MAORI MOKO: A COSTLY SIGNAL?

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JAYME CISCO

Dr. Craig Palmer, Thesis Supervisor

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The undersigned, appointed by the Dean of the Graduate School, have examined the thesis entitled

**MAORI MOKO: A COSTLY SIGNAL?**

Presented by Jayme Cisco

A candidate for the degree of Master of Arts

And hereby certify that in their opinion it is worthy of acceptance.

________________________________________________________________________

Dr. Craig Palmer

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Dr. Mary Shenk

________________________________________________________________________

Dr. Mark Palmer
I am eternally grateful for my husband and colleague, Jonathan Cisco. Thank you for always believing in me. Your constant encouragement and thought-provoking questions have made this work possible. Thanks, Mom, for impressing upon me the value of education early on and inspiring my love for learning. I am also thankful for the most supportive in-laws one could ever ask for.
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ABSTRACT

Costly Signaling Theory (CST) addresses cultural behaviors that are risky or apparently wasteful but which may serve to convey important fitness-related information. Recent studies have expanded the application of CST to such phenomena as religious ritual and body modification. The Maori, an indigenous Polynesian culture, historically practiced an elaborate form of facial tattooing called moko. Moko procedures were irreversible and potentially deadly. By examining historical sources and detailed ethnographic accounts, I evaluate four hypotheses for the explanation of traditional Maori tattoo: 1) Pathology, 2) Expression, 3) Costly signal of ally and enemy quality, and 4) Costly signal of mate quality. I argue that male moko may have signaled commitment and ferocity in war, in addition to mate qualities such as status, wealth, and bravery. I argue that female moko may have signaled potential mate qualities such as rank, wealth, and sexual maturity/availability. I conclude with possible areas for future research.
1. INTRODUCTION

Prior to the mid-20th century, the Maori, indigenous inhabitants of New Zealand, practiced an elaborate form of tattooing called *ta moko* (literally, “to tattoo”). Maori *moko* designs were deeply engraved in the faces of men and women, using a chisel-like implement called an *uhi*. While the Maori also practiced a varying form of body tattoo that was applied with comb-like needles, this study will be restricted to the examination of traditional facial *moko*. The chisel application resulted in deep grooves in the faces, which resembled traditional wood carvings. This operation was risky in terms of exposure to pathogens and risk of death. Males endeavored to have their full faces covered with tattoos, although this took many years to complete. Female facial tattoos were generally limited to the lips and chin. Significantly, the practice of *moko* was strictly regulated by traditions regarding who could obtain tattoos, when, and of what type.

This study will use qualitative data, gleaned from early explorer accounts and ethnographies, to evaluate three hypotheses regarding the practice of traditional Maori *moko*. Traditional *moko* in this case refers to Maori facial tattooing prior to the 20th century, before the introduction of European culture significantly altered the practice.

Chapter One will introduce New Zealand and the Maori, including Maori social organization and structure, stratification, political organization, and warfare. Chapter Two will briefly outline the historical practice of *moko*, including procedures, practitioners, and descriptions of male and female *moko*. Chapter Three introduces four
non-mutually exclusive hypotheses to explain the existence of moko. Two hypotheses are presented as proximate explanations; the other two are presented as ultimate-level explanations, derived from costly signaling theory, with several sub-hypotheses. Chapter Four will evaluate each hypothesis and sub-hypothesis using qualitative descriptions from the ethnographic record. Finally, Chapter Six will conclude with a summary of the evidence, introduce contemporary moko, and present possible areas for future research.

**Brief Introduction to New Zealand and the Maori**

The island nation of New Zealand is located in the South Pacific, more than 1,000 miles southeast of Australia. It is composed of two main islands, the North and South Island, along with several smaller islands (Davidson 1979: 223). The North Island contains the capital, Wellington, and the country’s largest city, Auckland. The majority of New Zealanders reside in the North Island. The first European to visit the shores of New Zealand was the Dutch explorer Abel Tasman in 1642. Captain Cook was the second to explore the islands in 1769, though a European presence was not established until 1814 by a Christian mission (Cannon 2002). New Zealand became a British colony with the signing of the Treaty of Waitangi between British settlers and the Maori in 1840. In 1962, New Zealand became an independent nation.

The Polynesians are part of the Austronesian language family, one of the world’s largest and most widely distributed (Hurles et al. 2003). Recent studies using phylogenetic methods have placed the origin of the Austronesians in Taiwan,
approximately 5230 years ago (Gray et al. 2009). The Maori are one of the fifty ethnographically known Polynesian societies who, according to Kirch, “were all demonstrably derived from a single ancestral society” (Kirch 1984: 2). Captain Cook speculated that the Maori, Tongans, and Tahitians shared a common origin in the Western Pacific (Davidson 1979: 223). This society, known today as the Lapita Cultural Complex, spanned geographically from the Bismarks in Western Melanesia to the islands of West Polynesia, and temporally from c. 1600 to 500 B.C. (Green 1979). The Lapita Complex is primarily identified by ceramics characterized by dentate-stamped decoration, as well as portable artifacts such as fishhooks, stone and shell tools, and tattooing needles (Kirch 1984).

The Maori migrated to New Zealand and settled many of the coasts and some inland areas by 1200 A.D. (Davidson 1979). The exact date of first settlement is still under debate by archaeologists, but most indicate the first settlement by approximately 800 A.D. (Davidson 1979: 228). Archaeological evidence demonstrates that the early settlers brought tropical plants (such as the kumara), dogs, and Polynesian rats with them to New Zealand (ibid.). It is still disputed as to whether the islands were settled as the result of one or many migrations from elsewhere in the Pacific (ibid.). Maori oral tradition asserts that the ancestors set out from their homeland in Hawaiiki and arrived in the Bay of Plenty on the North Island, where they conquered the original inhabitants through marriage and conquest (Metge 1967). Archaeologists have estimated that the Maori homeland of Hawaiiki was located in the region of East Polynesia including the Society Islands, Austral Islands, and southern Cook Islands (Walter et al. 2006).
Archaeological evidence from this region dating to around the 13th century is comprised of villages containing residential structures, sites for fishing and hunting, gardens, middens, and cooking areas (ibid.). Based on evidence of the presence of specialists and long-distance voyaging, archaeologists infer that chiefs may have been present at this early date (Walter et al. 2006).

**Social Organization and Structure**

**Social Structure**

According to Sahlins (1958), Maori society was organized into three levels: the *whanau, hapu, and iwi*. The smallest and most basic economic unit was the *whanau*, or extended family. Family composition was flexible but was usually composed of a joint family with patrilocal residence. Families tended to be small, consisting of a man, his spouse, grown children (usually sons), and their spouses and children. *Whanau* were closely bound due to their small size, and they managed their own affairs (Firth 1959). Both descent and residence were flexible and traced bilaterally, although with a clear patrilineal/patrilocal bias. Rank and property were transmitted through both father and mother (Best 1941a). After marriage, Maori often participated in multiple *whanau* and favored the ones with which they were most comfortable (Metge 1967).

The *hapu*, or clan, was composed of multiple *whanau*. A *hapu* formed once a *whanau* extended beyond three or four generations. Membership in *hapu* was passed down ambilineally. In other words, children were members of the *hapu* of each of their parents, although one would have been preferred in terms of residence (Firth 1959).
Hapu were neither strictly exogamous nor endogamous groups (Best 1902). Marriage within the hapu was allowed as long as the couple was at least three generations removed from a common ancestor; marriage between first cousins was regarded as incest, as Hawaiian kinship terms treated cousins as siblings (Best 1902; Best 1941a).

The highest level of social organization was the iwi. The iwi were tribes composed of multiple hapu. Like hapu, iwi membership could be ambilineal, if both parents were from different iwi. Iwi membership was traced through males and females to a founding ancestor. Tribes traced their lineages to a founding ancestor who arrived on the islands in a specific canoe (Metge 1967). According to Best (1941a), the tribe was the highest order of political organization. Alliances were formed between tribes through the exchange of chiefly daughters in marriage. Loyalty to the tribe was paramount; every able-bodied man could be called upon to serve as a warrior, regardless of occupation (Best 1941a). The highest and largest level of society, which encompassed whanaus, hapu, and iwi, was the waka, a term which means “vessel” and refers to an original ancestor to arrive in New Zealand. Best explains that tribes (iwi) traced their lineages back to specific waka and that tribes from the same waka could form loose coalitions during times of war (Best 1941a).

**Stratification**

The stratification of Maori society was based on primogeniture and supremacy of the male line of descent (Simmons 1986). Maori society was clearly hierarchical, arranged into three classes (Best 1941a; Firth 1959; Simmons 1986). The first and highest class was the rangatira class. Rangatira class ranking was done at the individual,
family, and clan levels through the practice of primogeniture. First-born males and females were ranked as *arihiki*, or elites. Families who could trace their lineage through all first-born males back to a first-born male ancestor ranked the highest. *Ariki* status was purely ascribed; it was assigned according to birth order. Generally, only *arihiki* were eligible to become chiefs. However, achieved status was also essential to obtain high positions of leadership. If the first-born son was not deemed capable or endowed with enough *mana* (obtained through acts of generosity and bravery), a lower born son could become the head of a household or clan (Best 1941a; Firth 1959). According to Best, the *arihiki* families of each tribe were extremely influential, and the first-born sons and daughters of these families were regarded as sacred or *tapu*. They were so heavily revered, in fact, that they were “believed to possess considerable powers of a supernatural nature” and “almost looked upon as an *atua*, or god” (Best 1902: 184).

The second class in Maori society was the *tutua* or commoner class. *Tutua* were younger born sons and daughters. Families could, therefore, contain both high and lower ranking individuals. Families were ranked according to the birth order of lineage ancestors. Best (1941a) suggested that no Maori would identify themselves as *tutua*, and that everyone could have potentially named one high-ranking family in their lineage. However, marriage practices such as class endogamy and isogamy clearly reproduced hierarchies over time. Among chiefs and high-ranking families, securing marriages of equal status was paramount. To marry below one’s rank would be an admission of equal, and thus, lower status. Best (1941a) stated that the marriage of a member of a high-ranking family with a member of a lower ranking family would have
been considered degeneration.

Finally, slavery was practiced among the Maori. Slaves composed the lowest class in society, although Best (1941a) suggested that they were not theoretically part of society since they were usually prisoners of war, and were not considered to be kin and part of the tribe. Regardless of their rank and descent recognized in their birth community, slaves were regarded as having no mana or status once captured (Simmons 1986). Firth (1959) also asserted that slaves were not a static class, as slave women in particular were able to marry free men. Slave women did not pass slavery on to their offspring; rather, their children were eligible to inherit property and rank from free fathers equally with other siblings. Slaves were not able to possess land and were assigned the most menial and heavy labor. Firth (1959) argued that, as slaves were an important element of chiefly wealth, slavery was a vital institution in Maori society.

One final concept regarding rank among the Maori was that, as mentioned above, rank was not entirely ascribed. Men were able to raise their status and prestige through achievement. Historically, males secured higher status through acts of bravery in war. A renowned warrior of commoner rank could potentially increase his status and assume the position of chief, especially if he could establish that he were more competent than his eldest brother. Hereditary rank also had to be recognized by parents and elders before such status could be claimed. In order to gain a formal rise in status, an individual had to be recognized by the whare wananga, the college of learning, and by his superiors. The whare wananga aimed to “pass on old-time lore unchanged to succeeding generations,” through expert tohunga (priests) who instructed young
aristocratic men in all religious and ancestral knowledge (Best 1941a: 71). A rise in rank based on achievement could be granted for the lifetime of the recipient or it could become hereditary, passed down from father to son (Simmons 1986).

**Marriage**

Historically, marriage was predominantly monogamous, especially among commoners. Best noted that polyandry was not practiced, while the levirate and sororate were observed on occasion (1941a). Polygyny was allowed and was most prevalent among the *rangatira* class. Chiefs were known to have as many as three to six wives; multiple wives increased a chief’s prestige and wealth (Metge 1967; Taylor 1855). Pre-marital sex was allowed among commoners, but high-ranking girls and daughters of chiefs were expected to remain virgins until marriage (Best 1941a; Metge 1967). Divorce was somewhat common and uncomplicated, in which both partners agreed to separate and were expected to re-marry. Adultery committed by women was not tolerated. Husbands who caught their wives in an affair were allowed to kill both the wife and lover, unless they were both of high rank (Metge 1967).

The marriages of commoners were usually not carefully planned. The suitor was required to request the permission of the girl’s parents and elders. A meeting was then held to allow all relatives of the girl to debate the match and the girl was given an opportunity to accept or decline. Usually marriages of this type were observed with little ceremony (Best 1941a).

Marriages among the higher ranked were frequently arranged, sometimes at a very early age, even in infancy (Best 1941a; Metge 1967). Ceremonies among highly
ranking couples were elaborate, involving feasts and recitations of genealogies. Aginsky and Hiroa (1940) remarked that chiefly families often arranged marriages between first cousins. They further commented that the practice of marrying close relatives was to limit “too many aspirants for power and leadership in the community” (ibid.: 198). As previously stated, securing marriages of equal status was paramount among chiefs, particularly for first wives. The practice of marrying mates of equal rank, known as isogamy, was especially important for high-ranking families.

Isogamy was stressed for the first marriages of polygynous men and marriages of high-ranking women. Chiefs and other high-ranking men could marry polygynously and take female slaves and lower-ranking women as lesser wives. Best (1941a) stated that the first wife was always ranked above the other wives, while Metge (1967) asserted that the highest ranking wife and her children always took precedence over the others. Clearly, hypergyny was possible, as lower ranking females could marry chiefs and high-ranking polygynous men. Monogamous marriages tended toward isogamy, while polygynous marriages (excluding political matches and first-ranking wives) could be hypergynous.

