

Relationship status and elevated avuncularity in Samoan *fa'afafine*

DOUG P. VANDERLAAN AND PAUL L. VASEY

University of Lethbridge

Abstract

“Androphilia” and “gynephilia” refer to sexual attraction to adult males and females, respectively. Samoan androphilic males are known as *fa'afafine*. Previously, *fa'afafine* reported greater avuncular tendencies compared to those of men as well as the materteral (i.e., aunt-like) tendencies of women. Here, the Samoan male sexual orientation difference in avuncular tendencies was replicated. Furthermore, we hypothesized *fa'afafine* might form and invest in intimate sexual/romantic relationships less, leaving them with more resources, thus facilitating increased avuncularity. *Fa'afafine*, men, and women were comparable for sexual/romantic relationship involvement. Men and women tended to lower avuncular/materteral tendencies when involved in sexual/romantic relationships, which partially mediated the difference between *fa'afafine* and women for avuncular/materteral tendencies. Discussion detailed alternate explanations for elevated avuncularity among Samoan *fa'afafine*.

“Androphilia” refers to sexual attraction and arousal to adult males, whereas “gynephilia” refers to sexual attraction and arousal to adult females. In many non-Western cultures, androphilic males, particularly those who are transgendered, often occupy “alternative” gender role categories that are distinguished

linguistically from the gender-normative categories of “man” and “woman.” Some contemporary examples include, but are not limited to, the *woubi* of the Ivory Coast (Brooks & Bocahut, 1998), the *xanith* of Oman (Wikan, 1977), the *hijra* of India (Nanda, 1998), the *kathoe*y of Thailand (Totman, 2003), and the *muxes* of Mexico (Chiñas, 1995). In Samoa, androphilic males are referred to as *fa'afafine*, which means “in the manner of a woman.”

Doug P. VanderLaan and Paul L. Vasey, Department of Psychology, University of Lethbridge.

Various stages of this research were supported by the University of Lethbridge, by a NSERC of Canada Graduate Scholarship-D3, a Sigma Xi, Grant in Aid of Research, and a Ralph Steinhauer Award of Distinction to DPV as well as by a NSERC of Canada Discovery Grant to PLV. The authors wish to thank Resitara Apa, Nancy Bartlett, Peniamina Tolovaa Fagai, Vester Fido Collins, Liulaulu Faaleolea Ah Fook, Vaasatia Poloma Komiti, Anita Latai, Tyrone Laurenson, Fang Fang Li, Gaulofa Matalavea, Nella Tavita-Levy, Palanitina Toelupe, Trisha Tuiloma, Avalogo Togi A. Tunupopo, John Vokey, Erin Zelinski, the Kuka family of Savai'i, the National University of Samoa, the Samoan AIDS Foundation, the National University of Samoa, the Government of Samoa, the Editor, and three anonymous referees. We are grateful to all the individuals who agreed to participate in our study. We extend special thanks to Alatina Ioelu without whose help this study would not have been possible.

Correspondence should be addressed to Doug P. VanderLaan, Department of Psychology, University of Lethbridge, Lethbridge, Alberta, T1K 3M4, Canada, e-mail: doug.vanderlaan@uleth.ca.

Most *fa'afafine* do not self-identify as men or women; rather, they self-label as *fa'afafine*. Overall, *fa'afafine* tend to be effeminate in appearance and mannerisms, and from a Western cultural perspective many would be described as effeminate males, whereas others would be described as transgendered. Only a small minority would be described as transsexual because the vast majority of *fa'afafine* do not experience any dysphoria toward their male bodies (Vasey & Bartlett, 2007). They range from extremely feminine to unremarkably masculine, although instances of the latter are quite rare (Bartlett & Vasey, 2006; Schmidt, 2003; Vasey & Bartlett, 2007).

Despite this heterogeneity in gender role presentation, *fa'afafine* are, with very few

exceptions, exclusively androphilic. As such, *fa'afafine* are, almost without exception, childless (Vasey, Pocock, & VanderLaan, 2007; Vasey & VanderLaan, 2010a). It is important to note that *fa'afafine* do not engage in sexual activity with each other. Instead, *fa'afafine* are attracted to, and engage in sexual interactions with, masculine males who self-identify as "straight men" (Bartlett & Vasey, 2006). This pattern of sexual attraction and interaction is one of the primary reasons why *fa'afafine* do not identify as "gay." In a Samoan cultural context "gays sleep with other gays."

