

Oedipus Complex, Mate Choice, Imprinting; an Evolutionary Reconsideration of a Freudian Concept based on Empirical Studies

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Freud's assumption that the Oedipal relationship plays an important part in shaping the future character of mate choice needs a scientific reconsideration that, in turn, requires setting an empirically testable explanation. The authors hypothesize that the close physical and emotional attachment between the mother and her son includes a sexual imprinting-like mechanism that influences the processing of childhood experiences. Here they present a set of experiments showing that adults prefer long-term partners who resemble the mental representation of their parent of the opposite sex. Furthermore, mating preferences were found to be shaped in the process of attachment; those mothers were most frequently used as mental models for their sons' mate choice who provided more emotional warmth and less avoidance to their sons during childhood. The implications of the study's results for the contemporary interpretation of Freudian theory are discussed.

Key Words: Oedipal relationship; Mate preferences; Evolutionary psychology.

Freud's theory

It is well known that the Oedipus complex plays a pivotal role in Sigmund Freud's theory. This complex characterizes the early stage (between 3-5 years) of boys' sexual object-choice (Freud, 1905, 1938). During this period, boys have sexual feelings towards their mother, while they are jealous of their father and consider him a rival party. In Freudian theory, boys at this age have a primary incestuous urge towards their mother while they feel fear and anxiety toward the father because they suppose that the father would

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punish their forbidden sexual impulses. Freud claims that boys are gradually able to overcome their incestuous urges and fantasies, free themselves from parental authority, and individualize in a psychological sense. However, there are a number of “fixation points” in this process which often serve as the bases of psychoneuroses. In many of his works, Freud analyzes such cases, demonstrating that any inability to detach from the mother as a sexual object can lead to the development of a pathological personality.

Freud formulated his theory of the Oedipus complex based on his own clinical experience as he found that it could explain the developing processes of disorders of psychosexual development (Daly & Wilson, 1990). However, he never made direct observations of children in order to verify his theory, and developmental psychologists have not really found support for the classical Oedipal theory from their studies of children (Daly & Wilson, 1990; Kupfersmid, 1995).

Soon, in his substantial work *Totem and Taboo* (Freud, 1913), the theory was expanded into a fundamental explanatory principle involving the entire human race. This was necessary as Freud was looking for scientific support for the existence of human instinctive drives as ontological reality. When he realized that the psychic processes he described (including the Oedipus complex) could not be anchored to neural structures as the scientific development of his age did not permit that, he looked for other foundations (Grünbaum, 1984). He thought to have found a phylogenetic (prehistoric) event to explain sexual development in childhood. His central idea was that incest between a mother and her prepubertal son (and conflict between father and son) really occurred in our evolutionary past, and he hypothesized that the imprints of this Oedipal sin still appear in the course of an individual’s life even in contemporary societies. As is well known, Franck Sulloway (1983) described this period during which Freud turned from proximate (neural) analyses to ultimate (evolutionary) explanations.

This renewed effort towards the empirical demonstrates

Freud's theoretical flexibility and scientific commitment (MacDonald, 1986). However, his evolutionary scenario involved mostly speculative and arbitrary explanations (Spain, 1987; Sulloway, 1983). As a cornerstone of his theory, Freud created an anthropological-evolutionary narrative which has not been supported by empirical evidence. It could not be established in any of the hunter-gatherer communities that the frequent hostile behavior among men is caused by Oedipal conflicts, or that sexual rivalry arising from incest would lead to murders or the introduction of prohibitive taboos (Daly & Wilson, 1990; Kupfersmid, 1995).

Furthermore, Freud accepted the Lamarckian thesis, believing that the constant repetition of experiences gained in the primitive horde across generations eventually led to the build-up and fixation of impulses in the Id of individuals, which will then take the shape of sexual desire towards the mother and rivalry with the father. It has become evident by now that the thesis of inheritance of acquired traits and the biogenetic postulate are untenable (Gould, 1978; Ridley, 1994). Finally, he was unable to explain the function of incestuous urge, i.e. why it developed in the evolutionary process and to what extent it contributed to survival and reproduction. This is because – in spite of his commitment to the Darwinian theory – Freud's explanation completely lacks the concept of natural and sexual selection in the evolution of psychic structure and personality development (Mayr, 1982; Richards, 1987).