In practice, marriage rules were not always strictly followed, especially among lower ranking families. That this occurred is evidenced by Best’s (1941a) comment that Maori considered male status in a marriage higher than the female when the partners were of equal rank; however, if a woman were of higher rank than her spouse, her mana (status and influence) would be considered greater. Polack (1840a) commented that a marriage between a moderate chief and a higher ranked wife was considered
particularly ill matched. In such a case, “the wife almost inevitably opposes the husband in favour of her children, and the former dares not assume any superiority, as the relatives of his wife are ever ready to avenge, even with his blood, any unkindness shown to her or the children [...]” (ibid.: 32). He further points out that a highly ranked woman would lose her rank should she desire to marry a commoner or slave (Polack 1840a). Blackburn (1999) noted that the importance of purity of lineage among high-ranking families resulted in carefully arranged marriages and strict adherence to rules regarding rank.

**Political Organization**

Political organization paralleled the system of rank and primogeniture. According to Polack:

“The government is nominally vested in the person of a chief, termed the Rangatira nui or Ariki, whose power is derived either from a remote ancestry, marriage with the daughter of a powerful chieftain, or from having raised himself by reckless acts of valour and superior sagacity in native councils above the several competitors for the suffrages of his tribe” (1840a: 23).

Simmons (1986) asserted that ranking in the 19th century was divided into eight classes. These ranks pertain to political leadership. The top four ranks were hereditary and were more specific divisions of ariki status. The highest rank was the taiopuru, the supreme chief. The next in rank was the ahupiri, paramount chiefs in charge of a confederation of tribes or waka. The noaia were warriors who assisted the top two ranks in maintaining political stability and were related through collateral lines. Finally, the konini governed single tribal leagues and were appointed by the noaia for their
service. All of these classes were inherited through the father’s rank but only if their mother’s rank was recognized as being equal. The four ranks below these were not necessarily hereditary and divided the commoner or tutua class (Simmons 1986: 129-130).

The Maori expected a chief of a high-ranking clan to demonstrate intelligence, character, ability, and initiative (Best 1941a; Firth 1959). Chiefs were shown deference but not necessarily obedience; any suggestion had to be discussed with those involved before a decision was made (Best 1941a). The tino ariki was the first-born male of the eldest branch of the highest-ranking family in a community. According to Best (1941a), these men were protected at all costs. Female ariki could obtain significant influence and respect, were regarded as possessing mana, and were often involved in peace-making (Best 1941a).

Special statuses: tohungas and puhi

There were two exceptional positions in Maori society worth noting: tohungas and puhi. Tohunga were priests who served in religious functions, were experts in tribal and genealogical knowledge, and were exclusively allowed to engage in tapu (sacred) activities such as cutting the hair of an ariki and tattooing (Best 1941a). Generally, only ariki could aspire to becoming tohungas, although there were exceptions, such as in the case of the famous 19th century tattoo artist, Rangi (Robley 1896). Unlike other high-ranking ariki who aspired to obtain as many tattoos as possible, tohungas tended to have very few if any tattoos. Robley (1896) remarked that priests were either forbidden or exempt from being tattooed due to their status as highly tapu, or sacred. He further
stated that *tohunga* tended to have only a small patch of tattoo over the right eye, if they had any at all (ibid.). This special status is particularly interesting when considering the meaning of *moko*, which will be discussed in a later chapter.

*Puhi* were the first-born daughters of very high-ranking chiefs and were heavily guarded to protect their virginity until their arranged marriages took place. The highest-ranking *puhi* were often consecrated as permanent virgins (Best 1941a). Often a *puhi* would have her own dwelling, would be waited on by other young women, and would be restricted from engaging in any kind of heavy labor or menial tasks (Best 1941a). These young women represented the collective *mana* of their entire clan and, in some cases, the entire tribe. Gell (1993) pointed out that these ritual virgins would not be tattooed for two reasons. First, some *puhi* were so highly ranked that *tohunaga* refused to tattoo them, as they believed that shedding the *puhi’s* blood would have exposed them to great danger. Te Awekotuku et al. confirmed this, stating that “for reasons of their birth, there was no marking or spilling of their blood at all” (2007: 88). Secondly, many explorers and other scholars recorded that chiefly daughters were not allowed to obtain tattoos while still virgins, as this marked sexual maturity. Thus, girls destined for permanent celibacy would never be tattooed, and the absence of tattoos in this case symbolized their high rank and ritual purity.

**Warfare**

Early explorers and ethnographers have written extensively on the prevalence and centrality of warfare in Maori society. Tregear’s opening statement in his chapter on
war among the Maori is revealing:

“War was the only pastime that in his heart of hearts the Maori truly loved. Over and over in his boyhood he had heard the descriptions of battles in which every detail had been discussed, he was taught by precept and example every valuable means and variety of fortification, every rule of leadership, every disposal of force, every stimulant to success in battle” (1904: 325).

Davidson stated in 1979 that Maori warfare in the 18th century was an extreme example of Polynesian warfare, evidenced by the proliferation of fortifications throughout the country. Based on archaeological evidence, the number of pa, or fortifications, have been estimated at between 4,000 and 6,000, the majority of which are in the North Island where warfare was most prevalent (Kirch 1984: 209).

Interestingly, Walter et al. (2006) noted that these fortifications do not necessarily provide evidence of an advanced chiefdom composed of institutionalized chiefs; rather, they were more likely the result of the concerted effort of an entire community, or hapu. One thing is certain: the monumental architecture of the pa demonstrates that safety and security were very important in Maori society and that warfare was a constant threat.

Wars were initiated for any number of reasons but primarily to “obtain utu (compensation), for insults and slights as well as material injury, by shedding blood” (Metge 1967: 34). Wars were also fought over land (Taylor 1855). War parties were led by local chiefs at the hapu level and could include hundreds of warriors (Metge 1967). Elaborate rituals were carried out by the presiding tohunga prior to, during, and following war, in which the warriors were regarded as highly tapu (Taylor 1855). The side that killed the most warriors won engagements; slaves were also procured during
battle, which were often young women and children. Tregear remarked that to be captured and rendered a slave was “a mark of still greater contempt than being killed for food” (1904: 356).

_Cannibalism_

Any account of Maori warfare cannot fail to include a section on cannibalism. Many early explorers and ethnographers remarked on cannibalism among the Maori following a battle (see Best 1941a; Cook 1967; Cowan 1930; Earle 1966; Taylor 1855; Tregear 1904). In 1832, Augustus Earle recounted with horror two instances in which he personally witnessed the roasting and consumption of slaves, who were murdered for disobeying their masters’ orders (1966). He attributed this practice to the scarcity of animals in their environment (ibid.). Cook reported that the Maori responded with shock when he inquired if they consumed their own dead. While they reported to never eat any of their own relatives, Cook stated that, following a battle, they “feast and gorge themselves on the spot or carry off as many of the [enemy’s] dead as they can and do it at home with acts of brutality horrible to relate” (1967: 71).

Even as late as 1967, ethnographers continued to write about Maori cannibalism. Metge stated that “apart from providing much needed protein, cannibalism completed the victor’s revenge, by reducing the defeated to food” (1967: 35). The fact that the Maori did not consume their own dead and the significant message that was communicated to the enemy by consuming their dead suggest that, if they did in fact practice cannibalism, they did not do so because they lacked sufficient sources of protein.
William Ahrens has challenged that the notion of cannibalism is an anthropological myth, because he was “unable to uncover adequate documentation of cannibalism as a custom in any form for any society” (1979: 21). He argues that early ethnocentric explorers were not the only ones to make false claims about cannibalism; even present-day ethnographers continue to claim the existence of cannibalism on unreliable (non-observable) evidence (ibid.). While it is true that we cannot conclude that the Maori practiced cannibalism based on the written record, archaeological evidence may shed some light on the matter. Davidson (1979) has argued that violence was widespread early in Maori history; in fact, there may be evidence of cannibalism at an early date on the Coromandel Peninsula in which a man and a moa were apparently consumed. Further, she stated that warfare and cannibalism were more extensive on the South Island than the North at the end of the 18th century, based on archaeological evidence (Davidson 1979).

Traditional Maori society was stratified, organized into three main tiers and three social classes. Ideal marriages were between equally ranked partners and high-ranking men endeavored to marry more than one wife. For males, rank was primarily ascribed, although a certain level of status was possible to achieve through war and leadership. Warfare was rampant, as demonstrated by the emphasis on warriorhood and existence of extensive fortifications. These aspects of Maori society played an essential role in the development of the intricate system of tattooing, called moko. The traditional practice of moko will be described in the following chapter.
2. THE HISTORICAL PRACTICE OF MOKO

Introduction

One aspect of Polynesian culture that has always drawn a great deal of attention from explorers, ethnographers, tourists, and colonizers, is the prevalence and beauty of their tattooing. Numerous books and articles have been published on tattooing in Polynesia, particularly concerning the Tahitians, Marquesans, Samoans, and not least of all, the Maori. Some scholars have suggested that Polynesian tattooing originated in the Lapita Cultural Complex. The famous Lapita ceramics appear to be decorated with designs that were carefully incised and consist of patterns found throughout Polynesia in tattoos: spirals, geometric designs, and chevrons (Blackburn 1999). Archaeologists have also found tattooing utensils at early Lapita sites (Kirch 1984). While most of the written records describing Maori tattoo date back only to the late 18th through the 20th centuries, archaeological evidence demonstrates that the practice existed on the islands long before Europeans arrived to record it. According to Davidson (1979), the remains of tattooing chisels have been found at sites of all ages throughout New Zealand. This evidence suggests not only that the Maori have been practicing tattooing since their arrival in New Zealand, but also that the practice may date back to the Maori homeland, perhaps even to the Lapita Cultural Complex.

Maori facial tattooing (moko) was unique for a number of reasons. Maori moko was not the result of a delicate series of needle pricks as was common in most of Oceania and the rest of the world. Rather, designs were literally cut into the skin with a
chisel-like implement, leaving deep furrows in the face. Many have compared moko to
the appearance of woodcarvings (Gathercole 1988). Maori moko was highly elaborate
by the time the Europeans arrived, consisting of beautiful curvilinear motifs that
covered the entire faces, parts of the thighs, and buttocks of high-ranking men. Women,
too, were tattooed. Female tattoo was generally restricted to the lips and chin, although
occasionally tattoos were placed on the forehead, nose, cheeks, breast, arms, and pelvic
region (Polack 1840b; Robley 1896; Roth 1901; Simmons 1986; Te Awekotuku et al.
2007).

After the signing of the Treaty of Waitangi and the establishment of New
Zealand as a British colony, male facial tattooing began to decline. It resurged briefly
during the wars against the Europeans, during which time the second Maori King
encouraged young warriors to take the moko (Te Awekotuku et al. 2007). Simmons
succinctly concluded that “lack of war, a general retreat into the rural areas largely out
of contact with Europeans, and a religious and social atmosphere which did not favour
continuation of the old ways, should have led to the complete abandonment of
tattooing” (Simmons 1980: 94). This was, in fact, the case for male moko. However,
female moko leading up to the early 20th century actually increased in importance and
prevalence, even as male moko declined. Simmons elaborated, stating that the former
centrality of male moko was key in emphasizing the social importance of particular men
in the tribe. Once men put away their war weapons and the importance of warriorhood
diminished, women began to mark “the genealogical or social importance of a family”
by obtaining lip and chin tattoos (Simmons 1980: 94). The focus of this thesis is on the
historical practice of *moko*, beginning around the time of European contact, through the loss of the traditional art of *moko*, around the mid-20th century.

**Procedures**

**Practitioners**

As previously described, tattoo artists, or *tohungas*, were specialists and high status individuals. The term *tohunga* actually refers to a “priestly expert and learned man,” who would have been, in most cases, a high-ranking *ariki* (Best 1941a: 346). A good *tohunga* was well renowned, paid handsomely for his services, and often sought out by reputation (Polack 1840b; Roth 1901). For example, the 19th century *tohunga*, Rangi, was well known and his services were highly sought after. Augustus Earle reported in 1832 that Rangi was originally a slave, but that he had “raised himself to an equality with the greatest men of his country” through his skill in tattooing (1966: 125). The highly *tapu* (or sacred) act of shedding blood from the head required the skill and status of an expert *tohunga*.

**Utensils**

Traditional Maori *moko* involved chiseling a design into the skin. The instrument used to “carve” the designs into the face was called an *uhi*. This was composed of a small chisel made out of bone, shark’s tooth, or later metal, attached to a length of wood that was often elaborately carved. Designs were tapped into the skin by striking the *uhi* with a mallet while the patient reclined with their head in the *tohunga’s* lap (Best 1941b; Robley 1896; Roth 1901; Te Awetokutu et al. 2007). The pigment was made
from soot obtained by burning kauri tree gum and was introduced to the open flesh by a second chisel. This second chisel was not only used for inserting the pigment, but for “reinforcing the scarification and enhancing the textured effect” (Te Awekotuku et al. 2007: 20). For tattoos elsewhere on the body, a serrated chisel was used, which did not leave the deep furrows in the skin (ibid.). While body tattoo was prevalent, facial tattoo involved significantly more risk and played a more integral role in Maori society. It is thus the central focus of this study.

**Operation**

The pain of the operation, which often lasted many hours, was excruciating, but it was essential for the patient to remain completely composed from beginning to end (Best 1941b; Robley 1896; Roth 1901). Both Robley (1896) and Roth (1901) related accounts of Europeans undergoing this operation. One such European was John Rutherford, who asserted that the facial tattoo operation was agonizing - he was ill for a full six weeks after the operation (Bentley 1999). Reportedly the worst pain occurred in the days following the procedure, in which the entire face was swollen, in some cases to the point that vision was temporarily lost. Robley (1896) also reports that in some cases, the features of the face were permanently distorted. The loss of blood and risk of infection was high. Death was a significant threat (Polack 1840b; Roth 1901). Furthermore, no medical treatments existed to offer relief from the excruciating pain of the operation (Te Awekotuku et al. 2007). Richard Cruise, a European who witnessed a *moko* operation, noted that, “whatever the pain might have been at the time [of the operation], the inflammation that followed and continued for many days was quite
frightful” (1957: 102). In order to make the desirable grooves in the skin, it was essential that the cuts were made sufficiently deep. Taylor (1855) reported that it was possible to cut entirely through the cheek during this process.