In a Samoan cultural context, "straight men" are those who self-identify as men and are masculine with respect to gender role presentation. Inclusion in this category is not contingent on exclusive sexual activity with women. Most self-identified straight men are gynephilic, but may engage in sexual activity with *fa'afafine* or other straight men on a temporary basis, particularly if female sexual partners are unavailable. Our participants informed us that many straight men in Samoa have engaged in sexual interactions with *fa'afafine* at least once in their lives (also see Croall & Wunderman, 1999).

A large body of research indicates that there is a biological basis for male androphilia (reviewed in Mustanski, Chivers, & Bailey, 2002; Wilson & Rahman, 2005), and familial studies point to a genetic component (e.g., Bailey, Dunne, & Martin, 2000; Hamer & Copland, 1994; Kendler, Thornton, Gilman, & Kessler, 2000; Långström, Rahman, Carlström, & Lichtenstein, 2010). At the same time, research demonstrates that androphilic males in Western cultures reproduce at about one fifth to one tenth the rate of gynephilic males (e.g., Bell & Weinberg, 1978; Hamer & Copland, 1994; Iemmola & Camperio Ciani, 2009; Saghir & Robins, 1973; Van de Ven, Rodden, Crawford, & Kippax, 1997; Yankelovich Partners, 1994). Given the reproductive benefits associated with male gynephilia, one would expect genes for male gynephilia to have long replaced those for male androphilia. Despite this prediction, archeological evidence suggests that male same-sex sexual activity existed during human

prehistory (e.g., Nash, 2001; Yates, 1993). Moreover, male androphilia seems to exist at similar, albeit low, frequencies across diverse cultures (Whitam, 1983). Although the approximate frequency of male androphilia across cultures appears to be quite low ($\leq 5\%$ of males; Whitam, 1983), it, nevertheless, occurs too frequently to count as a random genetic defect (Bell & Weinberg, 1978). As such, a trait that lowers direct reproduction requires explanation when viewed from a functional (evolutionary) perspective.

The kin selection hypothesis for male androphilia (Wilson, 1975) offers a potential explanation for the maintenance of male androphilia over evolutionary time. This hypothesis postulates that genes for male androphilia could possibly be maintained in the population if the fitness costs of not reproducing directly were offset by enhancing indirect fitness. Indirect fitness is a measure of an individual's impact on the fitness of kin (who share some identical genes by virtue of descent), weighted by the degree of relatedness (Haldane, 1955; Hamilton, 1963). Theoretically speaking, androphilic males could increase their indirect fitness by directing altruistic behavior toward kin, which, in principle, would allow kin to increase their reproductive success. In particular, androphilic males should allocate altruistic behavior toward close kin because they share more genes in common with such individuals. Hence, if this process of kin selection accounts for the evolution of male androphilia, then selection should have favored the evolution of cognitive biases in androphilic males that could enhance investment in kin. The implication, then, is that androphilic males should be more willing to invest in kin relative to other individuals whose life histories are (or will likely be) characterized by direct reproduction.

To date, studies conducted in the United States and Great Britain have not found that androphilic men are more willing to invest time and money toward parents, siblings, or nieces and nephews relative to gynephilic men; these studies, therefore, do not support the kin selection hypothesis for male androphilia (Bobrow & Bailey, 2001; Rahman

& Hull, 2005). These studies were replicated in Samoa and, in contrast, a male sexual orientation difference in willingness to invest time and money toward kin was found (Vasey et al., 2007; Vasey & VanderLaan, 2010a). Specifically, *fa'afafine* exhibited elevated avuncular tendencies (i.e., uncles' willingness to care for nieces and nephews) relative to Samoan gynephilic men. In addition, *fa'afafine* exhibited elevated avuncular tendencies compared to the materteral (i.e., aunt-like) tendencies of Samoan women (Vasey & VanderLaan, 2009). Also, compared to Samoan women and gynephilic men, *fa'afafine* give more money to nieces (Vasey & VanderLaan, 2010b) and exhibit a pattern of avuncular cognition that appears to be adaptively designed for maximizing resources directed toward nieces and nephews, whereas minimizing resources directed toward nonkin children (Vasey & VanderLaan, 2010c). Taken together, these findings from Samoa are consistent with the kin selection hypothesis for male androphilia.