Freud may be responsible for being one-sided in insisting on these false assumptions even after they proved untenable and were gradually displaced by alternative explanations stemming from valid scientific knowledge. Some of these failures, however, are understandable, given the state of related scientific knowledge of that period. Modern empirical sciences, including evolutionary psychology, offer a possibility of shedding light on Oedipal relationships.

Evolutionary Psychology

In general, evolutionary theories approach behavior not

from the perspective of immediate motivation but its function (Wilson, 1978). They state that organisms (among them humans) have been selected for cognitive mechanisms and behavioral strategies¹ that help them avoid the negative effects of incest, the so-called inbreeding depression (van den Berghe, 1983; Lieberman et al., 2003). Children born from a sexual relationship between close relatives manifest a high degree of homozygosity, which reduces the chance of their survival. Indeed, the studies demonstrate that half of the descendants of first kin (siblings, parents and their children) are either stillborn or manifest serious diseases that lead to reduced fitness and often to premature death (Durham, 1991).

Several investigations have revealed that adaptive behavioral programs against incest evolve through a developmental mechanism described by Edward Westermarck at the end of the nineteenth century, which Freud firmly rejected. (Westermarck, 1894). Westermarck assumed that humans develop sexual aversion against individuals with whom they share the social environment of their childhood. The close and intimate ties of bonding elicit affections that later turn into sexual rejection towards family members living in the same household. This theory, often referred to as the Westermarck-effect, is confirmed by a number of observations and experiments. One of the most widely known investigations proved that children reared together from birth in Israeli *kibbutzim* never marry each other in adulthood. They reported that they were affectionate friends but did not feel sexual desire for each other (Shepher, 1983). Another support of the Westermarck-effect comes from the villages of Taiwan where reduced fertility was found in marriages between minors where grooms and brides are traditionally compelled to live together from early childhood (Wolff 1976). A recent experiment revealed that siblings who establish a sexual relationship with each other had been raised separately for

¹ In evolutionary psychology, “strategies” are considered as non-consciously driven behavioral patterns that are caused by evolved psychological processes and serve a specific function.

at least one year in their childhood. In general, the frequency and duration of childhood separation correlated with the probability of incestuous relationships (Bevc & Silverman, 2000). This is due to the fact that because of the lack of early attachments – and the sexual aversion developing as their consequence – siblings could preserve their sexual interest for each other. The exact mechanism of sexual aversion or inhibition is not clarified yet. However, data show that within physical relationships, olfactory signals (pheromones) play a significant role in recognizing kin and friends, and in retrieving certain emotions that may influence mate choice (Schneider & Hendrix, 2000).

Evolutionary psychology thus arrived at a conclusion opposite to the Freudian theory of incest. Its empirical results suggest that there exists no childhood incestuous drive that would affect the formation of adult personality. To the contrary, there is a certain sexual aversion against relatives which functions to ensure genetic representation in the following generations (by impeding the birth of unhealthy or dead children). This sexual aversion develops at the time of puberty, and empirical evidence – in accordance with the expectations of evolutionary psychology – has shown that neither sexual attraction nor sexual aversion are manifested in prepubertal boys. Naturally, incestuous drives – and Oedipal conflicts in general – may be claimed to function unconsciously, latently, and appear only symbolically. This would, however, hopelessly divert us from the idea of scientific justification. A meta-analysis surveying the results of several investigations concluded that no reliable data confirm that children in the Oedipal phase would consistently entertain positive emotions towards their parents of the opposite sex, and negative ones towards those of the same sex (Fisher & Greenberg, 1977).

Based on the above findings, we could claim that this aspect of Freudian theory has been fully refuted. However, such declarations would be premature. The sociobiological approach – with all of its empirical findings – leaves us with questions that are not yet addressed, which suggest the possibility of reinterpreting the Oedipus complex. To start

with, we face the question of taboos (Aoki, 2005). Sociobiologists argue that the biological propensities working against incest were turned into cultural traditions by socially reinforcing them, imposing sanctions against incest (Wilson, 1978). This, however, prompts a problem that Freud and Frazer had already demonstrated: if the incest taboo is an innate predisposition of human nature that emerges automatically in early development, why the need for a separate institutionalization (Freud, 1913)? Additionally, a number of anthropological studies have shown that some incest-related taboos have nothing to do with the ban on sexual relationships between close relatives (Thornhill, 1991). Often the sanctions impose a prohibition against the marriage of distant relatives or even strangers, while at other times they allow, or even require, the marriage of close relatives. There are usually political and dynastic reasons behind it: to ensure power, property or paternal status for certain social groups.