Due to the extreme pain, risk of infection, and loss of blood, facial tattoos were done over a long period of time. William Brown reported that the first operation (for males) was generally done at the age of 16 to 18, but this depended on the ability to pay the tohunga and the time needed for the wounds to heal (1845). According to Tregear, the face was not fully tattooed at once because “the inflammation induced in the tender flesh was so acute that delay was inevitable lest the victim of vanity should die” (1904: 259). Robley (1896) reported an incident in which a war captive was tortured; his face was completely tattooed at once and he subsequently died from his wounds.

Additionally, tattooing was a ritual governed by strict taboos. Blood was deemed very sacred and the head was considered the most sacred part of the body. Consequently, blood shed from the head was regarded as particularly dangerous (Gell 1993). Many restrictions were placed on the recently tattooed individual. The person tattooed, as well as the tohunga, were not allowed to touch their faces or any food, nor communicate with anyone who was not in the tapu (restricted) state. Special utensils were used for eating and drinking or they were served by attendants (Robley 1896; Roth 1901). Given the fact that complete recovery from a tattooing operation could take anywhere from a few days to several weeks, the incapacitation of key leaders was a significant disruption to the community.
Male Moko

While many early explorer and ethnographic accounts reported a great deal on moko, few attempted to systematically document the significance of specific patterns and their placement. D.R. Simmons published a pioneering work in this regard in 1986, entitled “Ta Moko: The Art of Maori Tattoo.” I will briefly outline the major fields of the face used in male moko, and what information was contained in each field according to Simmons.

The tattoos on a male face were divided into eight fields, each of which had its own name and contained specific information about the wearer. The face was divided into equal halves, and further into four major fields with some additional areas for secondary design. In general, designs on the right-hand side of the male face marked the father’s tribal affiliation, rank, and position, which were additionally noted to be either hereditary or achieved. Designs on the left-hand side of the male face contained information about the mother’s rank, tribal affiliation, and position (Simmons 1986: 131).

One of these regions was called the Ngakaipikirau. This area was above the center of the eyebrows and composed of two triangular areas on the forehead. It indicated rank, including that of ariki, and whether this rank was hereditary or achieved. This area would have been left blank on someone who lacked ariki status. The second region contained the Ngunga, two triangular areas above the brows and at either side of the ngakaipikirau. These were composed of rays, which indicated by their placement and number, the person’s position in life. Third, the uirere contained information about
tribal affiliation, and occupied the region on either side of the nose. Patterns on the nose indicated tribe and birth order. Spirals on the cheek by the nose indicated the father and mother’s hapu. Fourth, the uma marked whether there was a rise in rank, and the father’s and mother’s lineages. Fifth was the raurau, consisting of the area on the cheeks on either side of the nose down to the mouth. Simmons asserted that this area can be thought of as the signature of the individual. Such information as personal rank due to war, birth, or oratory and whether they were protected by an ariki would have been displayed in this area. The sixth area was the taihou, located between the jaw and mid-cheek and on either side of the raurau. The individual’s occupation was displayed here. The wairua, found beneath the lip to the edge of the mouth, contained information about the wearer’s mana and personal identification. Finally, the taitoto identified the birthright of the wearer and was found at the angle of the jaw (Simmons 1986: 131-132).

Simmons (1986) added that the te marau, or spiral tattoos on the buttocks, identified whether the wearer was descended from a male or female lineage and the affiliated tribe. These were usually worn only by male war leaders and were granted as a reward for service.

Simmons’ assertion that facial tattoos were visual records of one’s identity is further supported by the use of moko by Maori chiefs as signatures on documents. Polack stated that the moko was the “sign-manual and crest of a native chief. In title-deeds of land purchases, or receipts of any description, the moko or fac-similes [sic] on the face of a chief are correctly represented by him on paper” (1840b: 48). Additionally,
the “signatures” of Maori leaders on the Treaty of Waitangi were actually the illustrations of their facial tattoos (Te Awekotuku et al. 2007). The moko of a high-ranking chief was so unique and well-known, that even people who lived as much as 400 miles from the individual and who had never seen his face, were able to determine his identity when showed a drawing of his moko (Polack 1840b).

Female Moko

Maori women also went through the process of obtaining moko, although theirs were limited to the areas of the chin, lips, above the upper lip, and occasionally between the eyes, buttocks, genitals, back, and legs (Polack 1840b; Robley 1896; Simmons 1986; Tregear 1904). While there was some regional variation in the patterns and extent of female tattooing (Simmons 1986), there was a great deal of consistency within regions. Simmons (1980) stated that female moko primarily demonstrated rank. One missionary noted in the mid-19th century that female moko of high-ranking women in the Bay of Islands consisted of upper and lower lip tattoo and two lines on the forehead (cited in Simmons 1986: 107).

Women also used moko to denote a special status. Simmons (1986) described several tattoos that were unique to “tapu” women, or those who were set aside because of their high rank. A woman who was of such high status that no mate would be found to equal her lineage would never marry or have children, and was marked by a partial face tattoo like those found on men. A woman who was set aside for a political marriage (usually puhi) had a spiral tattoo on the buttock. Tattoos on the back or legs
marked the tribal identity of a woman and were used particularly for those marrying into other tribes. Tregear (1904) stated that these marks were also reserved for women of high status. Finally, a tattoo on the genitals marked a woman as able to have children of _ariki_ status in her first arranged marriage, but any children from later marriages would be denied this status (Simmons 1986: 136-137).

Clearly, the practice of _moko_ was regulated by tradition. Rank, status, and gender were important factors that determined what kind of tattoos an individual could obtain. Why such a painful practice existed in traditional Maori society is a question that many scholars have debated over several decades. The following chapter will present four hypotheses, two of which have several corresponding sub-hypotheses, which aim to explain the purpose and existence of traditional Maori _moko_.

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3. ALTERNATIVE HYPOTHESES AND METHODS

Proximate vs. Ultimate-level Explanations

There are two approaches to the explanation of human behavior: proximate and ultimate-level explanations. A proximate-level explanation is one that focuses on a cause that is most immediate to the phenomena at hand. In the context of human behavior, proximate explanations look for causes that occur after conception, within the individual’s own lifetime. Most psychological explanations are proximate: an example would be attributing the cause of a behavior to a person’s genes or ontogeny. Ultimate-level explanations seek causes of behavior that are rooted in evolutionary history. Evolutionary theory as applied to human behavior attempts to explain how humans have evolved to behave the way they do, and why certain traits would have been favored by natural selection.

This study will examine two proximate and two ultimate hypotheses for traditional Maori moko. While every behavior has both proximate and ultimate-level causation, the proximate hypotheses will be presented as such because they are presented in the literature as proximate. The ultimate hypotheses are derived from costly signaling theory, which is rooted in evolutionary theory. They are presented as ultimate-level explanations because the corresponding proximate mechanisms are easy to infer, and the hypotheses tend to be presented in the literature as ultimate-level explanations. Since we see differences in the elaboration and forms of moko between men and women, a sound hypothesis should address this difference. The proximate-level
hypotheses apply to both males and females and predict no differences between
genders in terms of tattooing. The first ultimate-level hypothesis applies to males only,
while the second ultimate-level hypothesis applies to both males and females. Both
ultimate-level hypotheses predict differences between men and women in terms of
their use of moko.
Table 1. Hypotheses and Predictions

<table>
<thead>
<tr>
<th>Hypotheses</th>
<th>Predictions</th>
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<tbody>
<tr>
<td><strong>Proximate</strong></td>
<td></td>
</tr>
<tr>
<td>1) Pathology (M/F)</td>
<td>1. Not widespread</td>
</tr>
<tr>
<td></td>
<td>2. Reported as pathological condition</td>
</tr>
<tr>
<td>2) Expression (M/F)</td>
<td>1. Not aimed to influence behavior (i.e., not communication)</td>
</tr>
<tr>
<td><strong>Ultimate – CST</strong></td>
<td></td>
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<tr>
<td>3) Warfare (M)</td>
<td></td>
</tr>
<tr>
<td>3a) Allies</td>
<td>1. Permanent, indicates affiliation</td>
</tr>
<tr>
<td></td>
<td>2. Promots cooperation</td>
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<td></td>
<td>3. Sufficient pain to signal bravery and sacrifice</td>
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<td></td>
<td>4. Added prior to battle to indicate commitment</td>
</tr>
<tr>
<td>3b) Enemies</td>
<td>1. Display information that intimidates enemies</td>
</tr>
<tr>
<td></td>
<td>2. Identifies affiliation - distinguishes enemies</td>
</tr>
<tr>
<td></td>
<td>3. Added prior to battle to intimidate enemies</td>
</tr>
<tr>
<td></td>
<td>4. Maori reported that it intimidated enemies</td>
</tr>
<tr>
<td>4) Sexual selection (M/F)</td>
<td>1. Competition for mates, polygyny (M) and isogamy (F)</td>
</tr>
<tr>
<td></td>
<td>2. <em>Moko</em> indicates mate quality</td>
</tr>
<tr>
<td></td>
<td>3. <em>Moko</em> differs between men and women</td>
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<tr>
<td>4a) Health (MF)</td>
<td>1. Tattooing process severe, caused wounds</td>
</tr>
<tr>
<td></td>
<td>2. Multiple operations signal fitness</td>
</tr>
<tr>
<td></td>
<td>3. More prevalent in males</td>
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<td></td>
<td>4. Potential mates found individuals with more <em>moko</em> attractive</td>
</tr>
<tr>
<td>4b) Males</td>
<td></td>
</tr>
<tr>
<td>Status</td>
<td>1. Signal status, rank, lineage, social influence</td>
</tr>
<tr>
<td>Wealth</td>
<td>1. Signal wealth (potential for parental investment)</td>
</tr>
<tr>
<td>Bravery</td>
<td>1. Added after battle to communicate success in war</td>
</tr>
<tr>
<td></td>
<td>2. Signal fitness</td>
</tr>
<tr>
<td>4c) Females</td>
<td></td>
</tr>
<tr>
<td>Status</td>
<td>1. Signal status, rank, lineage</td>
</tr>
<tr>
<td>Wealth</td>
<td>1. Signal wealth, kin connections</td>
</tr>
<tr>
<td>Sexual status</td>
<td>1. Signal sexual maturity and/or availability</td>
</tr>
</tbody>
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Proximate-level Hypothesis

Hypothesis One: Pathology

A popular explanation for tattooing in Western cultures in the 20th century was that it is rooted in an individual’s pathological conditions. Walter Bromberg wrote in 1935 that tattoos reveal “latent homosexual feelings,” feelings of inferiority, and “narcissistic and auto-erotic gratification” (cited in Gilbert 2000: 163). The idea that tattoos can reveal specific pathological conditions has prevailed in the psychiatric industry for decades. One psychiatrist, Shirley Ferguson-Rayport, argued that she could diagnose a condition based on the type of tattoo. She suggested that based on the imagery of the tattoo, the individual could be diagnosed with schizophrenia or psychopathic deviance (1955: 121). As recently as 1990, psychiatrists have continued to argue that tattoos indicate pathological problems. Robert Raspa and John Cusack countered Ferguson-Rayport’s argument that imagery can lead to a diagnosis, and argued that “it is the mere presence of the tattoo, not its artistic content, that correlates with certain diagnoses” (1990: 1481). Among these diagnoses include homosexuality, low self-esteem, alcohol abuse, schizophrenia, and bipolar disorder (ibid.). In 1996, Armando Favazza concluded that multiple tattoos are linked with “antisocial personality, an increased incidence of assaultive behavior, impulsivity, and difficulties in heterosexual adjustment” (153). The pathology hypothesis does not predict any differences between males and females, excluding the implicit possibility that males and females may suffer from different pathological conditions. However, these differences are not addressed, and no corresponding differences between male and female
tattooing is expected. The pathology hypothesis as applied to Maori moko yields two predictions:

1. If Maori tattoo was the result of pathological conditions, it should not have been widespread but practiced by a limited number of individuals.
2. Maori should have reported that tattooes were only associated with individuals with probable pathological conditions.

**Hypothesis Two: Expression**

The notion that tattooing is a medium for self-expression is common in Western culture. The word “expression” literally means to express, or squeeze out, and is defined as the “indication of feeling, spirit, character, etc., as on the face, in the voice, or in artistic execution” (Dictionary 2010). The word expression is used to explain an art form such as tattooing in two ways. First, expression is often used to explain the process in which an individual asserts something about themselves, but which is not aimed to communicate to others. According to this view, tattooing is done for the individual’s benefit and enjoyment, not to influence the behavior of others. This use of the term expression often implies individuality and creativity, since it originates within individuals. Alternatively, many people, scholars included, use the words “communication” and “expression” synonymously. Proponents of this view of expression may be arguing that a phenomena is aimed at communication, but this use of the term requires a more thorough examination of the argument. This hypothesis is concerned with the former, as the latter use of the term actually refers to communication and not expression, which will be addressed by other hypotheses.
The idea that tattooing is merely a form of personal expression has significant currency outside of academia, but has also been suggested by various scholars. For example, Peter Gathercole suggested that Maori tattooing in particular may have served to “express the ideal social personality of the Maori in the form of a ‘mask,’” superimposed, like the technique of tattoo itself, on the human face” (1988: 176). In 2001, Millner and Eichold II conducted a study investigating the motivation of 79 individuals for piercings and/or tattoos. They found that forty-two percent of those surveyed reported their primary motivation to be individual expression. Twenty-three percent reported a related motivator, that of personal body art (Millner and Eichold II 2001). Here again, we see that proponents of this view of expression focus on the individual, and not the influence on the behavior of others. Similar to the pathology hypothesis, the expression hypothesis does not explicitly address any expected differences between male and female tattooing. The expression hypothesis yields one prediction:

1. *Moko* did not influence the behavior of others in any discernible way (i.e., it was expression and not communication).

Ultimate-level (Evolutionary) Hypotheses

Introduction to CST

Both of the ultimate-level hypotheses presented in this thesis are derived from costly signaling theory. Evolutionary biologists have been attempting to explain seemingly wasteful and/or risky behaviors in the animal kingdom for decades. One of
these explanations, Zahavi’s handicap principle, has had a significant effect on evolutionary theory in anthropology. The handicap principle asserts that an honest signal of quality can be evolutionarily stable if it demands such a cost to the individual signaler that individuals lacking the quality will be unable to imitate it (Zahavi 1975, 1977, 1990, 1995, 1997). A handicap may serve to signal genetic quality to attract potential mates and/or deter rivals.