Despite these results, there is a need to be cautious about claiming that the kin selection hypothesis for male androphilia provides an accurate account of why *fa'afafine* exhibit elevated avuncular tendencies (Vasey et al., 2007; Vasey & VanderLaan, 2009, 2010a). Some unique proximate factor(s) not explicitly posited by this hypothesis might underlie elevated avuncular tendencies in Samoan *fa'afafine* and better explain why they differ from Samoan women and gynephilic men as well as Western male androphiles in this regard. As such, factors that are specific to the group that is exhibiting the unique pattern represent the most tenable candidate explanations (Bailey, Gaulin, Agyei, & Gladue, 1994; VanderLaan & Vasey, 2008). Here, we consider one such factor, involvement in sexual/romantic relationships, which may potentially be different for *fa'afafine* as well as relevant to their elevated avuncular tendencies.

Inclusion in the category *fa'afafine* is contingent on feminine gender role presentation rather than sexuality (Poasa, 1992; Schmidt, 2003; Shore, 1981). Not surprisingly then, *fa'afafine* are often identified in

childhood, long before patterns of overt sexuality emerge (Bartlett & Vasey, 2006; Vasey & Bartlett, 2007). Although the vast majority of *fa'afafine* are androphilic in adulthood, Samoans view this pattern of attraction as an optional consequence of being a *fa'afafine*, rather than as a defining criterion for inclusion in this category (Besnier, 1993). *Fa'afafine's* gender atypicality seems to be relatively unproblematic for most Samoans, perhaps because the *fa'afafine's* gender-liminal status affords them the opportunity to undertake both men's and women's work, which families and community members prize (Schmitt, 2003; Vasey & VanderLaan, 2009, 2010a).

The same cannot be said for *fa'afafine's* expression of same-sex sexuality, however, to which some Samoans voice objections (Schmitt, 2003). Because the *fa'afafine's* same-sex sexuality is sometimes viewed disparagingly, it is not surprising that marriage between *fa'afafine* and men is not sanctioned by Samoan society. Sexual interactions between Samoan men and *fa'afafine* are often clandestine, "one-night stands." When sexual relationships between Samoan men and *fa'afafine* do occur, they tend to be quite short-lived (Dolgoy, 2000; Mageo, 1992; Schmidt, 2003). Reflecting on this situation, some *fa'afafine* have told us that it is simply not part of their role in Samoan society to have enduring sexual/romantic relationships with men. Thus, unlike their androphilic male counterparts in Western cultures (i.e., gay men), and gynephilic men and women in Samoan culture, *fa'afafine* may be less involved in sexual/romantic relationships.

If *fa'afafine* are, in fact, less involved in sexual/romantic relationships, this may have implications for their avuncular tendencies. Because resources are finite, investing effort in forming and maintaining sexual/romantic relationships might then limit the amount of resources that can be allocated toward other endeavors. Hence, if *fa'afafine* invest less in sexual/romantic relationships, then this might afford them greater resources, such as time and money, that can be allocated toward nieces and nephews, and thus form the basis of their elevated avuncular tendencies.

Here, we present two studies. In Study 1, we replicated previous studies comparing the avuncular tendencies of Samoan *fa'afafine* and gynephilic men (Vasey et al., 2007; Vasey & VanderLaan, 2010a). In Study 2, we tested the relationship hypothesis, which suggests that elevated avuncular tendencies on the part of *fa'afafine* are mediated by their lesser involvement in sexual/romantic relationships (i.e., having a relationship partner, frequency of spending time with a relationship partner, money allocated to a relationship partner). Specifically, on the basis of the information presented above, we predicted that *fa'afafine* would be less likely to form, and invest in, intimate sexual/romantic relationships with men, than women and gynephilic men would be to form, and invest in, intimate relationships with each other. In addition, we tested whether decreased sexual/romantic relationship involvement was associated with increased willingness to invest time and money toward nieces and nephews as well as whether *fa'afafine's* elevated avuncular tendencies could be accounted for by their sexual/romantic relationship involvement.

Study 1: Replication

Method

Participants

All participants were recruited through a network sampling procedure on the two larger and more populated islands of Independent Samoa: Upolu and Savai'i. A network sampling procedure involves contacting initial participants who display qualities of interest (i.e., status as women, *fa'afafine*, or men), then obtaining referrals from them to additional participants who, in turn, provide further referrals, and so on. The rate of participation for all groups was greater than 90%.

