

“NICE INK, MAN”: A BIOCULTURAL, MIXED METHODS APPROACH
TO TATTOOING AS COSTLY HONEST SIGNALING
AMONG SOUTHERN WOMEN

by

JOHNNA TERESA DOMINGUEZ

CHRISTOPHER D. LYNN, COMMITTEE CHAIR
KATHRYN OTHS
WILLIAM DRESSLER
MATTHEW WOLFGRAM
JENNIFER PURVIS

A THESIS

Submitted in partial fulfillment of the requirements
for the degree of Master of Arts
in the Department of Anthropology
in the Graduate School of
The University of Alabama

TUSCALOOSA, ALABAMA

2015

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ABSTRACT

In this thesis I examine the influence of a cultural model of tattooing on psychological and biological stress in a sample of Southern tattooed women. The handicap principle of sexual selection states that a high risk ornament is utilized by a mate to show high-quality health. The handicap principle in regard to tattooing would mean that tattooed people would be consistently rated as more physically attractive and healthier. This was not the case in previous studies because cultural factors also influence the opinions of tattooing. Women internalize different cultural models from their friends and family well before they make the decision to get tattooed.

I sought to determine if these opinions of tattooing are associated with perceived stress among 50 participants, and if tattoo experience is associated with biomarkers of stress (salivary immunoglobulin A) among 25 of the same participants receiving a tattoo. I used mixed qualitative and quantitative methods to group participants by positive and negative opinion for comparison of perceived stress and by high and low tattoo experience for comparison of S-IgA change.

Results indicate that the tattoo opinion models I constructed for this study were not the most important variables when predicting perceived stress, but that individuals with more tattoo experience have adapted to the biological stress of tattooing. These data suggest that the immune response is enhanced by tattooing, but that an evolutionary signaling theory of tattooing requires incorporation of cultural models. Tattoos may not indicate better health in an environment where tattoos come with numerous preconceptions.

DEDICATION

This thesis is dedicated to Dr. Anthony Paredes. To many, he was a well-known anthropologist. To me, he was an honored grandfather. I am sorry that I didn't finish this before he died. May this be a worthy tribute to his legacy

LIST OF ABBREVIATIONS AND SYMBOLS

m	Mean
n	Number
p	Probability associated with the occurrence under the null hypothesis of a value as extreme as or more extreme than the observed value
PSS	Perceived Stress Scale
r	Pearson product-moment correlation
R ²	Multiple correlation coefficient
sd	Standard Deviation
SES	Socioeconomic Status
S-IgA	Salivary immunoglobulin A
t	Computed value of t test
α	Alpha
=	Equal to
<	Less than
>	Greater than
\leq	Less than or equal to

ACKNOWLEDGEMENTS

I am in a vastly different place than I was when I started this project, both literally and figuratively. My first act of thanks is always to God. I am always assured that I am loved even when I make mistakes.

In Alabama, I would first like to thank my advisor, Dr. Christopher Lynn, who encouraged me and graciously continued to do so even when I decided to move over 2,000 miles away. He always pushed me to do more and be better, and I don't think I would be where I am today without him. I am also grateful to the members of my Master's thesis committee for being patient with me as I finished this project: Dr. Kathryn Oths, Dr. William Dressler, Dr. Matthew Wolfgram, and Dr. Jennifer Purvis. This project could not have been completed without the help of Dr. Jason DeCaro, who spent hours in the lab running saliva samples when I no longer could. I am very much indebted to him for such generosity.

In California, I would like to thank Bishops Jon Bruno and Diane Bruce. I strive every day to give back to others at least half of the love and help you have given to me. To Tim Alderson, who is an inspirational leader, encouraging mentor, and good friend. To Joanne Leslie and Charleen Crean, both of whom worked with me and convinced me that I could, in fact, get through this. To the entire Holy Spirit community, especially Albert, Alida, David, and John, who taught me how much there is to hear in long silences.

And to my parents, Sara and Christopher Campbell, who are superheroes in their own right

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INTRODUCTION

When I was 18, I made one of the most significant decisions I have made about my body by getting a tattoo. Since then, I have decided to get many more tattoos. Although I would not say that I got my tattoos to become more attractive to potential mates, researchers have begun to examine if body modification through tattooing is in fact a subconscious display of fitness in human mate selection (Carmen et al. 2012, Koziel et al. 2010).

One of the most salient themes found in mate attraction is “costly honest signaling,” or the “handicap principle” of sexual selection. The handicap principle of sexual selection states that individuals who honestly possess some form of high-quality trait will benefit from advertising their genetic quality in various ways that are too costly for inferior, dishonest individuals to display (Zahavi & Zahavi 1997). There are numerous historical and cultural references to beliefs about tattooing’s role in protecting the body, which may indicate that tattooing is a costly honest signal of underlying health. Native groups like the Maori, Lakota, and Mandan once proposed that increased tattooing experience provides an immunological inoculation effect, or “hardens” the body against sickness or arrows (Nikora et al. 2007; Stirn 2003). However, in a study by Wohlrab (2009), men rated tattooed women as less attractive than women who didn’t have a tattoo. This suggests that the cultural context of a tattoo is important. As a tattooed female, this piqued my interest. Why were tattoos a signal of biological health in males, but not in females?

Unlike other animals, where many signals have communicative value without rationale, humans can think about their signals. Individuals can plan in order to acquire and use resources that symbolize their inner thoughts and qualities. Culture can shift the importance of unconscious signals of biological health. I began thinking of my experiences with each of my tattoos. I internalized different cultural responses from friends, family, and even strangers well before I made the decision to get each of my tattoos. The decision to get my second tattoo on a very visible area of my leg may have been driven by the positive reactions I received from my first tattoo on my shoulder. Consequently, my next tattoo was even more hidden than the first, probably because of the high amount of attention I received from the second. My tattoos were also highly influenced by cultural factors. My third tattoo was the University of Alabama (UA) script "A." In addition to the master's degree, toward which the following thesis is an effort, I attended UA for my undergraduate degree and quickly became swept away in the rabid football hysteria that is a cultural norm for the area. It felt only fitting that I tattoo myself with a UA symbol after the football team won the national championship in 2011. My last three tattoos, which were much more spontaneous than the others, were probably done because I had surrounded myself with tattoo enthusiasts during the course of this study.

The context in which a tattoo is used determines if it is interpreted as a signal and the cost to the bearer. A tattoo may act as a signal of physical fitness with positive valence in Native cultures, or males in modern North American society, but a tattoo may be a signal with negative valence for modern North American and European females. Successful signals need to be produced within the constraints of what is acceptable, traditional, and considered normal. For example, my upbringing in the southeastern region of the United States exposed me to a unique constellation of attitudes and values related to attraction. Men and women acted in certain ways,

and this influenced the way in which people displayed themselves. Even at football games, gender stratification was clear: men wore collared shirts and ties, and women wore dresses. This is a modern artifact from a past history of good ol' boys and Southern belles. Many people with whom I have discussed tattooing mention that their Southern tradition keeps them from getting a tattoo. On the other hand, when I traveled to Bloomington, Indiana for a conference in the beginning stages of this project, I was acutely aware that tattoos were much more visible there than in Alabama and that people's reactions to them were less obvious. I have no doubt that my surprise at visible female tattoos was based on my identification as a Southern woman. Therefore, I wanted to study tattooing in a limited location of the South in order to examine how Southern beliefs and biases affected reactions to visible female tattoos.

At the same time as I was developing the cultural piece of this project, I was learning in my classes at Alabama that integrating cultural questions with ones about adaptation, biology, and ecology can give us a better understanding of the people we study. In graduate school in particular, I was lucky to spend time with so many talented colleagues studying human health in exciting new ways. There were numerous graduate students studying the effects of culture change and stress as adaptation using both psychosocial and physiological markers. These students were utilizing the impressive biological lab for the Anthropology department to run cortisol samples in order to link these data. My own advisor Dr. Christopher Lynn had used cortisol to examine the relationship between glossolalia ("speaking in tongues") and biological stress in his doctoral dissertation (2009). Joining the often subjective measures of cultural anthropology with objective markers of stress brings topics like tattooing into a broader systems approach of wellbeing.

It was Dr. Lynn who brought to my attention the studies about tattooing as a sign of physical fitness. While most biological studies of tattooing have been restricted to investigations of disease risk, Dr. Lynn's idea was that there could be a beneficial immunological response to getting more and more tattoos. Muscles grow stronger after repeated exercise. Could the immune system grow stronger after repeated tattooing? I could see a connection between the questions I had already developed about gender and context and the ones Dr. Lynn was asking. And I knew from my experience in a department emphasizing biocultural medical anthropology that I couldn't leave out any part of the equation of human health. So in this study, I sought to determine a holistic model of tattooing that incorporates both biological and cultural questions.

AIMS AND SIGNIFICANCE

I completed this mixed-methods project in two phases in Alabama from May 2012—July 2013. The aims of my research included defining a Southern cultural model of tattooing and examining biocultural impacts of tattooing on Southern women in relation to their social network.

These objectives are important because cultural models are internalized schemas or representations of the world that are widely shared by the members of a society and play an enormous role in their understanding of that world and their behavior in it. For example, females internalize messages about beauty from social relationships and, over their life course, attempt to improve their appearance by engaging in various body projects, such as appetite suppression, exercise regimens, invasive surgical procedures, and tattooing. Participating in such “body projects” (DeMello 2000), or permanent changes to the body used to construct an identity, helps females express and display femininity. Those whose bodies fail to live up to these ideals often suffer from low self-esteem and body image.

Body projects must be understood in the same way signals are, within a context that is considered acceptable and normal. Thus, it is important to consider how the group that I describe as Southern tattooed women define their tattoos relative to a cultural model of beauty and personal attractiveness that are specifically situated in the southeastern region of the United States. Figure 1 outlines the model upon which the hypotheses outlined below are based. It illustrates that all interactions are embedded in a cultural domain. A tattoo is a signal which indicates signs that are both cultural (e.g., a person's values) and biological (e.g., health). These cultural and biological signs interact with the costs of tattooing and affect how attractive the receiver finds the signaler.

In this project, I tested the hypothesis that there is one cultural model shared by what I refer to as Southern women in which tattoos signal certain values, but that the place where women were recruited contributes to variation in the knowledge of this model. In the context of this cultural model, friends' and family's opinions of tattooing turn tattoos into costly displays that have measurable impacts on psychobiocultural markers of wellbeing and health. Specifically, my predictions and objectives were as follow:

1. Tattooed women vary in their knowledge about the cultural model based on their cultural context. To test this, women were recruited from hair salons and tattoo studios. Women recruited from hair salons may have internalized different messages about tattooing than women recruited in the tattoo studios.
2. Some women have a more positive opinion of tattooing than do others, and if so, believe that their friends and family have a more positive opinion of tattooing. To test this, I created a scale to assess personal attitudes about tattooing and what participants believed

their friends and family would respond to questions about tattoos, i.e., a woman's opinion is positively correlated with her perceived opinion of her relatives and friends.

3. Tattooed women who believe that their opinion of tattooing is similar to their friends' and families' opinions are more likely to have more tattoo experience, lower levels of psychosocial stress related to that experience, and a better biological immune response related to their tattooing than women who believe that their personal opinion of tattooing is different from their friends' and family's. To test this, I grouped women by high and low difference for comparison of tattoo experience, perceived stress, and salivary immunoglobulin A (S-IgA).