An often-cited example of a handicap in biology is the peacock’s tail (Zahavi 1995). The peacock’s tail is seemingly wasteful and risky because it is a conspicuous display that requires substantial energy and reduces the animal’s ability to elude predators. The handicap principle predicts that the unwieldy tail is sufficiently costly to prevent males with lower genetic quality from displaying or having one. However, the male with the large and showy tail benefits from signaling its quality to females and male rivals. Because the tail is costly in terms of energy and risk of predation, it serves as an honest signal of the individual’s quality. Another example of a costly behavior in terms of risk is gazelle stotting (Zahavi and Zahavi 1997). Gazelles jump high in the air (stot) when they see a predator, displaying their behinds. This is a very risky behavior because it alerts the predator to the gazelle’s presence. However, this makes sense as a costly signal. The gazelle sends a reliable signal of its health and ability to outrun the predator, benefiting the signal sender (by dissuading the predator from chasing) and the receiver (by saving it the wasted energy of a fruitless chase). Zahavi’s handicap principle has been adopted and furthered by evolutionary anthropologists and psychologists to explain human behavior. This principle has had a significant role in the formation of costly signaling
While an in-depth review of the historical trajectory of costly signaling theory is beyond the scope of this study, it is important to highlight some key developments in order to evaluate whether or not Maori moko can be understood as a costly signal. Costly signaling theory (CST), according to Bliege Bird and Smith, is a single theoretical framework which combines past approaches such as conspicuous consumption, wasteful advertising, and symbolic capital to explain human status competition and “domains of human behavior and culture that have appeared most resistant to adaptationist analysis” (2005: 222). Costly signaling theory essentially addresses the communication of certain human characteristics, which are difficult to accurately perceive and vary in quality. Moreover, costly signals allow observers to determine the quality of such characteristics in others and minimize deception (Bliege Bird and Smith 2005). In order to accurately assess the quality of others, perceivers must rely on signals that are costly or difficult to fake. Bliege Bird and Smith (2005) describe the conditions in which a costly signal would be the most appropriate method of communication. First, members of a group must have an attribute with varying quality, detection of which is difficult but could, in principle, be signaled. Second, observers must have a lot to gain or lose through detection of the attribute quality. Third, those displaying the signal and those perceiving it must have conflicting interests, i.e., the signaler benefits from successful deception of the perceiver. Finally, the cost or benefit to the signaler must be quality dependent (Bliege Bird and Smith 2005). Costly signals benefit both the signaler and the receiver. The signal sender may benefit by gaining allies, deterring rivals, or
securing mates. According to Smith and Bliege Bird, “the payoff to the signaler comes from being chosen as a mate or ally or deferred to as a dominant in mating, cooperative, or competitive contexts” (2000: 246). The receiver benefits by being able to accurately assess the qualities of the signaler: such as whether or not the individual would be a good mate, a good ally, or a strong competitor (ibid.).

Costly signaling theory has been applied to many different aspects of human behavior that are apparently wasteful, such as big-game hunting and feasting (Alvard 2002; Alvard and Gillespie 2004; Bliege Bird et al. 2001; Bliege Bird et al. 2002; Gintis et al. 2001; Gurven et al. 2000; Hawkes and Bliege Bird 2002; Patton 2005; Smith and Bliege Bird 2000; Smith et al. 2003; Wood 2006), altruism and cooperation (Irons 1996a; Kydd 2000), religion (Iannacone 1992, 1994; Irons 2001; Sosis 2000, 2003, 2004; Sosis and Alcorta 2003; Sosis and Bressler 2003; Sosis et al. 2007), and body modification (Low 1979; Ludvico and Kurland 1995, Singh and Bronstad 1997). The latter phenomenon is clearly the most relevant to the present analysis. Bliege Bird and Smith indicated that “there are plausible grounds for expecting signaling theory to illuminate costly and often seemingly irrational forms of bodily modification, ranging from tattoos and scarification to genital cutting (male and female) and footbinding” (2005: 232). The application of CST to tattooing has even been acknowledged outside of evolutionary anthropology. Steve Gilbert, in his book “Tattoo History,” observed that tattooing might function as a handicap. He remarked that all tattoos are similar in that “they advertise the fact that the owners of the tattoos have money, can endure pain, are deadly serious, and will be dangerous adversaries in battle,” and concluded that it is an idea
that needs to be explored further (Gilbert 2000: 160).

Of the two hypotheses that follow, one is derived from costly signaling theory, but is only indirectly related to sexual selection. It will be termed the “Warfare” hypothesis, is divided into two sub-hypotheses, and pertains to male moko. The remaining hypothesis and corresponding sub-hypotheses are derived from costly signaling theory and sexual selection theory. They will be termed the “sexual selection hypotheses” and address aspects of both male and female moko. Both hypotheses and their sub-hypotheses share the underlying premise that the human behavior in question is a form of communication. They vary in terms of who is sending the message (whether male or female), what message is being communicated, and who the message is intended to influence (again, whether male or female).

Hypothesis Three: Warfare - Male costly signals of quality as allies and enemies

The hypothesis that male moko was a form of costly signaling related to warfare has two sub-hypotheses: 1) that it signaled qualities such as commitment and willingness to sacrifice primarily to allies, and 2) that it signaled qualities such as ferocity, affiliation, and status to enemies.

3a) Allies

Many researchers have argued and demonstrated that costly signaling theory is useful in explaining forms of human cooperation, such as altruism, religion, and male solidarity groups. Bliege Bird and Smith (2005) suggested that the cost of a signal could indicate the honesty of the signaler to potential allies or competitors. Specifically, a tattoo could signal two things to an ally: 1) affiliation and commitment, and 2)
willingness to sacrifice for the benefit of others.

Male tattoos may signal willingness to sacrifice for others in two ways. First, undergoing the painful tattoo operation may indicate to other men the individual’s willingness to suffer extreme pain. Steadman and Palmer (2009) have suggested that sacrifices encouraged by religions function to communicate the sufferer’s willingness to endure pain for others. This willingness to sacrifice for one’s allies and kin is particularly important in the context of warfare, because the inability to rely on a fellow warrior could pose a danger to the rest of the party (Steadman and Palmer 2009). They conclude that painful rituals promote social behavior, and allow participants to specifically identify who they can rely on in dangerous situations (ibid.). Similarly, Kathryn Coe (2003) has suggested that traditional visual art (including tattoos), are rituals that encourage cooperation among co-descendants. In the case of male moko, engaging in the ritual of obtaining moko is costly in terms of wealth, time, and physical pain. Coe argues that such rituals encourage kin to sacrifice for one another and reduce competition among kin (ibid.).

Costly signaling theory has also been applied to explain the development of costly rituals and behaviors in order to reliably signal the individual’s commitment to others and willingness to cooperate (Gintis 2001; Iannacone 1992, 1994; Sosis 2000, Sosis 2003, Sosis and Bressler 2003; Sosis and Ruffle 2004; Sosis et al. 2007; Wilson 2002; Zahavi 1995). Costly signals can divide those who are trustworthy cooperators from those who are untrustworthy, in that those who do not intend to cooperate would not be willing to engage in the cost of sending the signal (Kydd 2000). Tattooing may signal the
individual’s commitment and cooperation with conspecifics. One of the most powerful aspects of costly signaling theory in this context is the ability of a costly signal to solve the problem of free-riders. Iannacone (1992) noted that “apparently unproductive costs, such as dietary restrictions, painful initiations, and grooming requirements, can overcome free-rider problems associated with collective action;” therefore, “perfectly rational people may thus embrace stigma, self-sacrifice, and bizarre behavioral standards” (289). Sosis et al. (2007) argued that those high-quality individuals who signal commitment are rewarded by an increase in status, resulting in greater reproductive gains, as well as the ability to participate in successful cooperatives.

War parties may suffer the most serious consequences from the inclusion of free-riders (Sosis et al. 2007). The risks of going to war with less-than-committed warriors are higher mortality and defeat. Sosis et al. (2007) suggested that costly (reliable, honest) signals of commitment might have been selected for in societies with recurrent warfare. They further hypothesize that, because smaller groups are more likely to suffer from the loss of members to an enemy group, costly and permanent indicators of group commitment might be more common in societies in which internal warfare is more prevalent than external warfare (ibid.). High ritual costs that may fit this hypothesis include scars and tattoos. Knowing that your ally is brave and willing to sacrifice for the sake of the group would be an important quality to discern. Thus, both signalers and observers would benefit from a difficult-to-fake signal of commitment and bravery (Cronk 1994).

According to the costly signal of ally quality hypothesis, the signal sender and
receiver would be potential allies and/or kin. The message would indicate the sender’s quality as an ally, such as their willingness to sacrifice and cooperate. Four predictions are as follows:

1. To communicate commitment to a particular set of allies, moko should be permanent and indicate affiliation in some identifiable way. The permanence of the marks should have deterred free-riders and deserters.

2. Moko should promote cooperation among conspecifics, particularly in the context of warfare, by indicating the commitment of one’s allies.

3. The ritual should be sufficiently painful as to serve as a signal of bravery and a willingness to sacrifice for the group.

4. To the extent that they were added prior to battle, male moko should indicate commitment to allies.

3b) Enemies

Likewise, tattooing may serve as a costly signal aimed at enemies and rivals. Zahavi (1995) noted that some birds engage in the signaling of altruism to communicate their quality as cooperators, as well as potential rivals. Bliege Bird and Smith (2005) also noted the possibility that costly signaling would be a reliable form of communication that could indicate the otherwise hidden quality of a signaler as a competitor. Additional functions of scars and tattoos on the battlefield may be to make the warrior look fierce or aid in identifying allies and enemies in battle (Sosis et al. 2007). While war paint may similarly make a person look fierce and display affiliation, the temporary nature of paint (and thus lack of cost), makes it an unreliable signal. The display of painful forms of
adornment, such as tattoos, scars, and knocked-out teeth, honestly communicate the individual’s bravery and ability to withstand pain. If this signal is visible to the enemy, as it would be if displayed on the face and in hand-to-hand combat, the competitor would have a reliable way to ascertain the quality of their rival. This honest indication of the ability of a warrior would benefit both the signaler and the receiver. In the same way that specific tattoos can identify the individual’s commitment to a specific clan or tribe, such a mark may also communicate this affiliation to their enemies. This can serve to intimidate if the tattoo indicates that the warrior is from a clan or tribe that is known for their ferocity on the battlefield. Marks that indicate superior rank, leadership, or skills in battle could also inspire fear in an enemy.

According to the costly signal of enemy quality hypothesis, the sender and receiver of the signal would be competitors. The message would indicate the sender’s quality as a rival, such as their bravery and ferocity. This hypothesis yields four predictions:

1. *Moko* should communicate information about the wearer that could intimidate enemies. For example, patterns that indicate that the man was a fierce warrior or a powerful leader could instill fear in the enemy.

2. *Moko* patterns should identify affiliation (such as tribal or clan) in a way that allows individuals to distinguish enemies.

3. To the extent that they were added prior to battle, male *moko* should be intended to intimidate enemies in battle.

4. Maori men (and women) should have reported that *moko* actually served to intimidate enemies in battle.
*Introduction to Sexual selection*

Sexual selection, developed by Darwin (1871), attempts to explain how ornaments that appear to reduce an individual’s chances for survival may have been favored by natural selection. The handicap principle developed by Zahavi (1975, 1977, 1990, 1995, 1997) is one explanation of how such a seemingly wasteful attribute may actually increase the reproductive success of an individual with a pronounced handicap. While the handicap principle has been criticized, even the critics acknowledge that for non-heritable traits (such as the tattoos that concern us here), the handicap principle may work as a mechanism for sexual selection (Maynard-Smith 1976). Recent studies have explored the possibility that hunting in certain contexts may be a costly signal involved in sexual selection. For example, Smith et al. report that Meriam hunters reproduce earlier, have higher-quality mates, and greater reproductive success than non-hunters (2003: 116).

Because males and females have different mating strategies, we would expect to find differences in how they signal quality as mates, what qualities they are signaling, and to what extent each sex signals. In the case of human body modification, we would expect males and females to have different reasons and mediums for communicating to a potential mate. Low (1979) argued that cultural ornamentation in males may serve as several types of sex signals, falling into one of two categories. The first, “sexual fitness ornaments,” could signal status, physical vigor, prowess, and ferocity through ornaments such as penis sheaths and evidence of circumcision (1979: 465). The second, “success tokens,” could signal the potential for parental investment, through ornaments
such as expensive clothing and conspicuous consumption (Low 1979: 465). For females, Low hypothesized that cultural ornaments may signal maternal fitness (as in corsets), sexual receptivity (as in lipstick), and sexual un/availability (such as wedding rings) (465). These differences in the messages communicated by male and female sex signals parallel the differences we see cross-culturally in male and female ornamentation. Ludvico and Kurland (1995) and Singh and Bronstad (1997) have suggested that human scarification may serve as a costly signal of mate quality. As a form of scarification, tattooing may be a mechanism for sexual selection.

**Hypothesis Four: Sexual Selection - Costly signals of mate quality**

The hypothesis that Maori *moko* functioned as sex signals for both men and women yields four general predictions:

1. Competition for mates should exist between males. Polygyny would be expected.

2. Females should have competed on some level for mates, whether this was due to a shortage of mates (prevalent warfare) or due to competition for the highest-ranked males, as is found in societies with isogamous or hypergynous marriage.

3. *Moko* should communicate information about the wearer that honestly signals aspects of mate quality.

4. *Moko* should differ between men and women in how they were used, in quantity, or design.

*Moko* may have served as sex signals of several different aspects of mate quality.
For males, these may include health, status, wealth, and bravery. For females, these may include health, status, wealth, and sexual maturity/availability. Each will be presented below as sub-hypotheses to the sexual selection hypothesis.

4a) Health: Costly signals of pathogen-resistance

Hamilton and Zuk (1982) were the first researchers to demonstrate that pathogen prevalence and the degree of sexual ornamentation are correlated. They argued that because elaborate sexual ornamentations are costly, they signal the physical quality and vigor of the potential mate (usually a male signaling to a female). Hamilton and Zuk concluded that the degree of sexual ornamentation signals the degree of pathogen resistance (Singh and Bronstad 1997).

