt as *Sebastê* under Herod the Great). Not only is he advertising himself as “something great” but also the people give him the title “the power of god that is called great” (v. 10, *hê dynamis tou theou hê kaloumenê megalê*). The text explains that people were attracted to Simon because he “amazed them with his magic (v. 11, *hai magieai*)”. When he sees “the great signs and miracles” (v. 13, *sêmeia kai dynameis*) performed by Philip, Simon is taken by the same kind of amazement (*ekstasis*) as were his followers before, he believes and receives the baptism. There are four important conclusions regarding magic which we can draw from this passage. First, Simon is not condemned for his practice. Whereas this silence cannot be interpreted as a positive attitude, the neutral presentation of Simon’s art in this episode is certainly different from the reaction given on his activity in the *Acts of Peter* 9,

¹⁵ Bremmer, “The Birth...”, 7.

¹⁶ U. Luz, *Das Evangelium nach Matthäus*, I/1, Zürich, Benziger Verlag and Neukirchen-Vluyn, Neukirchener Verlag, ³1992, 118. On the basis of Luz’s interpretation of the passage it is difficult to see “a polemic function” (*ib.*) in it. Cf. R. Kotansky in this volume, 379-421.

where he is called “most wicked” (*improvissimus*) and a “troubler” (*sollicitator*) and “deceiver” (*seductor*) of “simple souls”.¹⁷ We can add that the conflict in the subsequent episode (vv. 17-24) is not about Simon’s magic as rather his offering money so that he can give people the Holy Spirit by the laying on of hands. Second, the parallels between Simon’s and Philip’s impact on the people (especially the latter’s impact on Simon himself) suggests a great deal of phenomenological similarity between the appearances of the two wonderworkers. There is no effort in the text to deny such a parallel, but in fact it is strengthened by the repetitive structure of the narrative. Third, Philip wins the people of the city for himself because he outperforms Simon. This is a case of “magical competition” of the sort that is first attested in Biblical literature in 1 Kings (Elijah and the Baal priests) and will take place in the *Acts of Peter* between Peter and Simon. Fourth, despite the phenomenological similarity, the terminology is clearly creating an image of Simon as “the other”: his deeds are “magic” (*magai*), whereas Philip performs “sings and miracles” (*sêmeia kai dynamis*).

A more militant attitude toward magical practice in Acts starts with Paul’s missionary journeys. When Paul, Barnabas, and John Mark arrive at Paphus on Cyprus, they are confronted with the Jewish magician Bar-Jesus or Elymas (Acts 13.6-12). This time the conflict is narrated in very much the same way as the competition of Peter and Simon in the *Acts of Peter*. The proconsul is interested in Paul’s message, but Elymas tries to turn him away. Paul responds the challenge, calls him “full of deceit (*dolos*) and villainy (*rhadiourgia*)”, “son of devil”, “enemy of all righteousness”, and finally strikes him with temporary blindness. When he sees the outcome of the competition, the proconsul becomes a believer. Three observations have to be made in connection with this episode. First, although he subsequently qualifies the activity of Bar-Jesus as *dolos* and *rhadiourgia*, the reason of Paul’s demonstration of power is not Bar-Jesus’ practice as rather his attempt to turn away the proconsul from the missionaries. Second, Paul’s move of calling temporary blindness on Bar-Jesus is an act of magic itself, by which he outperforms the magician and convinces the proconsul. Third, the apostle is reported to have acted “filled with the Holy Spirit”. In this context the Holy Spirit appears as a so-called *parhedros* (lit. one that sits nearby), a figure of

¹⁷ For a detailed interpretation, see I. Czachesz, “Who is Deviant? Entering the Story-World of the *Acts of Peter*”, in: J.N. Bremmer (ed), *The Apocryphal Acts of Peter. Magic, Miracles and Gnosticism*, Leuven, Peeters, 1998, 85-96 at 92-94.

a supernatural assistant who collaborates with the magician.¹⁸ This attitude to magic is different from the coercive approach when the magician tries to persuade the divinity to assist him in reaching his own ends. The magician often calls the supernatural assistant “lord” or “ruler” and himself “servant”. To acquire a *parhedros* one had to undergo specific initiatory rituals. The *parhedros* could assume one of four different forms: it might be (temporarily) materialized in human shape; assimilated to a deity, e.g. “Eros as assistant”; identified with an object, such as an iron lamella inscribed with Homeric verses; or represented by a demon. Phenomenologically, the role of the Holy Spirit in the Book of Acts is often identical with that of a *parhedros*.

According to one of the Greek Magical Papyri, the *parhedros* might be used for the following purposes: to bring on dreams, to couple women and men, to kill enemies, to open closed doors and free people in chains, to stop attacks of demons and wild animals, to break the teeth of snakes, to put dogs to sleep (PGM I.96-130). The *parhedros* can also bring forth water, wine, bread and other food (but no fish and pork). Various activities of the apostles in the canonical and apocryphal Acts can be directly seen as examples of such magical performance. We will discuss more examples later, but from the canonical Acts Peters’ killing Ananias and Sapphira (5.1-11) and three stories about miraculous rescue from prison (apostles: 5.17-20; Peter: 12.6-12; Paul and Silas: 16.25-43) immediately come to mind (including the falling down of chains and opening of doors).¹⁹

Another spectacular confrontation with magic occurs in Acts 19.11-20. While Paul was in Ephesus, God did extraordinary miracles through him: “when the handkerchiefs (lat. sudaria) and aprons (lat. semicintia) that had touched his skin were brought to the sick, their diseases left them and the evil spirits came out of them”. However, when the seven sons of the Jewish high-priest Sceva try to exorcise a man invoking the name of Jesus, the demons turn against them, so that they must flee out of the house naked and wounded. People all over Ephesus hear about this, Jesus’ name is praised, and many of them who practiced superstition (*perierga praxantoi*) collect their books and burn them publicly. Similarly as in the other two conflicts with magicians in Acts, magic is confronted with magic. In terms of the above-mentioned ancient theory, we can conclude that the coercive approach of the priest’s sons

¹⁸ F. Graf, *Magic in the Ancient World*, trans. F. Philip, Cambridge, Mass. and London, England, 1997, 107-115; A. Scibilla, “Supernatural Assistance in the Greek Magical Papyri. The Figure of the *Parhedros*”, in: Bremmer and Veenstra (eds), *The Metamorphosis of Magic...*, 71-86.

¹⁹ Cf. Euripides, *Bacchae* 447-448; Ovid, *Metamorphoses* 3.699-700; Josephus, *Jewish Antiquities* 18.29.

failed when they tried to invoke Paul's *parhedros*. After comparing the healings and exorcisms caused by "Paul's laundry" in this episode with the powers communicated by Peter's shadow (Acts 5.15) and the hem of Jesus' garment (Luke 8.44), Klauck admits that "these phenomena are externally very similar" and refers to the difference in the "system of convictions involved".²⁰ It would be illusory, however, to hypothesize that Paul and his followers had a radically different world-view from that of their adversaries. References to the assumed "allergy" of Jews against all sorts of magic on account of the Old Testament are equally anachronistic and misleading.²¹ The very fact that Paul's adversaries in these episodes are themselves Jews excludes such an interpretation. In spite of Biblical prohibitions, magic was not only tolerated but actively practiced in the Qumran community.²² The question is rather which approach to magic and which particular *parhedros* the author of Acts thinks to be more powerful than the others.

For the same reasons, the accounts of magic in the Book of Acts cannot be interpreted as pejorative descriptions of other peoples' practices, which we have earlier seen in contemporary Western and African contexts. Attributing to this writing a distinction between religion and magic is even further from the truth. The practices of Philip, Peter, John, and Paul are phenomenologically not different from the practices of their adversaries.²³ The key to the interpretation of magic in Acts seems to be the theory of coercion and *parhedros*: magical practices that are performed in other ways than having the assistance of the Holy Spirit as *parhedros* must be condemned. If we accept this solution, it is not a sheer coincidence any longer that the Book of Acts, the New Testament writing that pays the most attention to the Holy Spirit, also contains the most references to the Christian and non-Christian use of magic.