Even if we put aside the question of taboos and consider only individual motivations and predispositions, we are still faced with a complex picture. In his *Ethnographic Atlas*, Peter Murdock (1967) describes more than 200 tribal societies where a sexual relationship or marriage between cousins is encouraged or at least tolerated. As for industrial societies, marriage between relatives is quite rare, whereas homogamy is a frequent form of mate choice, representing a lasting relationship between people of similar character. Research positively indicates that married couples are similar to each other in many ways – among others, their socio-economic status, education, age, intelligence, personality traits, and anthropometric properties (Mascie-Taylor, 1995; Thiessen et al., 1997). Genetic marker analyses have shown that this relationship represents genetic similarity as well; couples show a greater genetic similarity than randomly selected and paired individuals of the population (Rushton, 1989). This may be surprising, but our present-day genetic knowledge can explain it. It is known that, to a lesser or greater extent, genetic controls influence almost every aspect of human behavior. The influence of genes comprises not only the

development of physical traits but also the development of intelligence, personality traits and the various cognitive abilities (Clark & Grundstein, 2000). Consequently, homogamy increases not only the phenotypic similarity of couples but also raises the proportion of shared genes they possess and their descendants inherit. However, in the absence of more direct evidence (using, e.g., genome sequencing), at the moment it is hard to specify genetic markers by which assortative mating works.

Empirical data concerning homogamy largely differentiate the above picture of Oedipus complex and incest. They seem to weaken the sociobiological view that the 'blueprint', the ultimate concern of all organisms, would be to strive to enhance genetic variety. They instead strengthen the view that mating or sexual relationships frequently occur and develop on the basis of genetic similarity. This is not opposed to the Freudian concept. Even if sexual bonding with close kin is banned by strong innate emotional restrictions, individuals generally try to find their 'gene-relatives' when looking for mates; i.e., those who have similar genes for certain physical and behavioral characteristics although they are not relatives by descent.

In brief, it may be concluded that organisms, and humans among them, choose their mates to achieve genetic similarity, while preserving genetic variety. Put in modern evolutionary biological terminology, individuals are selected to maintain an optimal balance between inbreeding and outbreeding (Alcock, 1998). The reason for this is that both types of mating involve reproductive benefits and costs. Outbreeding has the benefit of an increase in the offspring's genetic variance, which enhances the chances of adaptation to the changing external environment. However, its extreme form may lead to the negative genetic consequence that recombination may break co-adapted genetic complexes that have high fitness value in the local environment (Read & Harvey, 1988). The opposite, inbreeding – i.e., mating with kin – increases the representation of the parent's genes in the offspring by augmenting them with copies of these genes obtained from the mate. At the same time, as we

could see, mating with close kin can lead to inbreeding depression. This is because of an increased risk of homozygosity for rare, detrimental, recessive alleles, and because of the additive effects of alleles in different loci that have the same phenotypic effects (Blouin & Blouin, 1988; Nachman & Crowell, 2000). Both mechanisms increase the risk of extreme and possibly pathological features in offspring, resulting in a lower chance of survival. This has a certain evolutionary utility because it removes seriously detrimental recessive alleles from the gene pool. Close inbreeding brings these alleles into the homozygous state, reveals their deleterious phenotypes, and thereby exposes them to purifying selection. Close inbreeding was a prime characteristic of pre-Neolithic humans over many millennia, and played a useful role in cleansing the gene pool of harmful genes. Because of the above benefits and costs, a certain balance between opposing selection pressures is thought to have evolved. Thus, it may be expected that individuals prefer sexual partners with whom they share an intermediate level of genetic similarity (Bateson, 1983). For example, it could be demonstrated experimentally that Japanese quails prefer to mate with their unfamiliar first and second cousins rather than with closer or more distant relatives, or unrelated individuals (Batson, 1979). A recent study examined all known couples of the Icelandic population born between 1800 and 1965, and showed a significant positive association between kinship and fertility, with the greatest reproductive success observed for couples related at the level of third and fourth cousins (Helgason et al., 2008).