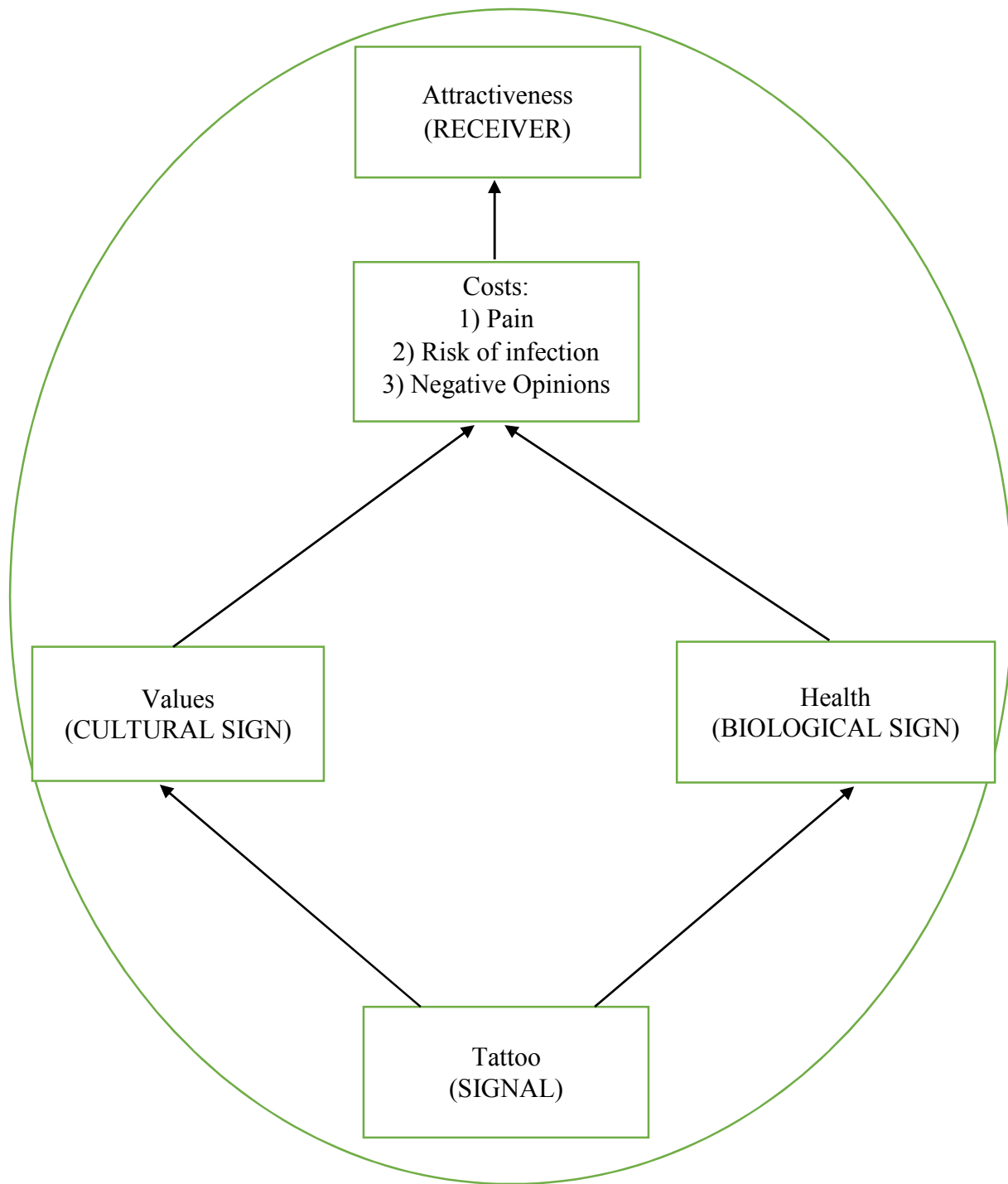


Figure 1. Biocultural model of tattooing as a costly honest signal

THESIS OUTLINE

I begin chapter two with a brief overview of signaling theory, then I describe the history of tattooing in the United States in a signaling context and discuss how the construction of femininity associated with the South may impact a signaling model of tattooing. In this chapter I also give a brief explanation of stress functioning and the immune system. Additionally, I give a review of salivary immunoglobulin A (S-IgA) literature to illustrate the effectiveness of this antibody as a simple measure of immune functioning. I give information about the two preliminary studies for this project in chapter three.

In chapter four I explain the southeastern cities in which I conducted my interviews and give some background and context for my thesis. I outline the methods of this project, including the sampling strategy and interview schedule, and the methods for data analysis in chapter five.

In chapter six I review the results from the different phases of research, including consensus analysis and immunoassays, as well as the statistical analyses used to test the hypotheses of this research. In chapter seven I bring the dimension of the tattooing body project into the discussion of psychological and biological stress. In the final chapter I address limitations in this study and possibilities for further study.

LITERATURE REVIEW

Physical appearance affects self-definition, identity, and interaction with others. The degree to which one meets the cultural criteria for beauty is of key social and personal import. Over the past 15-20 years, researchers investigating human mate choice have hypothesized that sexual selection has a very influential role in our most distinctly human behaviors (for reviews, see Gangestad & Scheyd, 2005; Grammer et al. 2003; Roberts & Little 2008; Thornhill & Gangestad 1999). Individuals perform *proximate* behaviors for an ultimate *evolutionary* reason: the perpetuation of one's genes. Most studies of modern motivations for body ornamentation use *proximate causation*, which refers to the immediate cause of a behavior (Alessi 1992). For example, a person gets a tattoo or piercing because he or she wants to be unique. Motivations for body ornamentation could in fact be understood using *ultimate causation*, which explains the origin of the behavior (Alessi 1992). For example, a person gets a tattoo or piercing for the proximate reason of increasing his or her unique identity, leading to a higher likelihood of reproductive success and increasing the likelihood that offspring will pursue similar reproductive strategies and thereby influence ultimate causation.

COSTLY SIGNALING

Tattooing as body ornamentation has been used throughout human history to garner attention from a mate. Costly signaling is one of the most salient themes found in the study of body ornamentation in mate selection (Carmen et al. 2012). Costly signaling is based on the fact

that properties important to survival and attractiveness, such as fertility and health, are not observable. Instead, humans recognize and display signs and signals that establish a connection between their perceivable features and their unobservable properties. Signals are not observable features that are intentionally displayed. Signs, however, can be anything in the environment and are dormant potential signals (Goffman 1959). A signaler takes steps to display the sign. For instance, getting a tattoo is a signal, but after that, the individual is not thinking about its effects every time someone sees it, so it becomes a sign. A conscious intention becomes habitual and internalized (Goffman 1959). Similarly, conforming to dress codes and outward practices of one's group can be explained as a broadly intentional act, with the purpose of signaling membership of that group (Bacharach and Gambetta 2001). While establishing a connection between signals and values can be relatively easy, there is always the threat of misrepresentation through false signals. The honest signalers, however, want to prove their honesty.

The main result in signaling theory is that truth about some fact is transmitted through a signal in order to gain some benefit (Zahavi and Zahavi 1998). The difference between the cost of the signal and the benefit from the signal is essential in this concept. The signal must be cheap enough relative to the benefit for honest signalers, but costly enough relative to the benefit for lying signalers. Signals often have more than one source of costs, which means they can signal more than one property to more than one type of receiver. In animals, the peacock's tail is costly to grow in terms of developmental resources and nutrients, energetically costly to fan and display, and maintain free of parasites, and costly to carry because it makes the animal more noticeable to predators and hampers its ability to run away. Yet the tail also serves to attract mates and discourage predators (Zahavi and Zahavi 1998). In humans, the tattoo has multiple costs. There is considerable pain in the tattoo process, and the tattoo can generate cost from the

receiver's response. If the tattoo is associated with negative characteristics, the display of the tattoo can increase negative reactions to the signaler.

TATTOOING AS COSTLY SIGNALING

Tattooing in tribal societies can be thought of as costly signaling because their lack of access to modern health care, which makes the behavior risky. "Ta moko" or taking moko is a form of tattooing in the Maori culture of New Zealand in which pigment is inserted by chiseling the skin (Nikora, Rua, & Awekotuku 2007). This form of tattooing was slow and painful, so the ability to withstand the pain of body tattooing is often linked to a passage into adulthood (Stirn 2003). It was also something that could be seen as a fitness indicator because it demonstrates strength and reproductive viability. In New Guinea, those lacking tattoos are referred to as "raw" (Elbin 1979). Native American populations like the Mandan and the Lakota underwent ritual tattooing to reach an altered state of consciousness when receiving tattoos (Stirn 2003). Thus, at a very basic level, a ritual in which one tattoos the body is in fact a physical display of life experience. The ability to successfully display without infection is a signal to immunological fitness and behavioral identity.

Modern-day tattooing has its roots in these tribal societies. By 1784, crewmen on naval ships began receiving tattoos in Polynesia, spreading the acceptance and popularity of tattoos throughout Europe (DeMello 2000). The increased prevalence of tattooing seemed to coincide with the increase in modernity, such as the first tattoo machine, and sterile environments and needles. The period between the First and Second World Wars increased tattoo popularity among servicemen because it became a sign of group membership (DeMello 2000). The rise of tattooing in postmodern society seems to map on to sociocultural movements, such as hippies and bikers in the 1960s, and feminists, LGBTQ groups, and punk culture in the 1970s. By the 1990s,

second-wave feminism, the gay rights movement, and punk culture became mainstream, and so did tattooing (DeMello 2000). The type of people getting tattooed shifted once more. What was once something solely practiced within various subcultures began to emerge as a status symbol among the elite in popular culture (DeMello 2000).

Tattooing is now integrated into the status quo, and it may still signal fitness as it did in tribal cultures. If tattooing is a costly signal, it would mean that tattooed people would be consistently rated as more physically attractive and healthier. Modern studies have highlighted the negative perceptions of females with visible tattoos (Hawkes et al. 2004; Swami et al. 2007; Wohlrab 2009). In a study of 278 German men and women, where all participants were opportunity sampled from a German university, women rated tattooed men as healthier than non-tattooed men. Yet females with visible tattoos were perceived negatively by both men and women and rated as less healthy than their non-tattooed counterparts (Hawkes et al. 2004; Wohlrab 2009). In addition, tattooed women have been rated as less physically attractive, more sexually promiscuous, and as heavier drinkers than non-tattooed women (Swami et al. 2007). Tattooing does seem to be a successful signal of health and attractiveness for men. But in women, the signal is interpreted negatively by some subgroups.

Signals that succeed need to be displayed within the constraints of what is acceptable, traditional, and considered normal. In the modern, industrialized world, where exposure to mass media presents people with an increasingly biased view of the range and frequency of attractiveness, individuals must seek new and unique displays of fitness. “Body projects” are permanent changes to the body used to construct an identity (DeMello 2000; Hawkes et al. 2004; Shilling 1993, 1997). Different body projects have different social implications in accordance with dominant discourses of gender and sexuality. For example, surgical enhancement provides

individuals with a more competitive edge in the mating market than they would otherwise be able to achieve, especially if the modified trait appears to be natural (Edmonds 2010). Although most of the population does not and cannot engage in this behavior, there are more accessible alternatives. Ironically, though previous studies suggest tattooing is a signal that is interpreted differently for women, it is still being used as part of females' ongoing body projects.

An examination of the tattooing taboo for females is particularly relevant in the southeastern United States because of the nature of Southern gender roles. Scholars have recognized this region as a distinctive regional entity and even ethnicity (Dillman 1986). Dillman (1989) included the sex-stereotyping of gender roles in her definition of Southern culture. In a study of gender role ideology in the contemporary Southern region of the United States, Middleton-Keirn (1986a) found that white, middle-class women in the Southern region of the United States relied on a construction of femininity that involved a presentation of self that was not threatening to male dominance. This included "being seen and not heard," as well as being soft, gentle, pretty, dainty, and frilly. The presentation of what she referred to as Southern femininity, however, was also shown in this study to be able to manipulate the gendered hierarchy. For example, Middleton-Keirn (1986b) established that respondents who associated feminism with unattractive and abrasive women noted that those women could get what they wanted more often if they acted more "feminine." Thus, the feminine Southern belle strategy "is a highly successful, vivaciously conversational mode...the perfect style, short of silence, for women who are extraneous to a male-oriented, power-driven society" (Middleton-Keirn 1986b, p. 27).

COSTS OF TATTOOING AMONG CONTEMPORARY SOUTHERN WOMEN

Tattooing as a body project may be going through a gradual and rough transition in general, since the Pew Research Center (2010) study showed that more people outside of high-risk groups are getting tattoos. In a study of 40 women in Canada, Atkinson (2002) found three different models of female tattooing. Women used tattoos to: 1) conform to the oppression of patriarchy by maintaining their bodies as sexual objects for men; 2) resist gendered social structures and oppression by using their bodies to create their own meaning independent of males; or 3) negotiate between a desire for feminist resistance and to “pass” as norm-abiding.

Atkinson’s model parallels the Southern belle strategy, as it supports dominant gender ideals that render tattoos socially acceptable. The second model has its history in the tattooed woman making a living as sideshow circus attractions in the late nineteenth century. These women made a space of independence at a time when limits were placed on women’s social and economic freedom (Osterud 2009). In the 1970s, the women’s liberation movement took this idea from the tattooed woman, asserting that a woman’s power over her own body could be achieved through this type of body art (Rubin 1988). Clearly, there is variation in beliefs about tattooing, and some individuals may accept tattooing more than their friends or family members. The last group most likely suffers from a “bifurcation of identity” due to two conflicting cultural models of tattooing in their social interactions: an attempt to be “normal” on the one hand and a desire to resist patriarchal body ideals on the other (Atkinson 2002). An application of signaling theory thus requires analysis of the cultural domain in which a signal is displayed and received. Often, costly signaling models tend to define variability according to superimposed categories. Cultural consensus analysis is another way of analyzing a cultural domain based on informant knowledge and information.

THE CULTURAL DOMAIN OF TATTOOING

Cognitive anthropology draws on culturally relevant aspects of life that can shape perceived experiences. This theories produced by scholars in this field are shaped from the definition of culture proposed by Goodenough (1981), which is what one needs to know in order to function adequately in a social system. The meaning that shapes life from day to day is the cultural knowledge that is most relevant to a person. This knowledge is shared and distributed through schemas, or generalized collections of knowledge groups, among individuals. Cultural models are the ways in which people incorporate these schemas into their behavior, and they prescribe the elements of a domain so that members of society can perform appropriate behaviors at appropriate times (D'Andrade 1995; Holland and Quinn 1987; Shore 1996). Yet since the sharing and distribution of knowledge depends on participation and communication, there is variation among individuals due to the fact that some people share more because they have learned more in specific situations. The task of cognitive anthropology is to quantify this variation, and cultural consensus analysis (Romney et al. 1986) is an approach that can be useful in investigating the stress response among tattooed women.