Low (1990) hypothesized that pathogen stress and signs of sexual selection are correlated, although she was not able to support this with the data in her study. Using Low’s data on pathogen stress, Ludvico and Kurland (1995) applied the Hamilton and Zuk hypothesis to human scarification. They tested four hypotheses to explain scarification: 1) rite of passage, 2) trauma procedure, 3) nonadaptive sexual selection, and 4) adaptive sexual selection character driven by pathogens, using the cross-cultural method. In the pathogen-driven model, Ludvico and Kurland (1995) asserted that a wound caused by scarification subjects an individual to greater pathogen exposure than that found in individuals who do not undertake scarification. They further suggested that the scar would signal the individual male’s resistance to pathogens to young females and their guardians (1995: 160). Two years later, Singh and Bronstad (1997) published a study in which they tested the hypothesis that scars placed on areas
indicative of sexual health (breasts and stomachs for females; faces, shoulders, and arms for males) would be more prevalent in areas with high pathogen rates. They predicted that the high correlation between pathogen severity and prevalence of scars would support the hypothesis that scarification functions to signal mate quality and pathogen resistance, and found cross-cultural evidence that female scarification on the stomach is highly correlated with pathogen prevalence (ibid.) However, neither Singh and Bronstad (1997) nor Ludvico and Kurland (1997) found any correlation between male scarification and pathogen prevalence.

According to the pathogen-resistance hypothesis, the signal sender and receiver could be either male or female. The message would indicate the sender’s resistance to pathogens, or health. This hypothesis, applied to Maori moko in both males and females, results in four predictions:

1. The form of tattooing should be sufficiently severe as to cause wounds that increase the individual’s vulnerability to pathogens.

2. Individuals who survived multiple moko operations should be more resistant to pathogens than those who did not. Thus, individuals with more tattoos would be more attractive than those with fewer tattoos.

3. To the extent that male-male competition was greater than competition between females, moko would be more prevalent in males than females.

4. To the extent that the tattoos were sex signals, potential mates would find individuals (male or female) with moko more attractive than those without.

4b) Costly Signals of Male Status, Wealth, and Bravery
As mentioned above, Low (1979) argued that male cultural ornamentation serve as sex signals of status, physical vigor, prowess, and ferocity, as well as parental investment. Specifically, male moko may function to signal several aspects of mate quality: health, wealth, commitment, ferocity, and status. Health may be honestly communicated through the individual’s ability to withstand the operation and resistance to pathogens (Bliege Bird and Smith 2005; Ludvico and Kurland 1995; Singh and Bronstad 1997). Wealth, or more specifically the potential for parental investment, may be reliably signaled through tattooing, as the operation required substantial payment to the priest. As previously discussed, ferocity, commitment, and the willingness to sacrifice can be signaled to allies and enemies, as well as to potential mates. Finally, the signaling of status and rank may also be an important indicator of mate quality.

The degree of polygyny in Maori society may be an important factor when considering the evolution of costly signals of male mate quality. We would expect greater male-male competition for mates and more reliable signals of mate quality in polygynous societies. Additionally, male rites that can signal such mate quality are expected to be more prevalent in polygynous societies (Sosis et al. 2007). Whether or not males compete for multiple mates in Maori society may be an important factor in the elaboration of sex signals.

According to the costly signal of male mate quality hypothesis, the signal senders would be males and the receivers, females. The message would communicate the sender’s quality as a potential mate, such as health, status, wealth, and bravery/fitness potential. Four predictions are as follows:
1. *Moko* should signal status, rank, lineage, and/or social influence.

2. *Moko* should signal wealth or the potential for parental investment.

3. *Moko* should signal bravery and fitness potential. To the extent that facial tattoos were added after battle, they should communicate success in war to kin and women.

**4c) Costly Signals of Female Status, Wealth, and Sexual Maturity/Availability**

Bliege Bird and Smith noted that signaling is not exclusive to males, but rather that “females compete, often directly, with other females not only for access to resources needed to support their families but also for high-quality mates and allies” (2006: 325). Females and their guardians are concerned with ascertaining the hidden qualities of their mates, but they are also interested in competing with other females for the mates of highest quality, particularly in societies with socially imposed monogamy or isogamy. Many applications of costly signaling to human behavior effectively explain how and why males would signal (Alvard and Gillespie 2004; Smith et al. 2003; Sosis et al. 2007), but tend to exclude female signaling. Costly male behaviors may be signaling to allies and enemies, particularly in the context of warfare (Sosis et al. 2007). However, the warfare explanation of body modification does not explain why women in the same society would engage in costly ornamentation. Singh and Bronstad (1997) argue that female scarification on the stomach is more prevalent in areas with high pathogen stress. Pathogen stress, however, does not predict female scarification on other parts of the body. While few costly signaling studies have specifically addressed female signaling, Low (1979) argued that females use cultural ornamentation as sex signals. The following
hypothesis predicts that female *moko* signals aspects of mate quality such as health, wealth, status, and sexual availability/maturity. Such signaling would indicate that females are competing for mates, and we would expect the competition for high quality mates to be high in order for female signals of quality to evolve.

According to the costly signals of female mate quality hypothesis, the signal senders would be females and the receivers, males. The message would communicate the sender’s quality as a potential mate, such as health, status, wealth, sexual maturity and/or availability. Three predictions are as follows:

1. *Moko* signal status, rank, and lineage.
2. *Moko* signal familial or clan wealth.
3. *Moko* signal sexual maturity and/or availability.

**Methods**

The most thorough way to test these hypotheses would be to use quantitative data, gathered from the field during the historic time period when Maori *moko* had been unaltered by outside influences. Unfortunately, such data do not exist. Ethnographers and explorers during the 18th, 19th, and 20th centuries did not systematically interview men and women with *moko*, nor did they collect information about these individuals regarding their number and quality of mates, number of offspring, etc. Although we do not have such a data set, we do have a wealth of historical and ethnographic description. The goal of this study was to synthesize the vast literature pertaining to the Maori in order to evaluate several hypotheses concerning
the function of moko around the time of European contact.

One problem associated with historical research involves the inability to account for observer bias and ignorance. Most of the documents prior to the late 20th century were written by Europeans, not by the Maori themselves. Certainly not all of the explorers who spent a brief time in New Zealand fully comprehended the intricate social system in which moko was embedded. Additionally, many descriptions of moko are brief and were only recorded as exotic anecdotes.

Despite these issues, there is a large amount of literature pertaining to Maori moko. Sources range from accounts by early explorers, missionaries, and military men, to ethnographers. Many of these sources have been republished in the last few decades and have become more widely available. I was able to obtain many of these through the University of Missouri library, Mobius (the Missouri library system), and Inter-library loan. Some were also available in article form on JSTOR and other online databases. Unfortunately, a few early sources are held only in New Zealand and were not obtainable on this side of the Pacific. For most of these, I was able to find citations in more contemporary sources.

Since the revival of Maori tattoo in recent decades, the topic has seen a surge in popularity. Many full-length books and articles have been published on the topic since the early 1980’s. These sources were very useful as guides to earlier historical sources and as summaries of previous research on the topic. While many scholars have offered suggestions as to the function of tattoo, the application of specific anthropological theories to the case of Maori moko has yet to be published. The goal of this thesis is to
examine the practice of *moko* within its historical context in order to evaluate the above hypotheses.
4. RESULTS

This chapter contains the evaluations of each hypothesis, to determine how they fit the case of traditional Maori *moko*. Due to the lack of quantitative data available for this study, the evaluations will be qualitative, based on the accounts of early explorers and ethnographers. For some hypotheses, the qualitative data is sufficient to determine whether or not they are supported. Unfortunately, more data would be needed to fully evaluate others. Specifically, some ambiguities in the literature result in the inability to draw sufficient conclusions. Such ambiguities and the support for each hypothesis will be addressed.

Proximate-level Hypotheses

*Hypothesis One: Pathology*

The hypothesis that tattooing is associated with pathological conditions is not supported in the case of Maori *moko*. There is nothing in the record that indicates that facial tattoos were obtained by a limited number of people. In fact, the practice was extremely widespread. Reverend Richard Taylor reported in 1855 that “some were more fully tattooed than others, but all were more or less so. The grand chiefs had their faces and thighs entirely covered with this ornamental renting of the skin” (150). Likewise, Polack noted that “the art of tattooing is universally practised by the New Zealanders” (1840b: 42). Clearly, *moko* was not restricted to the limited number of individuals with pathological conditions. Moreover, there is no evidence in the record that Maori
considered *moko* to be the mark of such individuals. Additionally, the pathology hypothesis would not predict the fact that *moko* was strictly regulated by tradition and demonstrated an individual’s rank and status. One final point against the pathology hypothesis is that *moko* operations were very expensive. Individuals and/or their families and clans paid the tattoo artist a considerable sum for each operation (Te Awekotuku et al. 2007). If the hypothesis that tattooing in Maori society was the result of abnormal psychology was accurate, then one would expect to find reports of a limited number of individuals obtaining *moko*, who were known to have pathological conditions, whose tattoos were not regulated. There are no such reports in the record, demonstrating that this hypothesis is not applicable to traditional Maori tattooing.

**Hypothesis Two: Expression**

There are few early sources that assert that Maori tattoo was merely a form of personal adornment. Best argued that the differences in designs between individuals “were not marked for the purpose of tribal, family, or individual identification,” but rather that the design “was settled by the preference of the tattooed one, or the design sketched by the artist” (1941b: 546). These statements are questionable, given the fact that contemporary Maori scholars concur that the practice was not one intended for mere personal adornment. Mohi Rua, a Maori researcher at the University of Waikato, asserts that “the lines of Moko are perpetuated with meaning. Recorded in the design are the wearer’s whakapapa [genealogy], ancestry and the essence of ones identity. Accordingly, the moko was such a clear statement that it was considered bad manners to ask a person who they were” (1999: 2). If *moko* designs were truly arbitrary and
governed only by self-expression, it would be impossible to glean any information about
the wearer from their moko. Furthermore, Maori tattoos as expression would have had
no systematic relationship with the individual’s status, rank, wealth, and achievements.
This is clearly challenged by Simmons and those who agree with his analysis of moko.
Simmons’ (1986: 25) statement that Maori moko “served to identify rank, to give
recognition to achievers and to provide authority structure” is supported by Rua and
other Maori scholars.

The prediction that moko designs were not aimed at communication (influencing
others) is not supported by the evidence. Moreover, moko was neither random nor
purely creative. As indicated in the chapter on moko, tradition dictated the meanings
and placement of specific designs. If Maori tattoo was the result of an individual
expressing aspects of their inner-being, as some may claim, we would not expect it to be
so highly regulated. Maori moko was clearly aimed at communication. While
contemporary Western tattoo may or may not be a form of expression, there is no
evidence to support the assertion that traditional Maori moko was merely a form of self-
expression.

Ultimate-level Hypotheses

Hypothesis Three: Warfare - Male costly signals of quality as allies and enemies

3a) Allies

The hypothesis that male moko signaled willingness to sacrifice and commitment
to allies predicts several aspects of moko and is strongly supported by qualitative
evidence. The first prediction was that *moko* was permanent and indicated tribal and
clan affiliation in order to communicate commitment to allies. Additionally, the
permanence of these marks should deter free-riders and deserters. The first prediction
is confirmed by the ethnographic record. *Moko* was completely irreversible. The only
way to cover a facial tattoo was to grow facial hair over part of the pattern (obviously
only possible for males). This did indeed occur after the Europeans established New
Zealand as a permanent colony and warfare between Maori had ceased (Gilbert 2000).
However, male *moko* was not limited to the area where facial hair grows, so some parts
of the face were impossible to cover. Moreover, according to Simmons’ (1986) analysis
of *moko* patterns, lineage, clan, and tribal affiliation were indicated by *moko*. Recall the
*uirere*, the area on either side of the nose that indicated tribal affiliation. Furthermore,
the spirals on the cheeks on either side of the nose indicated the mother’s and father’s
clan affiliations (Simmons 1986). Such permanent marks of affiliation allowed Maori
men to reliably identify one another as allies or enemies, even as alliances changed over
time. In addition, permanent displays of affiliation would most certainly have reduced a
warrior’s ability to switch sides in the middle of a battle or defect to a larger war party.
The painful operation itself may have deterred the less-committed from obtaining
*moko*, indicating commitment to one’s clan and tribe. This was a visible and permanent
sign of commitment, as well as signal of the individual’s willingness to sacrifice. *Moko*
would have been a clear indication of one’s affiliation and commitment when forging
alliances.

The second prediction, that *moko* should promote cooperation among
con specifics, particularly in the context of warfare, seems to be supported by the ethnographic record. *Moko* may have promoted cooperation among male allies, due to its permanence. Additionally, the pain of the operation may have deterred free-riders. As Sosis et al. point out, “whether attacking or defending, each individual who defects places the remaining group members at greater risk of injury or death” (2007: 236). Given this risk, the ability to reliably determine whom one can count on in battle would have been a significant advantage. In their study of the correlation between warfare and male rites, Sosis et al. (2007) found that male rites are significantly more costly in societies with prevalent warfare and that these rites tend to leave permanent marks in those with external warfare. Maori warfare fits their model in that warfare was a central focus of society and tended to occur between tribes. There was also a considerable amount of time, wealth, and self-sacrifice involved in the process of obtaining *moko*, which may have aided in building social relationships among individuals. In 1827, Augustus Earle described the preparations involved in going to war and the important role of *moko* in these preparations: “Their canoes, muskets, powder and balls, increased daily; and a very ingenious artist, called Aranghie [Rangi], arrived to carry on this important branch of his art [of tattooing], which was soon placed in requisition, for all the mighty men in the neighbourhood were one by one under his operating hands” (1966: 124). One thing that is unclear in the literature, however, is how consistently tattoos were added before or after battles. To the extent that they were added prior to battle, as the above quote demonstrates, they would have communicated commitment to allies.
The third prediction within the costly signals of ally quality hypothesis, that the ritual should be sufficiently painful as to serve as a signal of bravery and a willingness to sacrifice others, is strongly supported by the evidence. The process of obtaining moko was significantly more painful than any other form of tattooing. As previously described, the operation was so risky and painful that the face had to be done in sections over long periods of time (Cook 1967). One Maori expert on moko reports that “herbal treatments followed, and alleviated, a period of intense, hallucinogenic pain; [...] but there is no medicinal preparation in either the Maori oral narrative or the written record that offers pain relief” (Te Awekotuku et al. 2007: 39). There is no doubt that undertaking this extreme form of body modification took a considerable amount of bravery and willingness to sacrifice, which would have been clearly signaled to allies and those witnessing the operation.

