

**CROSS-CULTURAL INVARIANT ASPECTS OF MALE ANDROPHILIA IN  
THE ISTMO ZAPOTEC**

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ISTMO ZAPOTEC

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## ABSTRACT

Across cultures, male androphilia (i.e., sexual attraction towards adult males) predominantly occurs in two forms—cisgender and transgender. Despite significant differences in gender role presentation, cross-cultural research demonstrates that both forms share multiple psychodevelopmental and biodemographic correlates. However, this research has been mostly conducted using the cisgender form in Western cultures, whereas research on the transgender form, which is more common in many non-Western cultures, remains scarce. The studies within this thesis present new empirical research on male androphilia among the Istmo Zapotec—a non-Western culture found in southern Mexico where cisgender and transgender androphilic males are recognized as members of a third gender category locally known as *muxes*. The studies found that both cisgender and transgender *muxes* share similar psychodevelopmental (i.e., childhood separation anxiety) and biodemographic (i.e., familial clustering of male androphilia) correlates, thus providing further evidence to suggest that both forms of male androphilia share similar bio-developmental foundations.

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# CHAPTER 1

## Introduction

In various cultures throughout the world, people share numerous invariant aspects known as human universals (Brown, 2004). Donald Brown (2000) defines human universals as “features of culture, society, language, behavior, and psyche found in all ethnographically or historically recorded human societies” (p. 156). These human universals include, but are not limited to, language, tool use, facial expression of emotions, sexual division of labor, and various sexual behaviors (Brown, 1991).

Sexual selection is one of the driving forces of evolutionary biology (Darwin, 1871). Throughout our evolutionary history, sexual selection has shaped males<sup>1</sup> to be sexually attracted to females, and females to males. This is perhaps the largest and most universal of any psychological sex differences. However, the occurrence of male same-sex sexual behavior deviates from this common pattern. The existence of this trait in humans raises various questions. How widespread is male same-sex sexual behavior? How is it expressed across cultures? What features underlie this trait?

In this thesis, I address these questions by discussing certain aspects of male same-sex sexual behavior that are considered invariant across cultures. Firstly, I discuss male same-sex sexual behavior from a cross-cultural perspective and, in doing so, discuss the biodemographic and psychodevelopmental universal features that characterize this trait across cultures. Then, I present new empirical evidence pertaining to one psychodevelopmental (Chapter 2) and one biodemographic (Chapter 3) correlate of same-

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<sup>1</sup> The terms *male* and *female* refer to an individual’s biological sex as indicated by readily observable parameters of sex development at birth (i.e., genitalia), regardless of the individual’s gender role presentation as a boy/man, girl/woman, or otherwise.

sex sexual attraction in males using data from an indigenous culture in Mexico. Finally, I summarize the implications of the novel findings that were obtained throughout the course of my Master's degree, and end with suggestions for future cross-cultural research on male same-sexual behavior (Chapter 4).

### **Labeling Male Same-Sex Sexual Behavior Across Time and Space**

In Western cultures, men who are sexually attracted to the opposite sex are labeled “heterosexual,” whereas those who are sexually attracted to the same sex are labeled “gay” or “homosexual.” The first appearance of the terms “heterosexual” and “homosexual” date back to 1868 in a private correspondence between Karl-Maria Kertbeny and Karl Heinrich Ulrichs, two of the first known advocates and researchers of “homosexual” men (Bullough, 1994). Given the relatively recent appearance of these terms in human history, some might argue that male same-sex sexuality is a relatively recent phenomenon.

Archaeological evidence in the form of ancient pottery and cave art depicting male same-sex sexual behavior indicate that it is not a recent phenomenon, and has therefore existed in human history since at least a millennium (e.g., Kelker & Bruhns, 2009; Larco Hoyle, 1998; Nash, 2001). Furthermore, cross-cultural research has demonstrated that male same-sex sexual behavior occurs in most cultures worldwide for which data are available (Hames et al., 2017; Murray, 2000) and at similar (albeit low) frequencies (e.g., Gates, 2011; Whitam, 1983). Given this, there may have existed a plethora of alternative labels or terms that describe male same-sex sexuality at those different times and places. If so, then those labels may have been unique to the individuals within those specific cultures during certain time periods. As such, despite the prevalence of any identity category in the collective minds of individuals within a culture (e.g., “gay” and “homosexual” in the West),

these labels can lose their actual meaning, or at the very least nuance, when transported to different cultures or time periods around the world.

Another problem with labels such as “gay” and “homosexual” that deserves mention is that they are often declarations of individual identity. For many, self-labeling (or being labeled by others) as “gay” not only describes what they do sexually, but *who* they feel they are as well. In other words, their sexual orientation is felt to be such a core aspect of their being that it becomes a central pillar of their personal identity. Additionally, the terms “gay” or “homosexual” often connote a “package” of behaviors that extends beyond sexual activity into the social realm. For example, beyond their sexuality, “gay” men share similar interests and personality traits that likely facilitate the formation of “gay” subcultures (e.g., Lippa, 2005; Su, Rounds, & Armstrong, 2009; Zheng, Lippa, & Zheng, 2011). Therefore, individuals who display same-sex sexual behavior might refrain from self-identifying as “gay” or “homosexual” if they feel that social aspects of those identities are incompatible with what they feel themselves to be. If some males who, despite expressing same-sex sexual behavior, do not identify with terms like “gay” or “homosexual,” then utilizing them in other cultures would potentially lead to further misunderstanding and possibly even be offensive.

Thus, in order to adequately conduct cross-cultural research on this topic, we need to focus on features of male same-sex sexuality that transcend culturally specific identities. A focus on cross-culturally universal sexual *feelings* facilitates comparisons in a manner that culturally specific identity categories do not. As such, the terms *androphilia* and *gynephilia* are employed throughout this thesis when referring to the sexual feelings expressed across cultures. Androphilia refers to sexual attraction and arousal to adult

males, whereas gynephilia refers to sexual attraction and arousal to adult females. Despite the differences that exist between same-sex attracted “gay” men in Western cultures and same-sex attracted males from many non-Western cultures, both can be accurately described as androphilic biological males.

### **The Expression of Male Androphilia Varies Cross-Culturally**

The manner by which male androphilia is publically expressed varies cross-culturally, but generally takes one of two primary forms: cisgender and transgender (Murray, 2000; Vasey & VanderLaan, 2014; Whitam & Mathy, 1986). Both cisgender and transgender male androphiles can occur in the same culture and consider themselves to be part of the same community, but typically one or the other tends to predominate (Whitam & Mathy, 1986). In Western cultures, the most common form of male androphilia is the cisgender form. *Cisgender male androphiles* behave in a relatively masculine manner and are often referred to as “gay men.” They usually occupy the gender role typical of their sex and they identify as men. Cisgender androphilic males typically engage in sexual activity with other cisgender androphilic males.

The transgender form of male androphilia tends to be more common in non-Western cultures (Murray, 2000). *Transgender male androphiles* behave in a relatively feminine manner and sometimes occupy “alternate” gender identities and roles that are distinct from those of “men” and “women.” They typically engage in sexual activity with masculine male sexual partners (“men”) and not with each other. Examples include, but are by no means limited to, the *nádleeħ* from the Navajo culture in southwestern USA (Thomas, 1997), the *bissu* of Sulawesi (Davies, 2007), the *hijra* of India (Nanda, 1990), the *xanith* of Oman (Wikan, 1977), the ‘*yan dandu* of Nigeria (Gaudio, 2011), the

*fa'afafine* of Samoa (Vasey & VanderLaan, 2014), and the *muxes* of the Istmo Zapotec (Mirandé, 2017). In some of these cultures, transgender androphilic males have an institutionalized role which often involve specialized religious activities (Herdt, 1997). However, these *role specialized* transgender male androphiles do not appear to be the majority given that they only occur in approximately 20% of the cultures in which the transgender form of male androphilia has been documented (Vasey & Court, in press).

### **Cross-Cultural Universal Correlates of Male Androphilia**

Despite significant differences in outward appearance and gender role enactment, cross-cultural research suggests that both forms of male androphilia share numerous biodemographic and psychodevelopmental correlates. With respect to biodemographic correlates, it has been consistently found that compared to gynephilic males, both forms tend to be later born among their siblings (e.g., Blanchard, 2004; Semenyna, VanderLaan, & Vasey, 2017b; VanderLaan & Vasey, 2011; Vasey & VanderLaan, 2007), have more older brothers (e.g., Bogaert & Skorska, 2011; Semenyna et al., 2017b; VanderLaan & Vasey, 2011; VanderLaan et. al., 2017a; Vasey & VanderLaan, 2007), come from larger families (e.g., Camperio Ciani & Pellizzari, 2012; Schwartz, Kim, Kolundzija, Rieger, & Sanders, 2010; Semenyna, Petterson, VanderLaan, & Vasey, 2017a; VanderLaan, Forrester, Petterson, & Vasey, 2012), have more androphilic male relatives (e.g., Schwartz et al., 2010; Semenyna, VanderLaan, Petterson, & Vasey, 2016; VanderLaan, Forrester, Petterson, & Vasey, 2013a; VanderLaan, Vokey, & Vasey, 2013b), occur at similar prevalence rates across cultures (e.g., Gates, 2011; Semenyna et al., 2016; VanderLaan et al., 2013a), and exhibit little or no reproductive output (e.g., Schwartz et al., 2010; Vasey, Parker, & VanderLaan, 2014). In addition, the fraternal birth order effect—the finding that

each biological older brother increases the odds of male androphilia by ~33%—shows a remarkable consistency across populations of cisgender and transgender male androphiles, suggesting that the manner in which older brothers influence the development of male androphilia is relatively constant across culturally diverse populations (e.g., Blanchard, 2017; Blanchard & VanderLaan, 2015; Cantor, Blanchard, Paterson, & Bogaert, 2002; Semenyna et al., 2017b; VanderLaan & Vasey, 2011; VanderLaan et al., 2017a).

With respect to psychodevelopmental correlates, prospective and retrospective research has found that when compared to gynephilic men, both transgender and cisgender androphilic males are characterized in childhood by greater levels of female-typical behavior (e.g., play with dolls) and lower levels of male-typical behaviors (e.g., rough and tumble play) (Bailey & Zucker, 1995; Bartlett & Vasey, 2006; Besharat, Karimi, Saadati, 2016; Cardoso, 2005, 2009; Green, 1987; Li, Kung, & Hines, 2017; Petterson, Wrightson, & Vasey, 2017; Rieger, Linsenmeier, Gygax, & Bailey, 2008; Semenyna & Vasey, 2016, 2017; Semenyna et al., 2017b; Whitam, 1983). During adulthood, both forms of male androphilia exhibit a preference for female-typical occupations (Hart, 1968; Lippa, 2010; Semenyna & Vasey, 2016; Zheng, Lippa, & Zheng, 2011). Furthermore, both types of male androphiles express elevated cross-sex beliefs and wishes in childhood (e.g., “I wish I was a girl”) (Bailey & Zucker, 1995; Vasey & Bartlett, 2007; Whitam, 1983).

Taken together, the numerous biodemographic and psychodevelopmental correlates shared by both transgender and cisgender androphilic males across multiple cultures suggest that both forms are simply different cultural expressions of the same underlying trait that share a common biological foundation. This, however, does not mean that differences do not exist between the two groups. Indeed, cisgender and transgender

males exhibit differences with respect to gender role identity and enactment. Nonetheless, the consistency of the evidence presented above suggests that the apparent differences between the two forms are a result of the environment into which they are born and develop, rather than being a result of distinct biological processes.

### **Lack of Cross-Culture and Within-Culture Comparisons**

In recent years, psychologists have expressed a pressing need to conduct comparative research on diverse non-Western populations given that most of our knowledge about human psychology is based on research in Western, Educated, Industrialized, Rich, and Democratic (WEIRD) societies (Arnett, 2008; Heinrich, Heine, & Norenzayan, 2010). Unfortunately, our current knowledge of male androphilia in humans is overwhelmingly grounded in research on the cisgender form, which predominates in Western cultures. Sustained quantitative research on the transgender form of male androphilia outside of the West has been limited to only one non-Western culture in the Polynesian island of Independent Samoa.

In this culture, local transgender androphilic males are known as *fa'afafine* and are recognized as a “third” gender. The term *fa'afafine* signifies “in the manner of a woman” in the Samoan language. Research derived from Samoa has provided evidence to suggest that the transgender form of male androphilia is biologically and developmentally similar to the cisgender form. Garnering further evidence from additional societies that are culturally distinct from Samoa, and where transgender androphilic males are commonplace, would further bolster the conclusion that both transgender and cisgender androphilic males share a similar etiology.