Cultural consensus analysis (CCA) is useful to quantify the extent to which knowledge about a cultural model is shared across a set of respondents (Romney et al. 1986). The cultural consensus model utilizes methods such as free-listing and pile sorts to understand the content and structure of a certain cultural topic (Dressler 2001; Dressler 2009). Once the content and structure of a cultural domain have been examined, CCA can be used to determine how much of the contents of a cultural domain are shared among individuals. It is only after testing if people are responding in similar ways that a researcher can make the assumption that they are working from the same cultural model.

CCA also measures how well individuals understand a cultural model. A cultural competency score is calculated for each individual by factoring an agreement (correlation) matrix among informants. Finally, CCA can be used to estimate the “culturally correct” answers of a cultural model derived from a group of respondents' answers to questions concerning a specific domain of knowledge. In creating this cultural answer key, more weight is given to informants whose cultural competency scores are higher.

SOCIAL STIGMA AND IMMUNE RESPONSE

If CCA can identify a shared cultural stigma around being tattooed, even subtle indications of disapproval can impact health. Previous anthropological work has linked stressors to various health outcomes. Cultural consonance, or behavioral approximation to the cultural consensus model, has been found to be associated with arterial blood pressure and depressive symptoms (Dressler and Dos Santos 2000; Dressler et al. 2002). Differences in modernization and culture change have been correlated with blood pressure (Dressler 1991; James 1991; Janes 1990; McGarvey and Schendel 1986), as well as catecholamine levels (Brown 1981, 1982).

In turn, these psychosocial stressors are particularly important in the activation of the stress response. The majority of research on the physiological pathways linking stress, immune function, and morbidity is conducted with animal models, but epidemiological as well as experimental evidence suggests the same processes are at work in humans. Some of the earliest psychoneuroimmunology (PNI) studies found consistent impairments in immune function following loss of a loved one (Irwin et al. 1987). Stress and life disruption associated with natural disasters such as earthquakes and hurricanes have also been shown to have effects on the immune system (Boyce et al. 1993; Ironson et al. 1997; Solomon et al. 1997). Stressful personal relationships such as divorce and poor marriage quality have been related to suppress cell-

mediated immunity (Kiecolt-Glaser et al. 1995; 1996). Cortisol levels have been linked to general everyday stress, stress caused by family environment, and alcohol behavior (Flinn and England 1995; Hanna et al. 1986; Pollard et al. 1992; Schmitt et al. 1995). Finally, cell-mediated immune function has been linked to exposure to westernizing influences (McDade et al. 2000).

Measurement of the immune response is particularly relevant in studies of tattooing because psychosocial stress has been associated with rate of wound healing. For example, in students given a standardized punch biopsy wound, healing took on average 3 days longer when the wound was administered prior to a major exam than it did over the summer (Marucha et al. 1998). In the studies on stressful personal relationships previously mentioned, healing was also slower following an experimentally-induced wound (Kiecolt-Glaser et al. 1995; 1996).

Of course, the particular immune measures selected for study should reflect the specific goals of the investigation. Cohen et al. (1991) showed there was a weaker correlation between stress and disease occurrence than between stress and infection itself. Secretory immune factors seem to prevent infection rather than respond to infection (Miletic et al. 1996). Secretory measures are therefore useful in a study of tattooing since the body will be preventing infection after the physical insult of receiving a tattoo. Thus, people with chronic or protracted forms of stress have a higher risk of getting an infected tattoo.

Salivary immunoglobulin A (S-IgA) has been the most common way to study the connection between stress and secretory immunity factors, but the literature on stress and S-IgA appears to be inconsistent. Some studies report that S-IgA decreases in relation to stress (Gleeson et al. 1995). Other studies, even when studying the same type of stressor, report that S-IgA increases in relation to stress (Kugler 1991; Rood et al. 1993; Stone et al. 1987a; Valdimarsdottir and Stone 1997). Distinguishing chronic and acute stress is necessary to understand these

differences. Academic stress studies have been divided into acute and chronic stress studies based on whether saliva samples were collected minutes before, during, or after a single examination (referred to as acute examination stress) or sometime during the extended examination period (referred to as chronic academic stress). Sorting the studies according to this single criterion reveals a remarkably consistent picture: all acute examination stress studies were associated with increased S-IgA (Bosch et al. 1996; Evans et al. 1994; McClelland et al. 1985), whereas most chronic academic stress studies were associated with decreased S-IgA (Deinzer and Schuller 1998; Deinzer et al. 2000).

A number of studies have also investigated chronic stress using self-report inventories to determine frequency of exposure to major life events (e.g., death of a spouse) and minor daily hassles (e.g., minor conflicts at home work) and to assess the perceived impact of these exposures. Prior research has established that individuals scoring highly on such questionnaires exhibit increased susceptibility to a variety of infectious and inflammatory conditions including respiratory infections (Cohen and Herbert 1996). Questionnaire-based studies tend to support the hypothesis that higher levels of stress exposure and perceived stress are associated with lower levels of S-IgA (Evans et al. 1993; Farne et al. 1992; Graham et al. 1988; Martin et al. 1988; Miletic et al. 1996; Ng et al. 1999). One study by Beck et al. (2000) illuminates how self-report inventories and cultural consensus can be utilized successfully in this study. Certain behaviors such as positive emotional arousal, relaxation, positive mood, and pleasurable social events have been found to be associated with elevated levels of S-IgA (Dillon et al. 1985; Green and Green 1987; Green, et al. 1988; Miletic et al. 1996; Stone et al. 1987b). Drawing on these studies of behavior, as well as studies about S-IgA and stress, Beck et al. (2000) proposed a model of choral singing and the immune system based on coping behaviors. They believe that successful

immune systems adaptations would be accompanied by characteristic subjective states such as satisfaction with performance, feelings of positive emotional arousal, relaxation, and group fellowship. Unsuccessful cultural adaptations, or poor performances, allow feelings of performance anxiety and stress to persist. Samples of saliva were collected from the members of a professional chorale during an early rehearsal, a late rehearsal and a public performance. Results show that seven emotional, cognitive, and evaluative variables generally associated with choral singing are highly predictive of changes in level of S-IgA during the performance condition. These included levels of mood before and during singing, stress, relaxation, feeling "high," detachment/engagement, and specific satisfaction with the immediate performance. The hypothesis that singing perceptions mediate the relationship of singing to physiological response was confirmed.

Given the results from these studies, I predicted that those with a healthier immune system will display greater IgA production relative to the acute tattoo stressor. Increased tattoo experience will amplify this effect. Those with less healthy immune systems, due to chronic psychosocial stress or genetics, will display more flattened or diminished responses.

SUMMARY

Tattooing is found cross-culturally and throughout history, but little attention has been paid to it as a cultural practice that may also be biologically adaptive. This project tests the hypothesis that tattooing could signify underlying health because it reduces the reactivity of biological stress response over time. But a costly signaling theory also demands examination of the cultural mechanisms that legitimize and encourage tattooing. In the next few chapters, I will outline preliminary research that revealed the emic view that there are restrictions on how women in the Southern region of the United States can participate in tattooing. This illustrates

the importance of eliciting how tattooed women actually understand and approach tattooing in relation to their gender and sexuality. In the next chapter, I will describe the preliminary studies involved in this study.

PRELIMINARY STUDIES

While research with choral groups shows that the effects of positive psychological states on S-IgA are mediated by cognitive variables (Beck et al. 2000), the research design depended on questionnaires that imposed meaning outside of the choral singing realm. A better design would be one that draws on culturally relevant aspects of the research question. For instance, to test if tattooing is a costly signal, it is important to measure the costs of the signal in a specific context, which requires examining the cultural mechanisms that legitimize and encourage tattooing in the South.

With this in mind, I conducted two preliminary studies to compare the cultural context situated in the South. Only then could I move on to a more detailed examination of the cultural model and its effects on stress and health. In the first study, I hypothesized that tattooed men and women would be perceived more positively by both tattooed and non-tattooed people in Tuscaloosa, Alabama. In the second study, my aim was to generate a list of words to describe women in the South who are tattooed.

STUDY 1

The first study was conducted in Tuscaloosa, Alabama in the fall of 2011. The objective was to determine the personality characteristics people associated with tattooed men and women in the area.

Participants. Thirty-eight adults (age 19-82, $m=31.29$, $sd=16.736$) were recruited in various locations in town, including Winn-Dixie, the University of Alabama Campus, Egan's bar, Target, and Starbucks. The mean age of tattooed individuals was 22.7 with a SD of 4.8 years, whereas non-tattooed individuals were older ($m=35.8$, $sd=19$ years). I asked every third person that approached the front of the establishment where I was taking surveys if they would like to participate in a survey about the perceptions of tattooing. If they said no, I moved on. If they said they didn't have a tattoo, I told them that the possession of a tattoo did not matter. I interviewed participants on site using a semi-structured interview format with pencil and paper, which took approximately 15-20 minutes each (see Appendix A). I provided each participant who did accept an informed consent. Protocols were approved by the Institutional Review Board at the University of Alabama.

Materials. The semi-structured interview contained demographic questions about gender, age, ethnicity, relationship status, and occupation. In order to assess the opinion of tattoos, I asked two open-ended questions about the perception of men with tattoos and the perception of women with tattoos (see Appendix A). In addition, I asked an open-ended question querying the participant perception of differences between tattooed and non-tattooed people.

Analysis. Answers were coded as positive (1) or negative (0). To test the hypothesis that tattooed men and women would be perceived more positively by both tattooed and non-tattooed people in Tuscaloosa, Alabama, an independent samples t -test was used to compare age and the tattooed and non-tattooed groups. A chi-square test was calculated comparing the presence or absence of a tattoo and positive or negative responses to the questions on perception of tattoos and whether there was a difference between tattooed and non-tattooed people. A significance level of $p \leq .05$ was selected for all statistical tests.

Results. I found a significant relationship between possessing a tattoo and positive perception of tattoos ($\chi^2(1) = 4.224, p = .04$). Tattooed people were more likely to have a positive perception of tattooed men and women (92.3%) than were non-tattooed people (58.8%). While people with tattoos typically related tattoos with art and creativity, people without tattoos tended to focus on the impact tattoos had on a person's future. Thirty-seven percent of respondents believed there was a difference between tattooed and non-tattooed people. One 38-year-old male summed up these answers: "People with tattoos are risk-taking, daring. They think outside of the box. They were probably raised in a culture that was more accepting."

Limitation. I did not record the number of people I approached or the number who declined to participate. This means that I am unable to determine if there was a bias in the type of person who participated in the study.

STUDY 2

The questions I asked in the first study were too broad. For instance, "What is your perception of women with tattoos?" (Appendix A). Because study 1 indicated a difference in perception between tattooed men and women, and I was interested in a more specific geographical area, I developed a freelisting interview schedule to elicit beliefs specifically about *Southern women* who are tattooed.

Participants. I asked 22 females and 17 males between the ages of 18 and 28 ($m=22.14, SD=7.38$) from three summer classes at the University of Alabama to complete an interview using pencil and paper. The interview consisted of four freelisting questions.

Materials. I selected all of these words from those used by participants in Study 1, with the exception of the words promiscuous, clean, and Southern belle, which were variations on terms that I found in the literature review (Hawkes et al. 2004; Swami et al. 2007; Wohlrab 2009). In

the interview, I asked about the personality traits of women in the South with and without tattoos and then which of the listed traits could be considered good and which were bad (see Appendix B for freelisted items).

Results. A total of 40 words were selected for the consensus ratings used in this thesis. These words were categorized into words that could be considered negative, words that could be considered positive, and words that were more neutral (Table 1). Words were considered neutral if respondents associated them with both their list of negative descriptors and positive descriptors. For example, conforming and mainstream were listed as negative traits for respondents who valued creativity and individuality. But for respondents who valued tradition, and thus respected the status quo, these were positive characteristics. The most commonly used word was “trashy,” with almost one third of respondents using the word (n=12).

Table 1. Items used for consensus survey

<i>Considered Negative</i>	<i>Considered Positive</i>		<i>Considered Both</i>
Trashy	Artistic	Young	Rebellious
Unemployable	Outgoing	Traditional	Wild
Promiscuous	Adventurous	Successful	Edgy
Uneducated	Open	Respectful	Different
Immoral	Free-spirited	Reserved	Daring
Slutty	Creative	Upper-class	Conforming
Short-sighted	Independent	Moral	Mainstream
Guarded	Normal	Hospitable	
Goody two-shoes	Conservative		
	Southern belle		
	Straight-laced		
	Proper		
	Clean		

Limitations. I could have found a more representative sample for this study. Obtaining informants from more varied social classes was not achieved due to the opportunistic sampling strategy that was chosen for this study. I also did not sample from widely different social identity groups.