3b) Enemies

The hypothesis that male moko functioned as a signal of one’s quality as a competitor is supported. Historians and missionaries often commented that Maori men obtained moko to become more intimidating to enemies in war (Robley 1896; Taylor 1855). Crozet stated that men in the Bay of Islands in 1772 took “a lot of care to work out designs that [would] make them look frightful and give their faces a look that inspires terror” (cited in Simmons 1986: 44). This is all the more convincing given the type of warfare practiced by the Maori. Prior to the introduction of guns, Maori battles were fought in close hand-to-hand combat (Barrow 1978). Traditional weapons included short spears, and long and short clubs; they did not use bows and arrows (ibid.). In the
war haka (dance), the warriors would line up chanting and use exaggerated motions to slap themselves, stomp, and grimace wildly (Best 1941b). Such a scene was intended to demonstrate the prowess and fearlessness of the war party, and to intimidate their enemies. Tregear stated that the dance was “a means of rousing the fighting men to fury” and that “few who have seen the war-dance [...] will ever forget the resounding roar, the trembling earth, the muscular frenzy, and the moral effect of that tossing sea of human creatures, transformed by their own action into the semblance of demons” (1904: 62). Sosis et al. (2007) noted that male rites (such as tattoos and scars) may be intended to intimidate enemies or allow the warrior to distinguish allies from enemies during battle. To the extent that facial tattoos were added prior to battle, a central function would have been to intimidate enemies.

In addition to the way that moko was displayed by a competing war party, it could have intimidated enemies through the specific information communicated about the wearer. Early accounts describe moko as “denoting bravery in battle” (Buckland 1888: 325), which is further supported by Simmons’ analysis of moko patterns. The area on the cheeks called the raurau depicted information such as personal rank due to war (Simmons 1986). Successful warriors would have been marked in a way that was clear to the informed observer. Marks of rank, superior genealogy, and affiliation could have served to intimidate enemies on the battlefield. Tattoos indicating affiliation could have intimidated an enemy if the war party was from a tribe or clan known to be successful and/or brutal in war.

Further evidence for the significance of moko in the context of warfare lies in the
practice of carefully cutting off the heads of the heads off of fallen enemies if their faces were heavily
*mokoed* (Polack 1840b; Robley 1896). Untattooed heads were routinely “battered and
-crushed with the most savage brutality” (Polack 1840b: 47). Once a head was taken by
the enemy tribe, it was placed on a pole in the village as a trophy. These heads could
then be used to wager peace, in which the two sides would return the preserved heads
to their loved ones where they were honored (ibid.: 40).

Indeed, one consistent statement of early explorers, historians, and
ethnographers was that Maori reported *moko* to be an important part of warfare.
Robley concluded that tattooing was invented to make the mark, which inspired fear in
enemies, permanent (1896: 28). One final piece of evidence that may support the
hypothesis that *moko* served as a signal of ally and enemy quality in warfare, is the fact
that male *moko* diminished to the point of extinction in the 20th century. Following the
signing of the Treaty of Waitangi and the close of the New Zealand wars, warfare
between Maori tribes dropped rapidly (Simmons 1980). Coincidentally, male *moko*
became more and more rare during this time period, as will be discussed further in the
conclusion. The fact that male *moko* ceased to exist after colonization and the
pacification of Maori tribes lends strong support to the hypothesis that male *moko* was
a costly signal used in war.

The hypothesis that *moko* clearly signaled the commitments and intentions of
the wearer in the context of war explains many aspects of male *moko*. It can account for
why the rite was so painful, why it was done in an area so conspicuous to others on the
battlefield, and why males tended to have more facial tattoos than females. What it
does not account for, however, is why male moko had so much to do with status, and why females obtained moko.

**Hypothesis Four: Sexual Selection - Costly signals of mate quality**

The sexual selection hypothesis predicts that male moko communicated information that would indicate the individual’s quality as a potential mate, such as wealth, physical fitness, status and rank, and social influence. The general predictions of the sexual selection hypothesis regard mate competition and the differential use of moko by men and women. First, as previously discussed, polygyny was common among high-ranking men. While polygyny generally reduces competition between females for mates, the strict adherence to isogamy among high-ranking individuals led to more female competition that would be expected in many purely polygynous societies. Women competed not just for any mate, but for mates with specific ranks and ancestry. Clearly, men and women differed in how they used moko and what the tattoos demonstrated about them. The final prediction, that moko was an honest indicator of mate quality, will be subsequently addressed in the evaluation of each sub-hypothesis.

**4a) Health: Costly signals of pathogen-resistance**

The pathogen hypothesis is consistent with the practice of moko in that the risk of infection and death from the operation was high enough that survivors could reliably signal the quality of their health and resistance to pathogens. As revealed in the chapter on moko, the operation was so risky that the tattoos had to be done in small increments. A man with a full facial moko could communicate his health and vitality to others, whether allies, enemies, or mates. A female with moko, though considerably less
extensive than found in most males, would also signal the status of her health. For females, this may have been particularly important when potential mates evaluated maternal fitness potential.

While Singh and Bronstad’s (1997) findings that female scarification on the stomach is highly correlated with pathogen prevalence may support the assertion that scarification (and in our case, invasive tattooing) serves as a costly signal of health, it does not explain several aspects of Maori moko. First, their findings are limited to female stomach scarification. They found that they could not explain facial scarification with the pathogen prevalence model, nor did they find a correlation between male scarifications and pathogen prevalence. In fact, they found that “social class stratification was the only variable that significantly predicted male facial scarification” (Singh and Bronstad 1997: 410). Ludvico and Kurland (1995) similarly were unable to demonstrate the correlation between human scarification and pathogen prevalence, except in North America.

This hypothesis may explain why the tattoos were cut deeply into the face, to create wounds that would increase the risk of infection. Several accounts report that moko operations were conducted over a long period of time, in order to allow the tattooed area to heal before initiating another operation (Cruise 1957; Robley 1896). In fact, Robley asserted that “if too much was attempted at once it positively endangered life” and gave an example of one man dying from the inflammation and wounds due to having his entire face tattooed in one sitting (1896: 55).

Previous studies on male scarification have had mixed results in determining
whether or not it could be a function of sexual selection. Ludvico and Kurland (1995) found that the sexual selection model was the only hypothesis with significant results in their cross-cultural sample. They found that male (and female) scarification were positively associated with polygyny, particularly in the Pacific (ibid.: 168). Likewise, Singh and Bronstad, unable to account for male scarification through their pathogen-stress model, suggested that males may use scarification to advertise fitness potential and “to draw the attention of desirable mates” (1997: 413). However, Sosis et al. argued, based on their results connecting male scarification with warfare, that “male rites do not vary as a function of mating competition” (2007: 243). Despite these results, they did concede that females may use male rites to judge potential mates (Sosis et al. 2007). Few markers of mate quality could be more prominent and more permanent than extensive tattoos on the male face.

Overall, the pathogen-resistance hypothesis does account for the extreme pain and high risk associated with Maori moko. However, it does not account for the location of moko on the face of both males and females, why the patterns indicated status and rank, and why male moko would be associated with warfare. Other explanations must be examined in order to make sense of these aspects of Maori moko.

4b) Costly Signals of Male Status, Altruism, and Bravery

Status. Based on Simmons’ analysis, historical texts, and ethnographic sources, male moko functioned to communicate information about the wearer to others. Important qualities to discern in a potential mate were his rank, status, and lineage. A remark by General Robley is revealing: “That the face should be unmarked with moko
rendered a man liable to the term ‘Papatea’; or plain-face; anyhow he looked like a
tutua or poor nobody” (1896: 30). John Savage also reported in 1805 that Maori society
was divided into classes, distinguished by the tattoos on their faces (cited in Simmons
1986: 50). Moreover, Low (1979) found that male cultural ornaments tend to distinguish
rank. Moko was essential in communicating the rank of an individual, given that who
could have tattoos and when was strictly governed.

There were two ways for a man to earn his moko: through birth and through
war. As previously discussed, rank for males in Maori society was both hereditary and
achieved. Hereditary rank included lineage and birth order, resulting in ariki status.
Moko communicated hereditary rank through specific patterns and placement, as well
as the number of marks on the face. John Rutherford reported that, in the Bay of
Islands, no one except the greatest chiefs were allowed to obtain tattoos on the
forehead, chin, or upper lips (cited in Simmons 1986: 51). Furthermore, Roth asserted
that “the privileges of moko are limited to men of distinguished birth or to warriors
celebrated for their grand deeds, and that a rangatira considers himself the more
honoured the more his face is mokoed” (1901: 48). Achieved status, such as occupation
and rank due to war were indicated in the raurau, on the cheeks on either side of the
nose. Clearly, an important part of moko that would have been observable by discerning
females and their guardians was the mark of a man’s achievements, such as positions of
leadership and personal rank.

**Wealth.** One indicator of status is wealth, or the potential for parental
investment. Obtaining tattoos was a costly affair. The tohunga (priest) required
significant compensation for his services. Referring to the famous tohunga, Rangi, Earle relates that “as every chief who employed him always made him some handsome present he soon became a man of wealth and was constantly surrounded by important personages” (1966: 125). Many early sources report that tattoo artists were renowned and well paid (Polack 1840b; Robley 1896; Tregear 1904). In fact, the amount considered appropriate for the services of a tohunga in the mid-19th century was equivalent to that paid for a carved war canoe! (Te Awekotuku et al. 2007: 61). As many evolutionary anthropologists have pointed out in the case of conspicuous consumption, costly signals may serve to honestly communicate an individual’s wealth. The demonstration of wealth in the context of Maori moko may compare to Bliege Bird and Smith’s (2005) example of Meriam feasting, in which individuals could rely on such costly signals to determine the quality of potential mates. Wealth would have been an important quality to ascertain in a mate, particularly for females who were interested in their potential mate’s capacity for parental investment.

**Bravery/Fitness Potential.** Moko was not only a mark of hereditary status; many have asserted that it was a mark of manhood, required for marriage, and marked a man’s initiation and deeds as a warrior. Tregear remarked that moko “might be considered a mark of manhood and of ability to play a warrior’s part in the world; for often the process was commenced at puberty and took years to complete” (1904: 257). The pain and risk involved in the operation itself demonstrated a man’s bravery and commitment. Through this painful ordeal, men could display their courage and mana (Bentley 1999). For those who were born of lower status, demonstrating bravery or
leadership in war was an avenue to elevate status and obtain *moko*. Prehistorically, *moko* was the central demonstration of warriorhood, *mana*, bravery, and prestige (Gell 1993; Te Awekotuku et al. 2007).

Although early sources do not mention the terms “sexual selection,” they do assert that Maori men were motivated to obtain *moko* to make themselves more attractive and distinguished to women (Robley 1896; Taylor 1855; Tregear 1904). The sexual selection hypothesis accounts for several aspects of male *moko*, such as why specific sections of the patterns indicated rank, status, and wealth. Particularly interesting is the fact that Maori society was largely monogamous, but polygyny was allowed and high-ranking men aspired to acquire multiple wives. In general, polygyny increases male-male competition, allowing women and their guardians to evaluate and select among high quality mates. Low found that “the only societies in which male ornaments signaled more about within-sex status than did female ornaments were societies which appear to be effectively polygynous” (1979: 485). *Moko* allowed men to compete for high quality mates through honest advertisements of their quality.

**4c) Costly Signals of Female Status, Wealth, and Sexual Maturity/Availability**

As explained in the introduction, Maori society was organized on principles of primogeniture and lineage purity. Ideally, marriages were isogamous, arranged between equally ranked partners. To marry below one’s rank was an admission of equality with a lower-ranking lineage, which was shameful for the entire clan. Therefore, females and their guardians not only needed to distinguish the status of potential marriage partners, they also needed to communicate their own status. Low (1979) found that polygyny and
female ornamentation are inversely correlated. Female competition increases when polgyny is limited or when monogamy is socially imposed. We would expect higher and more intensive forms of competition among females in such societies (Low 1979). The Maori were primarily monogamous, with polygyny occurring mainly among the wealthy and high-ranking chiefs. In order to be mated with the highest-ranking monogamous males or marry polygynous men as first wives, females needed to engage in competition that would demonstrate their quality to potential mates. While we find that female moko was not as extensive as male moko, it was prevalent.

The sexual selection hypothesis fits the case of female moko in many respects. First and foremost, it explains why females would have engaged in signaling at all. It may also shed light on why both men and women described female moko to be an attribute of beauty, and why men reported to find females with moko more attractive.

**Status.** The tattooing of a young woman of rank was an important symbolic event, not only for the young woman, but also for her family, clan, and tribe. Te Awekotuku et al. state that, as a result of a young woman’s moko operation, “she crossed a threshold, and moved into adulthood. She became a symbol of the tribe’s political potential, as the whare tangata [womb], the beginning of a new line of chiefs and leaders” (2007: 88). The significance of the moko ceremony cannot be understated for the highest-ranking girls, the puhi. As previously specified, some tattoos were reserved for these young women, and clearly marked their special status. However, it was not uncommon for a young puhi of such unusually high status to be prohibited from obtaining moko. Due to the significant risk of the operation and the spilling of blood required, tohunga refused
to operate in such cases (Te Awekotuku et al. 2007).

