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Blom, J.D.; Sharpless, B.A.

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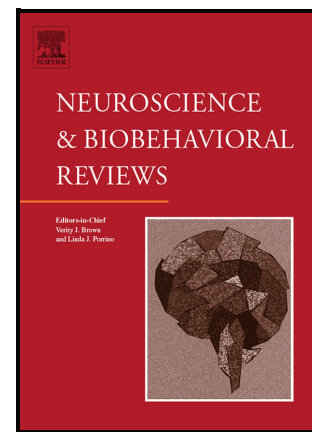
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A systematic review on clinical therianthropy and a proposal to conceptualize zoomorphism as a diagnostic spectrum

Jan Dirk Blom^{a,b,c,*}, Brian A. Sharpless^d

^a Parnassia Psychiatric Institute, Kiwistraat 43, 2552 DH The Hague, the Netherlands

^b Faculty of Social and Behavioural Sciences, Leiden University, Wassenaarseweg 52, 2333 AK Leiden, the Netherlands

^c Department of Psychiatry, University of Groningen, Hanzeplein 1, 9713 GZ Groningen, the Netherlands

^d Private Practice, Frederick, Maryland, USA

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Email address Dr. Sharpless: basharpless@gmail.com

*Jan Dirk Blom, MD, PhD

Parnassia Psychiatric Institute

Kiwistraat 43

2552 DH The Hague, the Netherlands

Tel: +31-88-3570232

Fax: +31-88-3584195

Email: jd.blom@parnassiaagroep.nl

Highlights

- Clinical therianthropy is associated with a range of mostly psychiatric conditions
- Cenesthesiopathy may play a role in its pathophysiology
- Clinical therianthropy can be effectively treated with a range of therapeutics
- We propose a diagnostic spectrum that includes therians, furies, and otherkin
- We caution against unnecessarily pathologizing these latter groups

Abstract

Clinical therianthropy involves the delusional belief that one transforms into an animal and assumes its characteristics. We conducted a systematic review and identified 77 published cases. Of the many theriotypes reported, 68% involved transformations into canines. Men debuted at a significantly earlier age than women; duration ranged from days (25%) to weeks (12%), months (33%), and years (31%). Associated conditions included psychotic disorders (41%), psychotic depression (24%), bipolar disorder (18%), and Cotard's syndrome (12%), while 16% engaged in other-directed physical violence. Treatment resulted in full remission (58%) and partial remission (33%) of the symptoms of clinical therianthropy, although the associated conditions were often chronic in nature and overall prognosis tended to be poor. We also discuss the history and reported etiologies of clinical therianthropy and propose a 'two-hit' pathophysiological model involving cenesthesiopathy and delusion formation. Diagnostic, therapeutic and forensic implications are also discussed. Lastly, we provide suggestions for a diagnostic spectrum that includes clinical and non-clinical cases, the latter comprising therians, furies, otherkin, and other people who experience varying levels of identification with animals.

Key words: cenesthesia, cenesthesiopathy, furry, lycanthropy, monothematic delusion, therian, zoanthropy

1. Introduction

We live in an age where physical identity no longer seems to be fixed, and people are increasingly aware of their freedom to choose an identity that matches their body scheme rather than the one dictated by the social mold. This may sound like recent and controversial news, 'ripped from the headlines', but the notion of a more fluid physical identity has, at least in certain ways, prevailed for ages, and in some non-Western societies still prevails. Therianthrope, therian, furry, animal person, otherkin and Brony are just some of the fashionable new terms that people use today to reflect their affinity with non-human animal characteristics, to the extent that they may identify either partially or integrally as nonhuman beings such as a cat, a dog, a cartoon-based pony or the Marvel superhero Black Panther. Well over a century ago, Frank Hamel (1869-1956) published a 300-page book titled *Human Animals* that contains hundreds of stories on people who for numerous reasons identified with animals, ranging from the African lion- and tigersmen, the Abyssinian hyena-women and the French bird-women, to were-foxes (Japan), were-serpents (Ancient Greece) and werewolves (virtually everywhere) (Hamel, 2015). The majority of these stories were collected from non-Western sources. The Western sources cited by Hamel were all historical in nature, likely due to the fact that no reasonable person around 1900 was supposed to believe in actual human-to-animal transformations. The Darwinian notion that Man had descended from primates had gone down well with the general population, as had the 19th-century degeneration theory that suggested humans could also tumble down the recently discovered evolutionary ladder, but no scientifically-savvy Westerner would think of identifying themselves with the animals listed in Hamel's book. Perhaps fittingly, Frank Hamel, the author, was really a woman who adopted a male *nom de plume* to help her better thrive in the male-dominated field of academic publishing (Sayers, 1957). Thus, Hamel herself was in a way familiar with evading the social rules that govern identity. Perhaps that

is the reason why the following opening sentences from her book read like a sympathetic manifesto on the notion of animal-human transformations:

The belief that men can change into animals and animals into men is as old as life itself. It originates in the theory that all things are created from one substance, mind or spirit, which according to accident or design takes a distinctive appearance, to mortal eye, of shape, colour, and solidity. Transformation from one form to another then becomes a thinkable proposition, especially if it be admitted that plastic thought in the spirit world takes on changed forms and conditions more readily than in the world of matter (Hamel, 1815, p. 1).

In our day and age, species identity is inextricably bound up with DNA-based identification. Such procedures (and even DNA itself) were unheard of in Hamel's time, but even back then it was believed that our species identity is anchored to our hereditary material and physical form (possibly meant in the essential, Platonic sense). The passage above may therefore not only be seen as an explanation of the way in which human-to-animal transformations were conceived of in ancient times, it is also a reminder that biological primacy may not be imperative and that other points of view (e.g. experiential, cultural) may be equally valid or viewed by some as even more compelling.

Strikingly, Hamel mentions only a single contemporary Western case in her book. It is the one described by the French alienist Bénédict Augustin Morel (1809-1873), of a man who was convinced that he had turned into a wolf and sought to prove this by showing his teeth and allegedly cloven feet (Morel, 1853). The case was described in biomedical jargon, and no one but the man himself (addressed as a 'patient' by Morel) believed that he had actually assumed an animal form. It would famously go down in history as the first modern biomedical description of clinical lycanthropy, and its place in Hamel's book underlines the fact that, by the 19th century, the phenomenon of human-to-animal transformation had been thoroughly pathologized.

The present paper deals with cases such as these and provides a systematic review of case reports on clinical therianthropy. The term clinical therianthropy is indebted to the Greek words *θηρίον* (*thērion*, wild animal) and *άνθρωπος* (*anthrōpos*, human being) and is synonymous with clinical zoanthropy, from the Greek noun *ζῷον* (*zōion*, animal). The adjective 'clinical' serves to distinguish the condition from putative cases of zoomorphism as described in mythological texts as well as forms of non-clinical therianthropy which have been described as an identification with the mental state of an animal without believing in any substantive physical transformation. Thus, the terms clinical therianthropy and clinical zoanthropy both refer to the condition where people are convinced that they have turned into an animal at least once. In biomedicine this is commonly termed a monothematic delusion, monosymptomatic delusion or content-specific delusion (Malloy & Richardson, 1994). The best-known example of clinical therianthropy is clinical lycanthropy, or the conviction that one has turned into a wolf (Blom, 2014). Other specific types are named per theriotype (i.e. the type of animal into which one believes to be transformed).

Our focus will be on biomedical descriptions of cases where people are convinced that they themselves have taken on an animal form and acquired their non-human characteristics (e.g., physical and/or behavioral). In Hamel's book and numerous other texts, however, examples abound of people who were accused by others of having turned into an animal, whether or not in the context of somatic conditions such as hypertrichosis ('werewolf syndrome', Fig. 1) and porphyria (Illis, 1964; Bénézech & Chapenoire, 2005; Kluger et al., 2015; Joshi & Kuchewar, 2022), or through supernatural means. (For an overview of medical conditions that have been associated with clinical therianthropy, see Table 1.) However, we consider these accusations to be very different phenomena from the subjective, personal experiences of transformation we will focus upon. The former cases are often discussed in the literature on werewolf trials and there are even cases of individuals being charged with slander for making false accusations of lycanthropy. We will briefly touch upon these historical topics, but for a more thorough exploration refer the interested reader to papers such as those by Fahy (1989), Russell and Russell (1989), Baratta and Weiner (2009),

Schulte (2015), and Metzger (2013; 2015), as well as the excellent tome *Werewolf Histories* edited by Willem de Blécourt (2015). Regardless, we contend that it is essential that clinical therianthropy be distinguished from the cases of people believing that others have been changed into animals (e.g., the interesting case in Nasirian et al., 2009). The latter appear more similar to a classic misidentification syndrome (what could be termed therianthropic misidentification delusion) or, in historical terms, as an atavistic way of dealing with one's enemy by creating a bestial, non-human, 'othering' stereotype.