On the basis of the ancient evidence cited up to this point, we also have to question the idea that "magic" necessarily reflects an *etic* (i.e. external to the culture examined) perspective. It was an *emic* term (i.e. internal to the culture examined), for example, for the Magi of Persia and the professional magicians of the Hellenistic world (e.g. ones that wrote or used the texts collected in the Greek Magical Papyri). Jews who called the activities of their

²⁰ Klauck, *Magic...*, 98.

²¹ Cf. A. Jeffers, *Magic and Divination in Ancient Palestine and Syria*, Leiden and New York, 1996; Pace Luz, *Evangelium...*, 118.

²² F. García Martínez, "Magic in the Dead Sea Scrolls", in: Bremmer and Veenstra, *The Metamorphosis of Magic...*, 13-33 at 33.

²³ The apostles are recognized as magicians in the Apocryphal Acts: *Acts of Paul* 15; *Acts of Andrew*, Epitomy 12, 18; *Acts of Thomas* 20.

fellow-Jews “magic” must have also recognize the similarity of those practices with their own ones – although they made a distinction on the basis of which supernatural powers assisted each of them. *Etic* perspectives, of course, are indispensable for understanding distant cultures. If someone would only use *emic* terms it would mean his language “went native”, and the account of that person would not any longer help members of his original culture to understand the culture under examination. The cognitive science of religion has opted for a third alternative, focusing on mental structures that underlie all existing human cultures, and explain differences between them based on the knowledge of such elementary building blocks. Cognitive scientific terms are certainly *etic* to all cultures, including one’s own culture, at least as compared to the folk-psychological models that people use in everyday life to make sense of their environment.

Whereas it was possible in antiquity to use the term “magic” to describe one’s own practices, the activities of other people in one’s culture, and the practices of other cultures, the use of this term in opposition with “religion” can be excluded. Whereas magic, when applied in any of the above-mentioned contexts, had a more or less clear meaning of bringing about changes in one’s environment with the assistance of supernatural powers, hardly any shared concept of “religion” existed. To take just a few obvious examples, most religions of Graeco-Roman Antiquity were first of all cults, which could be described in terms of their rites and institutions. The interpretation of mythology, together with the discussion of the great issues of life, lay outside the realm of religion. Judaism was a complex national, cultural and ethnic phenomenon, and had the tendency to involve the entirety of life, rather than being limited to certain cultic events. Christianity attempted to coordinate mythology, rituals, social life, philosophical thought, and ethics. More than other religions of the period, it was divided from the beginning by fierce philosophical debates. In conclusion, there existed a more or less clear, shared concept of magic, without an equally clear and shared concept of religion. The first steps toward establishing the dichotomy of religion (that is, Christianity) and magic was taken by Augustinus, but this is beyond the scope of this essay.²⁴

I will conclude the first part of this study by inventorizing some possible perspectives on magic. We have seen that neither the dichotomy of magic and religion, nor the choice of *etic* and *emic* perspectives offer a sufficient explanatory framework for a cognitive understanding of magic. The conclusions outlined below are based on the observations made

²⁴ F. Graf, “Augustine and Magic”, in: Bremmer and Veenstra, *The Metamorphosis of Magic...*, 87-103.

in the foregoing paragraphs and move beyond the binary distinction (or its rejection) in previous discussion.

1. *Magic as self-definition.* It is not unusual that specialists identify themselves as magicians. To this category belong the professionals of Hellenistic magic (e.g. as attested in the Greek Magical Papyri). Adherents of today's occult sects and practitioners of witchcraft are also self-declared magicians.²⁵ An interesting example of the ambiguous status of magicians is provided by the ethnographic record of Fang singers (Cameroon), who earn their bread from being intimates of the ghosts and having special ties with the ancestors, but have to balance carefully so that they are not *literally* taken for witches, in which case they might be forced to stop singing or even to leave the village.²⁶

2. *Magic as intra-cultural term.* The term "magic" can be used (with a pejorative connotation) for other practices than one's own, but within the same culture. Rivalry might be a typical motivation as in the examples of the Book of Acts. Both parties share common cultural patterns and explanatory mechanisms. They differ in the mode of evoking supernatural assistance (coercion vs. *parhedros*) and/or the particular agency that is invoked. Medieval accusations of witchcraft also belong to this category. Such pejorative usage is attested already in classical Greek sources.

3. *Magic as cross-cultural term.* Magic might be used to denunciate foreign (also new, outdated, or lower-class) practices as opposed to one's own. Examples with a pejorative connotation are abundant. The image of the Persian Magi in ancient Greece and the New Testament was often neutral or positive (which was also reflected in the kinds of practices attributed to them). A cognitive scientific concept of magic should be necessarily *etic*, but should not imply a value-judgment.

2. Magic as Competence

Consider the following passages:

²⁵ Cf. J. Pearson (ed), *Belief Beyond Boundaries: Wicca, Celtic Spirituality and the New Age*, Aldershot and Milton Keynes, 2002.

²⁶ P. Boyer, *The Naturalness of Religious Ideas. A Cognitive Theory of Religion*, Berkley, Calif., University of California Press, 1994, 232-234. For witchcraft accusations and violence, see cf. P.J. Stewart and A. Strathern, *Witchcraft, Sorcery, Rumors, and Gossip*, Cambridge, Cambridge University Press, 2004, 168-193.

1. [T]hey even carried out the sick into the streets, and laid them on cots and mats, in order that Peter's shadow might fall on some of them as he came by. A great number of people would also gather from the towns around Jerusalem, bringing the sick and those tormented by unclean spirits, and they were all cured. (Acts 5.15-16 NRSV)

2. And Peter turning around saw a smoked tunny fish hanging in a window. He took it, saying to the people, "When you see this swimming in the water like a fish, will you be able to believe in him whom I preach?" [...] So he went to the pond near by, saying, "In your name, O Jesus Christ, [...] I say, 'Tunny, in the presence of all these, live and swim like a fish.'" And he cast the tunny into the pond and it became alive and began to swim (*Acts of Peter* 13, trans. J.K. Elliott)

3. Simon came to the head of the dead man, bowed three times, and he showed the people how the dead man had lifted up his head and moved it, and opened his eyes and lightly bowed to Simon. [...] And Peter touched the side of the lad and said, "Arise." And the lad arose, took up his garment and sat and untied his chin, asked for other garments, came down from the bier [...]. (*Acts of Peter* 28)

4. Jesus said to them, "Fill the jars with water." And they filled them up to the brim. He said to them, "Now draw some out, and take it to the chief steward." So they took it. When the steward tasted the water that had become wine [...], the steward called the bridegroom and said to him, "Everyone serves the good wine first, and then the inferior wine after the guests have become drunk. But you have kept the good wine until now." (*John* 2.7-10)

5. For they were playing among clay, from which they were making images of asses, oxen, birds, and other animals. [...] Then the Lord Jesus said to the boys: The images that I have made I will order to walk. The boys asked Him whether then he were the son of the Creator; and the Lord Jesus bade them walk. And they immediately began to leap; and then, when He had given them leave, they again stood still. And He had made figures of birds and sparrows, which flew when He told them to fly, and stood still when He told them to stand, and ate and drank when He handed them food and drink. (*Arabic Infancy Gospel* 36, trans. *Ante-Nicene Fathers* 8)

The point that early Christian miracles are similar to other miracle stories of antiquity is not surprising and has been made many times, at least since the *Religionsgeschichtliche Schule*. Jesus' miracles have been labeled as magic since antiquity, first by Celsus and Talmudic tradition.²⁷ From the previous part of our study we have also concluded that Christians