Another aspect of the current scientific literature on male androphilia that has not



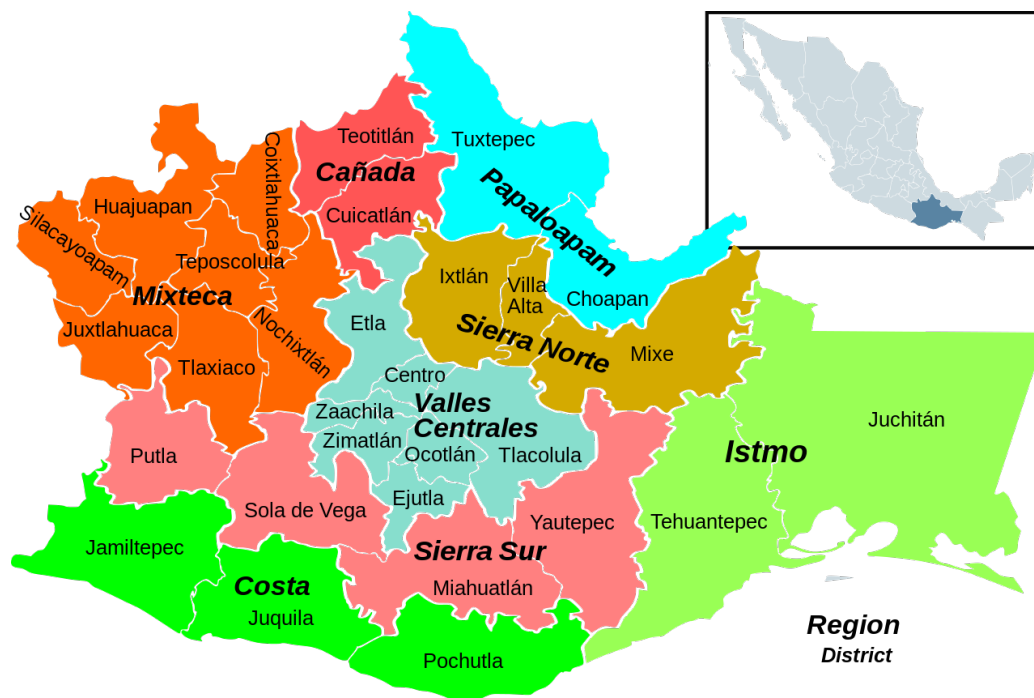
been thoroughly addressed is the lack of within culture comparisons between transgender and cisgender androphilic males in non-Western cultures. The arguments that the two forms share similar biological foundations are based on between-culture comparisons or within-culture comparisons in Western cultures. To best of my knowledge, no quantitative, within-culture comparisons of the two forms have been conducted outside of a Western setting. Given that in most cultures one of the two forms of male androphilia predominates far more so than the other, obtaining sufficient sample sizes of both so as to adequately conduct inferential statistical comparisons has proved challenging. This problem can be addressed by seeking out cultures where male androphilia is more commonly expressed in both the transgender and cisgender form. With this in mind, the present thesis sought to address these issues by focusing on one culture where both forms of male androphilia are readily observed—the Istmo Zapotec.

### **The Zapotec of Oaxaca**

The Zapotec are a Mesoamerican culture found primarily in the southern Mexican state of Oaxaca (Danvers, 2013). The presence of Zapotec civilization in this region dates to around 1500 B.C.E., long predating the arrival of Spanish conquistadors. Zapotec used to call themselves *binnizá*, which translates to “people from the sky” (Miano Borruso, 2002), and were known to be polytheistic, believing in multiple gods that were associated with distinctive natural phenomena (e.g., wind, lightning, and rain) (Danver, 2013). Although Zapotec adopted Roman Catholicism after the Spanish Conquest, their polytheistic beliefs have endured in the form of patron saints after which villages are often named (Danver, 2013; Miano Borruso, 2002; Mirandé, 2017). Despite hundreds of years of foreign influences, Zapotec culture remains an integral part of Oaxacan communities

(Comisión Nacional para el Desarrollo de los Pueblos Indígenas, 2006). Federal statistics show that of the ~400,000 individuals in Mexico who speak Zapotec, 87% of them reside in Oaxaca (Instituto Nacional de Estadística y Geografía, 2009).

The Zapotec are divided into four subgroups, named after the regions they inhabit in Oaxaca (Danver, 2013) (see Figure 1). The Central Valley Zapotec live in and around the Valley of Oaxaca, in the center of the state. The Serrano Zapotec are located in the northern mountains of Sierra Madre, in the Sierra Norte region of Oaxaca. The Southern Zapotec occupy the Sierra Sur region of southern Oaxaca, in the mountains of Sierra Miahuatlán. Lastly, the Istmo Zapotec can be found in the Istmo region of Oaxaca, which consist of the Tehuantepec and Juchitán districts. While the Highland Zapotec (i.e., Central Valley, Serrano, and Southern Zapotec) have been described as patriarchal, the Istmo Zapotec—specifically those located in Juchitán—have been previously labeled as a matriarchal society (Bennholdt-Thomsen, 1997; Göttner-Abendroth, 2012).



**Figure 1.** *Oaxaca regions and districts* (Aymatth2, 2010)

The representation of the Istmo Zapotec as a matriarchal society has been widely contested and dismissed as a myth for numerous reasons, which include the ongoing domestic violence towards women, the requirement of female virginity before marriage, the fact that women are left to raise children by themselves, and the exclusion of women from the political sphere (Chiñas, 1992; Miano-Borruso, 2002; Mirandé, 2017; Trono, 1999). Nonetheless, women from the Istmo Zapotec are considered to have a strong presence and role within the local culture. Specifically, they are believed to control household finances and the children's education, are economically autonomous, and dominate the local markets (Bennholdt-Thomsen, 1997; Chiñas, 1992; Miano-Borruso, 2002; Mirandé, 2017; Stephen, 2002; Trono, 1999). Indeed, the markets in the Istmo Zapotec culture are believed to be a female-dominant public space where mostly women congregate to conduct business as well as discuss local news and gossip (Bennholdt-Thomsen, 1997; Miano-Borruso, 2002; Mirandé, 2017; Trono, 1999).

Another unique aspect of Istmo Zapotec culture, that also seems to be predominantly managed by women, are the traditional yearly festivals known as *velas* (Bennholdt-Thomsen, 1997; Chiñas, 1992; Trono, 1999). These festivals, which are usually held over four-day periods, are celebrated with traditional food, music, and dances, and can have hundreds or even thousands of attendees. There are at least 45 *velas* that are celebrated each year (Trono, 1999), dedicated to saints, locations, occupations, and certain groups of people (Bennholdt-Thomsen, 1997; Mirandé, 2017). They are organized by associations that choose a *mayordomo*, who will then be the principle sponsor of the *vela* and cover a significant portion of the expenses. As such, sponsoring a *vela* can become an important source of status and prestige in Istmo Zapotec societies (Céspedes Vargas, 2015;

Chiñas, 1992). Since the title of *mayordomo* is usually given out to women (Bennholdt-Thomsen, 1997; Miano Borruso, 2002), *velas* are considered to fall within the sphere of women, adding to the important role they play within Istmo Zapotec culture.

While the household, business, and festive spheres are considered to be predominantly feminine realms of influence, production (i.e., farming, fishing, and manual labor), political representation, and intellectual work are usually left for Istmo Zapotec men (Chiñas, 1992; Miano Borruso, 2002). The discrepancies observed between men and women have led the anthropologist Beverly Chiñas (1992) to conclude that the Istmo Zapotec are a society with strict sexual division of labor and economics. Nonetheless, Chiñas (1992) also suggests that the Istmo Zapotec contains a “blend of roles which leads to a fine balance of equality between the sexes” (p. 87).

Asides from its distinctive festivals, strong female presence, and marked sexual division of labor, Istmo Zapotec are also recognized for their unique gender and sexual diversity, which includes recognition of a separate “third” gender category for androphilic males. The presence of cross-gender behavior in androphilic males has been documented in this region since *at least* the 16th century as evident by Zapotec terms used to describe such behaviors at that time (Miano, 2002). At present, these third gender androphilic males are known as *muxes*.

### **Istmo Zapotec *Muxes***

*Muxes* are a third gender recognized by the Istmo Zapotec as distinct from men and women, while possessing characteristics of both genders (Chiñas, 1992). The term *muxe* likely originates from a Zapotec adaptation of the Spanish word *mujer*, which means “woman” (Bennholdt-Thomsen, 1997; Miano Borruso, 2002). However, the word *muxe*

has also been suggested to derive from the word *namuxe'*, which is Zapotec for “shy,” “timid,” or “cowardly” (Bennhold-Thomsen, 1997; Mirandé, 2017). *Muxes* are biological males who are exclusively attracted to men and routinely adopt the receptive role during anal intercourse.

*Muxes* enjoy a high degree of acceptance in the Istmo region of Oaxaca, comparable to the situation experienced by *fa'afafine* in Samoa, but in striking contrast to that experienced by many transgender individuals in Western cultures (Grant et al., 2011). Their acceptance is such that some families believe having a *muxe* offspring is a “blessing from God” (Mirandé, 2017).<sup>2</sup> This view is grounded on the belief that while sons and daughters will eventually get married and move out, *muxes* will stay with their parents and take care of them during old age (Miano Borruso, 2002; Mirandé, 2017). *Muxes* are also accepted by the community at large. Perhaps the most prominent public display of this is *La Vela de las Auténticas Intrépidas Buscadoras del Peligro* (The Festival of the Authentic Intrepid Seekers of Dangers), a four-day festival in honor of the *muxes*, celebrated each November in Juchitán. More than 10,000 community members and visitors attend this festival, including representatives from the local Catholic Church (Mirandé, 2016). Additionally, *muxes* are integrated into the community and contribute by teaching its members about domestic violence, sex education, and AIDS awareness (Miano Borruso, 2002; Mirandé, 2017).

There are several explanations of why *muxes* are so accepted and integrated into Istmo Zapotec culture. For example, like Istmo Zapotec women, *muxes* are believed to be

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<sup>2</sup> While many of those interviewed in Mirandé (2017) stated that the *muxes* are generally accepted by the community, there were others who believed that *muxes* still face discrimination. Mirandé (2017, p. 212) suggested the possibility that “the *muxe* experience may be packaged and marketed like other products, resulting in stereotypical, romanticized, and essentialized conceptions of them.”

hard workers, and what they earn they invest towards their families (Miano Borruso, 2002; Mirandé, 2017). Others suggest that their acceptance is linked to a local myth in which families turn their last-born sons into a *muxe*, so that they can help with household chores, and assist their mothers in the local markets (Trono, 1999). Another explanation is based on *muxes*' contribution to the Istmo Zapotec economy by engaging in occupations such as embroiderers, designers, decorators, and artisans, which are substantial for the existence of the local festive system (Céspedes Vargas, 2015; Miano Borruso, 2002). Whatever the reason may be for their widespread acceptance, the consensus is that *muxes* display numerous altruistic behaviors directed towards their families and contribute to the community at large.

Like androphilic males elsewhere, *muxes* exhibit numerous gender non-conforming behaviors from a relatively young age. *Muxes* are often identified as such as early as their third year by their families and other community members (Chiñas, 1995; Miano Borruso, 2002). Common displays of childhood gender-nonconforming behavior in *muxes* include preferences for playing with dolls and other girl toys, having girls as playmates, imitating their mothers more than their fathers, preferences for dressing up in girls' clothing, and doing house chores that are usually given to girls more often than boys (Chiñas, 1992; Miano Borruso, 2002; Mirandé, 2017; Trono, 1997). Additionally, Istmo Zapotec mothers sometimes take their feminine sons out into the market and the streets in order to teach them the business trade, as they normally would with their daughters (Miano Borruso, 2002; Mirandé, 2017).

The female-typical behavior that *muxes* display during childhood usually persists into adulthood. *Muxes* are traditionally known for embracing occupations that are

considered to be feminine within Istmo Zapotec culture such as clothing designer, embroidery, sewing, cooking, and event decorators (Bennholdt-Thomsen, 1997; Céspedes Vargas, 2015; Chiñas, 1992; Miano Borruso, 2002; Mirandé, 2017; Trono, 1999). These types of occupational preferences can be considered feminine on a cross-cultural scale, as well, given that sex differences in preference for these occupations have been documented in a number of cultures (Lippa, 1991, 1998, 2005, 2010; Semenyina & Vasey, 2016; Zheng et al., 2011). It is yet to be seen, however, whether *muxes* exhibit female-typical occupational preferences and childhood behavior when using cross-culturally validated standardized measurements.

### ***Muxes' Sexual Partners***

Unlike cisgender androphilic males from Western cultures, *muxes* do not engage in sexual interaction with members of their own groups. Instead, they seek out masculine men who self-identify as “straight.” These men are commonly known as *mayates* (i.e., Spanish for “dung beetle”)<sup>3</sup> in the Istmo region of Oaxaca as well as in many other parts of Mexico (Bennholdt-Thomsen, 1997; Carrier, 1995; Miano Borruso, 2002; Mirandé, 2017; Prieur, 1998; Trono, 1999). *Mayates* are masculine men who routinely play the insertive role during anal intercourse with androphilic males. Often, *mayates* engage in sexual activity with androphilic males for some form of economic profit such as money, food, alcohol, or clothes, and sometimes just for pleasure (Carrier, 1995; Mirandé, 2017; Prieur, 1998). Nonetheless, *mayates* also marry and have sex with women, and, for the most part, consider themselves to be “heterosexual” (Carrier, 1995; Mirandé, 2017;

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<sup>3</sup> Prieur (1998) provides an explanation for this term by stating that “the word *mayate* originated as the name of the scarab beetle which makes a ball out of dung, lays its eggs in it, and then pushes the ball in front of itself using its snout. This reflects the expectation that *mayates* are supposed to be the active party during anal intercourse” (p.27).

Prieur, 1998).

*Mayate* self-identification as “heterosexual” men is rooted on how male sexuality is structured in many parts of Mexico. In such places, the labeling of an individual as “heterosexual” or “homosexual” is not contingent on the sex of the partner, as is the case in most Western cultures, but is predicated instead on the role that each male partner play during anal intercourse (Carrier, 1995; Prieur, 1998; Trono, 1999). While individuals that take the receptive role during anal intercourse are labeled “homosexual,” those that take the insertive role are labeled “heterosexual.” As such, engaging in sexual intercourse with androphilic males do not make the *mayates* “homosexual” in the eyes of the community.

The prevalence of *mayates* within certain regions in Mexico are speculated to be relatively high, as most men are labeled as such during certain periods in their lives (Prieur, 1998; Trono, 1999). Indeed, it is believed that Zapotec men often have their first sexual encounters with *muxes* during adolescence (Miano Borruso, 2002). This is attributed to the lack of available female partners that men have during such time periods (Miano Borruso, 2002), a consequence of the importance that Istmo Zapotec place on female virginity before marriage (Bennholdt-Thomsen, 1997; Trono, 1999).

Despite the prevalence of *mayates* within Mexico and the Istmo Zapotec, they usually speak about their sexual encounters with androphilic males only to select confidants, and they often hide or even deny such activity when questioned (Carrier, 1995; Mirandé, 2017; Prieur, 1998). One reason for *mayates* secretiveness regarding their same-sex sexual activity is that they are not accepted to the same degree as *muxes*. This is partly because *mayates* are often blamed for the transmission of sexually transmitted diseases to women, given that they sleep with both *muxes* and women (Mirandé, 2017).