< Fig. 1 around here >

< Table 1 around here >

1.1 Clinical relevance

Earlier reviews on clinical therianthropy (e.g. Moselhy & Nasr, 1999; Mondal et al., 2014; Blom, 2014; Groh et al., 2020; Guessoum et al., 2021) documented up to 43 published cases since Morel's report of 1853, meaning that over a period of 172 years, on average, a single case was published in a little over four years. One may therefore ask oneself what the relevance of clinical therianthropy might be for clinical practitioners who don't actively research the more unusual manifestations of psychopathology. First, as clinically oriented health professionals, we can confirm that these cases are out there. For instance, in the daily practice of the first author (inpatient psychiatry), a person with clinical therianthropy is seen every other year, on average. That may not sound like much, but it makes one suspect that the condition goes largely unrecognized in many places, especially if clinical therianthropy is not considered as a diagnostic possibility. We therefore feel the need to raise awareness of clinical therianthropy and thus promote the identification of people suffering from this condition in clinical practice. Second, since the outcome of such cases may be dramatic for patients and their loved ones, we hope that our review may aid to develop therapeutic interventions in the future. Much like the far more common Capgras syndrome (found in 7-10% of people with Alzheimer's dementia (Sinkman, 2017)), we wonder if a quicker

identification of these unusual symptoms may result in earlier treatment and less personal and family suffering. A third reason why we believe this topic to be a pertinent issue, is the swift rise of (online) therian and related communities that has taken place since the 1990s (Gerbasi et al., 2008; Scribner, 2012). Admittedly there is a massive difference between people enjoying the feline or other therian aspects of their personality, perhaps engaging in cosplay or joining online discussion sites, and those being involuntarily admitted to secluded nursing wards, going about on all fours, howling and writhing at night, and urinating in public places, so perhaps we are mistaken in suspecting a continuum between these two radically different phenotypes. We are also aware of some differences in the degree (i.e., ranging from partial to total) and nature (i.e., physical, spiritual, or psychological) of animal identification between these heterogeneous groups. These factors are obviously critical for differential diagnosis. And yet, given the similarities in content of the experiences involved, as well as the lack of studies comparing the two groups, we thought it useful to compare the results of our systematic review on clinical therianthropy with data that have been collected on therians and other people with zoomorphic tendencies. It is possible that the scant empirical literatures of each phenomenon may help inform the other and help to better distinguish potential subtypes of this animal-human experience, thus contributing to the development of a diagnostic spectrum.

2. Methods

We carried out a systematic literature search in PubMed, Embase, PsycINFO, Google Scholar and the historical literature up until July 1, 2024, using the search terms ailuranthropy, boanthropy, clinical lycanthropy, clinical therianthropy, clinical zoanthropy, delirium of metamorphosis, imitative monomania, insania lupina, insania zooanthropica, kynanthropy, lycanthrope, lycanthropia, lycanthropy, lycomania, melancholia canina, melancholia zoanthropica, partial lycanthropy, therianthropy, werewolf, werewolves, werewolves, zoanthropic melancholia, and zoanthropy. The digital searches were complemented by backward searches. Since we had no language restrictions we included

papers in English, French, German, Dutch, Spanish, Slovak and Persian. An additional forensic case report was identified through an online news article (Landrum, 2020). Papers were excluded when they contained no original case descriptions or when the phenomena reported did not comply with the definition of clinical therianthropy. From all relevant reports, we extracted the following data: i) year of publication, ii) demographic characteristics of the patient (e.g., sex, age at time of publication, and country of origin), iii) phenomenological characteristics of clinical therianthropy (e.g., theriotype, duration of illness, personal significance of animal form, personal history of animal attacks, presence of religious/demonic themes), iv) associated features (e.g., comorbid Cotard's syndrome, other-directed violence during episodes), v) clinical diagnosis, vi) test results, vii) type of treatment, and viii) clinical outcome. Statistical analyses were performed with the aid of SPSS version 29 (IBM Corp, 2023).

3. Results

Our initial search yielded 62 potentially relevant papers on clinical therianthropy, of which 42 contained original case descriptions. Cross-references and a search in historical sources yielded another 14 papers and book chapters. From these 56 texts, we extracted 79 pertinent case descriptions (summarized in the Supplementary Material, Table S1). One case had been published twice in different places (Knoll, 1986; 1991) and two older ones were almost identical to a historical case (Goulart, 1607; Bayfield, 1663) and therefore excluded. Since an anonymous reviewer of this manuscript provided one additional citation for a case of sleep-related dissociation, the number of unique cases to be analyzed was $N=77$ (for Prisma flow diagram, see Fig. 2). Among all individual patients, 33% were female. Ages of onset could be extracted in 70% of the cases, with the mean ages of female and male patients being 43 ($SD = 17.3$) and 29 ($SD = 12.7$) years, respectively (age range = 12-87 years). As Levene's test of equality for variances was non-significant, a one-way ANOVA was used to test for sex differences in age of onset. Results indicated that men experienced symptoms of clinical therianthropy at a significantly earlier age [$F(1, 52) = 10.52, p = .002$].

Of note, one person later diagnosed with clinical lycanthropy had been assigned a female gender at birth, and was recognized as being male at age six (Torres Iglesias & Marino Ferro, 2007).

< Figure 2 around here >

3.1 Phenomenology

Among the 77 people reported on, 36% stated that they had transformed into an animal. The remaining 64% had merely behaved like an animal, albeit while displaying often grossly disturbed behavior. The distribution of theriotypes can be found in Table 2. Since six people had received a diagnosis of clinical therianthropy without further specification, and four reported on more than one theriotype, the total number of theriotypes reported in it is 78. The majority of the cases involved clinical kynanthropy (n=28) or clinical lycanthropy (n=25), together accounting for 68% of the total number of reported theriotypes. The overall duration of symptoms of clinical therianthropy varied widely. Of the 60 clinical narratives that catalogued duration, 25% reported that symptoms lasted for days, 12% weeks, 33% months, and 31% years.

< Table 2 around here >

3.2 Clinical diagnoses

A total of 74 cases provided diagnostic information beyond clinical therianthropy. Due to the heterogeneity of reporting standards, though, some listed only one diagnosis - presumably the one thought most relevant - whereas others provided several. For our purposes, we adopted the conservative approach of including all diagnoses (viz., there are more than 74 total diagnoses tabulated) without presuming etiological primacy. The most common ones were psychotic disorders (41%), psychotic depression (24%), and bipolar disorder (18%), followed by substance-use disorder (8%), obsessive-compulsive disorder (7%), personality

disorders (5%, primarily cluster B), depressive disorders (5%), dissociative disorders (4%), and schizoaffective disorder (3%). Interestingly, the case described by Schenck et al. (1989) involved a nocturnal dissociative disorder (for a broader consideration of dissociated sleep states and status dissociatus, see Antelmi et al, 2016). In 18% of the cases the results of auxiliary investigations such as EEG and brain CT or MRI were provided, but except in a case of cerebellar hemangioblastoma (Arbelo et al., 2020) these were either negative or inconclusive.

3.3 Associated features

Data extracted from those case studies that included narratives ($n = 61$) allowed us to assess associated features. We grouped these into two categories, comprising historical precursors and co-occurring phenomena.

As for *historical precursors*, 23% of the case reports mentioned severe psychotrauma, ranging from psychical abuse or abandonment in early childhood to forced marriage and X-ray castration. Interestingly, 2% of the people reported on were born with polydactyly. In addition, 13% of the reports mentioned a history of animal attacks, with 88% of them involving attacks by the same species that people subsequently 'transformed' into (i.e., five wolves/dogs, one bee, and one cat). Media use was also assessed, with 12% of our sample viewing material consistent with their subsequent symptoms (e.g., horror movies, online searches for animal transformations). Given their identification with animals and the adoption of both their manner and behaviors, we assessed for a history of bestiality as well. A total of 8% of the sample reported at least one instance of bestiality in their past. Interestingly, only two of the five patients reported having sexual relationships with animals that were concordant with their assumed 'species' (i.e., one case each of clinical boanthropy and tigranthropy with a history of sexual relations with a buffalo and several cats, respectively).