²⁷ Origen, *Contra Celsum* 1.28, 38, 47; *bSanh* 107b; Arnobius, *Adversus nationes* 1.43; cf. B. Kollmann, *Jesus und die Christen als Wundertäter. Studien zu Magie, Medizin und Schamanismus in Antike und Christentum*, Göttingen, Vandenhoeck & Ruprecht, 1996.

themselves felt no need to distinguish between miracles of the apostles and the activity of magicians on a phenomenological level. The major difference in their eyes was that the apostles invoked the right supernatural assistance in the proper way, and therefore their performance was more effective: this point is clearly made in *Acts of Peter* 28 (passage 3 above) where Peter outperforms Simon in raising a young man. In general, neither the canonical nor the apocryphal Acts pay attention to how miracle or magic are actually performed. Among the few hints we have, one is the case of Eutychus. The young man was overcome by sleep, fell out of the window on the third floor, and was picked up dead. “But Paul went down, and bending over him took him in his arms, and said: ‘Do not be alarmed, for his life is in him’ ” (Acts 20.9-10). The healing power of Peter’s shadow (text 1) and of pieces of clothes that touched Paul’s body (see above) provide some further technical references. Simon in *Acts of Peter* 26 (text 3 above) bowed three times over the head of the young man. Jesus mixed saliva with sand to cure the blind man (John 9.6-7).

Yet these accounts were obviously written with the purpose of demonstrating the power of Jesus’ apostles and not as recipes that believers could imitate.²⁸ They are *stories* of magic and do not necessarily imply any actual magical performance. What these narratives witness to in cognitive terms is magical *competence*. The circulation of such stories, together with the fact that even today’s readers understand and appreciate them, demonstrates that both ancient and contemporary readers have cognitive structures which enable them to process stories about magical acts and find them interesting. This also implies that for the circulation and successful transmission of these narratives it is not necessary that the practices described in them were ever actually performed. To mention an analogy, widespread narratives about speaking animals in the apocryphal Act of the Apostles do not necessarily mean that such speaking animals have been ever seen or ever existed.²⁹

As I have argued elsewhere, the occurrence of speaking animals many and other fantastic details in early Christian texts can be explained by the violation of universal

²⁸ We do not read about new converts accomplishing such deeds. The accounts *were* intended “ad maiorem apostolorum gloriam”, *pace* J.A. Fitzmeyer, *The Acts of the Apostles. A New Translation with Introduction and Commentary*, New York and London, Doubleday, 1998, 329, *ad locum*.

²⁹ Cf. Ch.R. Matthews, “Articulate Animals. A Multivalent Motif in the Apocryphal Acts of the Apostles”, in: F. Bovon, A.Graham Brock, Ch.R. Matthews (eds), *The Apocryphal Acts of the Apostles*, Cambridge, Mass., Harvard University Press, 1999, 205-232; I. Czachesz, “Speaking Asses in the Acts of Thomas,” in: G.H. van Kooten and J.T.A.G.M. van Ruiten (eds), *Balaam and His Speaking Ass (Themes in Biblical Narrative)*, Leiden: Brill, in press.

ontological expectations.³⁰ How elements that violate everyday experience effect the attractiveness and memorability of ideas is explained by Pascal Boyer's model of *minimal counterintuitiveness*. Humans think about their environment using cross-culturally shared ontological categories.³¹ Ontological categories represent "the most fundamental conceptual cuts one can make in the world, such as those between animals and plants, artifacts and animals, and the like".³² Experiments have also shown that "at the ontological level there are clusters of properties that unambiguously and uniquely belong to all members of a given category at that level. All animals are alive, have offspring, and grow in ways that only animals do".³³ There is no agreement on the exact number of ontological categories, but the following list seems probable: HUMAN, ANIMAL, PLANT, ARTIFACT, and (natural) OBJECT.³⁴ In his theory of counterintuitiveness, Pascal Boyer hypothesized that religious ideas typically violate intuitive expectations about ordinary events and states, inasmuch as they "combine certain schematic assumptions provided by intuitive ontologies, with nonschematic ones provided by explicit cultural transmission".³⁵ Or, as he more recently summarized his model, "religious concepts generally include explicit violations of expectations associated with domain concepts", that is, they violate the attributes that already children intuitively associate with ontological categories. The idea of a ghost that can go through walls, for example, is based on the ontological category of human beings, but violates our expectations about intuitive physics that should otherwise apply to humans. Concepts that

³⁰ I. Czachesz, *Hell, Scatology, and Metamorphosis*, forthcoming.

³¹ F.C. Keil, *Semantic and Conceptual Development: An Ontological Perspective* (Cambridge, Massachusetts/London, England: Harvard University Press, 1979); 46–62.

³² F.C. Keil, *Concepts, Kinds, and Cognitive Development*, Cambridge, Massachusetts and London, England, MIT Press, 1989, 196.

³³ Keil, *Concepts, Kinds*, 214.

³⁴ Keil, *Semantic and Conceptual Development*, 48; S. Atran, "Basic Conceptual Domains," *Mind and Language* 4 (1989), 7-16; idem, *In Gods We Trust: The Evolutionary Landscape of Religion*, Oxford, Oxford University Press, 2002, 98; P. Boyer, "Cognitive Constraints on Cultural Representations," in: L.A. Hirschfeld and S.A. Gelman (eds), *Mapping the Mind. Domain Specificity in Cognition and Culture*, Cambridge, Cambridge University Press, 1994, 391-411 at 400-401; idem, *Religion Explained. The Human Instincts that Fashion Gods, Spirits and Ancestors*, London, Vintage, 2001, 90.

³⁵ Boyer, *The Naturalness...*, 48, 121, and passim.

contain such violations, Boyer suggests, “are more salient than other types of cultural information, thereby leading to enhanced acquisition, representation, and communication”.³⁶

The theory that counterintuitive ideas enjoy an advantage in the transmission of thoughts has been confirmed by experiments.³⁷ Experimental work has also proven that a limited amount of counterintuitive elements in combination with ordinary ones fairs better in transmission than excessive violation of ontological expectations. This is referred to as the principle of *minimal counterintuitiveness*. Minimally counterintuitive ideas underlie beliefs in ancestors, spirits, and gods,³⁸ and can be used, for example, to explain the dominance of particular types of narratives about the death and resurrection of Jesus.³⁹ An obvious and general conclusion from this body of cognitive research is that narratives, especially ones transmitted orally, tend to develop counterintuitive features, including acts of magic. Consider the following two hypothetical alternatives to the episode of Paul and Eutychus. (1) “The boy fell out of the window and broke his leg. Paul hurried downstairs, lifted him up, and laid him on a bed. He took a piece of wood and cloths and secured the broken leg by splints.” (2) “The boy fell out of the window and died. Paul did not go down but prayed to God. The boy came back to life, turned into an owl and flew back to the third floor. From that day he could remember everything he heard.” In terms of the theory of minimal counterintuitiveness, the first narrative would not be especially memorable and would be forgotten. The second, in contrast, contains too many counterintuitive details (rising from the dead, turning into an animal, remembering everything). One counterintuitive detail, Paul raising the dead boy (violating the ontological expectation that humans do not revive), is necessary but also enough so that the episode would be memorable and therefore transmitted. A similar

³⁶ P. Boyer and C. Ramble, “Cognitive Templates for Religious Concepts. Cross-cultural Evidence for Recall of Counter-intuitive Representations”, *Cognitive Science* 25 (2001) 535-564 at 538.

³⁷ Boyer and Ramble, “Cognitive Templates...”; J.L. Barrett and M.A. Nyhof, “Spreading Non-natural Concepts. The Role of Intuitive Conceptual Structures in Memory and Transmission of Cultural Materials” *Journal of Cognition and Culture* 1 (2001) 69-100; A. Norenzayan and S. Atran, “Cognitive and Emotional Processes in the Cultural Transmission of Natural and Nonnatural Beliefs”, in: M. Schaller and C.S. Crandall (eds), *The Psychological Foundations of Culture*, Mahwah, NJ and London, L. Erlbaum, 2004, 149-169.