SUMMARY

This chapter discussed the previous studies which investigated the perceptions about tattooing among Tuscaloosa residents facilitated interest in this research project. Overall, the personality characteristics that were previously found to be associated with tattooed people were indeed ones that continuously arose in the interviews (Hawkes et al. 2004; Swami et al. 2007; Wohlrab 2009). These include promiscuity, risk-taking, drinkers, and smokers (see Chapter Two). In addition, many participants mentioned that they had a negative perception of visible tattoos on women, a result that is also consistent with these previous studies. This preliminary research revealed that previous research on the overall perceptions of tattooing are applicable in Alabama.

This research also provided me with qualitative data generated by informants themselves, rather than by my own pre-conceived ideas about tattooing among women in the South. With the results from the second study in particular, I began to focus on how to measure these qualitative data along with quantitative data about stress. In this thesis, I utilized cultural consensus analysis to test if tattooing had high costs in the form of psychological stress for women in the context of the southern region of the United States. I then sought to test the effect of these costs on health through cell-mediated immune function, specifically salivary immunoglobulin A (S-IgA).

In the next chapter, I will explain the settings where I recruited women for the study, as well as how these settings could have impacted women's understanding of tattooing in the southern region of the United States.

SETTING

It is important to understand the setting in which women got their tattoos, as studios provide a context for customers as they embark on a quest for identity (Modesti 2008). In particular, comparing each tattoo studio reveals the hierarchical divisions of class and status within the tattoo community (DeMello 2000). I recruited from both a hair salon and tattoo studios to examine any differences in responses between such diverse settings. Although I did not sit inside the hair salon because I was only allowed to recruit from outside, I spent several months sitting in and observing tattoo studios as part of the qualitative research for this project.

All participants from this phase of the research were from either Gilda's Salon and Day Spa and Cynical Tattoos in Tuscaloosa, Alabama or InkHeart Tattoo Studio and Art Gallery in Leeds, Alabama; all interviews were conducted in these areas. These cities are approximately 74 miles apart (see Figure 2). I was able to recruit from Gilda's because I was a client there. However, the owner asked that I approach customers about the study outside the salon rather than inside because she did not want me to disturb customers during their appointments. At first, I recruited solely in Tuscaloosa because it was convenient. However, travel to another nearby city became necessary because of wariness from other tattoo studios in Tuscaloosa at including an outsider into the tattoo studio culture. I was finding a slow stream of women by word of mouth, but I wanted to recruit by sitting in a tattoo studio so that I could find participants at a faster pace. I learned about InkHeart from a friend of a friend who owned a tattoo studio.



Figure 2. A map of the distance between Cynical Tattoos and InkHeart Tattoo Studio and Art Gallery

TUSCALOOSA

According to the 2011 national census, the population of the city of Tuscaloosa was 91,605, up 1.2% from the 2010 estimate of 90,483 (United States Census Bureau 2011a). However, there is fluctuation between the summer and academic school year in the population due to the students at the University of Alabama and smaller institutions around the area. Tuscaloosa has approximately 53.8% whites, 41.5% blacks, 1.8% of Asian descent, 3% Hispanic or Latino, and 0.2% American Indian and Alaska Native persons. Approximately 85.3% of the population has at least a high school education or equivalent. Thirty-three percent of the population has an education that includes or goes beyond a bachelor's degree. In the year 2011, the median household income was \$34,359, and 29.6% of the population fell below the poverty line (United States Census Bureau 2011a).

Because it is a university town, Tuscaloosa is a growing social environment, with numerous tattoo studios that are fairly established and diverse. All of the women I found by word of mouth received their tattoos at Cynical Tattoos in Tuscaloosa, Alabama.

GILDA'S SALON AND DAY SPA

Since I was only allowed to recruit from the outside of Gilda's, description of this setting is based on the hair salon's Internet presence and my observations as a client. A Google search revealed an Internet website and a Facebook page. The website has information about hours of operation, promotions, and services offered. Services offered inevitably included haircuts and coloring but also those alterations that enforce a dominant feminine ideology: removing body hair, tanning, and skin care consultations. One product line advertised, AdvoCare, was also focused on weight-loss. Based on my observations and feedback from my stylist, the clientele consisted mostly of college-aged white women, most likely because of its placement in a college town with a large sorority culture. The Facebook page had 1,237 likes as of January 2013, making it seem like a relatively popular place to engage in body projects.

CYNICAL TATTOOS

A Google search of Cynical Tattoos revealed an Internet website and a Facebook page. The front page of the website has a slideshow of pictures of the inside of the studio, as well as a map, hours, specials, and information about the tattoo owner. Cynical's Internet presence reflects how popular the studio has become in Tuscaloosa. Another page of the site has two galleries of pictures from two tattoo artists, and the Facebook page has 1,801 likes as of January 2013 and countless pictures of tattoos that were done in the shop.

Cynical Tattoos seems to have a unique place among the alternative culture of Tuscaloosa, Alabama. The owner and his wife were part of the local burlesque troupe, while the apprentice had a second job as a bartender at a local bar that is popular with the more progressive people in the area. The owner is a white male in his early- to mid-forties, and, though he was the one who talked with me most, he didn't give me much information about himself. He used to own another

tattoo shop in Tuscaloosa with a friend. He sold it to the co-owner for a short time and expected to get it sold back to him. This didn't happen however, so he opened Cynical. He liked the way things turned out, because he met his wife at Cynical. During my fieldwork, his wife was a staff member at the shop, answering phone calls and handling piercings. The owner stated, “[My wife] controls the business side of things and now I just tattoo.”

The tattoo studio is on a busy road in Tuscaloosa, next to a laundromat, large gas station, a bank, and a fast food restaurant. This placement means that there is low flow of pedestrian traffic in this area. The low pedestrian traffic limits the amount of walk-ins entering the shop. This is not a problem for the shop, as Cynical Tattoos does not accept walk-in customers.

Cynical Tattoos tries to capture the feel of classic tattoo parlors of the 1950s and 1960s, which were primarily male domains. There is one room that serves as a waiting room for customer friends, as only the customer is allowed in an artist's room while they are tattooing. There are two leather couches, flash¹ art hanging from portfolios on the wall (which no one used during my time there), and a glass counter with piercings. There are three artist tattoo rooms on the right side of this central room and one piercing room at the back wall. There is a hallway the left side of the central room that leads to a bathroom and staff area where customers (including myself) are not allowed (see Figures 3 and 4).

¹ Tattoo flash is a stereotypical tattoo design most often used in tattoo shops that handle a large volume of generic tattoos for walk-in customers.



Figure 3. Client area of Cynical Tattoos



Figure 4. One tattoo artist's room in Cynical Tattoos

According to DeMello (2000), Cynical Tattoos could be classified as an “elite” tattoo studio, as tattooing’s popularity in media has made it a practice done by people in higher social classes. Cynical Tattoos is an artistically-inclined establishment. Clients are required to have an appointment, which creates a more personal relationship with the staff. Keeping the numbers low within the tattoo studio means only a few artists are needed in the studio and allows for substantial administrative and creative freedom. Cynical’s website emphasizes this with

statements indicating that tattoos should not be “mass produced” and that Cynical “does not sell designs as flash.” In contrast, the owner’s philosophy of tattooing is: “Each tattoo should be as perfect as possible and should be unique to that person. Each design is special to the client and each client is special to me.”

Cynical’s tattoo “elitism” is also reflected in its rules. One person said, “Cynical is strict and a bit expensive, but they sure get the job done well.” The strictness probably refers to the way employers handle their visitors. There is no food or drink allowed in the studio. The tattoo studio owner said this was for health reasons. Cynical’s elite classification is also reflected in the participation of tattoo artists from the studio at tattoo conventions around the country. Proof of their talent is displayed opposite the front door of the shop, where awards from many of these conventions cover the wall. Its clients desire the best art available and are willing to pay many thousands of dollars, while its artists see themselves as experts in all aspects of tattooing.

I can now compare these characteristics to those that arose in my observations of InkHeart, which served more of the working class than did Cynical.

LEEDS

The population of Leeds was 11,797, up 0.2% from the 2010 estimate of 11,772 (United States Census Bureau 2011b). The census also reports that Leeds has approximately 78.7% whites, 14.3% blacks, 6.6% Hispanic or Latino, and 1.1% of any other race/ethnicity. Approximately 81.1% of the population has at least a high school education or equivalent. Twenty-three percent of the population has an education that includes or goes beyond a bachelor’s degree. In the year 2011, the median household income was \$44,149, and 14.6% of the population fell below the poverty line (United States Census Bureau 2011b). In contrast to Tuscaloosa, Leeds is small and slightly less diverse. Many residents maintain traditional beliefs

and behaviors. The studio's owner hypothesized that this tendency to be more conservative means that the city has only one studio, InkHeart Tattoo Studio and Art Gallery.

When I began recruiting at the shop, it had been opened for less than a year². Among the five tattoo studios I contacted in Alabama, the owner was the only female tattoo owner I came across in my research. I recruited most of the women receiving tattoos from this studio.

INKHEART TATTOO STUDIO AND ART GALLERY

InkHeart does not have its own web page, but its Facebook business page is very active, with 1,130 likes as of January 2013 and more pictures of tattoos that were done in the shop than Cynical Tattoos.

I gathered more information about InkHeart's personnel since I spent much more time in this studio. The owner is white, in her early-thirties, and grew up not too far away from the area. She studied at a local community college and had a daughter when she was in her early twenties. Before she opened InkHeart, she tattooed people out of her home.

Unlike Cynical, InkHeart depends on a high degree of visibility and pedestrian traffic in downtown Leeds. During October, business relies on crowds that visit a haunted house that is popular in the area. The windowed front of the shop sparks walk-in traffic. The studio is one big room with an art deco atmosphere including black and white checkerboard tiled floors and black walls. A separate tattoo room was built into the larger room off to the right. There is a sign that prohibits anyone but customers from entering the tattooing room, but this was rarely enforced.

The artistic nature of tattooing is stressed in this shop, and seems to fall more in line with earlier eras when tattooing was associated with middle-class people (DeMello 2000). InkHeart is also an art gallery, and the artist considers herself more artist than tattooist. The owner placed her

² InkHeart is still in business as of February 2015.

original art on the walls in order to sell them. In addition, InkHeart was established to contrast with the stereotypical machismo of tattooing culture. The owner made sure her shop was different from other nearby shops and male-owned tattoo studios in Alabama. Those shops, she says, are filled with men “who don’t believe in God,” play metal music, and decorate with skulls. InkHeart was established for those unimpressed by and uncomfortable with the stereotypical machismo of tattooing culture. To this end, InkHeart resembled a cross between a fine art gallery and a tattoo studio. The similarities and differences between Cynical and InkHeart reveal the role of gender in the business of tattooing.

DISCUSSION

I predict that clients’ tastes, preferences, wants, and needs are all influenced by what I refer to as the cultural model of tattooing in the South. InkHeart was an important to this project because of its unique female atmosphere. In contrast to Cynical, InkHeart in Leeds was a female-owned and operated studio that eschewed the machismo typical of male-owned establishments and uniquely reflected a Southern female ethos. The male-owned tattoo studios I visited had pictures of half-naked and busty tattooed girls, particularly H2Ocean posters. H2Ocean, a line of all natural tattoo and piercing aftercare products, uses attractive and scantily clad women in their advertising (see Figure 5). These images enforce the idea that the female body is primarily an object for the male gaze. I was also interested by the wife’s role at Cynical. While his wife obviously plays an important role in the studio, it seems significant that she never learned to tattoo. InkHeart, on the other hand, had artistic posters of 1950s pin-up star Bettie Page and movie star Marilyn Monroe (see Figure 6). While these women were primarily known because of their sexuality, the posters represent them as glamorous Hollywood stars rather than pin-ups.



Figure 5. An H2Ocean poster in Cynical Tattoos



Figure 6. A poster of Marilyn Monroe in InkHeart Tattoo Studio and Art Gallery

InkHeart is more a traditional family business based on Southern practices than a countercultural enterprise. The female often holds together family and friend networks in the Southern region of the United States (Dillman 1989). This is evident in the fact that, at InkHeart, most of the customers seemed to be friends of the owner; and a lot of the conversations involved female gossip such as dating, families, and sex. The owner also commented once that “the mom in me makes me always stop to say, ‘You’re doing great, honey,’ or ‘Do you need a break?’”

Both tattoo studios in this study found a niche in their area but stressed that they could tattoo based on clients’ tastes and preferences. This is because the market is ultimately consumer-driven, and in a competitive market, the prosperous tattoo studios are those that incorporate clients’ wants and needs into their daily tattooing practices. The difference between InkHeart and Cynical reflect how important it is to define and examine that model, and then to understand how tattooed bodies are physiologically experienced.