Sexual Imprinting

Several researchers have hypothesized that an imprinting-like learning process is responsible for homogamy (Daly & Wilson, 1990; Bereczkei et al., 2002). It is well known that imprinting is a genetically canalized learning process in which experiences from the early relationship with the parents strongly shape future behavior and social competence (Lorenz, 1985). Unlike ordinary learning, it takes place at a particular stage of development

(sensitive phase) and occurs in an irreversible manner. Two forms of imprinting have been described. First, stimuli coming from the mother (or any other “substitute” object) in the first minutes or hours after birth elicit indiscriminate following responses from the offspring (parental imprinting). This tightens physical and emotional bonding between them which lasts for the rest of their lives (McFarland, 1993).

The second type of imprinting (sexual imprinting) also refers to a long-lasting process, in which the early attachment to the mother (and other relatives) influences the development of adult sexual behavior. Empirical data confirm that sexual imprinting plays a significant role in mate choice. In many species, males tend to choose mates for reproduction that are similar to the females rearing them (Immelmann et al., 1991; Kendrick et al., 1998).

Various mechanisms are involved in sexual imprinting as a complex behavioral system. One may have evolved to ensure that copulations are restricted to members of one’s own species. In this sense, everyone who is similar to one’s opposite-sex parent or sibling becomes eligible as a sex partner. A second form, negative imprinting, leads to Westermarck-type incest avoidance, which helps to exclude close relatives as potential sexual partners. A third type contributes to forming mating decisions in connection with the similarity to close relatives (Vos, 1995). Ethologists demonstrated in animal experiments that cohabitation with the parents creates mating preferences prevailing throughout adulthood. This imprinting results in the individuals learning the characteristic features of their close kin, and subsequently choosing partners who slightly, but not to a great extent, differ from their parents and siblings with whom they were reared. (Bateson, 1983). In other words, they choose a mate with a particular degree of relatedness but avoid sexual bonding with close kin. Some animal species use visual and others olfactory cues to identify mates that are similar to their relatives, yet not so similar that they are likely to be from the same family (Kendrick et al., 1998). In this way, sexual imprinting creates the adaptive

preferences for ‘optimal outbreeding’: it ensures the simultaneous preferences for limited degrees of both genetic similarity and dissimilarity during mate choice. This suggests that the same sensory learning process is responsible for homogamy and inbreeding avoidance.

The study of human imprinting-like processes between parents and children has been at the center of intensive research for decades; suffice it to mention the experiments of Bowlby, Meltzoff, Stern, and others (Cole & Cole, 1997). The role and mechanism of sexual imprinting has been studied less extensively. A number of theorists consider sexual aversion between cohabitant relatives (especially siblings) a kind of negative imprinting (Shepher, 1983). As demonstrated earlier, it is a genetically canalized learning process that transforms childhood experiences into the adaptive behavior of sexual aversion. In general, salient experiences of the childhood family environment have a significant effect on future sexual and reproductive behavior. Studies have revealed that children reared in unfavorable social circumstances – i.e., their childhood was characterized by a high level of emotional stress, insecure attachments and negative parental practices – reach sexual maturity and start sexual life earlier, and develop more short-term pair-bonds than their peers reared in more favorable circumstances (Belsky et al., 1991; Bereczkei & Csanaky, 1996, 2001; Burgess & MacDonald 2005; Kim & Smith, 1998).

Data confirm that sexual imprinting influences both animal and human mate preferences. Some studies found that young adult humans tend to choose mates whose hair and eye colors resemble those of their parents of the opposite sex, more than of parents of the same sex (Little et al., 2002; Zei et al., 1981). Other experiments reveal that women prefer the odor of men whose specific part of genotype – HLA alleles – that play a significant role in developing immune protection were similar to their fathers’ but not to their mothers’ HLA alleles (Jacob et al., 2002). Girls from mixed marriages tend to choose partners from their father’s nationality, and boys from their mother’s

(Jedlicka, 1980). Although these results suggest a strong correlation between the experiences with the opposite sex parent and future mate choice tendencies and preferences, they reveal little about the features, mechanisms and specific adulthood effects of relationships among cohabitant family members.