In addition, the reticence that *mayates* display can also be understood as a way to preserve their “heterosexual” identity in the eyes of Westerners, or those exposed to Western cultures, who conceive “heterosexuality” as a sexual preference for the opposite sex, instead of the sexual position that one adopts during sex (Prieur, 1998).

### **Cisgender and Transgender *Muxes***

*Muxes* vary in terms of the degree to which they present publically in a feminine manner (Mirandé, 2016). Not surprisingly then, the Istmo Zapotec recognize two types of *muxes*: *muxe gunaa* and *muxe nguiiu* (i.e., Zapotec for *muxe* “woman” and *muxe* “man,” respectively). *Muxe gunaa* are transgender androphilic males, comparable to the Samoan *fa’afafine*. They routinely dress in women’s clothing and present publically in a relatively feminine manner. In contrast, *muxe nguiiu* are cisgender androphilic males, comparable to Western “gay” men, who dress in men’s clothes and present publically in a relatively masculine manner. In the Istmo region, it is the transgender form of male androphilia (*muxes gunaa*) that predominates, but the cisgender form (*muxes nguiiu*) is quite common as well.

Like androphilic males elsewhere in the world (Bailey, 2003; Lippa, 2010; Whitam & Mathy, 1986), *muxe gunaa* and *muxe nguiiu* are relatively feminine when compared to gynephilic males, although the former tend to be much more so than the latter. Similarly, both types of *muxes* are exclusively (or near exclusively) attracted to masculine male sexual partners, as is overwhelmingly true for androphilic males regardless of the cultural context in which they are found (Bailey, 2003; Whitam & Mathy, 1986; Williams, 1986).

Previous qualitative research has demonstrated an association between social

class and *muxes*' gender role enactment. Specifically, cross-dressing appears to be more common among *muxes* who come from lower social classes (Miano Borruso, 2002; Mirandé, 2017). In a qualitative study that discusses *muxes* in the workplace, Céspedes Vargas (2015) argues that wage labor jobs (i.e., structured labor under a contract of employment) are mostly occupied by *muxes* that have a masculine gender expression, while self-employment is more common among *muxes* who have a feminine gender expression. Overall, it seems that while *muxe nguiiu* tend to come from higher social classes and work in structuralized occupations, *muxe gunaa* typically come from lower class and are routinely self-employed. Despite these differences, both types of *muxes* socialize together and, for the most part, consider each other to be members of the same community.

### **Comparing *Muxes* with Gynephilic Men**

The prevalence of both the cisgender and the transgender androphilic males among the Istmo Zapotec makes this culture a suitable one for conducting within culture comparisons of the two forms. As such, both empirical chapters of my thesis go beyond standard within-cultural comparisons between androphilic (*muxes*) and gynephilic males by undertaking additional, within-culture comparisons between cisgender (*muxe nguiiu*) and transgender (*muxe gunaa*) male androphiles. These comparisons are undertaken in relation to two purported correlates of male androphilia: one psychodevelopmental and the other biodemographic.

Chapter 2 of my thesis will be focused on one psychodevelopmental correlate of male androphilia: childhood separation anxiety. This chapter determined whether androphilic males, in general, recall elevated indicators of childhood separation anxiety

when compared to gynephilic males and whether transgender and cisgender androphilic males differ with respect to this trait. Chapter 3 presents on one biodemographic correlate of male androphilia: familial clustering of male androphilia. The research presented in this chapter denotes whether androphilic males, in general, have more androphilic male relatives when compared to gynephilic males, and whether transgender and cisgender androphilic males differ with respect to this trait. Chapter 4 summarizes the results of this thesis, discusses the broader significance of the findings, and provides some directions for future research.

## CHAPTER 2

### Recalled Separation Anxiety in Childhood in Istmo Zapotec Men, Women, and

#### *Muxes*<sup>4</sup>

#### Abstract

The Istmo Zapotec are a pre-Columbian cultural group indigenous to the Istmo region of Oaxaca, Mexico. Istmo Zapotec recognize three genders: men, women, and *muxes*. Like Istmo Zapotec men, *muxes* are biological males. However, unlike Istmo Zapotec men, most *muxes* are exclusively androphilic, relatively feminine, and routinely adopt the receptive role during anal intercourse. Furthermore, the Istmo Zapotec recognize two types of *muxes*: *muxe gunaa*, who resemble the transgender androphilic males that are common in many non-Western cultures, and *muxe nguiiu*, who resemble the cisgender androphilic males (“gay” men) common in Western cultures. Retrospective research conducted in Canada and Samoa demonstrates that cisgender and transgender androphilic males recall elevated indicators of childhood separation anxiety (i.e., feelings of distress related to separation from major attachment figures) when compared to males who are gynephilic (i.e., sexually attracted to adult females). The present study compared recalled indicators of childhood separation anxiety among Istmo Zapotec men, women, *muxe gunaa*, and *muxe nguiiu* ( $N = 454$ ). Men recalled significantly lower levels of childhood separation anxiety compared to all other groups (all  $p < .042$ ). No additional group differences were found. Our results are consistent with previous research conducted in Canada and Samoa, suggesting that

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elevated childhood separation anxiety is a developmental correlate of male androphilia that is cross-culturally universal. This research is also consistent with the conclusion that cisgender and transgender male androphiles share a common biological and developmental foundation despite being different in appearance.

## Introduction

The American Psychiatric Association's *Diagnostic and Statistical Manual of Mental Disorder (DSM-5)* defines Separation Anxiety Disorder (SAD) as developmentally inappropriate and excessive fear or anxiety concerning separation from those to whom the individual is attached (e.g., parents; American Psychiatric Association, 2013). In order to be diagnosed with SAD, the symptoms associated with the disorder must persist for four weeks in children and adolescents, and typically six months for adults. This condition appears to be more commonly manifested among girls compared to boys (Bowen, Offord, & Boyle, 1990; Shear, Jin, Ruscio, Walters, & Kessler, 2006).

Clinical research conducted in Canada indicates that highly feminine boys diagnosed with Gender Dysphoria<sup>5</sup>—the majority of whom will grow up to be androphilic men (Green, 1987; Singh, 2012)—presented with more indicators of separation anxiety relative to those who did not meet the criteria for a full diagnosis (Zucker, Bradley, & Lowry Sullivan, 1996). Additional research conducted in Canada using non-clinical samples indicates that adult cisgender androphilic males recalled elevated indicators of childhood separation anxiety when compared to their gynephilic counterparts (VanderLaan, Gothreau, Bartlett, & Vasey, 2011a; VanderLaan, Petterson, & Vasey, 2015, 2016). Similarly, cross-cultural research conducted in Samoa indicates that adult transgender androphilic males (known locally as *fa'afafine*) recalled elevated indicators of childhood separation anxiety when compared to Samoan gynephilic males (Vasey, VanderLaan, Gothreau, & Bartlett, 2011; VanderLaan, Petterson, & Vasey, 2017b).

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<sup>5</sup> Gender Dysphoria is characterized by strong and persistent cross-gender behavior and identity (American Psychiatric Association, 2013). Green (1987) and Singh (2012) employed diagnoses based on previous versions of the *Diagnostic and Statistical Manual (DSM)* in which GD was referred to as Gender Identity Disorder.

Evidence for elevated recalled indicators of childhood separation anxiety across two very different cultures, such as Canada and Samoa, suggests that childhood separation anxiety may represent a cross-cultural invariant pattern of psychosocial development in androphilic males. This conclusion would be greatly bolstered, however, if additional cross-cultural evidence could be garnered and, particularly, if that evidence was derived from a third, highly disparate culture. With this in mind, we sought to determine whether androphilic males recall elevated indicators of childhood separation anxiety in another distinct non-Western culture—the Istmo Zapotec.

The present study compared retrospective reports of childhood separation anxiety among Istmo Zapotec men, women, *muxe gunaa*, and *muxe nguiiu*. In light of previous research conducted in Canada and Samoa, we predicted that women and both types of *muxes* would recall elevated indicators of childhood separation anxiety when compared to men. In addition, because heightened childhood separation anxiety is associated with elevated female-typical behavior (VanderLaan et al., 2015, 2016, 2017b), we predicted that *muxe gunaa* would recall higher indicators of childhood separation anxiety than *muxe nguiiu*.

## **Method**

### **Participants**

Consistent with previous research in Samoa (Vasey et al., 2011; VanderLaan et al., 2017b), all participants were recruited using a network sampling procedure which consisted of contacting initial participants, who gave referrals for additional participants, who, in turn, provided further referrals, and so on. Data were collected in the city of Juchitán de Zaragoza, as well as 14 towns and villages within the Juchitán and Tehuantepec

districts in the Istmo region of Oaxaca, Mexico. Two field trips took place between November-December 2015 and February-March 2016. Monetary compensation (100 Mexican Pesos) was provided as an incentive to participate in the study. Participants were required to provide informed written consent prior to taking part in the study. This research was reviewed and approved by the University of Lethbridge's Human Subject Research Committee.

A total of 135 gynephilic men, 141 androphilic women, 117 *muxe gunaa*, and 61 *muxe nguiiu* were interviewed for this study. Participants' sexual orientation was assessed using a Kinsey scale (Kinsey, Pomeroy, & Martin, 1948) for sexual feelings over the previous year. Istmo Zapotec recognize that *muxes* are biological males as evidenced by the fact that they possess male genitalia. Nevertheless, participants were informed that the category "males" included men and/or *muxes*, whereas the category "females" only included women. All men identified as exclusively (Kinsey rating = 0,  $n = 132$ ) or predominantly gynephilic (Kinsey rating = 1,  $n = 3$ ). All women identified as exclusively (Kinsey rating = 6,  $n = 140$ ) or predominantly androphilic (Kinsey rating = 5,  $n = 1$ ). All *muxe gunaa* identified as exclusively androphilic (Kinsey rating = 6,  $n = 117$ ). All *muxe nguiiu* identified as predominantly (Kinsey rating = 5,  $n = 7$ ) or exclusively androphilic (Kinsey rating = 6,  $n = 54$ ).

### **Materials and Procedure**

Participants were interviewed using standardized questionnaires, which were available in Spanish after being translated and back-translated by fluent Spanish-English speakers. The author and a Spanish-speaking research assistant were available to answer participants' questions. A Zapotec-speaking research assistant was also present for



interviews, when participants were not fully fluent in Spanish. Questions were read out loud by research assistants in Spanish or Zapotec as necessary.

### *Biographic Information*

Participants were asked to report information regarding their age (in years), level of education, and level of income. Level of education was reported by stating the highest level of education achieved (1 = “None,” 2 = “Primary,” 3 = “Secondary,” and 4 = “Post-secondary,” which is the Canadian equivalent of “None,” “Elementary,” “Middle School,” and “High school,” respectively). Level of income was based on an average weekly income scale that ranged from 1 (0-250 Mexican Pesos) to 9 (more than 2000 Mexican Pesos).

### *Separation Anxiety Scale*

The Separation Anxiety Scale (SAS) utilized in this study was composed of seven questions that correspond to seven of the diagnostic criteria for SAD listed in *DSM-5*, which have been previously shown to adequately distinguish children with higher and lower levels of separation anxiety (Cooper-Vince, Emmert-Aronson, Pincus, & Comer, 2013). The scale assessed recalled indicators of separation anxiety between the ages of 6 to 12 years old. Participants rated how true each item was for them during their childhood using a 5-point Likert-type scale that ranged from 1 = “Never True” to 5 = “Always True.” In keeping with previous research (VanderLaan et al., 2011a; Vasey et al., 2011), group differences were examined for each of the items individually. In addition, mean separation anxiety scores were calculated by averaging participants’ ratings for all seven SAS items, which were then compared across groups. Cronbach’s alpha coefficients for SAS reliability were appreciable for men ( $\alpha = .71$ ), women ( $\alpha = .74$ ), *muxe gunaa* ( $\alpha = .76$ ), and *muxe nguiiu* ( $\alpha = .73$ ), as well as among all groups combined ( $\alpha = .75$ ).

## Results

A one-way analysis of variance (ANOVA) revealed no significant group differences for age or level of income (Table 2.1). A significant difference was found for level of education, and post hoc pairwise comparisons (Fisher's Least Significant Difference, LSD) showed that *muxe gunaa* had less education than all the other groups ( $p < .001$ ). Consequently, level of education was controlled for in all subsequent inferential analyses.

**Table 2.1**

*Descriptive and Inferential Statistics for Biographic Variables by Group*

	<b>Men</b> ( <i>n</i> = 135)		<b><i>Muxe Nguiiu</i></b> ( <i>n</i> = 61)		<b><i>Muxe Gunaa</i></b> ( <i>n</i> = 117)		<b>Women</b> ( <i>n</i> = 141)		One-way ANOVA	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>F</i> <sub>3, 450</sub>	<i>p</i>
Age (in years)	31.03	9.90	30.97	10.11	30.96	9.46	30.64	10.34	0.04	ns
Level of Education <sup>a,b,c</sup>	3.56	0.65	3.62	0.66	3.05	0.84	3.65	0.68	17.93	<.001
Level of Income	4.86	2.40	5.02	2.59	4.72	2.28	4.33	2.69	1.53	ns

<sup>a</sup> Statistically significant difference ( $p < .001$ ) between *muxe gunaa* and gynephilic men

<sup>b</sup> Statistically significant difference ( $p < .001$ ) between *muxe gunaa* and women

<sup>c</sup> Statistically significant difference ( $p < .001$ ) between *muxe gunaa* and *muxe nguiiu*

Between group comparisons were performed for each of the seven SAS items, and mean separation anxiety scores, using one-way analyses of covariance (ANCOVA), controlling for level of education. Post hoc pairwise comparisons were conducted using Fisher's LSD. Results of the comparisons between *muxe nguiiu*, *muxe gunaa*, women, and men are summarized in Table 2.2. Group differences were found for five of the seven individual items. Of those items, men scored significantly lower than women on all five; significantly lower than *muxe gunaa* on all but one item (Item 1); and significantly lower than *muxe nguiiu* on two items (Item 6 and 7). Women scored significantly higher than

*muxe gunaa* on one item (Item 1), whereas *muxe gunaa* scored significantly higher than women on another item (Item 6). No significant differences were observed between the two types of *muxes* (all  $p > .116$ ).