Regarding to *co-occurring phenomena*, Cotard's syndrome featured in 12% of the cases, either formally diagnosed or recognizable by its characteristic nihilistic symptoms (e.g., delusions of being deceased). Along with delusions of transformation, religious and occult

themes (e.g., possession, demonic forces, exorcism) played a role in 38% of the available sample (i.e. n=61). Finally, given the frequent delusion of being a predatory animal like a wolf or a tiger, we assessed for the presence of other-directed violence (i.e., not threats or animal 'posturing', but actual attacks on others) during the active phase of symptoms. This was reported in 16% of the sample with one case involving homicide.

3.4 Treatment and outcome

As shown in Table S1, a wide range of treatment methods have been applied to clinical therianthropy ranging from historical approaches (e.g., bloodletting, therapeutic enemas) to more modern therapeutics such as psychopharmacology (e.g. antipsychotics, antidepressants, antiepileptics) and electroconvulsive therapy (ECT). Limiting our total sample to the 52 cases which reported outcomes for symptoms of clinical therianthropy and also dated from 1951 (i.e., the first year in which chlorpromazine was used experimentally to prevent postoperative delirium) to the present, results were as follows: no change = 8%, incomplete remission = 33%, full remission = 58%, and death = 1% due to suicide (possibly 2%, if we include a case of suspected suicide).

4. Discussion

Our analysis of 77 cases of clinical therianthropy indicates that this clearly-defined and recognizable phenotype is associated with a wide range of (mostly psychiatric) disorders. Due to the heterogeneity of presentations, clinical diagnoses, and associated features, and especially the reported outcome, one may gain the impression that this involves a condition of 'average severity' in comparison to, for example, schizophrenia spectrum disorders (e.g., death due to suicide = 1-2%, other-directed physical aggression = 17%, homicide = 1%, psychotrauma = 23%, brain cancer = 1%, full remission = 58%). However, these statistics may obfuscate the fact that most individuals in these reports were severely ill, and that the majority, even when rid of their clinical therianthropy symptoms, remained severely ill. Of note, 'full remission' was here operationalized as full remission of therianthropic symptoms

not full remission of (mental) disease. Moreover, since none of the original studies made a comprehensive assessment of all the aspects that we here focus on, we suspect that our results are conservative at best, and quite possibly an underestimation of actual numbers. In what follows, we will zoom in on several individual findings, then briefly discuss historical aspects. Finally, we reflect upon etiopathology, (differential) diagnosis, treatment, and a comparison with therian and related identities.

The difference that we found in the ages of onset in men and women (29 versus 43 years) is in line with previous studies. In their 1999 review of 23 cases of clinical therianthropy Moselhy and Nasr found a male-female ratio of almost 3:1, with males debuting on average at 28 years of age and females at 46 (Moselhy & Nasr, 1999). The authors tentatively attributed this age gap to the protective role of oestrogens and to the fact that most females were diagnosed with an affective disorder, whereas males tended to be diagnosed with a schizophrenia spectrum disorder, which has long been believed to become manifest at an earlier age. A third possibility might be that males more often show externalizing coping mechanisms than females, making it more likely for them to draw attention from health professionals and law enforcement.

Regarding the association that we found between animal bites and symptoms of clinical therianthropy, the established rate of 13% lies far below the lifetime prevalence of around 25% found in UK community studies for dog bites alone (Westgarth et al., 2017). Again, the rate that we found may be an underestimate since this was not assessed systematically across studies. As an aside, we expect that rates may be higher in more rural and less developed areas with more regular animal-human contacts.

4.1 Historical aspects

Contrary to popular belief, the conceptualization of therianthropy as a natural disease dates back to Antiquity. The Roman physician Galen (129-217 AD) was among the classical authors who renounced the idea that people could actually turn into animals. Other

proponents of this view were Marcellus of Side (c. 117-c. 161 AD) and Pliny the Elder (c. 23 BC-AD 79) (Baratta & Weiner, 2009). In his *Natural History*, Pliny mused,

'That men have been turned into wolves, and again restored to their original form, we must confidently look upon as untrue, unless, indeed, we are ready to believe all the tales, which, for so many ages, have been found to be fabulous' (Riley & Bostock, 1855)

During the Middle Ages, the Persian physician Avicenna (980-1037 AD) gave lycanthropy a central place in his book on mental afflictions and listed as characteristic features social isolation, nocturnal activity, and aggression (Vattier, 1659). In their historical overview, Baratta and Weiner indicated that the insights of these classical authors were readily adopted by many physicians in the 16th century (Baratta & Weiner, 2009). Their list includes Jan Wier (c.1515-1588), Jean François Fernel (1497-1558), Jean de Nynauld (who distinguished diabolic and medical variants of lycanthropy), Robert Burton (1577-1640), Pieter van Foreest (1521-1597, 'the Dutch Hippocrates', who claimed to have encountered a lycanthrope himself in Alkmaar, the Netherlands), and Donato-Antonio Altomare (c. 1520-c. 1600), who claimed to have witnessed two cases. During the same era, the Spanish scientist Alonso de Santa Cruz (c. 1505-1567) published the story of a man around 30 years of age who had been found wandering the streets at night, howling in cemeteries and eating whatever he could find, who had been arrested and then sent to a pauper asylum. Citing Galen and Avicenna, the treating physician appeared to have realized immediately that he was dealing with a special type of melancholia called *insania lupina* and treated the man accordingly with then prevailing techniques such as enemas, bathing, refeeding and bloodletting. Allegedly, especially the left basilic vein produced foul, smelly blood, taken to be indicative of the underlying disease. The patient was then given a mild 'eradication medicine' and reportedly fully recovered within six weeks of time (de Santa Cruz, 1622). The case description ends with the almost endearing words that the patient was 'instructed thus that

the disease would not return; not only he, but also a person close to him and in charge of this task, so that every month he would take some simple and mild medicine that would ward off the melancholia' (de Santa Cruz, 1622, p. 97). During the decades that followed, two other case descriptions were published: one by Goulart (1607, quoting an author called Hauteemer) and the other by Bayfield (1663). Like de Santa Cruz, both authors designated their cases of lycanthropy in a matter-of-fact tone as variants of melancholia. The reason why we did not include them in our analysis, is that the particulars of the case descriptions show so much overlap with de Santa Cruz's (with the exception of Goulart's addition that the patient had been seen carrying around 'a severed leg and thigh of a corpse') that we doubt whether these were genuine cases. The point in nonetheless citing them here is that none of these three authors cared to explain the phenomenon at hand, as if they took for granted that actual werewolves were no longer believed in and that classifying werewolf madness as a type of melancholia was self-evident. This stands in stark contrast with the clerical literature published during the same era, which was not as enlightened (see below). Interestingly, King James I of England (1566-1625, known for his eponymous version of the bible), though believing wholeheartedly in witchcraft, was skeptical with regard to the supernatural origins of lycanthropy. In 1584, Reginald Scot (c.1538-1599) summarized the shared point of view of these authors by saying that 'lycanthropy is a disease and not a transformation' (Robbins, 1959). It is probably no coincidence that this reappraisal of the rational work of classical physicians took place during the Renaissance, when the ideas and achievements of Antiquity were adopted throughout Europe and employed to rejuvenate the intellectual and cultural climate. Surprisingly, this reappraisal also coincided with an increase in the number of werewolf trials, which in all their cruelty appealed more to the general audience than the sobering point of view advocated by these men, as did the belief in actual transformations of humans into animals. Perhaps that is one more reason why the number of biomedical case descriptions of therianthropes has remained so low throughout the ages.