Data used to replicate the sexual orientation difference in avuncular tendencies were collected during a single field trip (July to August, 2008) from 42 self-identified *fa'afafine* and 44 self-identified straight men who had not been interviewed previously. A

total of 41 *fa'afafine* (97.6%) described their sexual feelings as exclusively androphilic (Kinsey rating = 6). One *fa'afafine* (2.4%) reported most sexual feelings toward males, but an occasional fantasy about females (Kinsey rating = 5). All 44 (100%) straight men described their sexual feelings as exclusively gynephilic (Kinsey rating = 0).

Procedure and measures

Participants were interviewed using standardized questionnaires. A Samoan-speaking research assistant was present for those interviews for which the participants indicated that they preferred to do the interview in Samoan, or for those participants who were deemed by the researchers to be insufficiently fluent in English.

Biographic questionnaire. Participants responded to questions about basic biographic information including age, sex, gender identity (i.e., *fa'afafine*, "straight" man, woman), sexual orientation (androphilic vs. gynephilic), highest level of education received, and annual income. Highest level of education received was coded in an ordinal fashion (i.e., 1 = *primary school or less*, 2 = *secondary*, 3 = *postsecondary*). Data on the participants' annual incomes were converted to U.S. dollars. Sexual orientation was assessed using a Kinsey rating (Kinsey, Pomeroy, & Martin, 1948) question about sexual feelings experienced during the last year. Samoans, both inside and outside the *fa'afafine* community, recognize that *fa'afafine* are biological males that are socially distinct from men and women. Nevertheless, for the sake of consistency, participants were told, prior to answering questions pertaining to the Kinsey scale, that the category "males" included straight men and/or *fa'afafine*, whereas the category "females" included women.

Avuncular/maternal tendencies subscale.

All participants completed a subscale composed of nine items that was used in previous research (e.g., Bobrow & Bailey, 2001; Vasey et al., 2007) and was designed to measure

Table 1. Descriptive statistics for continuous biographic and relationship variables as well as avuncular/materteral tendencies

	<i>Fa'afafine</i>		Men		Women	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Study 1						
Age	27.69	8.92	28.91	8.81	—	—
Income	3,426.70	4,837.64	2,464.24	5,194.19	—	—
Avuncular tendencies	5.99	.96	5.51	1.43	—	—
Study 2						
Age	29.23	6.36	22.02	4.58	20.08	4.79
Income	6,719.37	8,839.84	2,200.26	3,368.33	2,327.33	3,074.63
Money spent on relationship partner	252.74	1,044.44	203.46	434.25	95.73	204.39
Avuncular/materteral tendencies: Time investment (six items)	6.20	.97	5.55	1.13	5.37	1.27
Avuncular/materteral tendencies: Monetary investment (three items)	6.37	1.08	5.78	1.24	5.14	1.66
Avuncular/materteral tendencies: Overall subscale	6.25	.93	5.63	1.06	5.29	1.20

avuncular/materteral tendencies toward nieces and nephews. Specifically, participants were asked to imagine that a brother or sister lived nearby (i.e., in the same village) and asked for help with the following child-care activities: (a) babysitting for an evening, (b) babysitting on a regular basis, (c) taking care of the children for a week while their parents are away, (d) buying toys for the children, (e) tutoring one of the children in a subject you know well, (f) helping to expose the children to art and music, (g) contributing money for day care, (h) contributing money for the children's medical expenses, and (i) contributing money for the children's education. Responses to these items were based on a 7-point Likert-type scale that ranged from 1 (*very unwilling*) to 7 (*very willing*). Avuncular/materteral tendencies scores were calculated as the mean response to these nine items.

Results and discussion

Internal consistency reliabilities, standardized item alpha, were computed for *fa'afafine* and men on the avuncular tendencies subscale, and were appreciable for both groups (*fa'afafine*: $\alpha = .74$; gynephilic men: $\alpha = .84$). Table 1 provides descriptive statistics concerning age, annual income, and avuncular tendencies. Response frequencies for highest level of education received for *fa'afafine* and men, respectively, were primary school or less: 0 (0%) and 2 (4.5%); secondary: 21 (50%) and 32 (72.7%); post-secondary: 21 (50%) and 10 (22.8%).