**Table 2.2**

*Separation Anxiety Scores by Item for Muxe Nguiiu, Muxe Gunaa, Women, and Men, Controlling for Level of Education*

	<b>Men</b> ( <i>n</i> = 135)		<b>Muxe Nguiiu</b> ( <i>n</i> = 61)		<b>Muxe Gunaa</b> ( <i>n</i> = 117)		<b>Women</b> ( <i>n</i> = 141)		<b>One-way ANCOVA</b>	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>F</i> <sub>3, 449</sub> <sup>e</sup>	<i>p</i>
I got very upset if I had to be away from my parents or away from home <sup>b,d</sup>	2.65	1.31	2.89	1.63	2.49	1.55	3.15	1.35	3.81	.010
I worried a lot about something terrible happening to my parents <sup>a,d</sup>	4.21	1.21	4.51	.94	4.59	.96	4.57	.88	3.60	.014
I did not want to go to school because it meant being away from my parents	1.69	1.10	1.53	.98	2.05	1.31	1.81	1.11	1.75	.157
I did not want to sleep alone <sup>a,d</sup>	2.27	1.38	2.43	1.53	2.91	1.71	2.74	1.46	3.24	.022
I had nightmares about being separated from my parents	1.90	1.13	1.97	1.21	2.44	1.51	2.17	1.21	2.30	.077
If I knew that I would have to be away from my parents, I would get physically ill <sup>a,b,c,d</sup>	1.78	1.08	2.38	1.47	2.87	1.54	2.19	1.36	10.38	<.001
I was scared of being alone without a close family member at home or in another setting <sup>a,c,d</sup>	1.99	1.15	2.53	1.49	2.77	1.67	2.75	1.44	7.92	<.001
Mean Scores <sup>a,c,d</sup>	2.36	.72	2.60	.83	2.87	.95	2.77	.80	8.08	<.001

Possible range for all SAS items [1, 5]

<sup>a</sup> Statistically significant difference ( $p < .05$ ) between *muxe gunaa* and gynephilic men

<sup>b</sup> Statistically significant difference ( $p < .05$ ) between *muxe gunaa* and women

<sup>c</sup> Statistically significant difference ( $p < .05$ ) between *muxe nguiiu* and gynephilic men

<sup>d</sup> Statistically significant difference ( $p < .05$ ) between gynephilic men and women

<sup>e</sup> Levene's tests for equality of variances were significant for all items ( $p < .05$ )

Finally, group differences were also observed for mean separation anxiety scores, in which men exhibited significantly lower scores than women ( $p < .001$ , Cohen's  $d = .54$ ), *muxe gunaa* ( $p < .001$ , Cohen's  $d = .62$ ), and *muxe nguiiu* ( $p = .042$ , Cohen's  $d = .32$ ). Mean separation anxiety scores did not differ among *muxe nguiiu*, *muxes gunaa*, and women (all  $p > .17$ ).

The 95% confidence intervals (CI) associated with these effect sizes overlap substantially for *muxe gunaa* (0.37, 0.87) and *muxe nguiiu* (0.02, 0.63), which provides further evidence that these two groups do not differ significantly for recalled indicators of childhood separation anxiety. In addition, when comparing the effect sizes between: (1) men and *muxe gunaa* and (2) men and *muxe nguiiu*, a two-tailed Fisher's  $r$  to  $z$  transformation<sup>6</sup> (Cohen, 1988) revealed no significant difference in recalled indicators of childhood separation anxiety ( $z = 0.90$ ,  $p = 0.368$ ) suggesting, once again, that the two groups of *muxes* did not differ for the trait in question.

### Discussion

The present study compared recalled indicators of childhood separation anxiety among Istmo Zapotec gynephilic men, androphilic women, and third-gender androphilic males (known locally as *muxes*). The Istmo Zapotec recognize two types of *muxes*: those who are transgender (*muxe gunaa*) and those who are cisgender (*muxe nguiiu*). Our results were largely consistent with our stated predictions. We found a sex difference in recalled indicators of childhood separation anxiety, with women exhibiting elevated scores compared to men. In addition, we found a male sexual orientation difference in recalled indicators of childhood separation anxiety, with *muxes* exhibiting elevated scores compared to men. *Muxes* and women did not differ in this regard. However, contrary to our prediction, transgender (*muxe gunaa*) and cisgender (*muxe nguiiu*) *muxes* did not differ significantly in terms of recalled indicators of childhood separation anxiety. This lack of significant difference could be an artifact of the relatively small sample size we employed for *muxe nguiiu* ( $n = 61$ ), and as such a result of a Type II error.

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<sup>6</sup> Cohen's  $d$  statistics were converted to  $r$  using the following formula:  $r = \sqrt{\frac{d^2}{d^2+4}}$

Istmo Zapotec represents the third culture, in addition to Samoa (VanderLaan et al., 2017b; Vasey et al., 2011) and Canada (VanderLaan et al., 2011a, 2015, 2016), in which a male sexual orientation difference in recalled indicators of childhood separation anxiety has been documented (Samoan studies Cohen's  $d = .41$  to  $.76$ ; Canadian studies Cohen's  $d = .30$  to  $.35$ ). The consistent nature of these results across three highly disparate cultures strongly suggests that sub-clinical childhood separation anxiety is a cross-culturally universal correlate of male androphilia. This relationship appears to exist regardless of whether male androphilia manifests in the cisgender or the transgender form, suggesting that the two share a similar developmental foundation.

Recently, VanderLaan et al. (2017) demonstrated that boys diagnosed with Gender Dysphoria not only exhibit SAD, but also exhibit other types of internalizing problems (e.g., general anxiety, depression, social withdrawal), suggesting that SAD is just one of many types of internalizing problems that gender dysphoric boys manifested. In light of this, it is interesting to note that the Zapotec term *namuxe'*, which is one of the possible origins of the term *muxe* (see Chapter 1), translates to “shy,” “timid,” or “cowardly.” Coincidentally, these are also behaviors that characterize boys with internalizing problems. It is possible, then, that *muxes'* elevated indicators of recalled separation anxiety is part of a broader pattern of internalizing problems that they experience during childhood. A broader assessment of the potential internalizing problems exhibited by children among the Istmo Zapotec should shed some light into this possibility.

There are several proximate mechanisms that may account for the fact that (pre)androphilic male children exhibit elevated recalled indicators of childhood separation anxiety compared to their gynephilic male counterparts. These include social, hormonal,

and/or genetic factors. With respect to social mechanisms, research demonstrates that, across different cultures, over-protective parenting is associated with a variety of anxiety symptoms and disorders in children and adolescents (Edwards, Rapee, & Kennedy, 2010; Mousavi, Low, & Hashim, 2016; Rapee, 1997; Wood, McLeod, Sigman, Hwang, & Chu, 2003). Furthermore, girls and feminine males have been found to encounter such parenting more often compared to gender-normative boys (Alanko et al., 2008, 2009).

Evidence suggests that the direction of causality between parental overprotection and offspring anxiety can be bidirectional (Edwards et al., 2010; Rapee, 2012). In other words, overprotective parenting can lead to childhood anxiety, but childhood anxiety can also lead to overprotective parenting. Indeed, there is substantial evidence that many parenting styles occur as a *response* to the traits and behaviors of children, rather than being their cause (Harris, 2009), not to mention the fact that parents and children share common genes, and anxiety is heritable (Polderman et al., 2015). Given that childhood anxiety can presage overprotective parenting, it seems reasonable to argue that parenting styles—which vary across cultures such as Canada, Samoa, and the Istmo Zapotec (e.g., Fry, 1993; Liu & Guo, 2010; Ritchie & Ritchie, 1983)—might moderate pre-existing tendencies toward childhood separation anxiety, but are unlikely to cause them. Simply put, the invariant nature of male sexual orientation differences in recalled indicators of childhood separation anxiety across very different cultures downgrade the probability that culturally-specific parenting styles cause the male sexual orientation difference in question, thereby rendering the role of biological factors as more probable mechanisms.

Thus, with respect to hormonal mechanisms, exposure to sex-atypical levels of sex steroid hormones during critical prenatal periods is thought to “feminize” areas of the male

brain that regulate sexual orientation, as well as correlated behaviors (Balthazart, 2016; Bao & Swaab, 2011; Berenbaum & Beltz, 2011, 2016; Ellis & Ames, 1987; Hines, Constantinescue, & Spencer, 2015). Research on avian and non-human primate models indicates that the prenatal administration of estrogen and synthetic antiandrogens in males alters the rates of infant separation distress vocalization in a female-typical fashion (Bernroider, Holztrattner, & Rottner, 1996; Wallen & Hassett, 2009). Consequently, prenatal exposure to female-typical sex steroid hormones may influence attachment and anxiety in humans (Del Giudice, 2009), and this, in turn, may give rise to sex and male sexual orientation differences in childhood separation anxiety.

Both the current study and past research conducted in the U.S., Canada, and Samoa (Bowen et al., 1990; Shear et al., 2006; VanderLaan et al., 2011a, 2015, 2016, 2017b) suggest that indicators of childhood separation anxiety are more commonly manifested in female, than in male, children. Thus, consistent with the predictions of the neuroendocrine organizational hypothesis, androphilic males are feminized with respect to their expression of this trait. This suggests that the developmental processes resulting in same-sex sexual partner preference have general effects in males. Indeed, research demonstrates that recalled childhood separation anxiety is positively correlated with recalled childhood femininity in Canadian and Samoan androphilic men (VanderLaan et al., 2015, 2016, 2017b). Although *muxe gunaa* and *muxe nguiiu* did not differ significantly with respect to the trait in question, our results accord well with those of VanderLaan et al.'s (2015, 2016, 2017b) Canadian and Samoan findings, inasmuch as *muxe nguiiu* scored intermediate between men and women in recalled childhood separation anxiety, whereas *muxe gunaa* scored in a manner that was more similar to women.

With respect to genetic mechanisms, twin studies indicate that common genetic factors underlie childhood gender-atypical behavior and same-sex sexual partner preference in males (Alanko et al., 2010), as well as neuroticism—a personality trait that is conceptually similar to anxiety (Zietsch, Verweij, Bailey, Wright, & Martin, 2011). Molecular genetics research indicates that Xq28—a region located at the tip of the X chromosome—is linked to male androphilia (Hamer, 2002; Sanders et al., 2015). Gene manipulation in this region has been used in mouse models to implicate this locus in the regulation and expression of anxiety (Samaco et al., 2012). Taken together, these findings seem to suggest that common genetic factors might underlie the expression of separation anxiety and male androphilia due to genetic linkage (i.e., proximity of genes in the same chromosome). It has yet to be demonstrated, however, whether the Xq28 region is linked to anxiety in humans.

Complementing the putative mechanistic bases for male sexual orientation differences in childhood separation anxiety, researchers have also addressed the potential evolutionary basis for these characteristics. VanderLaan, Gothreau, Bartlett, and Vasey (2011b) hypothesized that childhood separation anxiety is indicative of an elevated concern for the well-being of kin, making it an adaptive, developmentally appropriate expression of kin altruism. In support of this hypothesis, research demonstrates that Canadian androphilic “gay” men recalled significantly more indicators of childhood separation anxiety that relate to concern for parental well-being compared to gynephilic men, but they did not differ in this regard from androphilic women (VanderLaan et al., 2015, 2016). Samoan *fa’afafine* also recalled significantly more indicators of childhood separation anxiety that relate to concern for well-being of kin compared to gynephilic men and



androphilic women, and this tendency was associated with *fa'afafine's* willingness in adulthood to invest in nieces and nephews (VanderLaan et al., 2017b).

In the context of this literature, it is interesting to note that Item 2 of the SAS taps into childhood concern about parental well-being (“I worried a lot about something terrible happening to my parents”), whereas all of the other items are more accurately characterized as pertaining to concern due to separation from parents (Table 2.2). It is noteworthy that all groups scored much higher on Item 2 than they did on the other items, a pattern that is consistent with previous research in both Canada and Samoa (VanderLaan et al., 2015, 2016, 2017b). Furthermore, women and *muxe gunaa* scored higher than men for this item, a pattern that one would predict on the basis of previous studies. Employing a multi-item instrument that specifically assesses concern about parental well-being, such as VanderLaan et al.’s (2015) Parental Worry Subscale, may reveal similar differences between men and *muxe nguiiu*.

### **Limitations**

Several limitations call for caution when interpreting these results. First, retrospective reports of childhood behaviors have been characterized as flawed by critics who argue that such research is prone to selective recall bias and memory distortion (Fausto-Sterling, 2014; Gottschalk, 2003; Maughan, & Rutter, 1997; Ross, 1980). For example, some critics might suggest that the *muxes* in our study had heightened recall of their separation anxiety in childhood in order to create a consistent personal narrative in which there is a logical progression from a feminine childhood to a feminine adulthood. This explanation would, however, fail to account for why *muxe nguiiu*, who present in a relatively masculine manner in adulthood, also recalled indicators of childhood separation

anxiety that were statistically elevated in comparison to gynephilic men. Furthermore, our findings are consistent with clinical research demonstrating that boys exhibiting elevated feminine behaviors and identity also exhibit elevated indicators of childhood separation anxiety (Coates & Person, 1985; Zucker et al., 1996). The majority of such boys are androphilic in adulthood (Green, 1987; Singh, 2012). In addition, it is highly noteworthy that empirical evidence in support of this selective recall/memory distortion hypothesis is non-existent (for review, see Bailey & Zucker, 1995; Bailey et al., 2016; Zucker et al., 2006). Nevertheless, prospective studies among the Istmo Zapotec (and other non-Western populations) would be desirable to further elucidate the relationship between childhood separation anxiety and adult male androphilia outside of a Western cultural context.