³⁸ Boyer, *Religion Explained...*, 58-106; I. Pyysiäinen, *How Religion Works. Toward a New Cognitive Science of Religion*, Leiden and Boston, Brill, 2003, 9-23.

³⁹ I. Czachesz, “Early Christian Views on Jesus’ Resurrection. Toward a Cognitive Psychological Approach”, *Nederlands Theologisch Tijdschrift* 61 (2007) 47-59.

reasoning can be applied to texts 2, 3, and 5, the last passage involving a metamorphosis of lifeless matter into animals.

A minimally counterintuitive element can be identified in many other narratives. Healing from a distance is counterintuitive, because people are not supposed to act on anything without being physically present. Such violation of intuitive expectations occurs when Paul's pieces of clothes are taken to the sick and heal them or the sick are put under Peter's shadow. Jesus in John 4.46-54 also heals from a distance. The absence of stories about raising a dead person from a distance supports this interpretation. For example, when Jesus is underway to Bethany and learns his friend Lazarus has died, he finishes his journey, comes to the tomb, and only then he raises Lazarus (John 11.38-44). A combination of acting from a distance *and* raising someone from the dead would be excessively counterintuitive and therefore not advantaged in the transmission. Notice that the cognitive processing of such narratives does not require an explicit theory of the causal mechanisms that bring about healing. Obviously ancients had quite different theories about this than do modern Westerners. Also the substantial differences between the theories of ancient elites (as recorded in the works of Hippocrates and Galen, for example) and the views of the non-elite and mostly illiterate majority cannot be stressed enough.⁴⁰ The very occurrence of minimally counterintuitive elements makes these narratives successful in ancient as well as modern cultural environments, regardless of the variety of explanations that people would provide for them if asked about the underlying causes.

This does not mean that the ancient authors could not add their explanations to the stories. The message that we can gather from many of the magical episodes of the canonical and apocryphal Acts of the Apostles has been outlined above: the apostles were superior to their competitors in their methods of using supernatural assistance as well as the *parhedroi* who assisted them were superior to those of their competitors. The theological content is piggybacking, as it were, on the success of the stories. At first sight it might seem that this ancient theoretical framework into which the episodes were inserted is in diametrical opposition to the world-views of the modern readers and should be a reason to dismiss the narratives as superstition. Many modern Westerners reject the supernatural as an explanatory framework. On this account, ancient stories of magic might be entertaining episodes but lack referentiality to the actual state of affairs. Alternatively, they are expressions of psychological

⁴⁰ J.J. Pilch, *Healing in the New Testament. Insights from Medical and Mediterranean Anthropology*, Minneapolis, Fortress Press, 2000, 103.

contents and not of external realities. Other modern Westerners, particularly theologians, might hold a consistently monotheistic view of the world. The supernatural is acceptable as long as there is one God, but also according to them demons belong to the superstitions of the past. On this account, the underlying mechanism of the stories is that God controls natural and psychological forces.

Whereas contemporary Western thought prefers such alternative theories about magic in early Christian texts, we have good reasons to believe that the traditional conceptual framework did not lose its explanatory power. How can we explain that? Among members of the cross-culturally shared ontological categories, animals and humans are thought about as self-propelling, intentional agents: they perceive what is going on around them, react to those events, have goals and form plans.⁴¹ According to Stewart Guthrie and Justin Barrett, humans developed an oversensitive reaction to the presence of agency in the environment, which contributed to the emergence of belief in gods and spirits.⁴² In our evolutionary past, the dangers of not detecting an agent were much more serious than mistakenly detecting one that was not there. Consequently, intentional agency provides one of the most fundamental explanatory frameworks to make sense of the world around us.⁴³ Although modern Westerners are educated to reason about their environment in terms of mechanistic causality, they are able to do so only if they have ample time and resources. It is likely that our first hand reactions are based on intentional agency as much as the reactions of our ancestors were.

⁴¹ A. Leslie, "ToMM, ToBy, and Agency. Core Architecture and Domain Specificity", in: L. Hirschfeld and S. Gelman (eds), *Mapping the Mind*, Cambridge, Cambridge University Press, 1994, 119-148; idem, "A Theory of Agency", in: D. Sperber, D. Premack and A.J. Premack (eds), *Causal Cognition*, Oxford, Clarendon Press, 1996, 121-141. The needs of both social life and predation might have contributed to the development of mental modules which focus on agents in the environment, cf. R.A. Barton, "Primate Brain Evolution. Cognitive Demands of Foraging or of Social Life?", in: S. Boinski, P.A. Garber *et al.* (eds), *On the Move. How and Why Animals Travel in Groups?*, Chicago, University of Chicago Press, 2000, 204-237.

⁴² S.E. Guthrie, *Faces in the Clouds. A New Theory of Religion*, New York, Oxford University Press, 1993; J.L. Barrett, "Anthropomorphism, Intentional Agents, and Conceptualizing God", dissertation, Ithaca, NY, Cornell University, 1996; idem, "Exploring the Natural Foundations of Religion", *Trends in Cognitive Sciences* 4 (2000), 29-34; cf. W. Burkert, *Creation of the Sacred. Tracks of Biology in Early Religions*, Cambridge, Mass., Harvard University Press, 1996.

⁴³ Cf. D. Dennett, "Intentional Systems", *Journal of Philosophy* 68 (1971), 87-106; idem, "Intentional Systems in Cognitive Ethology. The 'Panglossian Paradigm' Defended", *Behavioral and Brain Sciences* 6 (1983), 343-390; idem, *The Intentional Stance*, Cambridge, Mass., MIT Press, 1987.

Although we do not think about sickness as caused by demons, we still speak about it as something that attacks, tortures, and finally leaves us....

We have started out above with the hypothesis that minimal counterintuitiveness offers a general explanation of the occurrence of particular type of magic in early Christian literature. It does not mean that the acts of magic mentioned in these writings include only such narratives. The healing of a lame person is certainly spectacular, but there is nothing about it that is counterintuitive: it does not contradict our expectations about cross-cultural ontological categories. Also healing a blind person by applying saliva to the eyes (John 9.6-7) is remarkable but not counterintuitive. Saliva does contain healing substances and we intuitively make use of it when we put a wounded finger into our mouth. Magic is bordering on folklore:⁴⁴ the phenomenon is well-known from today's alternative medicine,⁴⁵ and was all the more relevant in antiquity where elite knowledge impacted only a narrow segment of the population and even such knowledge was based on a pre-modern worldview.⁴⁶ There is a tendency, especially in the Gospel of John, to make "normal" instances of folk medicine more impressive by emphasizing some extraordinary circumstances: the man healed in John 9 was born blind, the one healed at the pool of Bethesda had been crippled for thirty-eight years (5.1-20). Stories of magical acts thus include ones with counterintuitive elements, ones with other kinds of extremities, and possibly ones which contradict neither cross-cultural nor ancient expectations. As S. Atran and A. Norenzayan have pointed out,⁴⁷ cultural information comes in packages: the criterion of "minimal counterintuitiveness" applies not only to individual pieces of information but also to the packages themselves. Writings such as the

⁴⁴ Cf. Pilch, *Healing...*, 70-72, 85-86, 100-103.

⁴⁵ E.g. R.C. Fuller, *Alternative Medicine and American Religious Life*, New York, Oxford University Press, 1989; S.J. Vellenga, "Geestige praktijken. Over de vitaliteit van religieuze heilwijzen in Nederland sinds 1850", *Nederlands Theologisch Tijdschrift* 59 (2005) 1-20.