Avuncular tendencies subscale scores of *fa'afafine* and gynephilic men were compared using hierarchical multiple linear regression. Avuncular tendencies score was the dependent (criterion) variable. Participant age, annual income, and education were entered as control

Table 2. Study 1: Stepwise hierarchical linear multiple regression of avuncular tendencies

	<i>B</i>	<i>SE B</i>	95% CI	β	ΔR^2
Step 1					
Age	.04	.02	.01, .08	.31*	
Income	.00	<.01	>-.01, <.01	-.02	
Education	-.11	.31	-.55, .66	.02	.091*
Step 2					
Group	.57	.27	.05, 1.10	.23*	.050*

Note. *Fa'afafine* coded as 1 and men coded as 0.

* $p < .05$.

variables on the first step of the equation. Group (i.e., *fa'afafine* vs. men) was entered as a dichotomous predictor variable on the second step of the equation. *Fa'afafine* exhibited significantly greater avuncular tendencies subscale scores than men (Table 2).

Study 2: Relationship Hypothesis

Method

Participants

To assess the relationship hypothesis, we used data collected during a single field trip (March to June, 2007) from 73 *fa'afafine*, 48 self-identified straight men, and 37 women, all of whom did not have children. Data were collected from the islands of Upolu and Savai'i using a network sampling procedure with a rate of participation greater than 90% as in Study 1. All 73 *fa'afafine* (100%) described their sexual feelings as exclusively androphilic (Kinsey rating = 6). A total of 39 (81.3%) straight men described their sexual feelings as exclusively gynephilic (Kinsey rating = 0), 5 (10.4%) reported most sexual feelings toward females but occasional fantasies about males (Kinsey rating = 1), and 4 (8.3%) reported most sexual feelings toward females but some definite sexual feelings about males (Kinsey rating = 2). Kinsey ratings for women indicated that 36 (97.3%) described their sexual feelings as exclusively androphilic (Kinsey rating = 0), and 1 (0.7%) reported most sexual feelings toward males but occasional fantasies about females (Kinsey rating = 1).

Procedure and measures

All participants included in Study 2 completed the biographic questionnaire and avuncular/materteral tendencies subscale as in Study 1. Data from the avuncular/materteral tendencies subscale were used to assess (a) willingness to make time investments (i.e., the mean response for items a to f of the avuncular/materteral tendencies subscale), (b) willingness to make monetary investments (i.e., the mean response of items g to i of the avuncular/materteral tendencies subscale), and overall avuncular/materteral tendencies (i.e., the mean response to all nine items of the avuncular/materteral tendencies subscale).

Relationship involvement questionnaire.

Participants in Study 2 also responded to an additional set of questions that assessed involvement in romantic and/or sexual relationships. Specifically, participants were asked to indicate whether they were currently involved in a romantic and/or sexual relationship by providing a *yes* (coded as 1) or *no* (coded as 0) response. In addition, participants were asked to report the frequency with which they spent time with a relationship partner. Response options for this second question were treated in an ordinal fashion and included: *never*, *less than once a week*, *at least once a week*, *two to three times a week*, *almost every day*, and *every day*. These responses were coded as 1 through 6, respectively. Finally, these participants were asked to report the amount of money they allocated toward relationship partners over the course

of the previous year. Monetary amounts were converted to U.S. dollars.

Results and discussion

With respect to the sample used to test the relationship hypothesis, internal consistency reliabilities, standardized item alpha, were computed for *fa'afafine*, gynephilic men, and women for avuncular/materteral tendencies measures. For all three groups, reliabilities were appreciable for the six items used to assess time investment (*fa'afafine*: $\alpha = .71$; men: $\alpha = .72$; women: $\alpha = .75$), three items used to assess monetary investment (*fa'afafine*: $\alpha = .82$; men: $\alpha = .76$; women: $\alpha = .84$), and the overall avuncular/materteral tendencies subscale (*fa'afafine*: $\alpha = .84$; men: $\alpha = .82$; women: $\alpha = .81$).