Hypothesis

The theoretical considerations and empirical findings mentioned above lead us to formulate the following hypothesis:

We assume that because of the adaptive benefits of mate choice based on genetic resemblance, the mental representations of observed parental traits play an important part in future mate choice. The close physical and emotional attachment between the mother and her son includes sexual imprinting-like processes that influence the processing of childhood experiences. In the course of their relationship with their parent of the opposite sex, children acquire the preferences that affect their later mate choice. Our hypothesis claims that adults prefer long-term partners who resemble the mental representation of their parent of the opposite sex. In the first several years, they internalize the phenotype of this parent and later use it as a model, or template, in mate-choice. In this concept, the resemblance measured between married couples (homogamy) is the result of a socialization process; it develops as the consequence of a genetically controlled learning mechanism (sexual imprinting).

Therefore, we consider the Oedipal relationship as a non-sexual bond between the mother and her son, whose function is to select the appropriate sexual partner during adulthood. It is noticeable that this hypothesis accords with Freud's theory. In general, it does so in as much as Freud, in his mature works, claims that the Oedipus conflict is a central stage in psychosexual development, whose proper solution induces the ability of normal sexual life and mature sexual object choice. In particular, Freud makes a few references to the effect that the adult son aims to choose a mate who is similar to his mother. In his work *Three Essays on*

Sexuality, he argues that a consequence of the Oedipal relationship is that boys' and girls' love turns to persons of the opposite sex "who conjure up the image of the mother and the father, respectively. Even if somewhat more loosely, object choice, too, adapts to this template in general. Man primarily looks for the recollected image of mother, as it has been drifting in front of him since his childhood" (Freud 1905, p. 228). These thoughts, while they are natural consequences of the Oedipus complex theory, are not elaborated in a detailed and precise way in Freud's oeuvre. Rather, they are marginal, complementary ideas, which nevertheless prove appropriate in light of the findings of the modern empirical sciences.

Experiment

In order to test our hypothesis, we have done the following experiment. 98 volunteers in 33 randomly selected young-adult families participated in the study, (Bereczkei et al., 2002; Bereczkei et al., 2004). Their portraits were taken, and they were instructed to pose naturally with a neutral facial expression, and we standardized the background and camera distance. Besides, we asked the husbands' mother for a portrait that depicted the mother at the time when her son was aged 2 to 8. We took further portraits of 238 randomly selected young women who were of similar age to the female members of couples (average age = 23.8 years). These photos were used as a means of control to judge resemblance.

We took black and white pictures, because some of the mothers' young-age pictures were taken in this form. All photos were developed and the images were scanned and stored in a computer. Then we compiled tableaux of the individual pictures. Each tableau comprised the image of the observed man's wife, mother and of three control persons. The mother's (young-age) portrait was placed on the left side of the tableau (numbered), and the wife's was placed together with control images on the right (lettered) in a way that the photos formed a square.

Finally, we asked 52 university students to participate in picture matching, i.e., establishing the degree of similarity

between pictures. They were asked to take a thorough look at the tableaux and do the required picture matching on each. They were not informed either about the aim of the study or that two of the portrayed people were related.

Their task was to choose a picture they thought resembled most the woman on the left (the man's mother) from the images of wife and control women on the right of the tableau. Then they had to select the second most similar woman, and so on, and finally, the fourth pick was the woman who they thought was the least similar. Each participant established an order of resemblance on the tableaux from 1 (high resemblance) to 4 (low resemblance). As a result, we could calculate the score frequency for the mother, the wife and the controls in all 32 tableaux.

Our findings clearly showed that the participants correctly established the similarity between the wife and her husband's mother to a significantly higher mean rate than expected by chance. They correctly found more than twice as many wives as controls to resemble most the woman on the left of the tableau (husband's mother). It means that independent, unfamiliar raters could clearly establish the resemblance between the men's wife and mother.