The network sampling procedure utilized in this study could have conceivably produced an unrepresentative sample of the Zapotec population. However, the representativeness of our study sample was increased by the fact that we sampled participants not only from the largest urban center in the Istmo region—the city of Juchitán de Zaragoza—but from 14 other towns and villages throughout the region in both the Tehuantepec and Juchitán districts. As such, we consider our data collection to have been reasonably comprehensive. It is also worth noting that we collected and statistically controlled for various biographic variables to reduce any systematic error. Nonetheless, future studies could consider using random sampling procedures to eliminate potential sample bias.

Finally, although our sample of *muxe nguiiu* ( $n = 61$ ) was larger than samples of androphilic males that are commonly utilized in cross-cultural research, it was relatively

small when compared to the other groups we compared in this study. As such, it would be valuable if larger groups of *muxe nguiiu* could be recruited for future research.

## **Conclusion**

Although this study was conducted on a non-clinical population, it has implications for clinicians treating children's mental health conditions. Specifically, one could reasonably argue that childhood separation anxiety represents a normative part of androphilic males' developmental life-course when it occurs at sub-clinical levels, given that it has been shown to reflect prosocial (VanderLaan et al., 2015, 2016, 2017b), as well as cross-culturally universal tendencies (Coates & Person, 1985; VanderLaan et al., 2011a, b, 2015, 2016, 2017b; Vasey et al., 2011; Zucker et al., 1996). Building on research conducted with Canadian androphilic men (VanderLaan et al., 2015, 2016) and Samoan *fa'afafine* (VanderLaan et al., 2017b), future research among the Istmo Zapotec should examine whether *muxes'* elevated indicators of childhood separation anxiety are linked to an elevated concern for the well-being of kin and, if so, whether this is influenced by childhood femininity—a trait that typifies androphilic males in a wide range of cultures worldwide (Bailey & Zucker, 1995; Bartlett & Vasey, 2006; Besharat, Karimi, & Saadati, 2016; Cardoso, 2005, 2009; Green, 1987; Petterson et al., 2017; Singh, 2012; Whitam, 1980).

## CHAPTER 3

### **Familial Patterning and Prevalence of Male Androphilia in Istmo Zapotec Men and**

#### *Muxes*<sup>7</sup>

#### **Abstract**

Male androphilia is known to cluster within families. Some studies demonstrate that male androphilia clusters in both the paternal and maternal familial lines, whereas other studies demonstrated that it clusters only in the latter. Most of these studies were conducted in Western populations where fertility is low and the sexual orientation of male relatives can sometimes be difficult to ascertain. These two factors can potentially confound the results of such studies. To address these limitations, we examined the familial patterning of male androphilia among the Istmo Zapotec of Oaxaca, Mexico—a high fertility, non-Western population where androphilic males are known locally as *muxes*. The Istmo Zapotec recognize two types of *muxes*—*muxe gunaa* and *muxe nguiiu*—who typify the transgender and cisgender forms of male androphilia, respectively. We compared the familial patterning of male androphilia between *muxe gunaa* and *muxe nguiiu*, as well as between both *muxe* forms combined and gynephilic men ( $N = 340$ ). Istmo Zapotec *muxe gunaa* and *muxe nguiiu* exhibit similar familial patterning of male androphilia. Overall, *muxes* were characterized by significantly more *muxe* relatives than gynephilic men. This familial patterning was equivalent in both the paternal and maternal lines of *muxes*. The population prevalence rate of male androphilia was estimated to fall between 3.35–6.04%

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in the Istmo Zapotec. This is the first study that has compared cisgender and transgender androphilic males from the same high fertility population and demonstrated that the two do not differ with respect to the familial patterning of male androphilia.

## Introduction

The existence of exclusive male androphilia in humans and non-human animals is widely considered to be one of *the* outstanding paradoxes in evolutionary biology because it hinders direct reproduction (Schwartz et al., 2010; Vasey et al., 2014). Compounding this puzzle is the fact that both twin (Alanko et al., 2010; Bailey, Dunne, & Martin, 2000; Kendler, Thornton, Gilman, & Kessler, 2000; Långström, Rahman, Calström., & Lichtenstein, 2010) and molecular genetic studies (Hamer, 2002; Mustanski et al., 2005; Sanders et al., 2015) indicate that male androphilia is influenced by genetic factors, and is thus, at least partially heritable. A more precise understanding of the nature of this heritability can be obtained by conducting family studies, which shed light on the way male androphilia clusters in families (i.e., whether they are grouped on the maternal line, paternal line, or both).

In Western cultures, various family studies have consistently demonstrated that cisgender androphilic males have more androphilic male brothers than gynephilic males, bolstering the conclusion that male androphilia is familial (Bailey et al., 1999; Schwartz et al., 2009; reviewed in Zucker & Bradley, 1995). However, when examining more distant categories of male kin in an attempt to determine whether male androphilia is inherited through the maternal line, paternal line, or both, studies of the familial clustering of cisgender androphilic males have provided a mixture of results. Some studies demonstrate that “gay” men have a preponderance of “gay” male relatives, but only in the maternal line (Camperio Ciani, Corna, & Capiluppi, 2004; Hamer, Hu, Magnuson, Hu, & Pattatucci, 1993; Rahman et al., 2008). These studies suggest that X-linkage factors might play an essential role in the expression of male androphilia because males can only share X-linked

genes with maternal kin. At the same time, other studies demonstrate that “gay” men exhibit a preponderance of “gay” male relatives in both the maternal and the paternal lines (Bailey et al., 1999; Schwartz et al., 2010). This pattern of familial clustering is consistent with the conclusion that genes for male androphilia can be inherited from both parents through autosomal-linked genes.

The discrepancies between the family studies described above may be partially explained by the low fertility rates typical in most Western cultures (Central Intelligence Agency, 2016). Families in Western societies tend to cease reproduction after obtaining a certain number of children, or after having one child of each sex. The existence of these so called “stopping rules” may obscure the familial patterning of low-frequency traits such as male androphilia (Gates, 2011), as has been shown to be the case for other well-established biodemographic correlates of male sexual orientation such as the fraternal birth order effect (Blanchard & Lippa, 2007; Xu & Zheng, 2017; Zucker, Blanchard, Kim, Pae, & Lee, 2007).

Additionally, because cisgender androphilic males in the West identify as men, and there are numerous cultural reasons for not disclosing one’s sexual orientation (e.g., D’Augelli & Grossman, 2001; D’Augelli, Hershberger, & Pilkington, 1998), it is possible that Western participants may report inaccurate or incomplete information regarding the sexual orientation of both themselves and their male relatives. This potential confound is circumvented in cultures in which transgender male androphilia predominates, since presentation as a transgender male in such contexts is, almost invariably, an unambiguous indicator of androphilia. In many non-Western cultures, androphilic males are recognized as occupying a third gender category that is distinct from men and women. In such

instances, a male's status as a third gender is also a reliable indicator of androphilia. As such, family studies conducted in high fertility non-Western populations, where androphilic males are recognized as third genders and predominately adopt the transgender form, are a valuable complement to studies carried out with "gay" men in lower fertility Western populations.

Research conducted in Samoa—a non-Western, high fertility population—has consistently demonstrated that the families of transgender androphilic males (known locally as a third gender—*fa'afafine*) have a higher proportion of androphilic male relatives (i.e. brothers, uncles, and cousins) when compared to the families of gynephilic males (Semenyna et al., 2016; VanderLaan et al., 2013a, b). These studies showed that *fa'afafine* have a preponderance of *fa'afafine* relatives in both their maternal and paternal lines, suggesting that autosomal-linkage factors are important for the inheritance of male androphilia. However, the rate of male androphilia among relatives with whom participants were more likely to share X-linked genes (i.e., maternal uncles and cousins via maternal aunts) was higher for *fa'afafine* than gynephilic males (Semenyna et al., 2016), furnishing some support for the role of X-linkage factors in the maintenance of male androphilia. Thus, evidence derived from family studies in Samoa indicates that male androphilia is familial, and is influenced by both autosomal and X-linkage factors.

Data from these family studies have also been used to estimate the population prevalence rate of male androphilia in Samoa. VanderLaan et al. (2013a) reported a population prevalence rate between 1.43–4.65%. In the larger follow-up study, Semenyna et al. (2016) reported similar, but more circumscribed results (0.61–3.51%). These rates



are comparable to those obtained for “gay” men in Western cultures (~1–5%) (e.g., Gates, 2011; Laumann, Gagnon, Michael, & Michaels, 1994).

Research conducted in Samoa provides the first empirical evidence that transgender male androphilia cluster within families. However, further evidence from additional non-Western, high fertility populations would help to elucidate the patterns of inheritance that typify transgender and cisgender male androphiles, especially if that evidence was derived from a culture that is unrelated to Samoa. In addition, such data could be used to generate prevalence rates of male androphilia in additional non-Western populations, thereby addressing calls for such research (Bailey et al., 2016). With this in mind, we examined the familial patterning of male androphilia among the Istmo Zapotec.

Fertility rates in Oaxaca, where the Istmo Zapotec inhabit, are estimated to be higher than neighboring Mexican states (Consejo Nacional de Población, 2016). A widespread belief among the Istmo Zapotec is that *muxes* “run in families,” and their status as *muxe* is determined at birth by biological factors (Chiñas, 1995; Miano Borruso, 2002). Our study tested this folk belief by examining whether male androphilia is familial among the Istmo Zapotec. Given that substantial numbers of both transgender and cisgender *muxes* exist among the Istmo Zapotec, a unique *within*-culture comparison can be made of the proportion of androphilic male relatives in the families of both cisgender (*muxe nguiiu*) and transgender (*muxe gunaa*) androphilic males.

Thus, the first aim of the present study was to compare the familial patterning and prevalence of androphilic male relatives between *muxe gunaa* and *muxe nguiiu*. Next, the prevalence of *muxe* relatives (i.e., brothers, uncles, and cousins) was compared between the families of Zapotec *muxes* and gynephilic males. Given evidence suggesting that both

forms of male androphilia share a common biological foundation, we expected that *muxe nguiiu* and *muxe gunaa* would display no difference in the prevalence of their androphilic male relatives. We did predict, however, that *muxes* (cisgender and transgender combined) would exhibit a preponderance of *muxe* relatives when compared to gynephilic male probands. In addition, we assessed whether *muxe* probands exhibited a preponderance of *muxe* relatives within the kin categories with whom they are more likely to share X-linked genes (i.e., maternal uncles and cousins via maternal aunts), thereby informing our understanding of the potential role of X-linkage factors in the development of male androphilia. Finally, a population prevalence rate of male androphilia among the Istmo Zapotec was calculated, which we predicted to be consistent with rates found in both Western and non-Western cultures (i.e., ~1–5%).

## **Method**

### **Participants**

Consistent with previous family studies conducted in Samoa (Semenyna et al., 2016; VanderLaan et al., 2013a), all participants were recruited using a network sampling procedure which consisted of contacting initial participants, who gave referrals for additional participants, who in turn provided further referrals, and so on. Data were collected in the city of Juchitán de Zaragoza, as well as 14 other towns and villages within the Juchitán and Tehuantepec districts in the Istmo region of Oaxaca, Mexico. Three separate field trips took place between November-December, 2015, February-March 2016, and November-December 2016. Monetary compensation (100 Mexican Pesos) was provided as an incentive to participate in the study. Participants were required to provide

informed written consent prior to taking part in the study. This research was reviewed and approved by the University of Lethbridge's Human Subject Research Committee.

A total of 171 gynephilic men and 169 *muxes* (110 *muxe gunaa* and 59 *muxe nguiiu*) were interviewed for this study. None of the participants were brothers or first cousins. Participants' sexual orientations were assessed using a 7-point Kinsey scale (Kinsey, Pomeroy, & Martin, 1948), which asked about sexual feelings over the previous year. All men identified as exclusively (Kinsey rating = 0,  $n = 165$  men) or predominantly gynephilic (Kinsey rating = 1,  $n = 6$  men). All *muxes* identified as predominantly (Kinsey rating = 5,  $n = 7$  *muxe nguiiu*) or exclusively androphilic (Kinsey rating = 6,  $n = 52$  *muxe nguiiu*;  $n = 110$  *muxe gunaa*).

### **Materials and Procedure**

Participants were interviewed using questionnaires, which were available in Spanish after being translated and back-translated by two fluent Spanish-English speakers. Two of the authors (FRG, LC) and Spanish-speaking research assistants were available to answer participants' questions. When participants were not fully fluent in Spanish, a Zapotec-speaking research assistant was also present for interviews. Questions were read out loud by research assistants in Spanish or Zapotec as necessary.

Participants reported the total number of biological brothers they had, as well as all male relatives (uncles, male cousins via aunts, and male cousins via uncles) for both the paternal and maternal sides of their families (see Appendix for example). An additional category was created combining maternal uncles and male cousins via maternal aunts in order to test for potential X-linkage factors of male androphilia. These kin categories are the only males with whom probands might share common X-linked genes (brothers were

not included to this created category since they cannot be used to conduct comparisons between the paternal and maternal sides of a family). The participants identified how many of those relatives were *muxes*. This information was used to calculate the proportion of *muxes* relatives within each kin category for each participant. These proportions were then averaged for each kin category within each participant group (i.e., men, *muxe gunaa*, and *muxe nguiiu*) so as to create a mean proportion of *muxe* relative, which was then used to conduct group comparisons.

Some of the participants had relatives who moved outside of the Istmo to different states within Mexico or to different countries that are known to have lower fertility rates (e.g., Mexico City, United States). Since our primary aim in this study was to analyze the prevalence of *muxes*, a unique gender category among the Istmo Zapotec, only male relatives who were raised within the Istmo region of Oaxaca and whose parents had spent their entire reproductive history within this region were included in the analysis.