4.1.1 Werewolf histories

This is not the place to delve too deeply into the prolific literature on mythical therianthropy, but a few points need to be addressed. Perhaps inspired by primeval legend such as the one of Odin turning into an eagle and Nebuchadnezzar into a wild animal eating grass 'like oxen', the belief in therianthropy used to involve the idea of an actual conversion of humans into animals and vice versa (Baring-Gould, 1865). And yet Renaissance-era witch-hunter manuals such as the *Malleus Maleficarum* (Kramer & Sprenger, 1971) and the *Compendium Maleficarum* (Guazzo, 1988) already related how people who believed in werewolves did not always conceptualize lycanthropy as a physical transformation, but rather as a demonic form of hallucination imposed by diabolical forces. Thus, there appears to have been a distinction between how the learned elite and the uneducated masses saw werewolves during the 16th and 17th centuries. The consequences were quite the same though, since those brought in front of a jury risked torture and execution (Russell & Russell, 1989). Much has been written about these werewolf trials, albeit on the basis of no more than several hundred documented judicial cases from France and other European countries (de Blécourt, 2015). Nonetheless, since the 1970s a rumour has been circulating that 'more than 30,000 people' had been killed in French werewolf trials between 1520 and 1630 alone. De Blécourt (2015) traces this figure back to a work by Pierre de Rosteguy de Lancre (1553-1631), a French judge who in 1609 conducted a massive witch hunt in Bordeaux, and in 1611 wrote that the Pays de Labourd, where the hunt took place, contained an estimated number of 30,000 souls, among whom there was 'hardly a family which does not have anything to do with witchcraft' (quoted in de Blécourt, 2015, p. 5). Exactly how and why this number was taken to refer to people being killed in werewolf trials is unclear, but suffice it to say that not only the number of case descriptions on clinical lycanthropy has long been overestimated (Blom, 2014), but also the number of 'actual' werewolf cases. Regardless, and in spite of wild overestimations of death tolls and the clear legal excesses of religious and secular authorities, one fact seems nonetheless clear: a sincere belief in the possibility of human-to-animal transformation was present, pervasive, and long-standing in Europe. Historian Rolf Schulte (2015) found objective evidence for this by studying 16th- to 18th-century legal cases involving slander in

Germany. He not only identified numerous examples but also noted that spuriously accusing a person of lycanthropy could result in legal consequences for the accuser.

4.2 Etiology

4.2.1 Supernatural hypotheses

Despite the enlightened position of certain Greek, Roman, and Arab philosophers in Antiquity and the Middle Ages, supernatural etiologies for human-to-animal transformations held sway throughout much of recorded history. Transformations were sometimes thought to come about through pure chance (e.g., being born out of wedlock), curses (e.g., Lycaon being transformed by Zeus), certain rituals, or magical clothing such as enchanted belts or girdles (Baring-Gould, 1865, de Blécourt, 2015). Interestingly, a review of werewolf folklore does not reveal much if any belief in transformations via bites. On the other hand, ‘werewolf salves’ played an important role. For example, in the famous case of Gilles Garnier (d. 1573, ‘the werewolf of Dole’), his self-described ability to transform into a wolf was considered only possible after applying one of these concoctions to the skin. Though recipes varied, such salves generally consisted of hallucinogenic plants (e.g., belladonna, henbane) blended with more innocuous herbs (e.g., celery; parsley) which were boiled in fat (de Nynauld, 1615). After leaving the concoction to cool and congeal, the ‘werewolf’ would then topically apply the salve and await transformation. It has been suggested that these ointments resulted not only in acute hallucinations, but also paraesthesias, the combination of which may have led people to believe that they had transformed into animals, at least until the intoxication abated (Emminghaus, 1878). In our analysis, only six cases (8%) could be linked directly or indirectly to substance use (alcohol intoxication, alcohol dependence, and cannabis use, two cases each) and none to the botanical hallucinogens traditionally used for the purpose of ‘transformation’.

4.2.2 Biomedical hypotheses

The symptoms of clinical therianthropy commonly manifest within the context of other serious conditions that affect a person's thought processes and self-perceptions more globally (Blom, 2014). As we saw, they have been found not only in people with schizophrenia spectrum disorders or psychotic depression, but also in dementia as well as bipolar, personality, dissociative, and substance use disorders. Sometimes these conditions can be designated as etiologies, as in substance use disorders, which have the potential to mediate hallucinations, body schema illusions, and delusions, whereas in other cases it would seem more likely that clinical therianthropy *and* the associated condition are caused by a common underlying factor (e.g. hyperexcitation of the dopaminergic pathways, amyloid plaques, brain tumour). It has also been suggested that clinical therianthropy and other monosymptomatic delusions are chiefly associated with right-hemisphere pathology (Malloy & Richardson, 1994). However, on the basis of what is currently known about clinical therianthropy, we can only say that the identification of such factors is a goal for future research.

4.3 Pathophysiology

As to pathophysiology, several models have been developed that partly overlap and complement each other. Given the variety of clinical contexts in which clinical therianthropy has been described, it is likely that multiple pathophysiological mechanisms lead up to the phenotype that we call clinical therianthropy. This is all the more likely given the fact that many psychiatric disorders have shared functional architectures of underlying brain pathologies (Xia et al., 2019). Similar to explanatory models for Cotard's syndrome (Sahoo & Josep, 2018), a 'two-hit' model can be applied wherein the first 'hit' would be an abnormal perception (e.g., hair growth, assumption of animal features) that the majority of unimpaired persons would presumably dismiss out of hand. However, if the person suffers from a condition that leads to this abnormal perception persisting (i.e., the second 'hit', which could be one of the conditions mentioned above, lesions, etc.), they would be more likely to sincerely believe that they are able to assume an animal form. In clinical therianthropy, a candidate for the first 'hit' would be a disorder of cenesthesia, or a profound alteration of

one's body schema. We suspect that this is not an obligatory stage, since it was reported on by a minority of the cases that we analyzed (and probably not assessed systematically).

Examples are Morel's famous case (described above; Morel, 1853), Deny and Camus' case of a woman who continuously bemoaned the bodily changes that had turned her into a dog or a bull (Deny & Camus, 1905), and the case by Keck and colleagues of a man who regarded his body as deformed and identified as a tiger (Keck et al., 1988). The second 'hit' would be a higher-order cognitive process that leads up to the *belief* that one has turned into an animal or has developed non-human animal characteristics. In what follows, we will highlight what is known about these two hypothetical developmental stages of clinical therianthropy.

4.3.1 Cenesthesiopathy

The first 'hit', a disorder of cenesthesia, is also known as cenesthesiopathy or, in present-day terms, a body schema illusion. The notion that we perceive our body only indirectly was already advocated by Aristotle (384-322 BC), who used the Greek words κοινός (*koinos*, communal) and αἴσθησις (*aisthēsis*, perception from the senses) which during the late 18th century were reintroduced to form the medical Latin term cenesthesia ('common sensation') (Hübner, 1794). Throughout the 19th century this 'sense of one's physical existence' was conceptualized as the sum of all internally mediated bodily sensations (Blom, 2023; Blom et al., 2010). These sensations were believed to add up to one coherent whole that approximated one's objective physical body. Conceptually, cenesthesia comes close to what we now call body schema, body image or body representation (Bonnier, 1905; Baumard et al., 2024). In 1905 the French neurologists Gaston Deny (1847-1923) and Paul Camus (b. 1877) elaborated further on this theme by introducing the notion of cenesthesiopathy, where people experience profound alterations to their body scheme. A case from their 1905 paper involves the above-mentioned woman who no longer felt human and instead experienced her body as that of a dog or a bull (Deny & Camus, 1905).

Over the past several decades, Damasio (1999) and others have utilized imaging studies to identify specific brain areas thought to be responsible for this key sense of bodily identity. For instance, the premotor and motor cortex (Arzy et al., 2006), the primary and secondary somatosensory cortex (Bär et al., 2002, Shergill et al., 2001), the precuneus and somatosensory association cortex (Bär et al., 2002) and the anterior insula (Craig, 2009) have all been implicated in mediating this existential sensation, although it would seem that the network involved is far more extensive (Kasten & Eilers, 2023; Baumard et al., 2024). From our and others' perspectives, the classical category of the cenesthesiopathies is of critical importance for understanding various forms of psychopathology, including clinical therianthropy, but also body dysmorphic disorder, body integrity identity disorder, apotemnophilia, anorexia nervosa, somatoparaphrenia, Cotard's syndrome, cenesthetic sexual hallucinations, the bodily distortions experienced in Alice in Wonderland syndrome, and the *shubo-kyofu* subtype of *taijin kyofusho* (Baumard et al., 2024; Blom, 2016; Blom et al., 2024; Kasten & Eilers, 2023; Neven & Blom, 2021; Sharpless et al., 2017). However, the cenesthesiopathies do not currently feature in any of the major psychiatric classifications. What perhaps comes closest is the ICD-11 diagnostic subcategory called Cenesthopathic Schizophrenia, which is filed under the overarching group of Other Schizophrenia (WHO, 2022). Though included in that volume, the current empirical literature is scant. However, if it is true that zoanthropic delusions could be rooted in somatosensory distortions that critically impact upon bodily self-perceptions and 'the common sensation', and that these, in turn, result in massive alterations to one's sense of physical identity, then these factors may eventually illuminate the neurobiological substrates of clinical therianthropy. Likewise, they may throw a new light on the nonpathological alterations to the body schema that may be experienced in the context of therianthropy.