METHODS AND MATERIALS

In this project I tested the hypothesis that there is one cultural model shared by women in the Southern region of the United States in which tattoos signal certain values, but also variation in the knowledge of this model based on where women were recruited. In the context of this cultural model, friends' and family's opinions of tattooing turn tattoos into costly displays that have measurable impacts on psychobiocultural markers of wellbeing and health. The objective was to compare the stress response of women who had more tattoo experience with women who had less tattoo experience. I also wanted to compare the stress response of women with a negative opinion of tattooing with women who had a positive opinion of tattooing. Finally, I compared women who believed their opinion differed only slightly from their friends' and family's opinions with women who believed their opinion differed greatly from their friends' and family's.

Specifically, my predictions and objectives were as follow:

1. Tattooed women in the hair salon will vary in their knowledge about the cultural model compared to tattooed women in the tattoo studio.
2. Women with a more positive opinion of tattooing will believe that their friends and family have a more positive opinion of tattooing.
3. Women who believed that their opinion of tattooing is similar to their friends' and family's opinions would be more likely to have more tattoo experience, lower levels of psychosocial stress, and a better biological immune response related to their tattooing

than women who believe that their personal opinion of tattooing is different from their friends' and family's.

FIELD SITES

From May 2012 through December 2012, I collected quantitative and qualitative data at three sites in Alabama: two tattoo studios—Cynical Tattoos and InkHeart Tattoo Studio and Art Gallery—and one hair salon—Gilda's Salon and Day Spa. Chapter Four has more information about these field sites. I chose hair salons because hair salons are sites where women go for body projects such as changing their hair, waxing, tanning, and receiving manicures and pedicures. However, because hair salons are more acceptable places for women in the Southern region of the United States to receive body projects, tattooed women in these areas may have more psychological anxiety about whether their tattoos are socially acceptable.

SAMPLING

Sample Size. I approached a total of 50 “Southern” women, all of whom agreed to participate. Everyone was intrigued by my study and eager to give more information about their tattoos. I believe this high acceptance rate is due to the popularity and prevalence of tattooing in the United States today. For this project, the definition of a Southern woman was quantified with three questions: 1) the state in which a participant was born, 2) the state in which the participant had spent the past five years, 3) and the state in which the participant had spent the past year. I defined a Southern woman as a woman who responded with a Southern state to at least two of these questions. In this project, a Southern state is defined as a state that seceded from the Union during the Civil War (Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Texas, Virginia) (Tindall 1972).

I chose two groups to examine differences related to surroundings. For the first group, I utilized convenience sampling at tattoos studios and snowball sampling to recruit 25 women receiving tattoos. For the second group, I utilized convenience sampling at Gilda's Hair Salon to recruit 25 women who already had tattoos and thus had already had time to negotiate their tattoos within my understanding of Southern culture. I collected questionnaire data using paper and pencil.

Recruitment: Gilda's. I approached participants about the study before they entered the hair salon. I explained the study to them and asked if they had a tattoo. If they did have a tattoo, I asked if they wanted to participate in the study. Each participant read and signed an informed consent approved by the Institutional Review Board at the University of Alabama. No participants declined to participate after the informed consent was read to them. I asked participants from the hair salon questions the surveys. I took the questionnaires I had filled out after time I spent recruiting at the hair salon.

Recruitment: Cynical Tattoos. I recruited all of the participants in Cynical Tattoos through snowball sampling. I recruited on social media (Facebook and Twitter) and through word of mouth. Each participant read and signed an informed consent approved by the Institutional Review Board at the University of Alabama. Participants from the tattoo studio completed the questionnaires before the first saliva samples were collected. I took the questionnaires with the completed saliva collection kits immediately after I spent time in the tattoo studio.

For both groups, I manually entered all results into SPSS version 21. All participants completed at least the demographic section, the consensus section, and tattoo opinion section.

DATA SOURCES

I used several data sources in the quantitative portion of the study, including questionnaires, the observations outlined in the preceding chapter, interviews, and saliva samples. The following section reviews these sources.

Cultural Consensus of Tattoos on Southern Women. I generated a cultural consensus survey from the preliminary freelisting data (see Table 1) and from the literature reviewed. The survey was a series of 40 statements about the characteristics of what I refer to as Southern women with tattoos (see Appendix C). Statements included “Southern women with tattoos are trashy” and “Southern women with tattoos are Southern belles”. Responses included “Strongly Agree,” (3) “Agree,” (2) “Disagree,” (1) or “Strongly Disagree” (0). I used this survey for between-subjects comparisons. I used the whole sample to calculate the degree of sharing or consensus of a model within a group. If a model is shared, then members of the group will be held to the standards of the model whether they completely agree with the model or not. From these statements, the “correct” answers can be identified for each question, as well as an individual’s cultural competence score, or the measure of how well their knowledge matches the shared model (Romney and Weller, 1986).

I used cultural consensus testing and analysis to estimate the “correct” answers of consensus survey. This analysis also indicated the degree to which my model of Southern women with tattoos was shared, as well as each individual’s cultural competence score in this model. I analyzed a matrix of the participants’ responses to the cultural consensus survey using UCINET version 6 (Analytic Technologies, Lexington, Kentucky). During consensus analysis, I first performed a factor analysis on participants, which indicated if there was a single cultural model among the data. Sufficient agreement or consensus to assume one cultural model is

represented by the eigenvalues, where the ratio between the first eigenvalue and the second eigenvalue must be a value of 3 or more. I also calculated cultural competence scores during the analysis, which measures the amount of knowledge each participant has regarding the model being tested. Consensus analysis also provides researchers with a cultural “answer key” for each item in the survey based on the weighted ratings of each participant.

Observations and Interviews. Once I defined the consensus model, qualitative analysis of the interviews can shed light on how these women view their tattoo body projects and how certain factors and social relations affect my Southern model of tattooing. I asked questions targeting these factors and social relations by asking participants to describe the ideal female body, how a woman felt about her own body, what she would change about her body, and how she would change her body (see Appendix E). I transcribed and analyzed answers for recurring themes. My field notes of observations were also integral to analysis of quantitative data.

Models of Tattooing. I created a 15-item scale with three subscales (Personal Model of Tattooing, Friends Model of Tattooing, Family Model of Tattooing) to assess association between individual opinion of tattooing and perceptions of one’s social network’s opinions (see Appendix D). This scale is intended to quantitatively analyze the relationship between model of tattooing and other variables. There are five questions in each subscale. Participants respond either YES (1) or NO (0) to all questions and are scored by summing each subscale. Thus, the range for each subscales is 0-5, and a participant with a score of 5 would have a very positive model of tattooing. The scales were tested in the current sample for reliability. Cronbach’s alphas indicate acceptable reliability for the Personal and Friends Models subscales ($\alpha=0.67$) and excellent reliability for the Family Model subscale ($\alpha=0.80$).

To examine how the differences between each subscale affected psychological and immunological data, I subtracted the friend and family opinion scores from the personal model scores to create two new variables. In addition, I created another variable by subtracting the family opinion scores from the friend opinion scores. These equations are shown below.

$$\begin{aligned} X_{\text{personal}} - X_{\text{family}} &= \text{difference between personal and family model means} \\ X_{\text{personal}} - X_{\text{friend}} &= \text{difference between personal and friend model means} \\ X_{\text{friend}} - X_{\text{family}} &= \text{difference between friend and family model means} \end{aligned}$$

Perceived Stress. The Perceived Stress Scale (PSS) is the most widely used psychological instrument for measuring the perception of stress (Cohen and Williamson, 1988). It is a measure of the degree to which situations in one's life are appraised as stressful. Items were designed to tap how unpredictable, uncontrollable, and overloaded respondents have found their lives in the past month (Cohen and Williamson, 1988). Each item is a statement, such as "In the past month, how often have you felt that you were unable to control the important things in your life?" I asked participants to respond how often they felt a certain way on a five-point scale (0 = never, 4 = very often). I used the 4-item version in this research, which has established reliability and validity (Karam et al., 2012). In this sample, the reliability coefficient of the PSS-4 was 0.86. This number indicates a high level of internal consistency for these scales with this sample.

Immune Response. I selected salivary immunoglobulin A as the proxy measure of biological stress response among women receiving tattoos. I used Salimetrics oral swabs (SOS) and swab storage tubes (SST), available from Salimetrics, LLC, to collect saliva. The oral swab fits inside the standard centrifugation tube, and participants place the swab in their mouth for one to two minutes. I collected samples directly before and after a tattoo session. Participants were instructed to remove the SOS from the SST and place it under their tongue. Participants were instructed to keep it under their tongue without chewing for 1-2 minutes and to think of food to

stimulate salivation as to saturate the SOS. They were instructed to then return the swab to the inner tube and cap the SST. I recorded the date and time of each sample. I then placed the sample in a lunchbox with an ice pack until I could store samples below -20°C in the Developmental Ecology and Human Biology Laboratory in the Department of Anthropology at the University of Alabama until the immunoassay process.

Control Variables. The demographic variables I collected included age, race, ethnicity, religion, sexual orientation, occupation, highest level of education, relationship status, relationship appraisal, and social status to control for confounding variables. I assigned education levels a score of 0 to 4 and included: less than high school, high school diploma, some college, college degree, and post-graduate. I asked participants to self-measure their social status on a 10-point ladder, with 1 being the least money, the least education, and the worst or no jobs and 10 being the most money, the most education and the best jobs (Adler and Stewart 2007).

I collected anthropometric data, including body density and handgrip strength. I measured body density to statistically control for body composition, since it has a known association with immune response (Marti et al., 2001), using a portable bioimpedance analyzer (Model TBF 310, Tanita Corp.). I measured handgrip strength to statistically control for neurological stability and fitness, which have also been found to be associated with immune response (Innes, 1999), using a portable hand dynamometer (Model DHS 174, Detecto Corp.). A participant squeezes the hand dynamometer as hard as they can for five seconds. I recorded and averaged the results of two trials to determine a rating. In addition, I controlled for several factors that may influence immune response by asking questions about alcohol, smoking, marijuana use, and various medications.

LAB ANALYSIS

Immunoassays were completed in the Developmental Ecology and Human Biology Laboratory in the Department of Anthropology at the University of Alabama by Dr. Jason DeCaro. Samples were assayed via commercially-available S-IgA kits (Salimetrics LLC, State College, PA). Before analysis, samples were centrifuged at 3000 rpm for 15 minutes to remove mucins. The test used 25 μ L of saliva pipetted into 96-well microtitre plates pre-coated with highly purified human S-IgA followed by a goat anti-human S-IgA antibody conjugated to horseradish peroxidase. Tetramethylbenzidine was added to each well and optical density (450 nm) was determined via an ELX800 universal microplate plate reader (BioTek Instruments, Inc., Winooski, VT). All samples, including standard curve and unknowns, were run in duplicate, and outcomes represent the average. Wells containing known high and low cortisol concentrations were utilized to correct for multiple plate comparisons.

STATISTICS

I conducted quantitative analyses using UCINET version 6 (Analytic Technologies, Lexington, Kentucky) and IBM SPSS version 21. I also used Anthropac version 4.983 to analyze freelist data. I considered statistics to be approaching significance at $p \leq 0.10$ and to be significant at $p \leq 0.05$.

I calculated preliminary descriptives for the full sample and for women from the hair salon and women from the tattoo studios for all questionnaire variables. I conducted t-tests to compare women from the hair salon to women from the tattoo studios for all questionnaire variables. I then compare the two samples according to Personal, Family, and Friend opinion of tattooing scales; according to tattoo opinion models for PSS scores; according to women with little and much tattoo experience for S-IgA change; and according to tattoo opinion models for

S-IgA change. I also used multivariate regression analyses to estimate a single explanatory variable of PSS and S-IgA.

A problem in using saliva for measuring concentrations of protein is how to overcome the well-known inverse relationship between the amount of saliva produced in a given period (flow rate) and the concentration of S-IgA protein (Brandtzaeg, 1971). I controlled for flow rate in this study by also measuring the total amount of protein in the saliva. Thus, I expressed changes in concentrations of S-IgA or cortisol as proportions of total protein. In this way, I was able to measure whether or not the increase (decrease) in the levels of the target proteins was greater (less) than that of the total protein.

To demonstrate that S-IgA levels increased as a result of tattooing, I used the following equation to calculate mean change:

$$\frac{\frac{\text{Post-Tattooing IgA}}{\text{Post-Tattooing Protein}} - \frac{\text{Pre-Tattooing IgA}}{\text{Pre-Tattooing Protein}}}{\frac{\text{Pre-Tattooing IgA}}{\text{Pre-Tattooing Protein}}}$$

In this way, I adjusted changes in pre-tattooing and post-tattooing IgA levels for changes in whole protein levels. I expressed the changes in IgA as mean changes as a proportion of total protein.