Bidwell (1841) reported that a tapu woman (one who was set aside) would have
tattoos usually reserved only for men, such as on the buttocks or a partial facial tattoo.
This was particularly the case when the woman’s lineage was unrivaled, meaning that
no mate could be found to equal her lineage (ibid.). Gell (1993) argued that women of
unrivaled rank were prominently tattooed to establish the girl’s state of permanent
virginity and effectively seal her off from society, at least reproductively. Women who
held male positions, as war leaders, for example, were also known to have obtained
extensive facial tattoos. Tribal histories explain that these few women were able to
occupy male roles and obtain male moko due to inherited leadership and demonstrated
skill in war (Te Awekotuku et al.2007). Female facial tattoos also indicated whether or
not the woman was a legitimate child and if she was recognized by her father (Simmons
1986).

Wealth. The tattooing of high-ranking women called for elaborate ceremonies
and girls were often tattooed collectively (Best 1941b; Gell 1993). Such ceremonies
involved the young women, their parents, and relatives, who put together an enormous
feast for the entire community. After enduring the tattooing procedure as a group,
usually performed by a very renowned tohunga, the food and young women in their
finery were displayed and the artist received considerable compensation (Te Awekotuku
et al. 2007). This type of ceremonial feasting, prevalent throughout the Pacific, is also
found in the Northwest Coast. Boone (2000) argued that Kwakiutl potlatches constitute
a form of costly signaling, in which high-ranking individuals could publicly confirm their
rights to certain statuses and social privileges. In addition to the moko itself, the feasts honoring high-ranking girls may have served as costly signals of wealth.

Treager (1904) and Best (1941b) noted another interesting aspect of female moko operations. They asserted that the lip-tattooing ceremony of a high-ranking woman included a human sacrifice. A war party was sent out to capture a member of an enemy tribe, after which everyone in attendance consumed the body. Regardless of whether or not the moko operations involved cannibalism, it is obvious that the event was a significant one for young women and their families, and that it involved substantial expense.

**Sexual maturity and/or availability.** Low (1979) argued that female ornaments may indicate sexual maturity and sexual availability. She suggested that some ornaments, such as lipstick or rouge, signal female sexual receptivity by mimicking the signs of sexual excitation (1979: 464). Descriptions of when and where females were tattooed are revealing, though they tend to be limited and are often anecdotal. Many scholars have asserted that women received lip tattoos after puberty but prior to marriage (Best 1941b; Bidwell 1841; Treager 1904). In fact, Treager noted that “no one would have a red-lipped wife” (red-lipped meaning un-tattooed) (1904: 265). Female lip tattoos may have indicated the girl’s sexual maturity and advertised her availability to potential mates. Tattooing on the chin, however, was the mark of a married woman (Cowan 1930; Robbley 1896). This area was usually tattooed sometime after her marriage. Gell, in his analysis of Polynesian tattoo, argued that “Maori female tattooing was both the ritual condition, and the public advertisement, of potential sexual
availability” (1993: 266).

The lack of tattooing on certain puhi, young women who would never marry and were forbidden to have sex, may be further evidence to support the hypothesis that female tattooing denoted sexual maturity (lip tattoos) and sexual unavailability (chin tattoos). If lip tattoos did in fact mark a pubertal woman as sexually mature, it makes sense that a puhi would not obtain this mark, in that she was to remain a life-long virgin. If chin tattoos consistently marked women as married and no longer sexually available, puhi would likewise not be expected to have chin tattoos. We would expect that the puhi who did eventually marry would have obtained moko. Puhi who had arranged marriages with men from other tribes would also be expected to have tattoos; recall the unique back and leg tattoos that marked women of this particular status (Simmons 1986). This type of tattoo on a woman marrying outside her tribe would have been significant in that they marked her tribal identity and served as a physical reminder to her husband’s people of the alliance between the two tribes.

Unfortunately, the evidence that chin and/or lip tattoo always communicated a girl’s pubertal or marital status is inconclusive. Consistent statements that girls were always tattooed upon puberty and after marriage are lacking. To the extent that girls were tattooed when they reached puberty and when women were married, female moko indicated a female’s sexual maturity and availability. The hypothesis that female moko indicated sexual maturity and/or availability is moderately supported, but would require more evidence to be firmly accepted or rejected.

Young women and their families shared the underlying desire to obtain high-
ranking husbands. Parents sacrificed a considerable amount of wealth to have their
daughter’s status marked permanently on her face. According to Te Awekotuku et al.,
moko for young women was “simply about beauty, a way of exciting admiration, and
envy, and attracting favourable attention as marriageable young women” (2007: 86).
Many others remarked that to have plain red lips was shameful for a young woman of
rank (Bidwell 1841; Robley 1904; Simmons 1980). To have blue lips was considered to
be the height of feminine beauty (Robley 1896).

Summary of results

Table 2. Hypotheses and Results

<table>
<thead>
<tr>
<th>Hypotheses</th>
<th>Results</th>
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<tbody>
<tr>
<td><strong>Proximate</strong></td>
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<tr>
<td>1) Pathology (M/F)</td>
<td>Not supported</td>
</tr>
<tr>
<td>2) Expression (M/F)</td>
<td>Not supported</td>
</tr>
<tr>
<td><strong>Ultimate – CST</strong></td>
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<tr>
<td>3) Cooperation (M)</td>
<td></td>
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<tr>
<td>3a) Allies</td>
<td>Supported</td>
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<td>3b) Enemies</td>
<td>Supported</td>
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<tr>
<td>4) Sexual selection (M/F)</td>
<td></td>
</tr>
<tr>
<td>4a) Health (M/F)</td>
<td>Supported</td>
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<tr>
<td>4b) Males</td>
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<tr>
<td>Status</td>
<td>Strongly supported</td>
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<tr>
<td>Wealth</td>
<td>Supported</td>
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<tr>
<td>Bravery</td>
<td>Supported</td>
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<tr>
<td>4c) Females</td>
<td></td>
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<tr>
<td>Status</td>
<td>Strongly supported</td>
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<tr>
<td>Wealth</td>
<td>Strongly supported</td>
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<tr>
<td>Sexual maturity/availability</td>
<td>Moderately supported</td>
</tr>
</tbody>
</table>
Males

Male facial tattoos communicated fitness potential to females, one of the purposes of male ornamentation suggested by Low (1979). Tattoos were obtained after successful battles, demonstrating their prowess and warrior capabilities. The more tattoos a man had, the higher his status and prestige. Moko also signaled a man’s health because multiple tattoo operations were dangerous. A man capable of withstanding the pain and risk of infection through many operations was clearly a robust individual with a good immune system and high threshold for pain.

Male moko was key in communicating a man’s status and rank, and ultimately, his potential to invest in offspring. This is in accordance with Low’s second postulated purpose of male cultural ornamentation. The two ways in which Maori men could achieve status was through birth and war, both of which determined the prevalence and details of a man’s tattoos. Females and their families needed to be able to discern mate quality while minimizing the risk of deception. Although polygyny was not common at all levels of society, males did strive to obtain multiple wives and increase their sphere of influence and prestige. Competing with other males for high quality females was essential; therefore, male moko was extensive.

Additionally, male moko signaled the individual’s quality as a potential ally and enemy. Aspects of moko such as the painful operation, permanence, and identification signaled a man’s willingness to sacrifice, cooperate, and commit to his kin and allies. Likewise, moko signaled a man’s quality as an enemy, such as his bravery and ferocity on the battlefield.
**Females**

Many theories that assert that body modification is a form of costly signaling exclude female body modification. Sosis et al. (2007) explained that male scarification and tattooing may be reliable signals of group commitment that increase solidarity in cultures with prevalent warfare. While this explanation corresponds well with male Maori *moko*, it does not explain why females would engage in such costly signaling.

Low’s (1979) concept of female cultural ornamentation as a sexual signal converges well with the ethnographic descriptions of female *moko*. To have tattooed lips was considered the perfection of feminine beauty and facial tattoos were always indicative of rank (Roth 1901). As Low (1979) predicted, female tattoos may have served to distinguish both pubertal and marital status. Additionally, a woman’s *moko* demonstrated her health, and thus reproductive fitness potential, through her ability to withstand the procedure. Her status was communicated to potential mates through her family or clan’s ability to pay for the services of the *tohunga* and the ceremonies associated with the ritual, as well as through patterns that identified her rank.

In conclusion, the pathology and expression hypotheses are not supported by the ethnographic evidence. Both costly signaling hypotheses, male cooperation and sexual selection, are strongly supported by the evidence. It seems clear that Maori men used *moko* to communicate their qualities as warriors to allies and enemies, as well as their qualities as mates to females and their kin. Likewise, women used *moko* to signal their qualities as mates to compete for high-ranking partners. Whether or not Maori
moko continues to serve as a costly signal of ally/enemy and mate quality will be addressed in the following chapter.
5. DISCUSSION AND CONCLUSIONS

As discussed at the end of the last chapter, the ethnographic evidence appears to support the conclusion that traditional Maori *moko* can be explained as a form of costly signaling. Male *moko* appears to have served as a costly, and thus reliable, signal of ally and enemy quality. Both male and female tattoos appear to have served as costly signals of mate quality. A certain degree of ascribed status was required for females to have *moko*, and males were required to demonstrate their prowess and ferocity in war in order to accumulate certain *moko*. A man’s deeds in battle would have been known to all, and those who were recognized as traitors or deserters would have been prohibited from obtaining *moko* that indicated success in war. *Moko* also sent a clear signal to enemies in war regarding a man’s reputation as a warrior, furthering his likelihood of being successful on the battlefield (Te Awekotuku et al. 2007). In addition, *moko* operations were painful and increased an individual’s exposure to certain pathogens. The ability of a male to repeatedly survive *moko* operations would have communicated his physical fitness to allies, enemies, and potential mates. The ability of a female to heal from *moko* operations would similarly communicate her fitness potential to potential mates. Finally, securing tattoos required substantial payments to *tohunga*, which would have been paid by individuals, families, or clans. An individual’s *moko* communicated to others their own or their kin’s ability to pay for the *tohunga’s* services.

The *traditional* nature of *moko* also made it a reliable signal in ways usually not
included in discussions of costly signaling theory. Traditionally ascribed statuses were required to obtain certain tattoos, and tattoos, especially those on the face, clearly communicated information about kinship and status. In a society in which isogamous marriage was imperative for high-ranking individuals, the traditional nature of moko made it essentially impossible to deceive others in regard to their ancestry, and thus, their rank. That is, traditional Maori tattoos were differentially costly in that not all individuals were allowed or were capable of obtaining moko. In addition to the risk and cost, tradition ensured the honesty of these signals, because the meanings of individual tattoos were prescribed and passed down from generation to generation. Social sanctions against obtaining false moko would have deterred individuals from advertising qualities they did not possess.

The traditional regulation of moko increased the honesty of a male signalers’ quality regarding willingness to commit and sacrifice for others, fitness potential, rank, health, and wealth, and female signalers’ quality in terms of health, status, wealth, sexual availability and maturity. It was this quality that allowed an individual to determine the identity of another by “reading” their moko. Finally, it can be said that moko was designed to effectively broadcast these signals because of the obvious location of the tattoos - on the individual’s face. Although tradition is rarely, if ever mentioned in the costly signaling literature, tradition may be a vital aspect of many of the cultural practices explained as costly signals. I would argue that it is the traditional aspect of moko that made it such an efficient, and impossible to fake, costly signal.

Simmons’ (1980, 1983, 1986) work on the meaning of moko sheds some light on
how this system served to inform men and women of potential mate quality. His assertion that male *moko* patterns and their location on the face communicated specific information about an individual’s status and descent seems to be confirmed by ethnographic and early historic accounts. Explorer Dumont d’Urville compared male *moko* to the European coat of arms, with the difference that *moko* additionally communicated the merits of the individual (Dumont d’Urville 1992). Brown also commented on the uniqueness of each facial tattoo, stating that “tattooing [sic] appears almost reduced to a system, as each tribe possesses some peculiarity in the form of the tattoo [sic]; so much so, that, by its means, members of one tribe at once recognise that to which a stranger belongs” (1845: 31). Female *moko* also communicated specific information about rank, wealth, sexual maturity and availability, and birthright (Simmons 1986).

In a society obsessed with the demonstration of rank and tracing rank through lineages, the elaborate development of costly signals that could clearly communicate a mate’s quality would have been adaptive. Those males who could survive multiple battles and multiple tattoo operations would have had a distinct advantage over males who could not. Females and their guardians would have benefited from the ability to determine mate quality without the risk of deception. High-ranking families sought to arrange marriages of equally ranked children. To marry below one’s rank was to devalue one’s status and the rank of one’s descendants. Therefore, it was essential for parents and children to accurately assess the fitness potential, descent, status, and potential for parental investment of mates. Given Simmons’s assertions that *moko* was a visual
depiction of kinship and descent, \textit{moko} would have also served to identify marriageable and non-marriageable individuals by depicting tribe, clan, and lineage.

Moreover, tribal warfare was rampant in historical Maori society. The ability to determine an ally’s commitment and an enemy’s ferocity would have been advantageous, given the substantial consequences of going to war with potential deserters. A man’s full facial \textit{moko} was an honest indicator of his willingness and ability to endure numerous operations. His endurance, physical fitness, and willingness to sacrifice would have been clearly communicated to allies and enemies, encouraging kin and non-kin to fight with him, and discouraging rivals from fighting against him. According to William Irons, “a social world filled with communications about commitments is bound to give rise to false signals of commitment designed to deceive. Thus both signaling one’s own commitments and monitoring those of other[s] are a crucial part of human social life” (1996b: 379).

\textbf{Contemporary Moko}

\textit{The Diminishing of Moko}

Darwin remarked in 1835 that “there is not nearly so much tattooing as formerly; but as it is a badge of distinction between the chief and the slave, it will probably long be practiced” (1889: 511). Unfortunately, the influence of missionaries and settlers had a more significant effect on Maori tattoo than Darwin anticipated. \textit{Moko} as it was historically practiced ended for the most part around the beginning to mid-20th century. Robley pointed out that this was largely due to the introduction of European civilization,
which “upset all their social order, and reduced the entire race to one dead level of social inferiority in the presence of the Pakeha” (1896: 123). Thanks to the second Maori King, Twahiao Matutaera Te Wherowhero, male facial tattoo was revived briefly during the mid-19th century (Te Awekotuku et al. 2007). One elder reported to James Cowan that the King “desired his young warriors to have their faces tattooed and to revert to the customs of their ancestors” (1921: 244). This elder went on to say that the young men did not want to obtain moko, and that there was “not one tohunga ta moko alive who could tattoo them if they did” (ibid.).