⁴⁶ H.F.J. Horstmanshoff and M. Stol (eds), *Magic and Rationality in Ancient Near Eastern and Graeco-Roman Medicine*, Leiden and Boston, Brill, 2004, especially P.J. van der Eijk, "Divination, Prognosis and Prophylaxis. The Hippocratic Work 'On Dreams' (*De victu* 4) and Its Near Eastern Background", *op.cit.*, 187-218 and K.-H. Leven, "'At Times these Ancient Facts Seem to Lie Before Me Like a Patient on a Hospital Bed' – Retrospective Diagnosis and Ancient Medical History", *op.cit.*, 369-386. For example, dreams appear in manuals as sources of diagnosis and praying to the gods as therapy.

⁴⁷ S. Atran, *In Gods We Trust. The Evolutionary Landscape of Religion*, Oxford, Oxford University Press, 2002, 100-107; A. Norenzayan and S. Atran, "Cognitive and Emotional Processes in the Cultural Transmission of Natural and Nonnatural Beliefs", in: M. Schaller and C.S. Crandall (eds), *The Psychological Foundations of Culture*, Mahwah, NJ and London, L. Erlbaum, 2004, 149-169.

canonical and apocryphal Acts contain an optimal composition of the above-mentioned story-types.⁴⁸

In conclusion, early Christian stories about magic have been developed and transmitted partly because they combine everyday notions with minimally counterintuitive ideas and are therefore attention grabbing as well as relevant. The explanatory framework that makes sense of such magical events seems to be secondary for their survival. The theological message that is added to them can be called “parasitic”, making use of the survival capacities of the cognitively successful stories. We have also seen that the ancient view of competing intentional agencies is deeply rooted in the human mind and may be very effective even today when in explicit reasoning they are replaced by materialistic or theological explanations.

3. Magic as Performance

Notwithstanding the general impression that performing magic was the privilege of the apostles and did not extend to the believers in general, there are ample references that such abilities could also be transferred to (or learned by?) other believers and later generations. It is not surprising that Acts shows Paul as a major wonderworker, since he is obviously presented as an apostle on par with the Twelve. But Philip, who is a less important figure, also performs miracles. For an inclusion of all believers in the group of miracle workers we can turn to the long ending of Mark, which states “these signs will accompany those who believe: by using my name they will cast out demons; they will speak in new tongues; they will pick up snakes in their hands, and if they drink any deadly thing, it will not hurt them; they will lay their hands on the sick, and they will recover” (Mark 16.17-18). The dating of the long ending of Mark is uncertain, but the first half of the second century is a likely date for the passage in question.⁴⁹ It would have been meaningless to add such a sentence to the Gospel unless there was an actual interest in at least some of the practices on the list. This passage therefore

⁴⁸ The conventions of genre may also determine the exact nature and composition of counterintuitive, unusual, and ordinary elements, such as suggested by other experiments. Cf. Barrett and Nyhof, “Spreading Non-natural Concepts...” and Norenzayan and Atran, “Cognitive and Emotional Processes...”.

⁴⁹ Cf. B.M. Metzger, *A Textual Commentary of the Greek New Testament*, Stuttgart, United Bible Societies, 1971, 125; James A. Kelhoffer, *Miracle and Mission: The Authentication of Missionaries and their Message in the Longer Ending of Mark*, Tübingen, Mohr Siebeck, 2000, 234-244.

provides indirect evidence that at least some second century Christians were performing some kind of magic.

The young convert Euxos in the *Acts of Andrew* (Epitomy 12) also performs magic.⁵⁰ He sprinkles the flames of a burning house with water and prays “Lord Jesus Christ, in whose hand is the nature of all the elements, who moisten the dry and dry the moist, cool the hot and kindle the quenched, put out this fire that your servants may not grow evil, but be more enkindled unto faith”. The flames die and the parents cry, “He is become sorcerer (magus)”. The invocation of Euxos is similar to the spells in Christian magical texts, extant from the second century and later. Consider the following examples:

6. Turn away, O Jesus, the Grim-Faced One, and on behalf of your maidservant, her headache, to (the) glory of your name, IAÔ ADÔNAI SABAÔTH I I I <...> OURIÊL <...> OURIÊL GABRIÊL. (Gold Lamella, 2nd c., trans. R. Kotansky)⁵¹

7. I praise [you, I glorify] you, I invoke you today [God, who is alive] for ever and ever, who is coming upon [the clouds] of heaven, for the sake of the whole human race, Yao [Sabaoth] <...>, [Adon]ai Eloi <...>. I am Mary, I am Mariham, I am the mother of the life of the whole world, I am Mary. Let the rock [split], let the darkness split before me, [let] the earth split, let the iron dissolve <...>. (London Oriental Manuscript 6796[2], 9-25, trans. M. Meyer)⁵²

8. Copy the power [of a figure drawn on the manuscript] on sherds [?] of a new jar. Throw them to him. They will force him out onto the street, by the will of God. Offering: mastic, alouth, koush. (Heidelberg Coptic text 686, 14.251, trans. M. Meyer)⁵³

These passages are interesting first of all because they witness to the actual performance of magic in early Christianity. Confirming the suggestion we have made earlier on the basis of

⁵⁰ Cf. Tobias Nicklas in this volume, 485-500.

⁵¹ R. Kotansky, “An Early Christian Gold Lamella for Headache”, in: P. Mirecki and M. Meyer (eds), *Magic and Ritual in the Ancient World*, Leiden, Brill, 2002, 37-46. Cf. PGM XVIIIa.1-4.

⁵² M. Meyer, “The Prayer of Mary Who Dissolves Chains in Coptic Magic and Religion”, in: Mirecki and Meyer, *Magic...*, 407-415; idem, “The Prayer of Mary in the Magical Book of Mary and the Angels”, in: S. Noegel, J. Walker, and B. Wheeler (eds), *Prayer, Magic, and the Stars in the Ancient and Late Antique World*, University Park, Penn., The Pennsylvania State University Press, 2003, 57-67; cf. idem, *The Magical Book of Mary and the Angels (P. Heid. Inv. Kopt. 685)*, Heidelberg, Winter, 1996.

⁵³ M. Meyer and R. Smith (eds), *Ancient Christian Magic. Coptic Texts of Ritual Power*. Princeton, Princeton University Press, 1999, 339.

Mark 16.17-18, the Golden Lamella shows that Christian magic existed in the second century. The task undertaken here, healing one's headache is certainly much more modest than the raising of dead in the canonical and apocryphal Acts, but the magical intention is clear: the lamella, as we have seen above, is a typical *parhedros*. The following question begs to be answered: did early Christians undertake magic because they heard such stories about Jesus and the apostles, or did they tell stories like that because they were practicing magic?

Our last two examples (texts 7 and 8) are especially intriguing because they provide a new angle to understand three already mentioned episodes of Acts: first the apostles, then Peter alone, and finally Paul and Silas are miraculously delivered from prison. The apostle sees an angel who opens the prison doors. Peter also sees an angel, his chains fall down, and he becomes invisible when wrapping his cloak around himself at the angel's instruction. When Peter and the angel came to the iron gate leading into the city, "it opened for them of its own accord" (*automatê ênoigê*). The way the apostles and Peter come free reminds one of the feats a *parhedros* can accomplish according to the Greek Magical Papyri ("to open closed doors and free people in chains", PGM I.90-130) as well as of the expected results of the magic in our last example (text 8, "They will force him out onto the street, by the will of God"). The third episode in Acts, in contrast, closely resembles the description of the magical texts related to Mary: "Let the rock [split], let the darkness split before me, [let] the earth split, let the iron dissolve" (text 7). It seems as if there were two standard magical ways to escape from prison: either walking out in front of the guards and through the gate, or demolishing the place by earthquake. We have to notice that demolishing buildings (mainly pagan sanctuaries) is frequently achieved by the apostles in the apocryphal Acts.⁵⁴ The same question must be asked here as with connection to the Gold Lamella: what is the relation between competence and performance, story and magical practice?