SUMMARY

In this chapter I outlined the materials and methods in this study used to test the hypotheses related to tattooing among my definition of Southern women. I reviewed the sampling procedures, including how participants were recruited. I reviewed the data sources, including the questionnaires developed and used, operationalization of tattoo opinion, observations and interviews, and biochemicals derived from saliva samples. I outlined the methods of data collection, including the kits provided participants for self-collection of saliva

samples and how questionnaires were administered. I outlined lab procedures for assaying S-IgA, and I reviewed the statistical procedures for testing the hypotheses. In the following chapter, I present the results of the study.

RESULTS

DESCRIPTIVE CHARACTERISTICS

Overall, the sample in my study was mostly white, young, educated, and middle-class (see Table 2). Women from the hair salon and women from the tattoo studios were similar in all factors except socioeconomic status (SES). Women from the tattoo studios had higher SES (mean=5.3, SD=1.4) than women from the hair salon (mean=4.5, SD=1.3). This difference was significant ($t = -1.96, p = .056$).

Table 2. Descriptive statistics

	Overall (<i>n</i> =50)	Hair Salon (<i>n</i> =25)	Tattoo Studio (<i>n</i> =25)	Difference $\bar{X}_{\text{hair}} - \bar{X}_{\text{tattoo}}$	<i>p</i>
Age (years)	28.68±8.94	28.40±10.03	28.96±7.89	-0.5	0.835
Race					
White	42 (84%)	21 (84%)	21 (84%)		
Black	4 (8%)	4 (16%)		-0.3	0.182
Other	4 (0%)		4 (16%)		
Education					
High school diploma	11 (22%)	4 (16%)	7 (28%)		
Some college	22 (44%)	14 (56%)	8 (32%)	0.1	
College degree	13 (26%)	6 (24%)	7 (28%)		0.763
Post-graduate	2 (4%)	1 (4%)	1 (4%)		
Socioeconomic status	4.88±1.35	4.52±1.26	5.26±1.36	-0.8	0.065
Perceived stress	4.5±3.2	4.8±3.1	4.3±3.3	0.5	0.631

Socioeconomic status represents self-reported placement on a 10-rung ladder from lowest to highest (1-10). Perceived stress is the sum of four items scored on a 5-point scale from lowest to highest.

Table 3 shows the tattoo experience for the sample. Among women from the hair salon, the average number of tattoos was slightly lower, and the average number of years they had been tattooed was slightly longer. Women from the hair salon had fewer tattoo sessions that lasted less time than women from the tattoo studio. Women from the hair salon also had a smaller

percentage of their bodies tattooed than women from the tattoo studios. None of these differences were significant. A tattoo experience variable was computed by adding these four variables together.

Table 3. Tattoo experience

	Overall		Hair salon		Tattoo studio		difference $X_{hair} - X_{tattoo}$	p
	<i>N</i>	<i>X(SD)</i>	<i>N</i>	<i>X(SD)</i>	<i>N</i>	<i>X(SD)</i>		
# of tattoos	46	3.2 (2.9)	23	3.1 (2.4)	23	3.4 (3.4)	-0.3	0.765
# tattoo sessions	44	4.6 (9.0)	22	3.1 (2.5)	22	6.2 (12.5)	-3.1	0.254
Hours of all sessions	44	11.0 (35.9)	21	4.3 (4.9)	23	17.2 (49.1)	-12.9	0.239
Percent body tattooed	46	0.11(0.4)	23	0.04 (0.2)	23	0.1 (0.6)	-0.06	0.313

CULTURAL CONSENSUS

I predicted that there would be a shared model of tattooing among the women I sampled, whom I refer to as Southern women. When I performed consensus analysis on agree-disagree responses of the entire 50 informants, the factor analysis indicated an eigenvalue of 18.3 for the first factor. The resultant eigenvalue ratio between factor one and factor two was 5.8 to 1, where a ratio of 3 or more indicates sharing. In this case, there is one culture that is being represented in the sample.

The consensus analysis also produced a competence score, or a score that indicates how well each participant “knew” the model being tested. Competence scores can range between 0 and 1. The mean cultural competence score was 0.58, with scores ranging from 0.08 to 0.85. This mean score indicates that a little over half of the time, the respondents provided the correct answer. To test hypothesis 1, a Pearson’s correlation test was run to examine if women from the hair salon were more competent in the model than women from tattoo studios. There was not a significant difference in the mean competency scores of women from the hair salon and women from the tattoo studios ($t = -1.10, p = .27$).

The correct answer based on the competence score was provided as a cultural answer key in the UCINET output, reflecting those responses considered culturally correct. Since I determined that agreement was present, the cultural key can be used to picture the model. The model of these 50 Southern women with tattoos does include some qualities that are associated with Southern women in general—e.g., classy, sweet, hospitable, respectful, and moral. However, the model of these 50 Southern women with tattoos rejects the most stereotypical characteristics of Southern women—e.g., conservative, Southern belle, straight-laced, proper, conforming, traditional, reserved, and goody two-shoes. The model also rejects entirely negative traits—e.g., trashy, uneducated, immoral, slutty, unemployable, disrespectful (see Table 4).

Table 4. Consensus answer key

Strongly Disagree	Disagree	Agree
Trashy	Wild	Artistic
Uneducated	Promiscuous	Rebellious
Immoral	Short-sighted	Outgoing
Unemployable	Conservative	Edgy
Slutty	Southern belle	Open
Disrespectful	Straight laced	Adventurous
	Proper	Different
	Conforming	Daring
	Young	Classy
	Traditional	Free-spirited
	Reserved	Creative
	Mainstream	Independent
	Upper-class	Normal
	Guarded	Sweet
	Goody two-shoes	Clean
		Successful
		Respectful
		Moral
		Hospitable

QUANTITATIVE DATA

I predicted that some women would have a more positive opinion of tattooing and believe that their friends and family have a more positive opinion of tattooing. Fifty-four percent of women in the sample had a negative opinion of tattooing, where at least two or more factors such

as number, size, location, and design affected how a woman felt about other women with tattoos. I also examined the Friend and Family subscales of the Model of Tattooing scale to evaluate if women believed their friends and family had a positive or negative opinion of tattooing.

Scores derived from the personal, friend, and family opinion of tattooing scales all ranged from 0-5. The correlation between personal, friend, and family opinion of tattooing was strong for individuals from hair salons ($r=.552, p=.004$; $r=.438, p=.029$, respectively) but non-significant in the tattoo studio sample ($r=.314, p=.127$) for both friends and family models. A Pearson’s correlation revealed a significant association between personal model of tattooing and both friend and family model of tattooing ($r=.431, p=.002$; $r=.322, p=.023$, respectively). (Table 5).

Table 5. Tattoo opinion models

	Overall N=50	Hair salon N=25	Tattoo studio N=25	Difference $X_{\text{hair}} - X_{\text{tattoo}}$	p
	X(SD)	X(SD)	X(SD)		
Personal	2.8 (1.2)	2.4 (1.2)	3.2 (1.1)	-0.8	0.022
Friend	2.6 (1.2)	2.6 (1.2)	2.7 (1.2)	-0.1	0.722
Family	1.4 (1.5)	1.6 (1.5)	1.2 (1.5)	0.4	0.447

I also predicted that women who believed that their opinion of tattooing is similar to their friends’ and family’s opinions would be more likely to have more tattoo experience, lower levels of psychosocial stress, and a better biological immune response related to their tattooing than women who believe that their personal opinion of tattooing is different from their friends’ and family’s. To examine this, I conducted correlation analyses between model differences and psychological and biological stress indicators.

There was a significant positive correlation between tattoo experience and difference between personal and friend model of tattooing ($r=.293, p=.057$). There was also a significant positive correlation between PSS and difference between personal and family model of tattooing,

as well as between PSS and difference between friend and family model of tattooing. However, none of these correlations were significant when splitting the sample by hair salon and tattoo studio. Among women from the hair salon, there was a significant positive correlation between PSS and $X_{\text{personal}}-X_{\text{family}}$, as well as between PSS and $X_{\text{friend}}-X_{\text{family}}$ (Table 6).

For analysis of immunological response, the mean decrease in SIgA across the sample was 0.0076 (SD=25). While this is not statistically significant on its own, there was a significant relationship after I ran a regression model to explore the relationship among opinion of tattooing differences, tattoo experience, psychosocial stress, and immune response. There was a significant relationship even after controlling for these variables ($F=18.651$, $df=24$, $p<.001$, with the model explaining 81% of the variance in S-IgA change (Table 7). This means that the model fits the data well. The only significant predictor was tattoo experience. Women with more tattoos ($r=.352$, $p=.099$), more tattoo sittings ($r=.869$, $p=.001$), more hours in tattoo sessions ($r=.908$, $p=.001$), and more of their body tattooed ($r=.593$, $p=.003$) had a higher S-IgA change (Table 8).

Table 6. Tattoo opinion difference correlated with related variables

		$X_{\text{personal}}-X_{\text{friend}}$			$X_{\text{personal}}-X_{\text{family}}$			$X_{\text{friend}}-X_{\text{family}}$		
		all	hair	tat	all	hair	tat	all	hair	tat
PSS	r	-.017	-.708	.066	.23	.505	.070	.23	.482	.011
	p	.905	.079	.754	.09	.010	.738	.10	.015	.957
Experience	r	.293	.069	.297	.07	-.203	.040	-.1	-.23	-.20
	p	.057	.767	.180	.62	.379	.859	.32	.312	.362

Bolded=significant. **Bolded and italicized**=approaching significance.

Table 7. Linear regression on SIgA

variable	standardized β	p	r^2
(constant)		.000	.814
Tat Experience	.939	.001	
Personal/friend	-.076	.563	
Friend/family	-.069	.585	
PSS	.127	.268	

Table 8. Pearson's correlations between SIgA pre post session change and tattoo experience

		# tat	# sit	Hours sit	% body
S-IgA change	r	.352	.869	.908	.593
	p	.099	.001	.001	.003
	n	23	22	23	23
# tattoos	r		.587	.486	.427
	p		.001	.001	.003
	n		44	44	45
# tattoo sitting	r			.981	.717
	p			.001	.001
	n			43	44
Hours sitting	r				.747
	p				.001
	n				44

Bolded=significant. **Bolded and italicized**=approaching significance.

QUALITATIVE DATA

In this study, it is also important to consider how individual women define their tattoos based on the ideas of beauty and personal attractiveness that are specifically situated in the South. This is why an interview about body projects was included in the study. Table 9 displays the descriptive for the body project questions and compares the difference in answers based on each sample.

Concerning the ideal female body, women responded about the ideal female body in five ways. Eighteen percent of women mentioned health when describing the ideal female body. More women from the hair salon mentioned health (28%) than women from the tattoo studio (8%). Thirty-six percent of the women described the ideal female body with a physical description, especially with height, weight, and waist measurements. More women from the hair salon mentioned physical descriptions (40%) than women from the tattoo studio (32%). The ideal height, weight, breast and waist measurements varied from 5'5" to 5'7" for height, from 120 lbs. to 140 lbs. for weight and from 25" to 38" for waist circumference. Eighteen percent of women believed that the ideal female body was impossible to describe, since it was relative to each individual. More women from the tattoo studio answered in this way (24%) than women

from the hair salon (12%). Twelve percent of women stated that a woman simply needed to be confident and happy with her body. More women from the tattoo studio answered in this way (16%) than women from the hair salon (8%).

Table 9. Body project questions

	Overall (n=50)		Hair Salon (n=25)		Tattoo Studio (n=25)		Difference $X_{\text{hair}} - X_{\text{tattoo}}$	p
	N	%	N	%	N	%		
Ideal Female Body								
Relativistic	9 (18%)		3 (12%)		6 (24%)		-3	.591
Phys. Description	18 (36%)		10 (40%)		8 (32%)		2	
Health	9 (18%)		7 (28%)		2 (8%)		5	
Happy/Confident	6 (12%)		2 (8%)		4 (16%)		-2	
Opinion of Own Body								
Positive	21 (42%)		10 (40%)		11 (44%)		-1	.197
Ambivalent	14 (28%)		7 (28%)		7 (28%)		0	
Negative	6 (12%)		5 (20%)		1 (4%)		4	
Change About Body								
Breasts	5 (10%)		3 (12%)		2 (8%)		1	.860
Hips/Stomach/Thigh	6 (12%)		4 (16%)		2 (8%)		2	
Height	3 (6%)		2 (8%)		1 (4%)		1	
Weight	8 (16%)		2 (8%)		6 (24%)		-4	
Skin/Color	3 (6%)		1 (4%)		2 (8%)		-1	
Facial Features	2 (4%)		0 (0%)		2 (8%)		-2	
Muscle definition	5 (10%)		4 (16%)		1 (4%)		3	
Butt	1 (2%)		0 (0%)		1 (4%)		-1	
Legs	2 (4%)		1 (4%)		1 (4%)		0	
Nothing	4 (8%)		3 (12%)		1 (4%)		2	
Love About Body								
Body Part	11 (22%)		5 (20%)		6 (24%)		-1	.369
Tattoo	5 (10%)		2 (8%)		3 (12%)		-1	
Facial Features	17 (34%)		10 (40%)		7 (28%)		3	
Health	4 (8%)		3 (12%)		1 (4%)		2	
Everything	2 (4%)		0 (0%)		2 (8%)		-2	
Not Sure	2 (4%)		2 (8%)		0 (0%)		2	

Fifty-four percent of women admitted that they were currently participating in a body project, while 28% said that they were not. Of the women who said they were participating in a body project, only one mentioned her tattoos. The rest mentioned social norms such as exercising, eating right, tanning and wearing make-up. Since tattooing is not seen as a body

project to these women, it is important to understand the meaning of their tattoos. Twenty-eight percent of the women decided to get tattooed because tattoos held some form of association or affiliation, including different moments in life. This includes the good—such as the 25th birthday of one woman—as well as the bad—such as a miscarriage or the death of a friend. Twelve percent decided to get their first tattoo because they felt that doing so increased their level of rebellion against a group or society. Twenty-six percent of the women chose to become tattooed because they believed it was a form of expression or art.