4.3.2 Cognition

The second 'hit', a higher-order cognitive process, leads up to the *belief* that one has turned into an animal or has developed non-human animal characteristics. When such a delusional

idea is based on cenesthopathic alterations, it is called a secondary delusion; if not, a primary delusion (Jaspers, 1997). Using a slightly different approach, the German psychiatrist Karl Jaspers (1883-1969) introduced the term 'delusional perception' to capture situations where there is an immediate change of meaning to that which is perceived (e.g. the body) even though the perception itself remains unaltered (Jaspers, 1997). An example would be the 24-year-old man described by Rojo Moreno and colleagues, who withdrew into his room to await his 'final transformation' into a wolf. He expected this to take place given the fact that people appeared to shun him and he perceived himself in the mirror as a person with abundant facial hair growth (Rojo Moreno et al., 1990). It may be tempting to attribute delusions and delusional perception to the thought disorders that many consider characteristic of schizophrenia spectrum disorders, but frontal lesions may also contribute to this. After all, a person's ability to correct delusions and delusional perceptions on the basis of new information may be severely compromised by frontal lesions, especially when these thwart their capacity to deal with conflicting data (Malloy & Richardson, 1994). This raises the question of whether delusional thinking and delusional perception are necessarily associated with schizophrenia spectrum disorders while avoiding another question, namely what the nature of the underlying cognitive process might be. In what follows, we will briefly touch upon both these themes.

4.3.2.1 Psychological mechanisms

Even given the field's currently limited understanding of the etiology of clinical therianthropy, it seems reasonable to conclude that somatic explanations proffered in the absence of psychological factors would be incomplete. This is because, as currently formulated, somatic models do not yet explain a key peculiarity of clinical therianthropy: why do sufferers focus their personal delusions on (a) animal forms and (b) self-transformation? Psychotic disorders, coenesthesiopathies, brain lesions, dementia, and other factors affecting the veracity of perceptions - whether of self, other, or the external world - provide the occasion for any number of delusional ideas and difficulties with reality-testing to manifest. However,

our review of the literature demonstrates that this very specific, ancient, and seemingly universal belief in human-to-animal transformation not only manifests in modern-day patients, but possibly at a higher rate than previously thought. Is this repeated delusion random (i.e., given enough people with delusions, some will become delusional on almost any subject) or is it possible that the unique symptoms of clinical therianthropy could be both meaningful and potentially comprehensible in terms of personal or cultural factors? A review of the psychological literature (e.g., Garlipp et al., 2004; Rosenstock & Vincent, 1977) indicates that clinical therianthropy has been primarily conceptualized through psychodynamic lenses, prioritizing conflict models (e.g., psychoanalysis, ego psychology) over deficit models (e.g. mentalization-based treatment) (Sharpless et al., 2022). Many writers (e.g., Moselhy & Macmillan, 1994; Surawicz and Banta, 1977) essentially view the delusional transformation as a psychic compromise between (a) the wish to act on classical drives toward aggression and sexuality, and (b) personal or internalized societal prohibitions against such acts. From this standpoint, a person would unconsciously want to behave in an 'animalistic' manner, but to knowingly do so would leave them riddled with angst, guilt, or legal repercussions. Thus, a potential compromise would be to absolve themselves of personal responsibility by engaging in the prohibited behavior, but only after 'transforming' into a non-human animal for whom expectations of conventional morality would be non-existent. Symptoms of clinical therianthropy could therefore represent specific compromises for other transgressive desires such as incest (e.g., Nejad & Toofani, 2005; Rosenstock & Vincent, 1977) and bestiality (e.g., Keck et al., 1988; Mondal et al., 2014) as well.

A process of identification with animals or abusive humans has also been implicated. Several authors noted animal attacks in the developmental histories of their patients (Rao et al., 1999), and we identified a total of eight such cases (13%). Others reported tragic levels of childhood abuse and neglect from caregivers (Keck et al., 1988). At a more general level, links between childhood trauma and the subsequent development of hallucinations and delusions have been documented in the literature (e.g., Read et al., 2005). Using this lens of identification, people with clinical therianthropy may experience a direct but likely

unconscious identification with the aggressor and select an animal form similar to either the reality (i.e., a dog) or the fantasy (a bestial caregiver) of their own idiosyncratic histories of victimization. Cultural as well as personal associations may influence the animal 'form' as well (e.g., an apex predator or 'protector' animal). Other authors note the importance of personality pathology and regression in their own discussions of clinical therianthropy (Garlipp, 2004; Kulick et al., 1990), and we will build upon these themes using Otto Kernberg's (1984) concept of personality organization.

Three main levels of personality organization have been distinguished: neurotic, borderline, and psychotic. Although these three terms have been used broadly within the history of psychiatry - with some significant shifts in meaning across time and place - they are here used to denote types of overall personality structure. More specifically, a person's level of personality organization is determined by their use of defense mechanisms, level of identity diffusion, and overall reality testing. In clinical practice and scientific research, personality organization is often assessed with the aid of semi-structured clinical interviews (Yeomans et al., 2015). People at the neurotic level tend to use higher-order defenses (e.g., sublimation), have coherent identities and good reality testing, whereas psychotic individuals tend to use primitive defenses (e.g., denial, somatization), have diffuse identities, and suffer from compromised reality-testing. Borderline organized individuals use a mix of primitive (e.g., splitting, acting out) and higher-level defenses (e.g., humor), lack coherent identities, and generally have intact reality-testing. When under stress, however, they can temporarily regress to psychotic thought processes and become delusional and paranoid, but the duration tends to be shorter than in people with psychotic organizations. Though more details would clearly be helpful, the published cases seem to indicate that many people with clinical therianthropy operate at either borderline or psychotic levels of organization. Therefore, psychological contributions for this condition would include not only psychic conflicts with aggression as described above, but also legitimate and more profound characterological deficits, namely, a combination of difficulties with reality testing (driven in part by somatic states and syndromes), problems tolerating or containing intense affects (possibly associated

with trauma histories), and a lack of coherence in their felt personal identities. This combination may set the stage for a more global identification with a delusional animal form that possesses a personal or cultural significance.

Research on cognitive biases may also be useful for understanding the development and maintenance of delusions in the context of clinical therianthropy. Such biases can be understood as particular thinking patterns that lead individuals to draw incorrect inferences about internal and external experiences. Several of these have been implicated in delusions (de Rossi & Georgiades, 2022; Sheffield et al., 2023). For instance, *jumping to conclusions* is a well-studied cognitive bias that entails making hasty decisions based upon limited data. Related to this is the *liberal acceptance bias* which results in individuals having a lower decision threshold in terms of their own subjective probability estimates (i.e., they may make decisions based upon low probability events or data). The presence of these cognitive biases may make it more likely for an individual to firmly believe in the reality of an illusory transformation. People with delusions also tend to have a *bias against disconfirmatory evidence* which makes it more difficult for them to shift their beliefs when contrary evidence emerges. Relatedly, they tend to have strong *confirmation biases* which lead them to pay attention to (and process) information that is delusion-congruent. *Overconfidence* with these erroneous judgments is a frequent accompaniment in delusions more generally.