The explanation using sexual imprinting does not only assume the similarity of family members but also predicts what effect child rearing will have on adult sexual behavior. This second component of the theory was tested in the next study. In this study, participating men (husbands) were asked to fill in a retrospective attachment questionnaire, which was a shortened version of the Swedish EMBU test (Arindell et al., 1999). It was created to measure how adults see their parents' – father's and mother's separately – educational style and parental behavior during childhood. The questionnaire comprises three subscales, each containing 8 items. These measure Emotional warmth (e.g., "If things turned bad, I felt my parents tried to comfort and encourage me"), Overprotection (e.g., "I felt my parents interfered with everything I did"), and Rejection (e.g., "My parents were often sad or angry with me, without telling me the reason"). Participants rated themselves on a scale

ranging from 1 (no, never) to 4 (yes, mostly). Finally, we compared the previously established degree of similarity (score frequency) between the man's wife and his mother with the scores on the EMBU questionnaire.

The regression analysis revealed a significant negative correlation between the degree of the mother's rejection and the scores obtained from the similarity of the wife's and the mother's photo. Men who had frequently faced their mother's rejection during childhood were less likely to choose, as adults, a wife resembling their mother, than those who had experienced a more favorable relationship (Bereczkei et al., 2002). In another study (on a different sample), we found a positive association between the mother's affection toward her son and the degree of family resemblance (Bereczkei et al, 2004). Here the scores on the Emotional warmth subscale closely correlated with the degree of resemblance between the mother and the wife. These findings indicate that the closer the emotional and physical attachment the male child experienced in his relationship with the mother, the greater is the similarity between his mother and his wife as perceived by the independent raters in the previous study. In other words, those mothers who are most frequently used as a mental model for their son's mate choice are those who provided more emotional warmth and less avoidance to their son during childhood. Likewise, it is possible that rejection by the mother would have a negative effect on the use of her mental representation for mate choice. Consequently, the limited social relationships and the emotional environment of rejection may slow down or completely block the development of mate-choice criteria based on the mother's template.

As a summary of our empirical investigations we may conclude that the early relationship of a man with his mother may play a part in later mate choice strategies. More specifically, sons learn the particular features of their mother's phenotype across the enduring relationship with their mother. Their mating preferences are partly shaped in the process of attachment to the mother, and later they

prefer long-term mates who show similarity to the women with whom they had an intimate relationship as children. Our results may be evaluated as the possible empirical underpinnings of certain aspects of the Freudian Oedipus complex. Through their non-sexual attachment process, sons use a mental representation of mother in their later sexual object choice.

Limits of the Study

Certain limitations of our experiment must also be mentioned. It might pose a problem that the mothers' photographs were taken when their sons were between 2 and 8 years of age. This time span is broader than the period of the Oedipus complex (between 3 and 5 years of age) Freud originally defined. However, it includes a few years that Freud described as the period of latency, with no significant events or changes happening that might affect boys' later adolescent sexual development. Not to mention the simple fact that the mother's appearance does not seem to change significantly in this short period, thus independent raters match almost the same maternal face with the other photographs that the boys could see as young children.

The application of a retrospective attachment questionnaire might manifest another possible difficulty. As in the case of all retrospective self-evaluation questionnaires, with the use of EMBU we are faced with the problem that the greater the distance of the investigated time period is, the less reliable memories could be retrieved, because an increasing number of subsequent effects might distort the original memories. Although our participants were all young adults who are relatively close to their childhood years, it is not probable that EMBU can fully reconstruct their early experience with the parents. The questionnaire rather serves to recall the experiences and impressions of their later childhood, when memories are clearer and less ambiguous. However, a number of research results prove that there is no need to presuppose greater disruptions or radical changes in normal parent-child relationships until the onset of adolescence (Cole & Cole, 2001). More exactly: if no

unexpected and dramatic events disrupt the family system, i.e. death of a close relative, divorce, serious illness, etc., parental educational styles and practices are likely to remain unchanged, and children experience significant consistency in the relationship with their parents. The presupposition of such stability allows us to project adult recall of childhood memories to an early stage (the Oedipal phase) that we all have only very sporadic memories of. Nevertheless, this question may only be answered satisfactorily after a series of longitudinal experiments, where the features of both the earlier and later mother-child relationship could be studied.

Summary and Implications

In our study we attempted to reinterpret Freud's key concept, the Oedipus complex. We think that, in the light of the results of former researches, certain parts of Oedipal theory need to be jettisoned, and other parts can be assimilated into the modern behavioral sciences. The original Freudian assumptions about humans' desire to establish an incestuous relationship with the mother, and in general humans' incestuous drives, cannot be justified. Freud seemingly failed to distinguish between attachment and sexual attraction, but later psychological, ethological, and anthropological evidence excludes the existence of incestuous urges before puberty.