Let us first return to the somewhat simpler case of the Gold Lamella and consider recent experimental work about a comparable phenomenon. In an experiment conducted by Emily Pronin, Daniel M. Wegner, and their collaborators, participants were instructed to

⁵⁴ E.g. *Acts of Paul* 5 (Papyrus Heidelberg 37-9), *Acts of John* 42-7, *Acts of Titus* 9, *Coptic Acts of Philip* (O. von Lemm, "Koptische apokryphe Apostelacten", *Bulletin de l'Académie impériale des sciences de St. Pétersbourg* 1 [1890] 509-557, repr. in Hans-Gebhard Bethge, *Der Brief des Petrus an Philippus*, Berlin, DeGruyter, 1997, at 191); *Acts of John by Pseudo-Prochorus* (Th. Zahn, *Acta Joannis*, Erlangen, 1880, repr. Hildesheim, 1975, 42 and 81); *Acts of Barnabas* 19. Cf. I. Czachesz, *Commission Narratives. A Comparative Study of the Canonical and Apocryphal Acts*, Leuven, Peeters, 2007, 206.

perform a “voodoo ritual” with a doll.⁵⁵ They were introduced to a confederate who behaved either offensively or neutrally, and who later played the role of the “victim” of magic. Then participants were asked to generate “vivid and concentrate thoughts” about the victim (who was in the neighboring room) and prick the doll in particular ways. Finally, the victim came back and reported having a slight headache. It turned out that participants who had ill thoughts about their victims (because of their offensive behavior) were likely to think that they caused the victims’ headache, whereas participants meeting neutral victims were less likely to think so. In sum, university students, especially ones having evil thoughts about their victims, were easily made to believe they could curse victims by performing magic. What can we conclude from this experiment for our discussion of magic? We have suggested that intuitive reasoning about agency supplies a cross-cultural explanatory framework for processing stories of magic. The experiment of Pronin and others shows that modern Westerners, who have no explicit beliefs about demons, are able to use such reasoning in connection with their own behavior. This suggests that a similar implicit reasoning that is at work in the processing of stories of magic is used in thinking about magical acts: ill thoughts combined with magical manipulation can damage victims’ health.

What the experiment did not examine was the influence of information that participants received about the potential effects of voodoo: all participants equally received such information. Would participants in the experiment have come to the same conclusion if they had not been told about the potential effects of voodoo? Since the experimenters did not pay attention to this factor (familiarity with voodoo was not tested and everybody received the same introduction) we can only speculate about the role of previous knowledge. It is likely, however, that without introduction to the possible effects of voodoo the feeling of magic would have been less significant. Can this be translated to the hypothesis that early Christians felt magic could be effective because they learned about such precedents from tradition about Jesus and the apostles?

We have to answer this question cautiously for two reasons. First, whereas the long ending of Mark provides a list of particularly magical feats that believers can achieve, a more general, but much earlier reference is found in Paul’s first epistle to the Corinthians: “To each is given the manifestation of the Spirit for the common good. To one is given through the

⁵⁵ E. Pronin, D.M. Wegner, K. McCarthy, and S. Rodriguez, “Everyday Magical Powers. The Role of Apparent Mental Causation in the Overestimation of Personal Influence”, *Journal of Personality and Social Psychology*, 91 (2006) 218-231 at 220-223.

Spirit the utterance of wisdom, [...] to another gifts of healing by the one Spirit, to another the working of miracles, to another prophecy, to another the discernment of spirits, to another various kinds of tongues, to another the interpretation of tongues” (1 Corinthians 12.7-10). Whereas Mark 16.17-18 claims all believers can use magic, Paul writes about specialists: healers, miracle workers, and exorcists, who are in the company of teachers, prophets, and so on. More importantly, whatever the exact date of the epistle was,⁵⁶ it certainly predates our extant texts about Jesus and the apostles performing magic. Suddenly, the relation seems to turn around: magical practice came first, and the reports in the canonical and apocryphal Acts second. Alternatively, oral tradition about Jesus and the apostles could have existed that inspired such practices at Paul’s time – but such a hypothesis is impossible to test because of the lack of evidence. It is also probable, however, that Christianity incorporated already existing magical lore. We have seen that the list of achievements of a *parhedros* cover much of the types of magic occurring in Christian sources, such as delivery from prison, exorcism, killing enemies, as well as magic with wine and food. It is not impossible that magical specialists who converted to Christianity were among the healers and miracle workers mentioned in 1 Corinthians.

Are stories of successful magic and the intuition of agency enough to keep religious practice going? In the voodoo experiment, success was guaranteed. The same is true of the stories in the canonical and apocryphal Acts: the success rate of magic is hundred percent. But how does real-life magic (performance) deal with the less favorable chances? In the case of healing (rather than causing) headache there was certainly much probability that headache ceased after some time. In consequence, based on the healing stories in the tradition and on the innate explanatory framework of agency, one could conclude that the Gold Lamella was an effective tool against headache, at least most of the time. Even harder diseases might be healed and give the feeling of effective magic – but what about delivery from chains and imprisonment?

⁵⁶ A probable date is 53–54, cf. H. Köster, *Einführung in das Neue Testament im Rahmen der Religionsgeschichte und Kulturgeschichte der hellenistischen und römischen Zeit*, Berlin and New York, Walter de Gruyter, 1980:554; N. Perrin and D. Duling, *The New Testament. An Introduction*, San Diego and New York, Harcourt Brace Jovanovich, 1982, 175; Ch. Wolff, *Der erste Brief des Paulus an die Korinther* (Theologischer Handkommentar zum Neuen Testament, 7), Berlin, 1996, 13.

“Confirmation bias” means a tendency to seek evidence that is consistent with one’s hypothesis and to avoid seeking falsificatory evidence.⁵⁷ In Peter Wason’s experiment, subjects had to discover a simple relational rule between three numbers (2-4-6) by generating other sets of three numbers which the experimenter checked against the rule. It was discovered that subjects insisted on an initial hypothesis and chose only sets of numbers that matched it.⁵⁸ Subsequent experimental work has supported Wason’s findings. Recently Martin Jones and Robert Sugden have shown that information which is interpreted as confirming a hypothesis increases subjects’ confidence in the truth of the hypothesis, even if that information has no value in terms of formal logic.⁵⁹ Finally, experiments have shown how confirmation bias works in a social context: supporters have seen more fouls with players of the opponent team than with their own players.⁶⁰ In sum, information that may be seen as confirming one’s hypothesis (or prejudice) is sought for and interpreted as such, whereas information falsifying it is avoided and ignored. It is easy to see that this universal cognitive attitude plays an important role in finding “evidence” for the effectiveness of magic.

Not only are people biased toward confirming evidence, but they are also extremely good at downplaying counterevidence. Magical practices are not vulnerable to unsuccessful performances, because there is a wealth of explanatory strategies to deal with such situations. As Boyer pointed out, “rituals can never fail, but people can fail to perform them correctly”.⁶¹ Anthropologist E.E. Evans-Pritchard has recorded a number of ready made explanations among the Zande that can be used to account for the failure of an oracle: “(1) the wrong variety of poison having been gathered, (2) breach of a taboo, (3) witchcraft, (4) anger of the owners of the forest where the creeper grows, (5) age of the poison, (6) anger of the ghosts, (7) sorcery, (8) use”.⁶² In other words, the efficiency of magic is protected by the irrefutable

⁵⁷ For an overview, see M.W. Eysenck and M.T. Keane, *Cognitive Psychology. A Student’s Handbook*, Hove and New York, Psychology Press, 2005, 470-480.

⁵⁸ P. Wason, “On the Failure to Eliminate Hypotheses in a Conceptual Task”, *Quarterly Journal of Experimental Psychology* 12 (1960) 129-140; cf. idem, “Reasoning about a Rule”, *Quarterly Journal of Experimental Psychology* 20 (1968) 237-281.