I ran correlations between body project questions, PSS scores, and S-IgA to explore how qualitative data interacts with psychosocial stress and immune response. There was a weak negative correlation between perceived stress and whether a woman's tattoo was visible or not ($r = -.301$, $p = .047$). A tattoo was considered visible if it could not be covered by clothing. A t-test revealed higher perceived stress among women whose tattoos were never visible compared to women whose tattoos were always visible ($t = 2.79$, $p = 0.091$). There was also a significant negative Pearson's correlation between stress levels and opinion of own body. A t-test revealed that women who had a negative opinion of their bodies had stress scores that were 2.22 higher than women who has a positive opinion of their bodies ($p = 0.054$). Another t-test revealed that women who had an ambivalent opinion of their bodies had stress scores that were 2.69 points higher than women who had a positive opinion of their bodies ($p = 0.007$). These results reflect how necessary it is to examine the motivations and attitudes about tattooing in conjunction with the biological impacts of tattoos.

SUMMARY

Data support the prediction that there is a shared model of tattooing among 50 tattooed Southern women, but variation in cultural competency is not related to sample setting. There is

variation among women according to their personal opinion of tattooing, as well as their friends' and family's opinions of tattooing. Women with more tattoo experience have a different immune response as measured by S-IgA than women with less tattoo experience. These women's bodies are more equipped to handle the stresses of tattooing than women with less tattoo experience. The implications of these data will be discussed in more detail in the following chapters.

DISCUSSION

In the current study, I evaluated the relationships among opinions of tattooing, psychological stress, and indicators of immune response. Findings indicate a difference in the psychological profiles of stress between groups that differ in opinions of tattooing, as predicted. While the findings of this study do not support a difference in indicators of immune response between groups that differ in opinions of tattooing or psychological stress, the hypothesis that started this project was that there is a difference between groups with different tattoo experiences. This hypothesis was, in fact, supported. In this chapter I discuss the data from the preceding chapter with regard to ethnographic data and the opinions of tattooing typology outlined in chapter four.

As expected, cultural consensus analysis revealed that, in the case of this sample, there is one culture that is being represented. The next step is to understand the model itself. How would a woman be more competent in the model? The model of these 50 Southern women with tattoos includes some qualities that are associated with what I refer to as Southern women in general, but rejects the most stereotypical characteristics of Southern women and the most negative traits associated with tattooing. The Southern women with tattoos in this sample seem to be associated with a subculture separated from normal Southern traditions but which is not necessarily negative. Women have constructed a model that minimizes or deflects the negative reactions they fear from others. But the model also leaves room for movement. A woman can receive tattoos that are deemed inappropriate by friends or family in one or two ways, such as number,

size, location, or design. Once they have disregarded too many of these factors, however, they fall outside of a model that allows exploration at the same time it offers safety.

I predicted that tattooed women would vary in their knowledge about the cultural model based on where they had been recruited. However, there was not a significant difference in the mean competency scores of women from the hair salon and women from the tattoo studios. Thus, the women from the hair salon did not possess more knowledge concerning the questions that were asked, which suggests that women from both the hair salon and the tattoo studios have internalized the same model about Southern women with tattoos. On the other hand, the average number of tattoos from women in the hair salon was slightly lower than women from the tattoo studios. Although this difference was not significant, previous studies have shown that immediate family members, close friends, and co-workers played central roles in influencing the extent to which people became involved in tattooing (Atkinson 2003). The results from the tattooing opinion scales reflect how important social environment plays in tattoo experience in this sample.

In general, participants tended to believe that their friends and families had a more negative opinion of tattooing than they did. Personal and friend opinion scores are higher among women receiving a tattoo, but the scores are lower for the family opinion. It seems that women from the tattoo studios think that their families have lower opinions of tattooing than women from the hair salon. Women from the hair salon may be the ones who are more constrained by dominant cultural expectations and gendered codes supported by their social relations (e.g., surgical enhancement) (Shilling 1993, 1997). At the very least, they are in an environment which reminds them of these things more than women in the tattoo studios. While tattooing is slowly becoming more accepted in their area, it is still not as accepted as breast augmentation or excessive dieting

(Bordo 1989). In the hair salon, women are keenly aware of the fact that their body projects must express traditional images of the female body which conforms to the existing relations of gender power, which tattooing does not always do. Various sociological theories assume that identity, opinions, and beliefs are formed through reflection on the feedback offered by others in interaction over time (Blumer 1969; Goffman 1959, 1963; Mead 1934). Other people's opinions about tattooing seem to enter into the equation more among women in a more normative environment, such as in the hair salon where acceptable body projects like waxing and tanning occur (Shilling 1993, 1997).

Perhaps women from the hair salon were more willing to participate in tattooing because they believed their family would accept it. Many women from the hair salon had siblings who also had tattoos. Women in the tattoo studio sample, however, may take their family into less consideration when planning their body project. Instead, these women appear to have close friendships with tattooed peers. Most of the women in the tattoo studio samples were close friends with either the tattoo shop owner, the tattoo artist, someone else who was tattooed, or more than one of these.

The psychological cost of tattooing seems to differ between women from the hair salon and women from the tattoo studio. All of the significant relationships between perceived stress levels and opinion of tattooing models were among women sampled from the hair salon, but never among women from the tattoo studio. These relationships included: 1) Women who believed that there was a large difference between their personal model of tattooing and their family's model; and 2) women who believed that there was a large difference between their friend's model of tattooing and their family's model. In both of these cases, women reported higher levels of stress than women who had more negative opinions of tattooing, or who did not have a large difference

between personal, friend, and family opinion subscales. This shows that negative reactions came at a higher cost for women in the hair salon than it did for women in the tattoo studios.

Since there seems to be a sliding scale of tolerance in Alabama toward tattooing, women are presented with various reactions to their tattoo projects on an everyday basis. For some women, some of these reactions have a more lasting effect. Women from the hair salon are affected more by their family's opinions than women from the tattoo studios. This is understandable, since dominant gender ideologies are enacted more in hair salons than in tattoo studios (Gimlin 1996). On the other hand, friends' reactions to tattooing do not have as strong an effect among any of the women in the sample. Those women feeling bound by relationships that latch onto this particular Southern model of tattooing may be markedly sensitive to how their tattoo projects affect their sense of self. Women with a positive opinion of tattooing may be more sensitive to the reactions of others. They are aware that their opinion of tattooing is more accepting than the model that is dominant among their social relations. These women understand very well that tattoo projects are judged by friends and family based on number, size, location, and design, but they believe that few (if any) of these factors actually matter. These are the women whose stress levels are most affected by tattooing, because their tattooed bodies affect their interaction with others by altering their attractiveness. They are most likely women like those in Atkinson's 2002 study, who are negotiating between a desire to resist patriarchal body images and to remain "normal" among their friends and family.

Qualitative results reveal even more about the psychological costs of tattooing among these 50 Southern women. The reactions from others about the visibility of a tattoo and how women feel about their own bodies seem to affect psychological stress levels more than a positive or negative personal model of tattooing. Women whose tattoos are visible more often are less

stressed. This may be because they do not hide their tattoos because their tattoos increase their sense of attractiveness. McCormack (2006) found that women may tattoo themselves because of body dissatisfaction, to attain a certain image as a result of social pressures to appear attractive. The relationship between tattoo location and stress could also be related to social relationships. At first, the fact that visible tattoos correlate with lower stress levels seemed counter-intuitive, as the tattoo is still defined as a stigmatizing mark by most members of the mainstream society and is often hidden by individuals. Further exploration found the relationship to be more significant among women from the hair salon, where visibility would be especially important, since these women are surrounded by normative standards of female beauty (Gimlin 1996). Hair salon participants who had negative opinions of their bodies had higher stress scores than women with positive opinions. The difference between women with an ambivalent opinion of their bodies and women with a positive opinion of their bodies was even greater. The psychological cost of tattooing was lower when 1) a woman had an undoubtedly positive opinion of her own body, and 2) she was willing to show her tattoos to others, particularly her family members.

The interplay among social environment, tattoo experience, and psychological stress influences immunity. There was a similar decrease in S-IgA in both women with a positive and negative opinion of tattooing, but this difference was not significant. Although this means that the hypothesis that the personal opinion of tattooing affects S-IgA levels was not supported, the consistency in S-IgA decrease within these results attests to the reliability of the data collection and analysis methods. Due to the high stress of the tattooing process, the consistency of the decrease in S-IgA among all women suggests reasonable accuracy of biological testing in the study. This makes the results concerning the biological hypotheses more reliable.

Women with more tattoo experience had a lower decrease in S-IgA than women with less tattoo experience. There was also a lower decrease in S-IgA among women who believed that the difference between their personal model and their friend's and family's model was large. According to other research about the relationship between S-IgA and psychological measures, higher levels of stress exposure and perceived stress are associated with lower levels of S-IgA (Evans et al. 1993; Farne et al. 1992; Graham et al. 1988; Martin et al. 1988; Miletic et al. 1996; Ng et al. 1999). In this sample, that means women with more tattoo experience are less stressed than women with less tattoo experience. I also predicted that women with a larger difference between models would be more stressed, but this does not seem to be the case. Women with a larger difference between models are less stressed. Perhaps tattooing is adaptive precisely because it allows them to experiment within a cultural model.

Tattooed women may choose to modify the body through this redesigning body project as a tactic of emotion management in an uncertain world full of anxiety and doubt. Among this sample, there is no dominant cultural narrative that established a universal guideline for the body (Giddens 1991). Individuals are now more reflexive about their bodies because of this variety, and this can lead to more uncertainty. This trend is relevant in understanding why these women turned to tattooing as a form of self-expression. Tattooing may be sought out by people in key transitional phases of the life course, which are often the most uncertain. Tattooing may also be a way of managing feelings of frustration in socially tolerable ways. These women felt that getting a tattoo provided them with the power to resist or defy the tradition with which they were familiar. This is notable from woman in an area where tradition, and particularly tradition in the Southern region of the United States, is pervasive. Finally, tattooing is a method of stamping uniqueness in a world full of people who are constantly redefining themselves. These women

believe that tattooing allows them to express themselves in a unique and creative way that gives them power over their identities. These tattoos are permanent, and thus cannot be altered by another person. As one woman said, tattoos “can’t get sold or stolen.” Tattooing can be a body project that is used by women to self-narrate and to redefine themselves as women (McCormack 2010; Osterud 2009; Rubin 1998).

Tattooing as a means of overcoming anxiety may be evident in the fact that, of the women who had a positive view of their bodies, 19% mentioned their tattoos. One said, “I’ve started to like my body more in the past year than I did five years ago. And that’s because my tattoos cover my scars.” Another had a similar experience, admitting that she got more comfortable with her body as she got “more ink and piercings.” Finally, another woman said that her body was “pretty cool. It has battle scars, stories, and memories.” When asked what they love about their bodies, 10% of women mentioned their tattoos. One woman said this was because her tattoos were something she could “pick to put on my body.” These women’s positive body images are derived from their tattoos, so it appears that tattoos can change women’s self-esteem.

Qualitative data suggests that tattooing is a sign of individuality and group membership that is utilized in an attempt to enhance well-being. Previous research supports this. DeMello (2000) astutely constructed an understanding of tattooing around the idea that cultural deconstructions of tattooing are fluctuating. She portrayed tattooing body projects among her North American sample as the isolated search for unique identity. Camphausen (1997), on the other hand, highlights the role of tattooing in solidifying group identity among global tattoo practices. He drew attention to the idea that participation in tattooing practices can be underpinned by the desire to conform with prevailing in-group ideas. Atkinson and Young’s research (2001) in Canada reconciled these two different conclusions by exploring how

motivations to become involved in tattooing are culturally and contextually specific. Whether the tattoo is a symbol of individualism or group membership, it is clear that it is indeed a signal of something.