However, other elements of the Oedipus complex could be reconciled with the evidence coming from modern empirical science. Freud himself, as mentioned earlier, presumed that the Oedipus complex influences boys' later sexual object choice in a way that they try to find partners resembling their mother (see above). However, in the absence of suitable empirical evidence, this assumption was never elaborated and supported. In our studies we intended to shed light on the details and characteristics of that effect in terms of mate choice. Our data suggest that an early intensive relationship with the mother, that may lack sexual overtones, strongly influences boys' mate choice preferences. They tend to prefer long-term partners who resemble their mothers' memory image, which had probably developed during the imprinting period. Men later tend to

use this template as a model for choosing mates. Unfortunately, at the moment, we do not know the time of onset of the sensitive period for the imprinting processes. Most researchers agree that the imprinting period in humans, contrary to animals, is not limited to a short period of time; it may span years (Berezkei, 2007). The formation of sexual imprinting may coincide with Freud's Oedipal period, but it could also happen earlier or later.

One of the most important questions concerning our results refers to the influence our concepts might bear on the contemporary interpretation of Freudian theory. The Oedipus complex – in the original Freudian understanding as well as in later psychoanalytic interpretations – is an exceptionally wide-ranging concept comprising human personality development, the origins of pathologies, and the interpretation of a number of anthropological and cultural phenomena (Dilman, 1985; Benjamin, 1988). It is hardly disputable that it is not possible to deduce the entire theoretical concept from one single behavioral strategy (mate choice based on sexual imprinting) and to substitute it: this is not the aim of this study. Nevertheless, we believe we have succeeded in transforming one of the cornerstones of Oedipal theory to an empirically justifiable statement that, in addition, corresponds to one of the original Freudian attempts at interpretation.

It is worth noting that the sexual imprinting model could be extended to children of both sexes; thus, our explanation would shed a certain light on the psychological mechanism of the Electra-complex. In a recent study, a positive relationship was found between young women's husbands and the women's fathers, and the levels of emotional warmth provided by these fathers (Berezkei et al., 2004). In general, we suppose that humans are particularly sensitive to the specific cues coming from the *opposite-sex parent*. These cues shape a mental model of the opposite-sex parent, and search for a partner who possesses certain traits similar to that perceptual schema.

The current question – i.e. the type of influence the concept of sexual imprinting has on the present-day

interpretation of the Oedipus complex – is not independent of our theoretical view of the Freudian theory. A number of theorists relegate Freudian theory to the realm of unscientific speculation, arguing that Freud used concepts and notions that cannot be defined with precision and created hypotheses that are not justifiable by empirical means. And when the concepts are open to empirical verification, facts falsify them (Daly and Wilson, 1990). Other theorists do not consider Freud's oeuvre as an explanation of factual relations but rather as a text open for hermeneutical interpretation (Ian, 1993). Ricoeur (1970) and Habermas (1971) theorize that psychoanalysis does not aim to unearth objective facts but only the relationships of the meanings people attribute to these facts.

There seems to be a possibility, however, to avoid the one-sidedness of both the positivist and the hermeneutic approach. Freud himself said several times that the psychological processes that he described were a real part of the ontological structure of human nature that needed to be studied permanently. It remains a challenge for contemporary theorists to anchor certain components of the Freudian theory in neural, cognitive and emotional mechanisms that can be studied empirically (Slavin & Kriegman, 1992). The other claim, to reinterpret Freudian phylogenetic explanations in accord with the theoretical models of contemporary anthropology and evolutionary psychology, seems to prevail, as well. (Badcock, 1998; LeCroy, 2000). Our viewpoint intends to follow this approach. Freud's work can be interpreted in various ways; however, the turning point is the understanding of the details. If we can form testable theoretical models that can be transformed into the Freudian paradigm, and if we are able to find new methods to solve long-standing problems, it would be definitely unwise to neglect such opportunities. In our study we intended to take such an opportunity. Recently, an attempt has been made to determine whether similarity between wife and mother exists in personality factors, not only facial features (Gyuris et al., 2009). Our preliminary results suggest that maternal rejection during childhood has

a negative effect on a man's preference for a wife with emotional stability similar to his mother's.

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