## **Results**

### **Comparison between *Muxe Gunaa* and *Muxe Nguiiu***

The average proportion of *muxe* relatives among Istmo Zapotec *muxe gunaa* and *muxe nguiiu* was compared using a Mann-Whitney U test (Table 3.1). The test revealed that the two types of *muxes* did not significantly differ with respect to the proportion of *muxe* relatives overall (i.e., maternal and paternal lines combined; see Section 1, Table 3.1). Additionally, *muxe gunaa* and *muxe nguiiu* did not differ significantly with respect to the prevalence of *muxe* relatives in either their combined paternal (see Section 2, Table 3.1) or combined maternal lines (see Section 3, Table 3.1). Within the maternal line, *muxe gunaa* were found to have significantly more *muxe* cousins via aunts compared to *muxe*

*nguiiu* (Section 3, Table 3.1). The prevalence of *muxe* relatives in the category “X-chromosome-linked male kin” (i.e., maternal uncles and male cousins via maternal aunts combined) did not differ significantly between groups (see Section 3, Table 3.1). Lastly, no significant difference was observed when comparing the proportion of *muxe* brothers between *muxe gunaa* and *muxe nguiiu* probands (see Section 4, Table 3.1).

Within-group comparisons were conducted comparing the paternal and maternal relatives of *muxe gunaa* and *muxe nguiiu* using the Wilcoxon Signed Rank test (Table 3.2). For both types of *muxes*, no significant differences were observed for the prevalence of androphilic male relatives in paternal and maternal kin categories (i.e., uncles, male cousins via uncles, and male cousins via aunts). Finally, further within group comparisons were conducted using Friedman tests (Table 3.3) in order to compare the prevalence of *muxe* relatives across different kin categories. Among *muxe gunaa*, a significant difference was found between kin categories when considering all relatives combined (i.e., maternal and paternal). Post hoc Wilcoxon’s signed rank test demonstrated a preponderance of *muxe* cousins via aunts compared to *muxe* cousins via uncles ( $z = 2.67, p = .008$ ). A significant difference was also found among kin categories within the maternal line of *muxe gunaa*, but post hoc analysis failed to yield specific significant differences (all  $p > .065$ ). *Muxe nguiiu* showed no significant differences in the proportion of *muxe* relatives in any kin category (Table 3.3).

### **Comparison between *Muxes* and Gynephilic Males**

Given that proportions of *muxe* relatives among the families of *muxe gunaa* and *muxe nguiiu* were largely equivalent, the two *muxe* types were combined in order to compare them to gynephilic males. Mann-Whitney  $U$  tests (Table 3.4) revealed that *muxe*

probands had more *muxe* relatives overall (i.e., maternal and paternal lines combined) than gynephilic male probands (see Section 1, Table 3.4). *Muxe* probands also had a higher proportion of androphilic male paternal relatives compared to gynephilic males (see Section 2, Table 3.4), whereas maternal relatives did not differ between the groups (see Section 3, Table 3.4). Within *muxes*' paternal line, no individual kin category was found to be driving the preponderances of paternal *muxe* relatives compared to those of gynephilic males (see Section 2, Table 3.4). When considering the category "X-chromosome-linked male kin" (i.e., maternal uncles and male cousins via maternal aunts combined), no significant differences in the prevalence of *muxe* relatives were found between groups (see Section 3, Table 3.4). Lastly, *muxes* reported having more *muxe* brothers than gynephilic males (see Section 4, Table 3.4).

Within group comparisons were conducted using Wilcoxon Signed Rank tests in order to compare the prevalence of *muxe* relatives in the paternal and maternal lines of *muxes* and gynephilic males (Table 3.5). For both groups, no significant differences were observed for the prevalence of androphilic male relatives in paternal and maternal kin categories (i.e., uncles, male cousins via uncles, and male cousins via aunts). Finally, additional within group comparisons were conducted using Friedman tests (Table 3.6) in order to compare the prevalence of *muxe* relatives across different kin categories. *Muxes* showed no significant differences in the proportion of *muxe* relatives in any kin category. Among gynephilic men, a significant difference was found within the maternal line. However, post hoc Wilcoxon's signed rank test failed to yield significant differences between any of the kin categories (all  $p > .055$ ).

### **Population Prevalence Estimate of Male Androphilia among the Istmo Zapotec**

The family data collected in the current study were used to calculate a population prevalence estimate of *muxes* (i.e., male androphilia) among the Istmo Zapotec. Consistent with previous studies, the population prevalence estimate was comprised of the overall proportion of *muxe* relatives (i.e., paternal and maternal lines combined, including brothers) in relation to all male relatives (listed in Table 3.4). Specifically, the upper bound of the population prevalence estimate was calculated using the prevalence of *muxe* relatives among *muxe* probands, while the lower bound was calculated using the prevalence of *muxe* relatives among gynephilic male probands. The standard deviations (*SDs*) of these estimates were used to calculate 95% confidence intervals on the upper and lower bounds respectively. Given the binomial nature of these estimates (i.e., relatives either are, or are not, *muxes*), the *SD* was calculated as  $\sqrt{npq}$ , where *n* is the total number male relatives, *p* is the proportion of male relatives who are *muxes*, and *q* is the proportion of male relatives who are not *muxes* (i.e.,  $1 - p$ ).

For the *muxe* probands, a frequency of 197 *muxe* relatives out of 3716 total male relatives (5.30%) yielded a *SD* of 13.66, which represents 0.37% of the total number of *muxe* probands' male relatives. For the gynephilic male probands, a frequency of 129 *muxe* relatives out of 3183 total male relatives (4.05%) yielded a *SD* of 11.13, which represents 0.35% of all gynephilic male probands' relatives. The 95% confidence intervals (*CI*s) for the percentage of male relatives who are androphilic were calculated as: observed frequency  $\pm 2(\textit{SD})$ . Therefore, the 95% *CI* for the prevalence rate of *muxe* relatives was 4.57–6.04% for *muxe* probands, and 3.35–4.75% for gynephilic male probands. Given these confidence intervals, which are treated as the upper and lower bounds of the

prevalence rate of *muxes*, we estimate that the true rate of androphilia among the Istmo Zapotec falls between 3.35–6.04%.

### Discussion

In order to determine whether male androphilia clusters within families among the Istmo Zapotec, the current study compared the proportion of *muxe* relatives in the paternal and maternal lines of gynephilic males and *muxes*. Comparisons between transgender (*muxe gunaa*) and cisgender (*muxe nguiiu*) *muxes* revealed that both reported analogous family patterning of male androphilia. This held true when comparing the paternal and maternal lines separately and combined. There was, however, one significant difference observed between the two types of *muxes*. *Muxe gunaa* reported having more androphilic male cousins via maternal aunts than did *muxe nguiiu* (Table 3.1). This difference, while statistically significant, is probably an artifact of the small sample size for *muxe nguiiu* in this kin category ( $n = 40$ ). A power analysis (calculated with G\*Power 3.1.9.2, see Faul, Erdfelder, Lang, & Buchner, 2007) based on a statistical power at the recommended .80 level (Cohen, 1988) indicated that our sample had sensitivity to detect effects of  $d \geq .45$ . In other words, the effect size obtained in this comparison ( $d = .40$ ) does not exceed this threshold and is likely to be the result of Type I error.

Within the families of *muxe gunaa*, there were also significantly more *muxe* cousins via aunts than *muxe* cousins via uncles when the paternal and maternal lines were combined (Table 3.3). This difference may be driven in large part by the high prevalence of *muxe* cousins born to the maternal aunts of *muxe gunaa*. Although the proportion of *muxes* did not significantly differ between cousins born to maternal uncles and maternal aunts ( $p = .065$ ), the associated effect sizes were in the small to moderate range ( $r = .22$ ;  $d = -.43$ ).



This pattern of clustering would be consistent with X-chromosome linked inheritance. However, given that a substantial body of research demonstrates that transgender and cisgender male androphiles share numerous biodemographic correlates, there is no *a priori* reason to predict why this pattern would emerge only in the families of *muxe gunaa*, and why the same within-group difference does not exist when considering the family lines of all *muxe* combined (Table 3.6). These subtle differences did not overshadow the larger pattern, which showed that *muxe gunaa* and *muxe nguiiu* did not differ with respect to the clustering of male androphilia within their families.

After establishing that the two types of *muxes* had comparable proportions of androphilic male relatives, groups were combined in order to compare them to gynephilic males. Consistent with previous family studies conducted in both Western and non-Western cultures, the results presented here provide evidence that Istmo Zapotec *muxes* have more *muxe* relatives than gynephilic males. Specifically, *muxes* reported having more androphilic male relatives overall (i.e., both paternal and maternal lines combined), in the paternal line, and among their brothers (Table 3.4). Given 80% power, our sample sizes had sensitivity to detect effects of  $d \geq .27$  when comparing all relatives,  $d \geq .28$  when comparing paternal relatives, and  $d \geq .31$  when comparing brothers between *muxes* and gynephilic men (calculated with G\*Power 3.1.9.2., see Faul et al., 2007). When comparing within groups, there were no significant differences with respect to the prevalence of *muxe* relatives in the paternal and maternal lines for both *muxe* and gynephilic male probands (Table 3.5). Taken together, the results suggest that male androphilia clusters in the families of Istmo Zapotec *muxes*, and this clustering is equivalent in both the maternal and paternal lines.

It has been suggested that male androphilia is not a trait governed by simple Mendelian inheritance (i.e., single gene accounting for the expression of a trait), but requires instead a multifactorial genetic explanation involving both X-linkage as well as autosomal-linkage factors (Mustanski et al., 2005; Pattatucci, 1998; Sanders et al., 2015). The current study supports this conclusion. We did not find strong evidence implicating X-linked genetic factors as *exclusively* underpinning male androphilia because *muxe* probands did not exhibit a significant preponderance of *muxe* relatives in their maternal lines overall (Table 3.5), nor among the specific kin with whom they are capable of sharing X-linked genes (Table 3.4). The only X-linkage related group difference that was presently observed was *muxe gunaa*'s higher proportion of *muxe* cousins via aunts relative to *muxe* cousins via uncles (Table 3.3). The fact that our data did not support an exclusively X-linked genetic explanation for male androphilia does not mean that genes on the X-chromosome do not play a role in the maintenance of male androphilia. Instead, it is likely that Istmo Zapotec *muxes* and androphilic males elsewhere inherit both autosomal and sex-linked genes that act in synchrony (i.e., polygenic inheritance) to influence the development and expression of sexual orientation. In supporting this argument, both X-linked (i.e., Xq28) and autosomal (i.e., the centromeric region of the chromosome 8) genetic regions appear to be involved in the development of male androphilia (Mustanski et al., 2005; Sanders et al., 2015).

In addition to examining familial patterning of male androphilia, this study also produced a population prevalence estimate of male androphilia among the Istmo Zapotec. The upper and lower bounds for this estimate were the proportion of *muxe* relatives among the families of all *muxes* combined and gynephilic males, respectively (Table 3.4). As such,

the true prevalence of male androphilia among the Istmo Zapotec is estimated to fall between 3.35–6.04%. This is largely consistent with estimates derived from Euro-American cultures, where the population prevalence of cisgender “gay” men falls between ~1–5% (Gates, 2011; Laumann et al., 1994). This estimate, while valuable, does not tell us the actual differences in prevalence between cisgender and transgender *muxes* in the Istmo, as participants were not asked to identify their *muxe* relatives as *muxe nguiiu* or *muxe gunaa*. As noted previously, and illustrated by their relative sample sizes, it is the transgender form of male androphilia that tends to predominate in the Istmo Zapotec. As such, the population prevalence rate of *muxes*, the majority of whom are *muxe gunaa*, appears to be higher than the prevalence rate of Western transsexual women (i.e., biological males who opt for sex reassignment surgery), which is notably smaller (i.e., < 0.001%) (Alcerus et al., 2015; Zucker & Lawrence, 2009).

### **Limitations**

There are several limitations in the current study that deserve comment. First, the identity status of *muxe* relatives was not corroborated with the male relatives themselves. However, given that identification as *muxe*—whether *nguiiu* or *gunaa*—is both obvious and an unambiguous indicator of male androphilia (Chiñas, 1995; Miano Borruso, 2001), Istmo Zapotec participants are unlikely to misreport the sexual orientation of their male relatives. Furthermore, during many of the interviews, participants consulted with nearby members of their family in order to provide a precise report of their family pedigree. In this regard, it deserves mention that no other family study has independently corroborated the sexual orientation of the relatives of participants, even in Western samples where the sexual orientation of male relatives may be unknown or concealed. Second, participants were not

asked if their *muxe* relatives identified as *muxe gunaa* or *muxe nguiiu*. As such, we are only able to draw firm conclusions regarding the familial patterning of male androphilia in general, but not the specific ways cisgender and transgender male androphilia cluster in families.

Because male androphilia occurs at a relatively low frequency in any population, this study utilized a network sampling procedure. It is possible that this method produced a sampling bias, resulting in an unrepresentative sample of Istmo Zapotec *muxes*, men, or both. Efforts were made to avoid such bias by interviewing participants throughout the city of Juchitán de Zaragoza—the largest urban center in the Istmo region—as well as 14 towns and villages throughout the Juchitán and Tehuantepec districts in the Istmo region of Oaxaca. Nonetheless, future research conducted in the Istmo Zapotec could consider using random sampling procedures.

## **Conclusion**

This study on the Istmo Zapotec *muxes*, coupled with the research conducted on the Samoan *fa'afafine* (Semenyna et al., 2016; VanderLaan et al., 2013a, b) and Western “gay” men (Bailey et al., 1999; Camperio Ciani et al., 2004; Hamer et al., 1993; Rahman et al., 2008; Schwartz et al., 2010), suggests that having more androphilic male relatives is a cross-cultural universal aspect of male androphilia. This is the first study that has compared cisgender and transgender androphilic males in the same culture, showing that both report analogous proportions of androphilic male relatives, and comparable familial patterning. This comparison provides further evidence that both forms of male androphilia share a common biological foundation.