After the signing of the Treaty of Waitangi and the close of the Maori (or New Zealand) Wars at the end of the 19th century, male moko began to fade indefinitely. According to Simmons, the rapid decline of male tattooing was due to a “lack of war, a general retreat into the rural areas largely out of contact with Europeans, and a religious and social atmosphere which did not favour continuation of the old ways” (1980: 94). The final chief with traditional facial moko passed away at the beginning of the 20th century (Barrow 1978). Interestingly, while male moko was declining, the importance of female moko remained constant or even increased. Prior to the colonization of New Zealand by Europeans, both men and women obtained moko, although the emphasis was on male moko. Traditional tattoos were more numerous and elaborate on most men as compared to most women (though recall that there were a few exceptions in which women obtained elaborate, male-style tattoos). However, once the country was settled and ruled by the British and the conflicts between Maori tribes ended, so too did male moko. Simmons remarked that “the ancient way of emphasising social importance
for men of special significance to the tribe was to be tattooed” but that by the end of the 20th century, “women were now fulfilling that role” (1986: 151). As of the 1970’s, a few of the women who obtained lip and chin tattoos as young women in the early 20th century still lived (Barrow 1978). Barrow remarked in 1978 that some young women were getting moko on their chins and lips, and he concluded that “there seems to be a possibility of a considerable revival of this art” (28).

The diminished role of male moko as tribal wars ceased, and the increasing importance of female moko in the 20th century, may support one of two hypotheses. At first glance, it appears that the disappearance of male moko lends strong support to the hypothesis that male moko were costly signals of ally or enemy quality, but not necessarily of mate quality. We would expect that, if male facial tattoos were essential in communicating mate quality dependent on social status and rank, males would continue to signal after wars ceased. Since male moko did not continue after pacification, we could conclude either that the tattoos were important only in the context of war, or that males did not continue to vary in mate quality (i.e., males were no longer distinguished by birth order, lineage, or rank). While some indicated that the class system was reduced after European influence (see Robley 1896), we know that men continued to serve as chiefs and carefully maintain their lineages. The alternative explanation is that male moko was indicative only of ally and enemy quality, rather than mate quality.

However, a further explanation is plausible. European and missionary influence had a significant effect on Maori culture and Maori men were far more subject to the
influences of European culture than Maori women. For example, Maori men entered
the industrial workforce as laborers, blacksmiths, and carpenters (Metge 1967), adopted
Western dress, and grew beards over their moko. As male facial tattoos were
considered by Europeans to be barbarous and symbols of resistance (Nikora et al. 2007),
Maori men were strongly discouraged from obtaining moko. The consequences of
obtaining them would have been more significant for men than for Maori women.
Women spent most of their time in the home, which was “both their kingdom and their
prison” (Metge 1967: 101). (One woman told Nikora et al. that “in the old days our kuia
(elderly women) used to pretty much stay in their own backyard with their moko”
(2007: 483).) It is plausible that male moko signaled quality as warriors and potential
mates, but the consequences of having facial tattoos were more severe for men than for
women. Men may have adopted less controversial ways of signaling mate quality in a
newly colonized, Christianized, and urbanized society.

The fact that female moko increased in importance as male moko declined may
support the hypothesis that female moko was a costly signal of mate quality. When
monogamy is socially imposed on a previously polygynous, stratified society,
competition between females for mates increases (Low 1979). Polygyny was sharply
curtailed with the infiltration of New Zealand by missionaries and Christian settlers
(Metge 1967). Given that traditional female moko was an honest signal of mate quality,
in a system in which women competed for the highest-quality mates, we would expect
female moko to have increased when monogamy was socially imposed. Perhaps more
significantly, female moko may have increased in importance because male moko

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disappeared. Women, far less subject to the strictures of European society, may have
come the new keepers of Maori tradition, including moko.

Revival: Discontinuity with the Past

The 1970’s and 1980’s saw a massive revival of traditional Maori culture. The
social movement, Maoritanga (which means Maori-ness), aimed to assert the identity of
Maori culture as distinct but equal to mainstream New Zealand (Pakeha) culture
(Hanson 1989). As a result of Maori political activism, several important changes
occurred during this time. First, Te Reo Maori (the Maori language) became an official
language of New Zealand in 1987 and the Treaty of Waitangi Tribunal was established to
address Maori grievances (Doerr, 2004). The Maori language has been revived through
the establishment of Maori language schools, the first of which was founded in 1982
(Durie 1998). It is estimated that the number of Maori speakers increased from 18
percent in 1973, to 24 percent in 2006, and the number of young people (ages 15-34)
who speak with high proficiency more than doubled from 2001 to 2006 (Ministry of
Social Development). In addition, traditional Maori arts have seen a dramatic increase as
a result of the Maoritanga movement (Hanson 1989?). Similarly, moko has been
significantly revived in the past three decades. However, contemporary moko differs
from its historical practice in substantial ways, particularly concerning the tattooing
procedure, the designs, and reported meanings.

One way that Maori moko differs today from how it was practiced in the past
concerns the actual tattooing procedure. As previously described, traditional facial
tattoos were deeply carved into the face using a chisel. Today, with few exceptions,
moko is done using the Western method of needle and ink. Some have suggested that a
Pakeha (European New Zealander) man named Roger Ingerton was largely responsible
for the revival of Maori tattooing, at least in terms of using traditional designs (Gilbert
2000). According to Tricia Allen, “many Maori artists have since learned to tattoo. There
are today maybe a dozen doing ancestral moko, that is, ancient genealogical tattoo
designs” (Gilbert 2000: 191).

Maori men and women are now obtaining moko, both in traditional and non-
traditional forms. Many women are getting lip and chin tattoos and many men have
reverted to full facial moko. While there are Maori who acquire moko that resemble
traditional forms, some of the earliest individuals to revive the art were gang members.
Te Awekotuku et al. (2007) noted that prospective gang members acquired tattoos to
show their desire to join a certain gang. Once confirmed, new members “took on the
insignia of their group” and “became the new guardians of an adapted, yet old
tradition” (Te Awekotuku et al. 2007: 191). Furthermore, the gangs created new
designs, adapting traditional moko patterns and mixing them with Western tattoo forms
(ibid.). Many wearers of moko report that they are often discriminated against, as the
stigma that moko is gang-related prevails in mainstream New Zealand society (Nikora et
al. 2007; Te Awekotuku et al. 2007).

The change in many of the moko patterns and their placement results in a change
in meaning. Since the practice of moko is no longer strictly regulated (i.e., it is no longer
traditional), it is possible for anyone to obtain a tattoo, on any part of the body, in any
form. This aspect of contemporary Maori tattoo resembles the Western art of tattoo.
The loss of regulation means that the designs and meanings of each tattoo vary according to each individual. The individuality of contemporary tattoo makes it impossible to identify a person based on their moko. As one might expect, different individuals report different reasons for obtaining moko and different meanings for each design. Illustrating this point, Te Awekotuku et al. asked:

“Do we have to legitimise its [moko’s] resurrection by enriching it with significance, with the arcane references of wairua [spirits], tupuna [ancestors], whakapapa [genealogy], to bring it back? How many wearers just want a design for its own sake, its own loveliness, its own strong or subtle lines? Not every mark has to have meaning; its own elegance carries its own mana” (2007: 225).

**Revival: Continuity with the Past**

While this lack of regulation of moko has led to the current variation in meaning, there is some consistency in what people (Maori and Pakeha) claim that moko conveys. In many ways, the following meanings of contemporary moko parallel with the meanings we find during the historical period. First, many moko wearers report that their tattoos convey their identities. Contemporary moko identifies individuals as Maori, as part of an indigenous people who continue to assert their cultural autonomy in a bicultural society. One woman with moko reported that it is about “reclaiming a lost taonga [art] - a part of us that was taken away through the process of colonisation, almost to extinction. It is my external way in showing that I’m proud to be Maori” (Te Awekotuku et al. 2007: 151-152). Another individual stated that, “being in such a multicultural place like Auckland, this moko tells everyone who I am. [...] I don’t need to
walk around with pounamu, with kete now, instead I am wearing it on my face” (ibid.: 174).

Second, many individuals claim that their moko identifies their whakapapa, or genealogy. One young man with full facial moko told Rua how the patterns indicate his lineage: “My right side is te taha tane (male side) and the left side is te taha wahine (female side). On my moko it explains my mothers people and my fathers people” (Rua 1999: 4). Another man, Rihari, reported that the right and left sides of his moko indicated his tribal affiliations (Rua 1999). While many of the individual patterns have changed, moko continues to communicate whakapapa. According to Te Awekotuku et al., moko is “about bloodlines and life lines, about being Maori” (2007: 158). They go on to state that “on meeting someone with a moko, a Maori will often wonder – who is this person, where do they come from, what family do they belong to, what makes them remarkable, who are their living faces?” (ibid.: 158).

Another way that contemporary moko resembles its historical counterpart is in the communication of commitment. Many Maori report that obtaining moko indicates their commitment to their ancestors and living kin. One woman said that “having my moko was for me a memory of my past, of all my kuia [grandmothers] who had the moko” (Te Awekotuku et al. 2007: 153). The communication of commitment extends to living kin, and many Maori report that there are certain expectations that come with having moko. Rua (1999) stated that the expectation of cultural fluency is common and very demanding. Such expectations include the ability to recite genealogies and traditional stories, fluency in the Maori language, and skill in oratory, which are considered to be
the characteristics of leadership (Rua 1999: 7). One man told Rua how his own people approached him once he had taken the *moko*: “It’s a little presumption they have...they think you can sing 500 waiata (songs), whaikorero [speeches]. [...] There’s the pressure to start doing things before you get one. They (people in general) expect things” (Rua 1999: 6). Some told Te Awekotuku et al. that obtaining *moko* was one way to further their involvement in their communities and to commit to “kuapapa Maori; to living and working with and for the people” (2007: 170).

For men, *moko* may continue to intimidate others in two ways. First, male facial *moko* may intimidate those within and outside of gangs, due to the strong association between contemporary *moko* and gang-related behavior. Rihari reported that “different people from society treat me differently. Like professional people treat me different...They think I’m gonna attack them or I’m anti-government, pro-Maori...” (Rua 1999: 6). Another man told Rua that his fellow gang members found his *moko* intimidating because it was spiritual and *tapu*, a sign of his commitment to Maori culture (ibid.). For many Maori women, *moko* continues to be a mark of beauty. Te Awekotuku et al. noted that the women they interviewed reported that their *moko* makes them “feel more desirable” and one woman stated that “men absolutely love it” (2007: 101).

In many ways, the contemporary practice of *moko* has clearly changed. It is no longer regulated - any individual may choose to get a tattoo; the tattoo can be located on any part of the body; designs are now chosen by the individual; and in general, meanings are determined by the individual. Many New Zealanders still associate male
facial moko with gangs. However, it is clear that some aspects of traditional moko, although not consistent, continue into the current practice. Moko continues to communicate identity, whether in the wider sense of being Maori, or the more narrow sense of an individual’s genealogy. Moko continues to communicate an individual’s commitment to their culture and kin, whether living or dead. For men, it continues in some ways to communicate bravery and intimidate others. For women, it communicates feminine beauty. Given this information, can we conclude that contemporary Maori moko is a form of costly signaling?

Whether or not contemporary Maori moko is a form of costly signaling depends largely on the essential role of tradition. According to Bliege Bird et al., costly signaling requires that “signal traits are (1) differentially costly or beneficial in ways that are (2) honestly linked to signaler quality, and (3) designed to effectively broadcast the signal” (2001: 9). In order for contemporary moko to be a costly signal, it would have to meet these three criteria. Based on the research done thus far on contemporary moko, it is unlikely or at least unclear that it is a form of costly signaling.

First, the trait is no longer differentially costly. Today, there are no regulations as to who can obtain moko, when, where, and which designs. Nor could it be considered to be very costly, given that it is mostly done today using Western needles and ink, which is generally a safe practice with fewer risks and a considerably shorter healing time than the traditional method. Recently, a few individuals have attempted to bring back the chisel method. This method increases the cost, but the widespread availability of modern medicine in New Zealand drastically reduces the risk of death from infection.
The second requirement, that the trait honestly indicates the signaler’s quality, is also not necessarily met by contemporary moko. Again, the lack of traditional regulation results in the breakdown of the signal’s reliability. If any individual can get any tattoo, it cannot be relied upon to honestly communicate information about the wearer. To some extent, this may be circumvented in the context of gangs by the possibility that a non-gang member would be discouraged from getting a gang-related tattoo. Additionally, an individual with tattoos that convey an individual’s genealogy would not likely get away with lying, particularly in the context of close-knit communities. The final requirement, that the trait is designed to effectively broadcast the signal, may or may not be met. Contemporary Maori tattoo is not limited to the face, but may be located on any area of the body.

Future Research

Further research into the level of tradition used in contemporary moko may aid in determining whether or not it is currently a form of costly signaling. Many sources indicate that there are individuals incorporating their genealogies and tribal affiliations into their moko (Rua 1999; Te Awekotuku et al. 2007). Is this done according to tradition, so that individuals can be effectively identified by their moko? If so, it may be a reliable signal of some aspects of an individual’s quality. If the traditional method of tattooing becomes widespread, it may significantly increase the cost. While it is known that contemporary tattoo is not as regulated as it was in the past and many designs have personal meanings, an increase in the use of well-known traditional patterns may
make it a hard-to-fake signal. To what extent are traditional forms being used and what is the current degree of regulation in the sense of who can obtain moko and what each tattoo contains? If there is a significant degree of regulation, for example within gangs or kin communities, modern moko may be an honest signal, differentially costly, and designed as an effective signal.

Unfortunately, we do not currently possess the data to answer these questions. Data regarding the specific qualities signaled by moko, and the quality of mates of those who have moko, would aid in determining whether contemporary Maori moko is a sex signal used in signaling mate quality. Further research is needed to determine how contemporary moko functions in Maori (and New Zealand) society, to what extent individuals are returning to traditional forms and regulations, and the degree of cost involved, in order to determine if it is a form of costly signaling.
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