⁵⁹ M. Jones and R. Sugden, “Positive Confirmation Bias in the Acquisition of Information”, *Theory and Decision* 50 (2001) 59-99.

⁶⁰ M.W. Eysenck, *Psychology. An International Perspective*, Hove and New York, Psychology Press, 2004, 328.

⁶¹ Boyer, *The Naturalness...*, 208.

⁶² E.E. Evans-Pritchard, *Witchcraft, Oracles and Magic among the Azande*, Oxford, Clarendon Press, 1937, 330.

circular reasoning that magic succeeds only when all necessary conditions are fulfilled, and we know that all conditions have been fulfilled only if the magic succeeds.

The question still remains open, how positive evidence is accumulated about the efficiency of magical practices. Headaches are frequent and usually go away, whereas earthquakes demolishing prisons are very rare. Between the two extremes, however, there are a great number of phenomena that can be affected by magic. I will argue that such events are particularly important for the development of magic.

4. Magic and “Superstitious Conditioning”

A marked difference between cognitive approaches to magic and previous explanations is that in the former attention has turned away from the role of explicit reasoning toward unconscious factors. The third, missing component of our theory of magic will be supplied by a series of remarkable experimental results that partly predate cognitive science and evolutionary psychology. In the 1940s, Harvard psychologist Burrhus Frederic Skinner, known as the father of “behaviorism”, placed a hungry pigeon in a cage equipped with an automatic feeder.⁶³ A clock was set to give the bird access to the food for five seconds in regular intervals. Instead of waiting passively for the next appearance of the food, most of the birds started to perform various kinds of repetitive behaviors: one was turning counter-clockwise two or three times between two feedings, another was thrusting its head into one of the upper corners, a third was moving its head as if tossing an invisible bar, two displayed a pendulum motion of the head and body, yet another bird made pecking and brushing movements toward the floor. According to Skinner, these behaviors developed because the birds happened to execute some movement just as the food appeared, and as a result they repeated it. If the subsequent presentation of food occurred before a not too long interval, the response was strengthened further. Skinner observed that fifteen seconds was a particularly favorable interval of feeding for the development of the response. Skinner suggested that the

⁶³ B.F. Skinner, “‘Superstition’ in the Pigeon”, *Journal of Experimental Psychology* 38 (1948) 168-172; W.H. Morse and B.F. Skinner, “A Second Type of Superstition in the Pigeon”, *American Journal of Psychology* 70 (1957) 308-311; S.A. Vyse, *Believing in Magic. The Psychology of Superstition*, Oxford, Oxford University Press, 1997, 59-97; D.M. Wulff, *Psychology of Religion. Classic and Contemporary*, New York, J. Wiley & Sons, 1997², 129-139.

behavior he observed with pigeons is analogous to the mechanism of some human superstitions, such as rituals performed to change one's luck with cards or movements of the arm after a bowler released the ball.

Skinner's suggestions about human analogies inspired further experimentation. Gregory Wagner and Edward Morris designed a mechanical clown, Bobo, that dispensed a marble from its mouth at regular intervals.⁶⁴ They promised preschool children to receive a toy (that they actually received anyway) if they collect enough marbles in an eight-minute session. The session was repeated once a day for six days. Children developed responses similar to those of Skinner's pigeons: they grimaced before Bobo, touched its face, wriggled, smiled at him, or kissed his nose. Koichi Ono experimented with twenty Japanese university students.⁶⁵ The students were asked to take seat in a booth that was equipped with a counter, a signal lamp (with three colors), and three levers. They were not required to do anything specific but were told they may earn points on the counter if they do something. Points appeared on the counter either at regular or random intervals, but without any consistence with the light signals and anything students did. Three of the twenty students developed "superstitious behavior": one student pulled a lever several times and then held it, consistently repeating this pattern for 30 minutes; another student developed a different pattern of pulling the levers; the third student performed a complex sequence of movements that gradually changed during the session:

About 5 min into the session, a point delivery occurred after she had stopped pulling the lever temporarily and had put her right hand on the lever frame. This behavior was followed by a point delivery, after which she climbed on the table and put her right hand to the counter. Just as she did so, another point was delivered. Thereafter she began to touch many things in turn, such as the signal light, the screen, a nail on the screen, and the wall. About 10 min later, a point was delivered just as she jumped to the floor, and touching was replaced by jumping. After five jumps, a point was delivered when she jumped and touched the ceiling with her

⁶⁴ G.A. Wagner and E.K. Morris, " 'Superstitious' Behavior in Children", *The Psychological Record* 37 (1987) 471-488.

⁶⁵ K. Ono, "Superstitious Behavior in Humans", *Journal of the Experimental Analysis of Behavior* 47 (1987) 261-271.

slipper in her hand. Jumping to touch the ceiling continued repeatedly and was followed by points until she stopped about 25 min into the session, perhaps because of fatigue.⁶⁶

The behavioral patterns observed in these experiments are acquired by the elementary learning mechanism of “operant conditioning”, a phenomenon exhaustively studied by Skinner.⁶⁷ In operant conditioning, the subject learns about the relationship of a stimulus to the subject’s behavior. For example, Skinner placed a hungry rat in a small box containing a lever. When the rat pressed the lever, a food pellet appeared. The rat slowly learned that food could be obtained by pressing the lever, and pressed it more and more often. In terms of the law of reinforcement, the probability of the rat’s response (pulling the lever) increases if it is followed by a positive reinforcer (presentation of food). The previously mentioned experiments differed from this basic setting inasmuch as the subjects’ action did not influence the presentation of the reinforcer. It is most interesting to see which reinforcement patterns result in the strongest conditioning.⁶⁸ It might be expected that continuous or invariable reinforcement provide the strongest conditioning. In fact, the opposite is the case: continuous reinforcement leads to the lowest rate of responding, whereas the “variable ratio schedule” to the fastest rates of responding. The latter schedule means that every *n*th (e.g. fifth or tenth) response is rewarded on the average, but the gap between two rewards can be very short or very large. In real life, the latter type of rewarding schedule is found in fishing and gambling, for example, which might be an important factor in people getting so easily addicted to these activities.

The spontaneous development of ritualized behavior as a response to positive reinforcement that is independent of the response suggests operant conditioning as a third, independent source of magic. Notice that the emergence of “magical” activities in the experiments did not rely either on an explanatory mechanism - be it implicit (such as agency) or explicit (such as ghost beliefs or theological doctrines) - or on long-term memory and cultural transmission (such as counterintuitive ideas and miracle stories). Whereas it is difficult to compare the results of different experiments with each other, due to the different

⁶⁶ Ono, “Superstitious Behavior...”, 265.

⁶⁷ B.F. Skinner, *The Behavior of Organisms*, New York, Appleton-Century-Crofts, 1938, 19-21; B. Schwartz, E.A. Wasserman, S.J. Robbins, *Psychology of Learning and Behavior*, New York, Norton, 2002⁵, 131-245; Eysenck, *Psychology...*, 266-273.