**Table 3.1**

*Comparisons of the Prevalence of Muxe Relatives among Muxe Gunaa and Muxe Nguiiu*

	<i>Muxe Gunaa</i>					<i>Muxe Nguiiu</i>					Mann-Whitney <i>U</i>	<i>p</i>	Cohen's <i>d</i>	
	<i>n</i>	<i>M</i>	<i>SD</i>	Number of <i>Muxe</i> Relatives/ Total Number of Male Relatives	Percentage (%) of <i>Muxe</i> Relatives	<i>n</i>	<i>M</i>	<i>SD</i>	Number of <i>Muxe</i> Relatives/ Total Number of Male Relatives	Percentage (%) of <i>Muxe</i> Relatives				
<b>Section 1</b>														
Paternal and maternal relatives	110	.061	.068	138/2571	5.37	59	.053	.063	59/1145	5.15	3459.5	.469	.12	
<b>Section 2</b>														
Paternal relatives:	104	.058	.101	58/1087	5.34	56	.059	.090	30/546	5.49	2891.5	.933	.00	
Uncles	98	.067	.182	18/283	6.36	55	.057	.199	7/162	4.32	2857.5	.320	.05	
Male cousins via uncles	78	.032	.086	15/378	3.97	46	.082	.189	15/209	7.17	1602	.156	-.37	
Male cousins via aunts	83	.077	.189	25/426	5.87	41	.035	.105	8/175	4.57	1902	.129	.25	
<b>Section 3</b>														
Maternal relatives:	105	.074	.146	68/1242	5.47	56	.059	.112	25/499	5.01	3179	.335	.11	
Uncles	96	.053	.162	13/307	4.23	55	.059	.174	8/162	4.94	2591.5	.750	-.04	
Male cousins via uncles	79	.032	.086	16/422	3.79	45	.067	.191	13/178	7.30	1765.5	.922	-.26	
Male cousins via aunts	88	.103	.215	39/513	7.60	40	.029	.100	4/159	2.52	2173	.006	.40	
Uncles and male cousins via aunts	104	.078	.159	52/820	6.34	56	.052	.148	12/321	3.74	3273	.114	.17	
<b>Section 4</b>														
Brothers	91	.051	.167	12/242	4.96	47	.046	.173	4/100	4.00	2224.5	.487	.03	

All statistical comparisons were conducted using the means and standard deviations listed above and not the percentage of *muxe* relatives.

**Table 3.2***Within Group Comparisons of the Prevalence of Paternal and Maternal Muxe Relatives of Muxe Gunaa and Muxe Nguiiu*

	<i>n</i>	Paternal		Maternal		Wilcoxon signed rank ( <i>z</i> )	<i>p</i>	Effect Size $r = z/(n)^{1/2}$	Effect Size Cohen's <i>d</i>
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>				
<i>Muxe gunaa</i>	99	.059	.101	.074	.146	.459	.646	.05	-.12
Uncles	84	.067	.182	.053	.162	.972	.331	.11	.08
Male cousins via uncles	56	.032	.086	.032	.086	.751	.453	.06	.00
Male cousins via aunts	69	.077	.189	.103	.215	1.12	.264	.13	-.13
<i>Muxe nguiiu</i>	53	.059	.090	.059	.112	.299	.765	.04	.00
Uncles	51	.057	.199	.059	.174	.105	.916	.01	-.01
Male cousins via uncles	39	.082	.189	.067	.191	.035	.972	.01	.08
Male cousins via aunts	28	.035	.105	.029	.100	.339	.735	.06	.06

Due to the skewed nature of the data, all Cohen's *d* effect sizes should be interpreted with caution. Effect size interpretations are as follows: *r* = .1 small, .3 medium, .5 large; *d* = .2 small, .5 medium, and .8 large (Cohen, 1988; Fritz, Morris, & Richler, 2012).

**Table 3.3**

*Comparison of the Prevalence of Muxe Relatives across Kin Categories within Muxe Gunaa and Muxe Nguiiu Participants for the Paternal Line, Maternal Line, and both Lines Combined*

	<i>n</i>	Uncles		Male Cousins via Uncles		Male Cousins via Aunts		Friedman Test $\chi^2$ ( <i>df</i> = 2)	<i>p</i>	Effect Size $r = z/(n)^{1/2}$	Effect Size Cohen's <i>d</i>
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>				
<i>Muxe gunaa</i>											
Paternal and maternal	95	.065	.154	.034	.068	.088	.169	7.62	.022	.13, .08, .27 <sup>a</sup>	.26, -.14, -.42 <sup>a</sup>
Paternal	66	.067	.182	.032	.086	.077	.189	1.92	.383	.10, .02, .15	.25, -.05, -.31
Maternal	71	.053	.162	.032	.086	.103	.215	6.69	.035	.06, .20, .22	.16, -.26, -.43
<i>Muxe nguiiu</i>											
Paternal and maternal	48	.056	.119	.069	.118	.035	.093	1.13	.569	.14, .16, .18	-.11, .20, .32
Paternal	35	.057	.199	.082	.189	.035	.105	.950	.622	.21, .11, .09	-.13, .14, .31
Maternal	35	.059	.174	.067	.191	.029	.100	.216	.898	.02, .10, .12	-.04, .21, .25

All follow-up pairwise comparisons were conducted using Wilcoxon's test with a Bonferroni correction (critical  $p < .017$ ). All effect size estimates are listed in order of comparing uncles to male cousins via uncles; uncles to male cousins via aunts; male cousins via uncles to male cousins via aunts (see also note on Table 3.2).

<sup>a</sup> Post-hoc Wilcoxon's test between overall male cousins via uncles versus overall male cousins via aunts was significant ( $p = .008$ )

**Table 3.4**

*Comparisons of the Prevalence of Muxe Relatives among Muxes versus Gynephilic Male Participants*

	<i>Muxes</i>					<i>Gynephilic Males</i>					Mann-Whitney <i>U</i>	<i>p</i>	Cohen's <i>d</i>	
	<i>n</i>	<i>M</i>	<i>SD</i>	Number of <i>Muxe</i> Relatives/ Total Number of Male Relatives	Percentage (%) of <i>Muxe</i> Relatives	<i>n</i>	<i>M</i>	<i>SD</i>	Number of <i>Muxe</i> Relatives/ Total Number of Male Relatives	Percentage (%) of <i>Muxe</i> Relatives				
<b>Section 1</b>														
Paternal and maternal relatives	169	.058	.066	197/3716	5.30	171	.039	.058	129/3183	4.05	17388	.001	.31	
<b>Section 2</b>														
Paternal relatives:	160	.059	.097	88/1633	5.39	163	.032	.068	63/1429	4.41	15127.5	.002	.32	
Uncles	153	.063	.188	25/445	5.62	153	.032	.123	15/427	3.51	12472.5	.076	.20	
Male cousins via uncles	124	.050	.135	30/587	5.11	117	.047	.146	26/528	4.92	7620.5	.305	.02	
Male cousins via aunts	124	.063	.167	33/601	5.49	116	.045	.149	22/474	4.64	7597	.255	.11	
<b>Section 3</b>														
Maternal relatives:	161	.068	.135	93/1741	5.34	165	.050	.103	63/1495	4.21	14394.5	.124	.15	
Uncles	151	.055	.166	21/469	4.48	155	.033	.133	13/449	2.90	12285	.162	.15	
Male cousins via uncles	124	.045	.134	29/600	4.83	131	.044	.134	22/532	4.14	8222	.786	.01	
Male cousins via aunts	128	.080	.189	43/672	6.40	127	.065	.158	28/514	5.45	8587.5	.291	.09	
Uncles and male cousins via aunts	160	.069	.155	64/1141	5.61	164	.049	.106	41/963	4.26	14009	.176	.15	
<b>Section 4</b>														
Brothers	138	.050	.168	16/342	4.68	129	.006	.053	3/259	1.16	9789	.001	.35	



**Table 3.5***Comparisons of the Prevalence of Muxe Relatives in the Paternal and Maternal Lines of Muxes and Gynephilic Participants*

	<i>n</i>	Paternal		Maternal		Wilcoxon signed rank ( <i>z</i> )	<i>p</i>	Effect Size $r = z/(n)^{1/2}$	Effect Size Cohen's <i>d</i>
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>				
<i>Muxes</i>	152	.059	.097	.068	.135	.176	.860	.01	-.08
Uncles	135	.063	.188	.055	.166	.519	.604	.04	.05
Male cousins via uncles	95	.050	.135	.045	.134	.389	.697	.04	.04
Male cousins via aunts	97	.063	.167	.080	.189	.908	.364	.09	-.10
<i>Gynephilic males</i>	157	.032	.068	.050	.103	1.76	.079	.14	-.21
Uncles	137	.032	.123	.033	.133	.315	.753	.03	-.01
Male cousins via uncles	89	.047	.146	.044	.134	.037	.970	.00	.02
Male cousins via aunts	86	.045	.149	.065	.158	1.44	.149	.16	-.13

**Table 3.6**

*Comparison of the Prevalence of Muxe Relatives across Kin Categories within Muxes and Gynephilic Male Participants for the Paternal Line, Maternal Line, and both Lines Combined*

	<i>n</i>	Uncles		Male Cousins via Uncles		Male Cousins via Aunts		Friedman Test $\chi^2$ ( <i>df</i> = 2)	<i>p</i>	Effect Size $r = z/(n)^{1/2}$	Effect Size Cohen's <i>d</i>
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>				
<i>Muxes</i>											
Paternal and maternal	142	.062	.143	.046	.089	.070	.150	3.03	.220	.04, .00, .12	.13, -.05, -.19
Paternal	101	.063	.188	.050	.135	.063	.167	1.94	.379	.03, .05, .08	.07, .00, -.08
Maternal	106	.055	.166	.045	.134	.080	.189	4.01	.134	.03, .10, .13	.07, -.14, -.21
<i>Gynephilic males</i>											
Paternal and maternal	147	.030	.076	.049	.129	.051	.106	2.71	.258	.12, .13, .04	-.18, -.23, -.02
Paternal	90	.032	.123	.047	.146	.045	.149	.747	.688	.07, .05, .05	-.11, -.10, -.01
Maternal	103	.033	.133	.044	.134	.065	.158	8.09	.018	.15, .18, .13	-.08, -.22, -.14

All follow-up pairwise comparisons were conducted using Wilcoxon's test with a Bonferroni correction, with no tests reaching significance (all  $p \geq .055$ ). All effect size estimates are listed in order of comparing uncles to male cousins via uncles; uncles to male cousins via aunts; male cousins via uncles to male cousins via aunts (see also note on Table 3.2).

## CHAPTER 4

### Conclusion

In the first chapter of this thesis, I discussed how male androphilia is perceived across cultures and described what appear to be cross-cultural universal correlates of male androphilia. Thereafter, I emphasized how most studies on male androphilia have focused on the cisgender form in Western cultures, not on the transgender form which is more common in many non-Western cultures. Additionally, I highlighted the current gap in the sex research literature concerning within-culture comparisons between cisgender and transgender male androphiles. With this in mind, I set out to conduct such comparisons among the Istmo Zapotec—a non-Western culture where both cisgender and transgender androphilic males exist. These comparisons focused on one psychodevelopmental correlate (Chapter 2), and one biodemographic correlate (Chapter 3).

Chapter 2 examined the differences in recalled indicators of childhood separation anxiety between Istmo Zapotec men, women, transgender androphilic males (*muxe gunaa*), and cisgender androphilic males (*muxe nguiiu*). Chapter 3 compared Istmo Zapotec men, *muxe gunaa*, and *muxe nguiiu*, with regards to the familial patterning of male androphilia. In both studies, it was found that the two types of *muxes* did not differ from each other in relation to the two correlates under investigation. Although it is possible that in both instances the lack of difference resulted from statistical errors due to the somewhat lower sample sizes of *muxe nguiiu*, the most parsimonious conclusion is that both transgender and cisgender *muxes* share similar biological and developmental foundations. If *muxe nguiiu* and *muxe gunaa* do, in fact, have similar etiology, what then is the reason for differences in gender role enactment exhibited by the two types of *muxes*?

## **Explaining the Differences in Gender Expression between *Muxes***

The Istmo Zapotec are somewhat unique in that both cisgender and transgender forms of male androphilia occur at appreciable levels in the culture. How do androphilic males from the same culture come to adopt either a cisgender or transgender identity? Semenyna et al. (2016) argued that cisgender male androphilia predominates in some cultures, whereas transgender male androphilia develops in others, because gender role expectations for male androphiles differs across these cultural contexts. In other words, socialization effects, not biological ones, are primarily responsible for these between-culture differences. This leaves unanswered, however, as to why within-culture variation in gender identity and gender role enactment exists among male androphiles. There are several factors that could influence whether an androphilic male within Istmo Zapotec culture will adopt a cisgender or a transgender identity. These factors include variations in female typical behavior, acceptance/tolerance of feminine gender expression in males by family members or peers, socioeconomic status, and exposure to Euro-American culture.

Feminine interests and behavior in both childhood and adulthood are a consistent aspect of male androphilia across cultures (see Chapter 1). This cross-cultural universality suggests that androphilic males are biologically predisposed toward elevated femininity relative to their gynephilic male counterparts. That being said, there is considerable variability in these traits both within and between cultures. For example, in Samoa, *fa'afafine* tend to exhibit a pattern of female typical behavior and psychology (e.g., occupational preferences, childhood gender atypical behavior, and elevated indicators of separation anxiety) that is entirely gender-*inverted* (Semenyna & Vasey, 2016; Vasey et al., 2011; VanderLaan et al., 2017b), whereas Western “gay” men merely demonstrate one

that is *gender-shifted* (Bailey, 2003; Bailey & Zucker, 1995; Lippa, 2005, 2008; VanderLaan et al., 2011a, 2015, 2016). Although both types of male androphiles demonstrate elevated female typical behavior when compared to gynephilic males, individual, familial, peer, and cultural differences may serve to either enhance or suppress natural tendencies towards femininity in transgender and cisgender androphilic males, respectively.

Some pre-androphilic males among the Istmo might experience low acceptance towards their femininity from their family or peers, consequently suppressing their feminine gender expression and adopting a relatively masculine gender role typical of *muxe nguiiu*. Conversely, familial and peer tolerance of male femininity may increase the likelihood that a pre-androphilic Istmo Zapotec male will identify as a much more feminine *muxe gunaa*. In other words, naturally occurring variation in childhood femininity, differences in familial and societal acceptance of male femininity, and an interaction between the two may serve to explain, in large part, why Istmo Zapotec androphilic males adopt relatively more masculine or more feminine gender identities and roles.