4.4 Assessment

There are currently no structured or semi-structured clinical interviews or questionnaires to reliably assess the symptoms of clinical therianthropy. However, both observation-based and patient-reported diagnostic criteria were proposed by Paul E. Keck and colleagues in their seminal 1988 article (Keck et al., 1988). Which of their two methods to use depends upon the mental status of the person involved. For instance, during an active symptomatic phase the diagnosis would depend upon i) a clinician's direct observation of seemingly sincere, yet obviously non-human animal behaviors (e.g., barking or quadrupedal walking as in clinical kynanthropy). In most of the cases we reviewed (Table S1), people did not communicate via

human speech during the acute phase of their thought disturbance. Therefore, in order to meet Keck's first criterion, clinicians would seemingly need to rely upon their direct observations potentially supplemented by reports from other reliable sources (e.g., police officers, relatives). In contrast, patients in a non-acute phase might be able to ii) retrospectively report the presence of therianthropic delusions and hallucinations to the clinician when in they are in a more lucid state of mind or in between episodes. However, as our review demonstrates, significant thought disturbances may continue even if the clinical therianthropy symptoms abated. If this is the case, the accuracy of reporting should obviously be taken into account.

In addition to Keck's eminently reasonable criteria, we propose that the therianthropic behaviors should also be associated with either clinically significant distress (i.e., the individual is upset and concerned about their symptoms) and/or clinically significant impairment (e.g., they are unable to work or fulfil other important life roles). Clearly, most people under the sway of delusions of animal transformation would exceed these modest DSM- and ICD-based thresholds for 'disorder', but actively considering them may help to avoid misdiagnosis of more ego-syntonic beliefs and non-pathological symptom manifestations (e.g., cases described in the differential diagnosis section below).

Interestingly, while extracting data from the cases in Table S1 and subsequently applying Keck and colleagues' criteria, several diagnostic quandaries emerged. Some of these (e.g., duration thresholds) may be premature to discuss given the limited state of the current literature, so we will only focus on those which could gain a more immediate and practical consensus.

First, what level of putative animal transformation should qualify as clinical therianthropy proper? In the majority of cases we reviewed, a full delusional transformation into one or more animal forms was reported. This seems consistent with the criteria issued by Keck's group. However, several 'partial' cases involving delusional claw growth, changes to the chest cavity, or growth of thick fur were reported in the literature as well. Would these partial cases meet the criteria of Keck's group or would full diagnosis require a more

substantial shift in the patient's delusional perceptions of their bodies and/or manifestation of corresponding behaviors? Cases more akin to traditional 'werewolves' raise overlapping issues. Would a delusional 'hybrid' identity consisting of both animal and human features fall outside of the acceptable symptoms? Taken further, would someone who sincerely believed they transformed into a mythical animal (e.g., fairy, troll, hippogriff) and hallucinated their mythical properties (e.g., invisibility, superhuman strength, flight) meet the spirit of said criteria? In the case of werewolves, fairies, and trolls, a patient could conceivably retain the capacity for human-like speech and even some ostensibly human-like behaviors.

From our perspective, an important yet implicit facet of the criteria introduced by Keck et al. seems to be a substantial deviation in the patient's self-awareness. Namely there is a shift away from the acceptable, normal range of human thinking, feeling, and behaving and toward a less sophisticated, more 'instinctual', animal-like way of being. When this occurs, there are marked deviations from consensual human reality which are not only apparent to others but, when more lucid, to the patients themselves. Using this definition, we would envision that partial cases - as well as most 'human-like' hybrid cases - might be either excluded from diagnosis or, alternatively, given a diagnostic qualifier (e.g., 'clinical therianthropy, partial, without changes in behavior') in order to separate them out for further empirical study. In addition, someone meeting all criteria for clinical therianthropy except for the fact that they perceive themselves to be a mythical animal like a dragon or a hippogriff could be given an additional qualifier (e.g., 'clinical therianthropy, mythical form'). Future research will hopefully determine whether this 'splitting' of clinical therianthropy into several subtypes is warranted or whether a broader category is empirically and clinically more appropriate.

4.5 Differential diagnosis

The oftentimes dramatic symptoms of clinical therianthropy would seem to imply ease of diagnosis, but the condition can be misdiagnosed or potentially underdiagnosed due to factors such as the reporting abilities of the patient and the assessor's familiarity with

symptoms of clinical therianthropy and their typical manner of presentation. Some disorders share similar symptoms. For instance, people suffering from body dysmorphic disorder and *shubo-kyofu* devote significant attention to parts of their bodies, sometimes reaching delusional levels of intensity. Thus, patients may present with specific complaints that at first glance may appear to be consistent with clinical therianthropy (e.g., misperceptions of hair growth; possessing a pig-like 'snout'). However, neither of these populations report a belief in physical transformation. Similarly, those suffering from Cotard's delusion may report anomalous bodily perceptions, but the characteristic nihilistic delusions would be absent in clinical therianthropy proper.

Misdiagnosis of clinical therianthropy can also be made in terms of overpathologizing certain individuals who report strong identification with animals. In order to avoid this possibility, certain terms and group memberships will be discussed. However, in reviewing the professional and online literatures, there seems to be an unavoidable degree of fuzziness or overlap in current definitions (Plante et al., 2016) and, at least at present, a definitive definitional guide seems lacking.

4.5.1 *Therians, furies, and other people with zoomorphic tendencies*

Most people are familiar with anthropomorphism, or the act of attributing human qualities onto non-human animals. A related phenomenon, zoomorphism, involves the attribution of animal traits to human beings, deities, or inanimate objects (American Psychological Association, 2007, p. 1011). This term is particularly relevant for many of the groups described below, including therians and furies, who engage in a form of self-zoomorphism. *Furry* is the broad term describing an individual who possesses at least some degree of identification with non-human animals. Reasons for this could be aesthetics, a sense of felt identity, the notion that one has been an animal in a past life, or sexual reasons (e.g., Richards, 2015). The term furry has also somewhat circuitously been applied to people who identify with the 'furry fandom'. Members of the furry fandom may take part in organized conventions as well as online groups and may wear 'fursuits' (i.e., a manner of dress

consistent with their furry identity, ranging from fake ears to far more elaborate full-body costumes) representing their 'fursona' (Gerbasi, 2008). Age can be fluid, with some furies identifying as baby animals (i.e., 'babyfurs'). Some utilize furry-themed pornography or have sex with one another while in furry garb. These sexual acts have been termed 'yiffing' after a particular sound made by the arctic fox (Richards, 2015). An example of a more specific group of furies would be *Bronies* or those who identify with the anthropomorphic television show, *My Little Pony: Friendship is Magic*. Bronies who sexualize the show and utilize pony-themed pornography are termed *cloppers* in reference to the sound of hooves being slapped together in a masturbatory fashion. Another relevant group, already alluded to, is called *therians*. Therians overlap with furies to a degree, but the identification of these people with animals (or rather as animals) seems to be far stronger. This could range from a strong perceived connection to their fursona to a firmly held conviction that they are less than 100% human or would even prefer not to be human (Grivell, 2014). Reviewing the literature, people may identify themselves as therians on psychological, behavioral, spiritual, metaphorical, or existential grounds (Scribner, 2012). It may be noteworthy that therians identify with actual, real-life animals. Those who believe themselves to be mythical beasts (e.g., werewolves, dragons) and other non-human beings (e.g., faeries, elves) are generally termed *otherkin* (i.e., 'kin to the other'). Depending on the particular identification, human levels of intelligence could be present or absent.

4.5.2. A diagnostic spectrum?

In considering this basket of terms, one can see potential overlap with clinical therianthropy. However, cosplaying a cartoon pony is obviously quite a bit different from operating under a fixed delusion of physical transformation into one. We would argue that misdiagnoses can be avoided by focusing on i) the nature of the animal identification, ii) the presence or absence of a belief in actual transformation, iii) one's overall level of reality-testing, and iv) the presence of clinically significant distress and impairment. For example, a therian may possess a strong and authentic feeling of identification with a particular animal such as a

wolf. They may feel that they possess certain wolf-like traits and even feel a spiritual connection to wolves to such an extent that they believe a significant part of themselves is lupine in nature. However, unless there is a sincere belief in physical transformation into an actual wolf along with a shift away from typical human self-awareness, it would be inaccurate to diagnose them with clinical therianthropy. However, should they have broader deficits in conventional reality-testing or more pronounced psychotic phenomena, plus distress or impairment, a clinical diagnosis (e.g., psychotic disorder) may be warranted. Further, should furry- or therian-associated sexual disorders be distressing to the individual or cause impairment (e.g., a clopper who is unable to be aroused in the absence of pony-themed objects or pornography), a diagnosis of paraphilia may be appropriate, but not clinical therianthropy. Thus, we envisage a diagnostic spectrum or continuum of similarly themed phenotypes, some of which are wholly benign, others perhaps problematic to people themselves or their surroundings, and still others fully in the realm of severe psychiatric disorders.