With these data, I can begin to construct a more in-depth analysis to better understand the relationship between tattooing and stress and how tattooing can be a costly honest signal. The act of getting a tattoo can be seen as an honest indicator of fitness because only those who are truly healthy can display a colorful tattoo that does not become infected. Tattooing takes a toll on the body, so more fit individuals can afford to modify their bodies because their systems are able to put up with the additional strain. In addition, the statistics in this study show that the immune system is even *enhanced* with more tattoo experience. Modern factors such as increases in population density and better health care require individuals to increase their attractiveness by increasing their costly displays, and tattooing is one means of doing that. Furthermore, whether tattooing is used as a marker of individuality or as a group identifier affects the associated costs. Individuality makes us unique and ultimately increases the likelihood of getting noticed as someone special. Group membership, on the other hand, can be beneficial in order to receive the benefits like a sense of self-worth. In the tattoo studios, women discussed their tattoos in relation to individuality and positive body images. In the hair salon, women were more likely to discuss their tattoos in relation to another person. They included their friends and family in their description of either the tattoo itself or the tattooing process. Their relationships, rather than their own thoughts and feelings, were an essential part of their explanation of the tattoo. For some women, the costs associated with more tattooing outweigh the benefits, because unacceptable tattoos exclude them from group membership as a traditional Southern woman. The reactions from their friends and family negatively affect cognitive factors of well-being. For other women,

the benefits lead them to get more tattoos, because it emphasizes their unique-ness. The reactions from their friends and family positively affect cognitive factors of well-being. Tattooing then becomes adaptive, as the physical cost continues to impact their immune system (Carmen et al. 2012; Koziel et al. 2010).

SUMMARY

The results of the current study support the hypothesis that there is a shared model among 50 Southern women with tattoos but that there are varied opinions about tattooing on the female body in the Southern region. Additionally, while the tattoo opinion models constructed for this study were not the most important variables when predicting perceived stress scores and S-IgA change, there is evidence that individual experiences play a large role in mediating psychological and physical stressors involved in tattooing. Future studies about tattooing should consider factors that are dominant in the local environment, such as religion. Future studies should also investigate further how tattoo experience results in an adaptation of the immune system. The final chapter summarizes the limitations and conclusions of this research.

CONCLUSION

In this study I sought to determine: 1) if there is one shared model of tattooing among 50 women in the U.S. Southern region; 2) how the opinions of tattooing vary among individuals; 3) how opinions of tattooing affect psychosocial stress; and 4) the immune response in 50 Southern women with tattoos.

The results from consensus analysis demonstrate that women in two Alabama cities have what I refer to as a shared model of Southern women with tattoos. The model suggests that tattooed women hold slightly different values than women associated with my understanding of a traditional Southern female (e.g., rebellion and edginess), but the fact that those values weren't negative reveals there is a cultural shift in attitudes about tattoos. In previous eras, tattooed individuals were thought to be part of a subculture with negative associations. Today, tattooing is becoming prevalent in all demographics. The shift in attitudes about tattooing means that women in this study are just as influenced by the subculture in the Southern region of the United States as they are by a supposed tattooing subculture. This is supported by statistical differences between women sampled from the hair salon and women sampled from the tattoo studio. Those women recruited from hair salons either internalized different messages about tattooing than women recruited in the tattoo studios or had different answers because they were reminded of the dominant gender ideologies prevalent in the Southern region of the United States which are enacted in hair salons.

There were also a variety of responses about tattooing among tattooed women. Whenever I explained this study, people were confused because they assumed that any woman with a tattoo must automatically have a positive opinion about tattoos. This study revealed even *tattooed* women can have reservations about tattooing. In fact, women who had a more positive opinion of tattooing had higher levels of psychosocial stress, measured as perceived stress. Part of this may be due to the dependence on social relations to construct an individual meaning of tattooing. After all, the women who had fewer reservations and were more positive about tattooing often acknowledged that their family members and sometimes their friends have negative opinions of tattooing. This affected the way they participated in tattooing. Women who believed that their opinion of tattooing was similar to their friends' and family's opinions had more tattoo experience. For these women, the cost of getting a tattoo is lower than it is for women whose opinions about tattooing differed greatly from their friends' and family's. It does not cause as many negative reactions in the latter's lives as it does the former's.

While the quantitative data I collected in this study do not further support that reactions from social relationships mediate stress during the tattooing process, they do lend support to examining the biological processes of tattooing. Biochemical analyses of the stress response reveal that individuals who have more tattoo experience have a lower decrease in S-IgA from the beginning to the end of their session. If I were looking only at these biological results, I could state that tattooing can be an honest signal of biological health in women. However, the qualitative data reveal that the preconceptions associated with tattoos in what I refer to as the Southern cultural domain affect the success of the tattoo as a costly signal.

LIMITATIONS

This exploratory study has allowed for many insights into the biological, psychological, and social impact of tattooing among Southern women. However, some contributing factors have been identified that have influenced the outcome of this research, such as the use of the S-IgA kits six months past their expiration date. The ELISA manual states that the accuracy of results cannot be guaranteed after the expiry date stated on the label. However, a practice run with my own spit, which resulted in a normal standard curve, gave me reason to believe that the chemicals in the kit were still useful. In the summer of 2015, Dr. DeCaro will run a subsample of these biological samples on kits that have not expired to test the accuracy of this research. The small sample size may also have skewed the data in some way.

Another limitation of this study was the demographic bias of the sample. Most of the women in this study were younger, mostly white, educated, and middle-class. A potential advantage to the general homogeneity of the sample demographics is that consensus analysis revealed a clear sharing of one of the models of Southern tattooing in these 50 women. Through this research a model that is shared among younger middle-class white Southerners has been outlined. It also would have been ideal to have a control group of non-tattooed women for comparison of immunological and psychological data. In future research, both a control group and a sample that represents a broader demographic of the population including income, occupation, and education levels would provide a sample more representative of the Alabama population and may reveal additional models of Southern female tattooing shared by other demographic groups.

The region from which these women were recruited involved only two cities in Alabama. Generalizations about women in other parts of the Southern region of the United States should be

made with caution. While this would normally be considered a limitation, this research aimed to highlight that previous studies about tattooing were limited by the fact that their research was too broad and generalized. Future research on tattooing should decrease the scope of work so that similar research on tattooing can be compared across geographical areas. For example, how would the results of this study be similar or different in Los Angeles, California? New York, New York? Or what would happen if this study was replicated in Latin America, where tattoo infections happen much more often due to poor tattoo hygiene.

CONCLUSION

There is clearly a visible connection between tattooed women's perceived stress and their families' opinions of tattooing, although it was not an expected one. Future studies must explore this connection in order to better understand how these variables relate to each other. In contrast, the hypothesis that women who have a positive opinion of tattooing are more likely to have an altered immune response that is different than women who have a more negative opinion is not supported. Further, the main hypothesis of the biological research was supported. There was a clear indication that the immune response is altered in a manner that is different between individuals with a varying amount of tattoo experience. The implications of these results will not be fully understood until they can be replicated in future studies with larger sample sizes.

In this thesis I have reviewed the motivation for examining cultural models of tattooing in conjunction with utilizing a costly signaling model of tattooing. I have described the varied opinions of tattooing in two cities in Alabama to illustrate the need for a culturally relevant examination of tattooing when considering the biological impacts of tattooing. I reviewed the physiology of biological stress response to determine how social opinions of tattooing reduce or mediate this stress. I outlined a research project testing the costly and stress-inducing potential of

social opinions of tattooing during the tattooing process. I presented the data, which indicated 1) a cultural model of tattooing among Southern women, 2) variance in knowledge of that model dependent on social setting, 3) a relationship between social opinions of tattooing and tattoo experience, 4) a suggestive relationship between social opinions of tattooing and psychological stress of Southern women with tattoos, and 5) a difference in stress hormones depending on an individual's tattoo experience. I discussed the implications of these results. Finally, I explained the limitations of this study, and I outlined future research. This study will facilitate the creation of more sophisticated models that examine the impacts of tattooing on wellbeing and health. This requires an integration of the cultural environment with cognitive and biological adaptive strategies.

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APPENDIX A

Preliminary Semi-structured Interview

1. ID# (month & day of birth + last 4 digits of cell or phone #--e.g., 866291)

2. What is your sex?

3. What is your date of birth?

4. What is your ethnicity? Black White Hispanic Asian Other

5. What is your relationship status?

Single Casual Relationship Committed Relationship Engaged/Married Divorced
Widowed Other

6. What is your occupation?

7. What is your perception of men with tattoos?

8. What is your perception of women with tattoos?

Do you think there is a difference between men and women with tattoos and men and women without tattoos?

APPENDIX B

Personality traits of Southern women with and without tattoos

trashy	guarded
artistic	goody two-shoes
rebellious	hospitable
outgoing	wild
edgy	open
uneducated	immoral
adventurous	different
unemployable	promiscuous
daring	classy
free-spirited	creative
independent	slutty
short-sighted	classy
conservative	normal
Southern belle	straight-laced
proper	sweet
clean	conforming
young	traditional
successful	respectful
reserved	mainstream
upper-class	moral

APPENDIX C

Southern Tattooed Women

In your opinion, do you agree or disagree that Southern women with tattoos are:

trashy?	Strongly Disagree	Disagree	Agree	Strongly Agree
artistic?	Strongly Disagree	Disagree	Agree	Strongly Agree
rebellious?	Strongly Disagree	Disagree	Agree	Strongly Agree
Outgoing?	Strongly Disagree	Disagree	Agree	Strongly Agree
wild?	Strongly Disagree	Disagree	Agree	Strongly Agree
edgy?	Strongly Disagree	Disagree	Agree	Strongly Agree
open?	Strongly Disagree	Disagree	Agree	Strongly Agree
uneducated?	Strongly Disagree	Disagree	Agree	Strongly Agree
immoral?	Strongly Disagree	Disagree	Agree	Strongly Agree
adventurous?	Strongly Disagree	Disagree	Agree	Strongly Agree
different?	Strongly Disagree	Disagree	Agree	Strongly Agree
unemployable?	Strongly Disagree	Disagree	Agree	Strongly Agree

promiscuous?	Strongly Disagree	Disagree	Agree	Strongly Agree
daring?	Strongly Disagree	Disagree	Agree	Strongly Agree
classy?	Strongly Disagree	Disagree	Agree	Strongly Agree
free-spirited?	Strongly Disagree	Disagree	Agree	Strongly Agree
creative?	Strongly Disagree	Disagree	Agree	Strongly Agree
independent?	Strongly Disagree	Disagree	Agree	Strongly Agree
slutty?	Strongly Disagree	Disagree	Agree	Strongly Agree
short-sighted?	Strongly Disagree	Disagree	Agree	Strongly Agree
disrespectful?	Strongly Disagree	Disagree	Agree	Strongly Agree
conservative?	Strongly Disagree	Disagree	Agree	Strongly Agree
normal?	Strongly Disagree	Disagree	Agree	Strongly Agree
Southern belle?	Strongly Disagree	Disagree	Agree	Strongly Agree
straight-laced?	Strongly Disagree	Disagree	Agree	Strongly Agree
proper?	Strongly Disagree	Disagree	Agree	Strongly Agree
sweet?	Strongly Disagree	Disagree	Agree	Strongly Agree
clean?				

	Strongly Disagree	Disagree	Agree	Strongly Agree
conforming?	Strongly Disagree	Disagree	Agree	Strongly Agree
young?	Strongly Disagree	Disagree	Agree	Strongly Agree
traditional?	Strongly Disagree	Disagree	Agree	Strongly Agree
successful?	Strongly Disagree	Disagree	Agree	Strongly Agree
respectful?	Strongly Disagree	Disagree	Agree	Strongly Agree
reserved?	Strongly Disagree	Disagree	Agree	Strongly Agree
mainstream?	Strongly Disagree	Disagree	Agree	Strongly Agree
upper-class?	Strongly Disagree	Disagree	Agree	Strongly Agree
moral?	Strongly Disagree	Disagree	Agree	Strongly Agree
guarded?	Strongly Disagree	Disagree	Agree	Strongly Agree
goody two-shoes?	Strongly Disagree	Disagree	Agree	Strongly Agree
hospitable?	Strongly Disagree	Disagree	Agree	Strongly Agree

APPENDIX D

Group Models

- 23. Have participants answer the following questions.
- 24. Have participants answer the following questions according to how they think their closest friend(s) would respond.
- 25. Have participants answer the following questions according to how they think their family would respond.

Are Southern women with tattoos ever attractive?									
YES									NO
Are Southern women with more than 2 tattoos ever attractive?									
YES								NO	
Is location important?									
NO					YES				
Is size important?					Is size important?				
NO		YES			NO		YES		
Is style important?		Is style important?			Is style important?		Is style important?		
NO	YES	NO	YES	NO	YES	NO	YES		
10	6	9	5	8	4	7	3	2	1

Most Negative to Least Negative Models: 1-5

Least Positive to Most Positive Models: 6-10

APPENDIX E

Body Projects

1. In your opinion, what is the ideal female body?
2. How do you feel about your own body?
3. What is one thing you would like to change about your body?
4. How would you change this?
5. What is one thing you love about your body?
6. Is there anything you are currently doing to fit into the ideal female body?

APPENDIX F