It is possible that the relationship between familial acceptance of male femininity and gender identity is influenced by socioeconomic status. Research across cultures, including among the Istmo Zapotec, suggests that gender non-conforming androphilic males tend to come from lower social classes whereas those that are gender conforming come from higher social classes (Harry, 1985; MacFarlane, 1984; Miano Borruso, 2002; Mirandé, 2017; Prieur, 1998; Singh, 2012). Why this relationship between socioeconomic status and familial acceptance of male femininity exists is unclear. One possibility is that Istmo Zapotec families from higher classes are less accepting of their androphilic son's

femininity because the family stands to gain more if the son engages in the wage labor market and such jobs appear to be confined to cisgender individuals (see Céspedes Vargas, 2015). Conversely, families from lower classes might be more accepting of their androphilic son's femininity because wage labor jobs are largely unattainable and, in any case, feminine sons can help their mother in the local markets as well as with household chores. Assessing difference between *muxe gunaa* and *muxe nguiiu*'s socioeconomic status, their family's acceptance of male femininity, and the interaction between the two, should be the focus of future research.

In addition, exposure to Euro-American cultures through mass-media (e.g., the Internet, television, movies, magazines) or travel could also influence the gender role enactment of androphilic males. In such instances, androphilic males might be prone to adopt a cisgender expression, because this form predominates in Euro-American culture, where male femininity is stigmatized (Bailey, 2003; Bergling, 2001; Gates, 2011; Laumann et al., 1994; Murray, 2000; Rieger & Savin-Williams, 2012). As such, it is possible that *muxe nguiiu* have more resources that afford them the opportunities for exposure to Euro-American culture, whereas *muxe gunaa* are more confined to traditional Istmo Zapotec culture, in which feminine males are commonplace and the transgender form of male androphilia is culturally embedded (Chiñas, 1992; Miano Borruso, 2002; Mirandé, 2017).

The Istmo Zapotec represent a suitable culture in which to test whether these or other factors might be responsible for the developmental canalization between cisgender and transgender male androphiles in gender role identity and enactment. After considering what factors potentially influence differences in gender identity and expression among androphilic males, we are still left with the question as to why male androphilia exists at

all. Answering questions about the origin of a trait and its maintenance over time requires an evolutionary perspective.

### **Explaining Male Androphilia using Evolutionary Hypotheses**

The existence of male androphilia in humans is widely considered to be one of *the* outstanding paradoxes in evolutionary biology (Bailey & Zuk, 2009). Findings derived from familial clustering, twin, and molecular genetic research (e.g., Chapter 3; Alanko et al., 2010; Gómez-Gil et al., 2010; Hamer, 2002; Långström et al., 2010; Sanders et al., 2015; Schwartz et al. 2010; Semenyna et al., 2016; VanderLaan et al., 2013a) indicate that male androphilia has a genetic component. Nevertheless, androphilic males reproduce at far lower rates, if at all, compared to gynephilic males (e.g., Schwartz et al., 2010; Vasey et al., 2014). Given the reproductive costs associated with this trait and the reproductive benefits associated with male gynephilia, genes for male androphilia should have become extinct. Nonetheless, anthropological and archaeological research suggest that male androphilia has existed in most cultures worldwide (Hames et al., 2017) for millennia (e.g., Larco Hoyle, 1998; Nash, 2001; Kelker & Bruhns, 2009). A trait that has a genetic component and reliably occurs across human cultures, but lowers direct reproduction, yet persist over evolutionary time, requires explanation when viewed from an evolutionary perspective. The two most prominent explanations for this evolutionary conundrum are the Kin Selection Hypothesis (KSH), and the Sexual Antagonistic Gene Hypothesis (SAGH).

The KSH holds that genes for male androphilia persist over evolutionary time because androphilic males behave altruistically toward their close kin, with whom they share numerous identical genes. Such altruism may increase kin fitness and, by extension, androphilic males' inclusive fitness, thus offsetting the costs of not reproducing directly

(Wilson, 1975). Research conducted on cisgender androphilic males in both Western (i.e., USA, Canada, UK, Spain, France, Italy) and non-Western (i.e., Japan) industrialized cultures (which are characterized by low fertility) has provided little or no support for the KSH (Abild, VanderLaan, & Vasey, 2014; Bobrow & Bailey, 2001; Camperio Ciani, Battaglia, & Liotta, 2016; Forrester, VanderLaan, Parker, & Vasey, 2011; Rahman & Hull, 2005; Vasey & VanderLaan, 2012). In contrast, research conducted on transgender androphilic males in Samoa—a non-industrialized, high fertility population—has repeatedly found support for the KSH, where *fa'afafine* exhibit elevated altruistic tendencies toward their nieces and nephews (VanderLaan et al., 2017b; VanderLaan & Vasey, 2012; Vasey & VanderLaan, 2009, 2010a, b, c).

The adaptive feminine phenotype model (VanderLaan et al., 2016) posits that elevated kin directed altruism is a feminine trait that manifests in androphilic males, but differs in expression depending on life-history stage. In childhood, kin directed altruism is manifested in terms of separation anxiety that stems from worry about the well-being of parents and siblings. In adulthood, kin directed altruism is manifested, at least in part, as elevated avuncularity. Therefore, childhood separation anxiety (as it pertains to worry about the well-being of close kin) is conceptualized by VanderLaan et al. (2016) as a developmental precursor to adult kin-directed altruism. The findings derived from Chapter 2 of this thesis are consistent with the adaptive feminine phenotype model, in that both *muxe gunaa* and *muxe nguiiu* recalled elevated indicators of separation anxiety in childhood. Additionally, the local belief that *muxes* take care of their parents during old age (Miano Borruso, 2001; Mirandé, 2017) also provides some qualitative evidence for the expression of kin-directed altruism. Empirical research should further assess the extent of



this belief. Among the Istmo Zapotec, more refined tests of the adaptive feminine phenotype hypothesis (and, by extension, the KSH) will require establishing: (1) whether elevated indicators of childhood separation anxiety are related to childhood femininity in *muxes*; (2) whether elevated indicators of childhood separation anxiety stem from worry about the well-being of kin; (3) whether *muxes* exhibit elevated altruistic tendencies toward kin in adulthood; (4) whether indicators of childhood separation anxiety are related to elevated altruistic tendencies toward kin in adulthood; and (5) whether elevated altruistic tendencies toward kin in adulthood is contingent on the continued expression of femininity into adulthood.

The SAGH—a complementary rather than competing hypothesis to the KSH—states that genes associated with male androphilia reduce reproduction when present in males, but increase reproduction when present in the female relatives of androphilic males (Camperio Ciani, Corna, & Capiluppi, 2004). In Western cultures, some studies conducted on cisgender androphilic males have provided results that are consistent with the SAGH (Italy: Camperio Ciani et al., 2004; Camperio Ciani & Pellizzari, 2012; Iemmola & Camperio Ciani, 2009; white participants in the UK: Rahman et al., 2008), whereas others have not (US: King et al., 2005; Schwartz et al., 2010; non-white participants in the UK: Rahman et al., 2008). Studies of the SAGH in Samoa have shown that while the maternal grandmothers and mothers of *fa'afafine* demonstrate elevated reproduction, maternal aunts do not, leaving support for the SAGH equivocal at present (Semenyna et al., 2017a; reviewed in Vasey & VanderLaan, 2014).

The results presented in Chapter 3 suggest that the female relatives of *muxes* (i.e., mothers and paternal and maternal aunts) had a higher number of total sons compared to

those of gynephilic males (Table 3.4). The elevated offspring production exhibited by the female relatives of *muxes* is consistent with what the SAGH predicts. However, in order to adequately test the SAGH, the total number of offspring (both male and female) of *all* female relatives of *muxes* and gynephilic males would have to be compared. Given the relative lack of empirical data pertaining to SAGH, as well as the KSH, and the inconsistencies across study results, the Istmo Zapotec offers a compelling locale to further test these hypotheses among a non-Western population where male androphilia is commonly expressed in both the transgender and cisgender form.

### **Future Directions for the Cross-Cultural Research on Male Androphilia**

This thesis demonstrated that *muxes* recalled elevated indicators of childhood separation anxiety comparable to women and are, thus, feminine with respect to this trait. As of yet, no quantitative research has *directly* assessed whether Istmo Zapotec *muxes* exhibit female-typical behavior during childhood, and whether it persists into adulthood. Although there exists qualitative evidence of *muxes* displaying gender non-conforming behavior during childhood and adulthood (see Chapter 1), establishing this quantitatively would be useful. As such, future studies should assess this retrospectively by using validated questionnaires (e.g., see Zucker et al., 2006) and prospectively by using follow-up assessments from childhood to adulthood.

Thus far, cross-cultural research on the cross-culturally universal aspects of male androphilia has mostly focused on examining psychodevelopmental and biodemographic correlates that are shared among transgender and cisgender androphilic males. Future research should move beyond these types of correlates, and examine whether both forms of male androphilia also share *morphological* correlates. For example, studies in Western

cultures have consistently found that “gay” men are shorter than their heterosexual counterparts and thus shifted in a female-typical direction with respect to this trait (Blanchard, Dickey, & Jones, 1996; Bogaert, 2010; Bogaert & Blanchard, 1996; Skorska & Bogaert, 2016). Research also indicates that “gay” men have shorter noses than their heterosexual counterparts and thus are once again shifted in a female-typical direction with respect to this particular trait (Skorska, Geniole, Vrysen, McCormick, & Bogaert, 2015; Valentova, Kleisner, Havlíček, & Neustupa, 2014). Experimental research also indicates that participants perceived artificial male face models with shorter noses as being androphilic (González-Álvarez, 2017). Additionally, Martin and Nguyen (2004) found that “gay” men had shorter long-bone growth in the arms, legs, and hands, than gynephilic men. This finding, however, has yet to be replicated. As such, future cross-cultural research should assess whether androphilic and gynephilic males from non-Western cultures differ with respect to height, nose length, and long-bone growth, and whether these also differ between cisgender and transgender androphilic males.

## **Conclusions**

In recent years, sustained empirical research on the transgender form of male androphilia has focused on one third gender group from a non-Western culture—the Samoan *fa’afafine*. This thesis furnishes two additional studies on an additional third gender group from a distinct non-Western culture—the Istmo Zapotec *muxes*. The findings presented in the empirical chapters of this thesis demonstrated that like Samoan *fa’afafine* and other androphilic males worldwide (see above), Istmo Zapotec *muxes* recall elevated indicators of childhood separation anxiety, and that male androphilia clusters in the

families of these third gender males. These results support the conclusion that there are cross-culturally universal correlates of male androphilia.

This thesis also expands on the current scientific literature by providing the first within-culture comparisons of both cisgender and transgender androphilic males in a non-Western culture. The studies presented here demonstrated that the two forms of male androphilia in the Istmo Zapotec do not differ with respect to one psychodevelopmental and one biodemographic correlate. Although additional cross-cultural evidence would be desirable, the results presented in this thesis are in line with the conclusion that transgender and cisgender androphilic males share similar developmental and biological foundations.

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**APPENDIX: Fictitious example of a coding sheet for a *muxe* proband**

**Questions about your father’s side of the family (Paternal Relatives)**

1) How many sons did your father’s mother have? 5

2) How many of these sons were muxe? 0

3) How many daughters did your father’s mother have? 5

**Please provide the following information about each of your father’s mother’s children (your aunts and uncles on your father’s side of the family), from the first born to the last born:**

- 1) Whether that person is your father, aunt, or uncle (if you do not know the order, please indicate your oldest uncle, oldest aunt, youngest brother, and youngest aunt).
- 2) How many sons that person had?
- 3) How many of those sons were muxe?
- 4) How many daughters that person had?
- 5) Please list whether the first born was a boy, girl, or muxe.
- 6) The place or places where the children were born in (if there are no children, please list where your aunt or uncle live).

Father/Uncle/Aunt	# Sons	# Muxe	# Daughters	Oldest Boy, Girl, or Muxe?	Place of Birth
Aunt	2	0	1	Boy	Juchitán
Father	4	2	0	Boy	Tehuantepec
Aunt	2	0	0	Boy	Juchitán
Aunt	4	0	1	Boy	Juchitán
Uncle	3	0	1	Boy	Juchitán
Uncle	0	0	2	Girl	Salina Cruz
Uncle	1	0	2	Boy	Juchitán
Aunt	1	0	0	Boy	Juchitán
Uncle	0	0	0	N/A	Juchitán
Aunt	0	0	0	N/A	Juchitán

**Questions about your mother's side of the family (Maternal Relatives)**

1) How many sons did your mother's mother have? 6

2) How many of these sons were *muxe*? 0

3) How many daughters did your mother's mother have? 4

**Please provide the following information about each of your mother's mother's children (your aunts and uncles on your father's side of the family), from the first born to the last born:**

- 1) Whether that person is your mother, aunt, or uncle (if you do not know the order, please indicate your oldest uncle, oldest aunt, youngest brother, and youngest aunt).
- 2) How many sons that person had?
- 3) How many of those sons were *muxe*?
- 4) How many daughters that person had
- 5) Please list whether the first born was a boy, girl, or *muxe*?
- 6) The country or countries the children were born in (if there are no children, please list where your aunt or uncle live

Mother/Uncle/Aunt	# Sons	# Muxe	# Daughters	Oldest Boy, Girl, or <i>Muxe</i> ?	Place of Birth
Uncle	3	1	0	Boy	Juchitán
Uncle	2	0	3	Girl	Juchitán
Aunt	3	0	0	Boy	Juchitán
Uncle	2	0	4	Girl	Juchitán
Mother	4	2	0	Boy	Juchitán
Uncle	0	0	4	Girl	Juchitán
Aunt	1	0	2	Girl	Juchitán
Aunt	2	0	2	Boy	Juchitán
Uncle	2	1	0	Boy	Juchitán
Uncle	0	0	0	N/A	Juchitán