4.6 Psychotherapeutic implications

Given the limited empirical status of medical and psychopharmacological interventions for sufferers of clinical therianthropy, it will surprise no one that there are currently no well-validated psychotherapeutic options. After all, traditional talk therapies are of limited value to individuals under the sway of a delusional animal transformation who may be completely non-verbal. It may be important to note that several therapeutic options for delusions have been developed (e.g., as reviewed in Tamminga et al., 2021). Some of these may directly prove useful for certain patients with clinical therianthropy, but we found no examples of these treatments in our sample. However, we propose that psychotherapy could potentially be useful as an *indirect* intervention.

The goals of what have been termed the supportive psychotherapies are generally more modest than symptom reduction or personality change. They instead focus on helping patients maintain and/or return to their highest and most realistic level of baseline functioning

(Winston et al., 2012). Traditional supportive techniques such as reality testing, providing psychoeducation, and helping a person contain overwhelming anxiety may be generally useful in this regard (e.g., Sharpless, 2019). However, we contend that it may be particularly useful for patients and their therapists to look closely at prior episodes of illness and identify relevant patterns. For instance, what types of stressors typically preceded prior 'transformations'? What were the earliest signs or symptoms that transformations were happening (e.g., perceived hair growth, dissociation)? Through cataloguing these patterns and encouraging continual self-monitoring, therapists can help their patients recognize the incipient cues that symptoms may be returning. If so, they could then seek out additional (possibly pharmacological) treatment options in the hope that disruptions to their lives will be minimized.

4.6.1 Forensic implications

As noted above, clinical therianthropy can be associated with violence towards others when sufferers are in an acutely delusional state. Unfortunately, given the relative infrequency with which these symptoms are assessed in 'normal' clinical settings, it is likely that they are even less frequently assessed in forensic settings. Patients may be extremely reluctant to disclose the fact that they committed a crime while believing that they were an animal for fear of worsening their defence and/or increasing their likelihood for an involuntary hospitalization. Therefore, it may be important to keep clinical therianthropy in mind as a diagnostic possibility when evaluating reports of 'bestial' assaults/murders and other cases where witness or police statements indicate marked deviation from typical human mannerisms (e.g., walking on all fours, baring teeth) and ways of communicating (e.g., howling, roaring). A sincere belief that one is an animal would seemingly not indicate *mens rea*.

In cases where there is a suspicion that symptoms of clinical therianthropy may be feigned, additional assessment measures beyond a standard battery may be warranted. This is where knowledge of the scant empirical literature on this topic may become important and where a careful review of reports becomes critical. Regarding the former, does the patient fit

the typical profile of someone who suffers from clinical therianthropy? For instance, do they possess any chronic conditions (e.g., schizophrenia spectrum disorder, bipolar disorder) that appear to predate the symptoms of clinical therianthropy and potentially cause them? Did they ingest substances immediately before the violent act which could lead to such a deviation from normal human cognition and behavior?

Several factors may be important in terms of record review. First, are there any indications of expected cognitive or behavioral changes prior to the putative 'metamorphosis'? Similarly, are the accused's activities leading up to the attack (e.g., Internet searches, personal preoccupations, text messages) consistent with the development of therianthropic delusions? The accused's possible motivations may be critical as well. Did they know the victim? Did they have all-too-human motivations to assault/kill the victim (e.g., financial gain, sexual jealousy) or do they instead appear to be more animalistic (e.g., feeling 'cornered' or hungry). Similarly, were tools or weapons involved or did the accused only use violent means that an animal would possess (e.g., teeth, claws). This may get complicated, however. In the forensic case described by Landrum (2020) a man with a history of clinical therianthropy which predated his crimes first stabbed three strangers while in an acutely psychotic state and later proceeded to bite and ingest flesh, believing himself to be a dog at that time.

4.7 Limitations

Even though this is the most extensive systematic review on clinical therianthropy to date, the number of cases that we were able to include was still relatively small. Moreover, among the 77 case descriptions analyzed, only 79% contained narratives, with varying degrees of completeness. In terms of the descriptive statistics extracted from these cases, it is possible that several findings may be underestimates. This is due to the fact that we relied upon what was specifically described in the published case studies, and that these were not uniform. Where one author may assess and report on such things as a history of bestiality or prominent religious themes, another may prefer to focus on psychotrauma or other variables.

As to the etiological and pathophysiological mechanisms involved, the cases under study provided only rare glimpses of a final common pathway. Moreover, the associated conditions here listed do not necessarily tally with those featuring in present-day classifications. A case in point is dissociation, which in the work of Pierre Janet (1859-1947) had a meaning that differs substantially from that in the diagnostic categories of dissociative disorder featuring in the DSM-5 and ICD-11, which moreover differ somewhat among themselves (Janet, 1889; APA, 2022; WHO, 2022).

5. Conclusions

The notion of zoomorphism has such a long and impressive track record in the history of humankind that it is probably safe to say that it has always been around. It has been part and parcel of many cultures, and individuals may have felt attracted to the belief that human-to-animal transformations are possible under the influence of psychological, social, religious, philosophical, chemical, and cultural influences. From a biomedical point of view, cenesthetic aberrations or body schema illusions (whether or not under the influence of psychotropic substances) may also have led them to believe that they themselves possessed non-human animal characteristics or had physically changed into an animal. In Western countries this belief seemingly vanished during the Enlightenment, and with it the legal grounds to accuse outcasts of being malevolent were-animals who deserve to be punished. Although mythical and biomedical models of zoomorphism existed alongside each other during at least two previous eras (i.e. Antiquity and the Renaissance), the biomedical model slowly transformed the werewolf trial into a strange historical footnote.

On the basis of our systematic review, and especially the finding that today relatively large groups of people in Western societies identify as therians or variants thereof, we believe that the forces driving zoomorphic tendencies may never have actually ceased to exert their influence, although the public display of those tendencies may have been driven underground due to social pressures. During that interval of (perceived) societal suppression, it may well be that only people who failed to stay hidden from society due to severe

dysfunctioning or disruptive behavior surfaced in the acute nursing wards of psychiatric hospitals or in prisons. The birth of the Internet in 1983 gradually made it possible for people to anonymously and safely communicate their affinity with zoomorphism and create communities of like-minded individuals that may or may not maintain or intensify these beliefs. That the number of published cases of clinical therianthropy is so modest is probably due to underdiagnosis, but it may also indicate that zoomorphism in its numerous different forms is a harmless trait that only leads to excesses in relatively rare cases where people feel misunderstood, become socially isolated, and start showing grossly erratic behavior. In short, our systematic review indicates that the few people who have ever been diagnosed with clinical therianthropy represent a small minority of severely ill people at the end of a continuum; a group of people, nonetheless, who deserve further study, proper clinical diagnosis, and tailor-made treatment. We propose that psychotherapy may play a prominent role in relatively early stages of clinical therianthropy, whereas pharmacological treatment may be better suited to treat full-blown pathological cases or underlying processes. Most importantly though, remains the raising of public awareness.

5.1 Implications for research

Our review also implies potential changes to how future cases are catalogued in the scientific literature. As Table S1 demonstrates, there was a great deal of variability in the reporting standards of clinical therianthropy cases across time, place, and research context. This is perhaps not surprising. However, future study of clinical therianthropy - and any low base rate manifestation of psychopathology that implies a need for case study methodologies - could benefit from more detailed and uniform reporting. Interested researchers could adapt already existing models from the psychotherapy research literature (e.g., Fishman, 2013). At minimum, we would recommend that the majority of our table categories be included (i.e., demographics, age of onset, duration of illness, treatment approaches and results).