⁶⁸ C.B. Ferster and B.F. Skinner, *Schedules of Reinforcement*, New York, Appleton-Century-Crofts, 1957; Schwartz *et al.*, *Psychology of Learning...*, 217-224.

methods and setups employed in them, it is remarkable that six of Skinner's eight pigeons developed "superstitious" behavior (and such demonstrations have become classroom routine) and seventy-five percent of preschoolers did so in Wagner and Morris' experiment, but only three of the twenty Japanese students behaved in that way in the point collecting game. The ability and willingness to use explicit reasoning in connection with a task (which we can expect of university students in the given setting) seems to diminish the chance of developing a "magical" response.⁶⁹

Further we can ask if there is a connection between the development of magical behavior and the "reinforcement schedule" of the conditioning. In particular, the unexpected success of variable reinforcement schedules (such as found in gambling and fishing) raises the question whether a similar effect is at work in magic. Whereas experiments on "superstitious conditioning" manipulated reinforcement intervals and applied random reinforcement, no experimentation has been dedicated to the problem of variable schedules under such circumstances, to my knowledge. There are at least some hints, however, that certain reinforcement schedules may particularly support the development of magical behavior. We will approach this problem from the perspective of probability in schedules. Tossing coins is a simple form of gambling. Groningen born mathematician Daniel Bernoulli (1700-1782) analyzed a game where the player wins one ducat if a tossed coin lands "heads", two ducats if it lands "heads" for a second time, four if it lands "heads" for the third time, with the payoff doubling as long as the coin keeps landing "heads".⁷⁰ It can be easily realized that whereas the reward keeps doubling, the chance of winning the doubled reward is half the chance winning the original amount. In other words, the chance for different payoffs follows a so-called "power law" distribution (in which the independent variable is raised to a constant power,

⁶⁹ This is not true of the development of magical *beliefs* in the voodoo doll experiment (see above), where students with ill thoughts toward their confederates were inclined to attribute magical effects to their operations. This may suggest that the explanatory mechanism of agency is more difficult to override by explicit reasoning than ritualized behavior due to operant conditioning.

⁷⁰ D. Bernoulli, "Specimen theoriae novae de mensura sortis", *Commentarii Academiae scientiarum imperialis Petropolitanae* 5 (1738) 175-192; in English (trans. Louise Sommer): "Exposition of a New Theory on the Measurement of Risk", *Econometrica* 22 (1954) 23-36. The "St. Petersburg game" was originally described by Bernoulli's cousin Nicolas Bernoulli. The "St. Petersburg paradox" is that the banker and the payer cannot agree on a fair ante, because the distribution of payoffs does not have a characteristic size (because of following a power-law). Cf. H.G. Dehling, "Daniel Bernoulli and the St. Petersburg Paradox", *Nieuw Archief voor Wiskunde, Vierde Serie*, 15 (1997) 223-227.

with some simplification). Recently Péter Csermely has suggested that other forms of gambling as well as other exciting games in general may also involve similar regularities.⁷¹ In fact, scholars have demonstrated that the distribution of dividends in Korean as well as Japanese horse races follow a power law.⁷² It has to be noticed that various cultural phenomena seem to be attractive because they contain a ratio of elements that follows a power law (resulting in so-called fractal properties): for example, enjoyable pieces of music contain similar distributions of volume and pitch;⁷³ the same has been observed about the dimensions of masterpieces of traditional architecture.⁷⁴

In sum, gambling may present a strong case of operant conditioning not only because it provides a variable reinforcement schedule, but also because this variability, at least in some forms of gambling, follows a power-law distribution. If operant conditioning is a relevant factor for the development of magical practices, and variable schedules following a power-law distribution strengthen this effect, some especially widespread forms of magic may be good candidates to demonstrate this relation. Rainmaking is a cross-culturally known form of magic that is performed even in contemporary developed countries.⁷⁵ Rainfall obviously follows a variable schedule: we may think about rain dances as responses to a variable reinforcer. But a closer look at this schedule also reveals that it is subject to a power-law distribution: both the time intervals and the amount of rainfall are distributed according to a power law.⁷⁶ A rainmaking ritual that is accidentally followed by rain may encourage the repeated use of the ritual, launching a chain of ritual responses to the variable (power-law

⁷¹ P. Csermely, *Weak Links. Stabilizers of Complex Systems from Proteins to Social Networks*, Berlin, Springer, 2006, 25-31.

⁷² K. Park and E. Domany, "Power law Distribution of Dividends in Horse Races", *Europhysics Letters* 53 (2001), 419-425; T. Ichinomiya, "Power-law Distribution in Japanese Racetrack Betting", *Physica A: Statistical Mechanics and its Applications* 368 (2006) 207-213.

⁷³ R.F. Voss and J. Clarke, "1/f Noise in Music and Speech", *Nature* 258 (1975) 317-318; Id., "1/f Noise in Music. Music from 1/f Noise", *Journal of Acoustical Society of America* 63 (1978) 258-263; K.J. Hsü and A. Hsü, "Self-similarity of the '1/f Noise' Called Music", *Proceedings of National Academy of Sciences USA*, 88 (1991) 3507-3509; Yu Shi, "Correlations of Pitches in Music", *Fractals* 4 (1996) 547-553.

⁷⁴ For an overview of fractals in architecture, see Csermely, *Weak Links...*, 231-237.

⁷⁵ G. Bownas, *Japanese Rainmaking and other Folk Practices*, London, Routledge, 2004; A. Dunnigan, "Rain", in: M. Eliade and L. Jones (eds), *Encyclopedia of Religion*, vol 11, Detroit, 2005², 7602-7605; R. Boudon, "Homo Sociologicus. Neither a Rational nor an Irrational Idiot", *Papers: Revista de sociologia* 80 (2006) 149-169; "Rain dancing" at http://en.wikipedia.org/wiki/Rain_dance.

⁷⁶ O. Peters and K. Christensen, "Rain. Relaxations in the Sky", *Physical Review E* 66 (2002) 036120.

distributed) reinforcement schedule of rainfall. The plausibility of “making rain” with a ritual is somewhere between the “efficiency” of magical cures for headache and the elicitation of earthquakes that ruin prisons. But even the latter form of magic, which is surprisingly important in both Christian sources and the Greek Magical Papyri, has some relation with power-law distribution: the frequency and magnitude of earth-quakes are also described by power-laws. Experimental work on conditioning examines short-term effects in individuals. In order to reveal the possible effects of long-term reinforcement schedules, such as the distribution of rainfall (not to speak of earthquakes) we might need to consider other forms of individual and cultural learning.

5. Magic: Toward a Cognitive Theory

We can now propose a new cognitive theory of magic that is based on the interplay of three components: the success of miracle stories, beliefs (both implicit and explicit) which guarantee that magic makes sense to us, and repetitive behavior due to operant conditioning. To begin with the last element, by operant conditioning we can learn to “manipulate” reinforcers in the environment that are independent of our actions. On this level, “superstitious” behavior may emerge without any (implicit or explicit) explanation attached to it. Conditioned behavior can also remain completely unconscious: for example, students can condition a lecturer to move in certain ways by reinforcing his actions by nodding.⁷⁷ We practice totally ineffective manipulations routinely, with or without being aware of it. Implicit or explicit explanations attached to such manipulations may turn them into actual magic. Our readiness to use agency as an explanation as well as our selective attention to positive evidence particularly support the emergence of magic from meaningless automatisms. Stories of magic provide the third component: many of them are memorable and interesting due to their counterintuitive details, which make them successful regardless of whether we practice magic or believe in it. But the vitality of such accounts makes them important sources of inspiration, justification, and explanation with regard to magical practices. In turn, people’s own experience of conditioned superstitious behavior and their intuitively devised magical explanations make such stories more credible, realistic, and popular.

⁷⁷ Vyse, *Believing in Magic...*, 75-76.

Accordingly, early Christian magic was motivated by different factors rather than having just one single source. Personal superstitious practices were supported by a widespread, explicit system of demonology, which in turn relied on the universal, innate explanatory framework of agency. Whereas some magical practices may have been invented by Christians, many were inherited from the cultural environment and supplied with new interpretations. Christian adaptation of existing beliefs and practices may have included introducing or reinterpreting different forms of *parhedroi*, providing (new kinds of) initiations to the use of such powers, and establishing offices for practitioners. The incorporation of converted professionals into this new framework is a possibility that deserves further investigation. Finally, we have seen that the canonical and apocryphal Acts are rich sources of accounts of magic that carried on the message of the movement efficiently as well as inspired and justified magical activities.