5.2 Implications for nosology

Along with the issues we adumbrated relevant to differential diagnosis, our review leads to other potentially useful implications in terms of nosology. First, and consistent with prior reports, clinical therianthropy rarely occurs on its own, but far more frequently in the context of other serious psychiatric or somatic conditions and occasionally intoxications. It may therefore be a useful additional diagnosis or diagnostic qualifier with no assumption of it becoming a 'standalone' diagnosis. Second, we advise against applying this additional diagnosis or qualifier to nonclinical cases (i.e., to situations where people fulfill one or more criteria of zoomorphism in the absence of clinically significant distress or impairment in social, occupational, or other important areas of functioning). We thus hope to prevent a spurious epidemic of nonclinical or 'minor' cases of therianthropy, as well as to protect people who enjoy their perceived non-human animal characteristics - or perhaps simply tolerate them - from seeing their ideas and sensations being pathologized. Third, and contrary to some researchers' observations (e.g., Bou-Khalil et al., 2012; Dey & Shil, 2024), we do not consider clinical therianthropy a 'cultural concept of distress' (formerly known as 'culture-bound syndrome'). At least when considering it as a syndromal entity, our review indicates that the delusion of animal transformation occurs across a number of cultures in both the Old and New Worlds. It is of course possible, and maybe even probable, that specific cultures will not only have a tendency to choose different animals to 'transform' into, but may manifest the delusion differently, in effect constituting a more culture-specific 'idiom of distress'.

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Figure legends

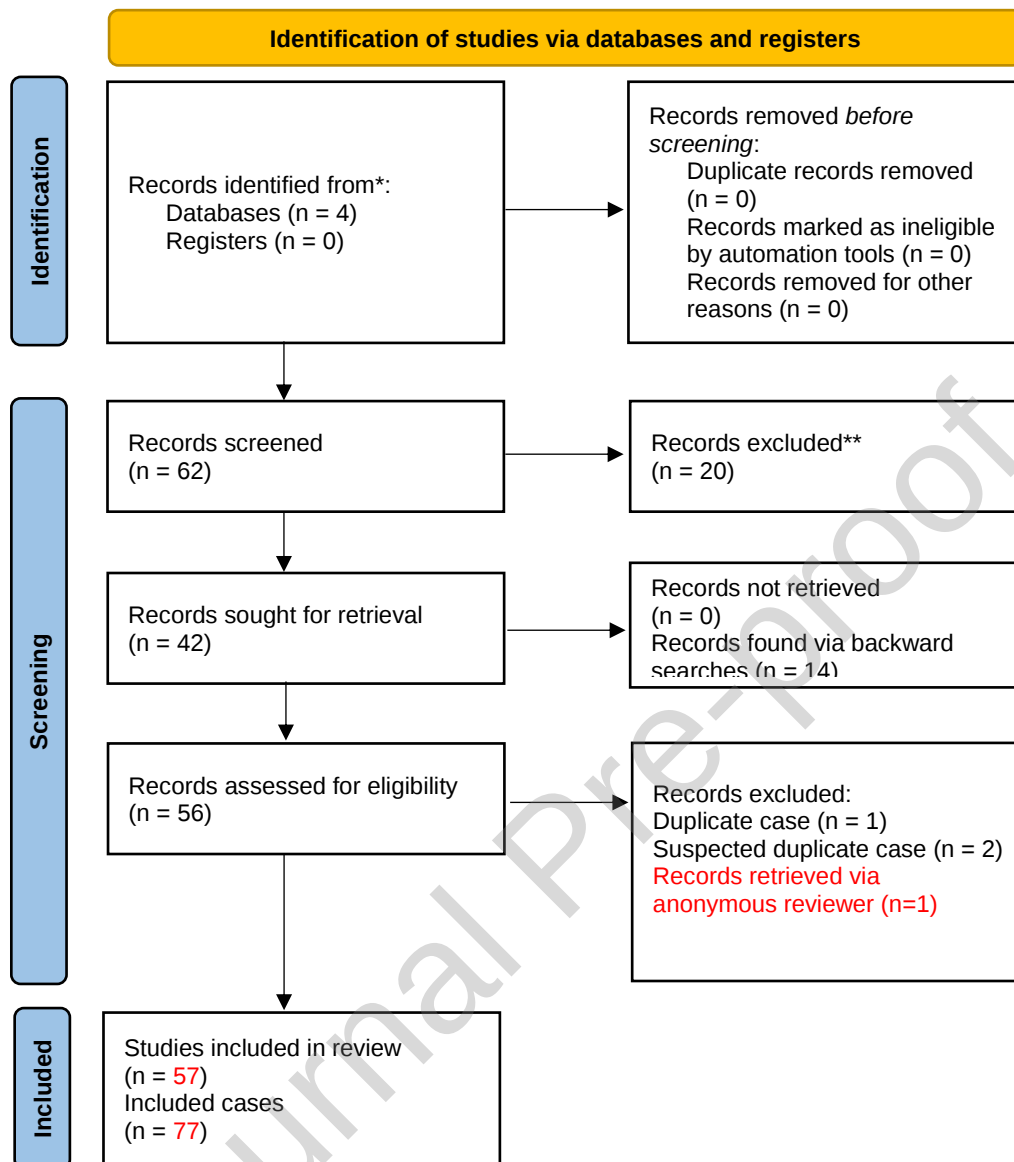
Fig. 1. Petrus Gonsalvus (c. 1537-c. 1618), the first person whose case of hypertrichosis was recorded. Oil on canvas, around 1580. Source: Collection Ambras Castle, Innsbruck, Austria/Wikimedia Commons: <https://commons.wikimedia.org/wiki/File:PetrusGonsalvus.jpg>

Fig. 2. Prisma flow diagram

Figures and tables



Fig. 1



From: Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ 2021;372:n71. doi: 10.1136/bmj.n71

Fig. 2 (separate file)

Table 1 Medical conditions associated with werewolf beliefs

Condition	Overlapping symptoms	Explanatory power for myth	Citation

Ambras syndrome/ congenital generalized hypertrichosis terminalis	Unusual and thick hair growth over the body, hands, and feet	Unlikely, as this condition is extremely rare (<100 cases worldwide)	Baumeister & Stengel- Rutkowski, 1994
Pellagra	Sensitivity to light may lead to nightly activities; irritability and aggression	Possible, as this dietary deficiency of niacin and tryptophan was common in pre- industrialized times	Hampl & Hampl, 1997
Porphyria	Can cause hair growth, reddish iron deposits in teeth, hallucinations and cognitive changes	Unlikely, as these inherited enzymatic liver conditions are very rare (<20,000 people in the US)	Winkler & Anderson, 1990
Rabies	Hallucinations, cognitive changes, increased sex drive, and aggression in later stages	Likely, as this disease was certainly common in the Old World, and has interesting overlap with werewolf mythology; spread by saliva/bites	Beresford, 2014; Sharpless, 2024
Substance intoxication (acute or chronic)	Hallucinations, paraesthesias, and cognitive and behavioral changes	Likely, as substances have been readily available in most cultures and there is some evidence that	de Nynauld, 1615

		they were used in various forms and rituals by putative werewolves	
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Table 2 Theriotypes and their distribution among cases analyzed (N=77)*

Name	Theriotype	Number (percentage)
Clinical ailuranthropy/galeanthropy	Cat	4 (5%)
Clinical batrakhanthropy	Frog	1 (1%)
Clinical boanthropy	Ox, bull	4 (5%)
Clinical chinanthropy	Goose	1 (1%)
Clinical gerbillanthropy	Gerbil	1 (1%)
Clinical gyranthropy	Tadpole	1 (1%)
Clinical hippanthropy	Horse	2 (3%)
Clinical kapranthropy	Boar	1 (1%)
Clinical kotopoulanthropy	Chicken	1 (1%)
Clinical kynanthropy	Dog	28 (36%)
Clinical leoanthropy	Lion	1 (1%)
Clinical lycanthropy	Wolf	25 (32%)
Clinical melissanthropy	Bee	1 (1%)
Clinical ophidianthropy	Snake	2 (3%)
Clinical ornithanthropy	Bird	2 (3%)
Clinical rhinoceranthyropy	Rhinoceros	1 (1%)
Clinical tigranthropy	Tiger	2 (3%)

* Since six cases were unspecified and several people reported on more than one theriotype, the total does not add up to 77

Supplementary material**Table S1** Summary of case descriptions on clinical therianthropy (N=77)**Highlights**

- Clinical therianthropy is associated with a range of mostly psychiatric conditions
- Cenesthesiopathy may play a role in its pathophysiology
- Clinical therianthropy can be effectively treated with a range of therapeutics
- We propose a diagnostic spectrum that includes therians, furies, and otherkin
- We caution against unnecessarily pathologizing these latter groups