Table 1 provides descriptive statistics concerning age, annual income, amount of money allocated to sexual/romantic relationship partner, and the avuncular/materteral tendencies measures. Response frequencies for highest level of education received for *fa'afafine*, men, and women, respectively, were primary school or less: 0 (0%), 0 (0%), 1 (2.7%); secondary: 51 (69.9%), 28 (58.3%), 10 (27.0%); postsecondary: 22 (30.1%), 20 (41.7%), 26 (70.3%). Forty-one (53.6%) *fa'afafine*, 31 men (64.6%), and 28 (75.7%) women indicated that they had a sexual/romantic relationship partner. Responses to the question concerning amount of time spent with a sexual/romantic relationship partner for *fa'afafine*, gynephilic men, and women, respectively, were as follows: every day: 24 (32.9%), 15 (31.3%), and 10 (27%); almost every day: 1 (1.4%), 2 (4.2%), and 3 (8.1%); two to three times a week: 9 (12.3%), 4 (8.4%), and 8 (21.6%); at least once a week: 2 (2.8%), 9 (18.8%), and 7 (18.9%); less than once a week: 3 (4.2%), 0 (0%), and 0 (0%); and never: 34 (46.4%), 18 (37.3%), and 9 (24.4%).

To investigate whether relationship involvement mediated *fa'afafine's* elevated avuncular tendencies, we followed the guidelines for investigating the presence of possible mediation effects described by Frazier, Tix, and Barron (2004). Hence, we first

confirmed that group was significantly associated with avuncular/materteral tendencies above and beyond the influence of control variables (i.e., age, income, education). As mentioned, previous studies showed that *fa'afafine* exhibit greater willingness to invest in nieces and nephews compared to Samoan men and women, but Samoan men and women do not differ in this regard. For the present sample, group comparisons were conducted using a stepwise hierarchical multiple linear regression model that simultaneously evaluated whether men and women differed from *fa'afafine* for avuncular/materteral investment tendencies after age, income, and education were statistically controlled. To this end, we used two dummy-coded predictor variables with men coded as 1 in the first, women coded as 1 in the second, and *fa'afafine* coded as 0 in both. The results of these analyses were consistent with those of previous studies. Specifically, relative to *fa'afafine*, men showed significantly lower avuncular time investment tendencies, women showed significantly lower materteral monetary investment tendencies, and both men and women showed significantly lower overall avuncular/materteral investment tendencies (Table 3).

Next, we evaluated whether relationship involvement was a potential mediator of any of these group differences. Doing so entailed first assessing whether *fa'afafine* differed from men or women for the variables used to assay relationship involvement. Regression analyses using the same dummy-coding scheme as the previous analyses showed that women were significantly more likely to be involved in a relationship relative to *fa'afafine* but that no additional significant group differences existed for these variables (Table 4). Hence, none of the relationship variables were candidate mediators for the significant group differences between men and *fa'afafine* for the avuncular tendencies measures because there were no significant group differences for any of the relationship variables.

Given these results, we narrowed our analyses and focused on whether the difference between women and *fa'afafine* for being in a relationship mediated the difference between these groups for avuncular/materteral

Table 3. Study 2: Group comparisons of investment tendencies of men and women relative to *fa'afafine* using stepwise hierarchical multiple linear regression

	Time investment tendencies			Monetary investment tendencies			Overall investment tendencies					
	B	SE	B	SE	B	SE	B	SE	B			
Step 1: Controlled variables												
Age	.04	.02	.01, .07	.25**	.04	.02	<.01, .07	.18*	.04	.02	.01, .07	.24**
Income	.00	<.01	>-.01, <.01	-.03	.00	<.01	>-.01, <.01	.03	.00	<.01	>-.01, <.01	-.01
Education	-.49	.17	-.84, -.15	-.22**	-.43	.21	-.86, -.01	-.16*	-.47	.17	-.81, -.14	-.22**
Step 2: Group comparisons												
Predictor 1: Men	-.50	.23	-.95, -.04	-.20*	-.51	.28	-1.06, .03	-.17	-.50	.22	-.94, -.07	-.21*
Predictor 2: Women	-.51	.27	-1.04, .01	-.19	-1.08	.32	-1.71, -.45	-.34***	-.70	.25	-1.20, -.20	-.27**

Note. In Step 2, groups were compared using dummy coding such that men were coded as 1 for Predictor 1, women were coded as 1 for Predictor 2, and *fa'afafine* were coded as 0 for both predictors. Predictors 1 and 2, therefore, show the effects of *fa'afafine* versus men and women, respectively.

* $p < .05$. ** $p < .01$. *** $p < .001$.

Table 4. Study 2: Group comparisons for relationship involvement of men and women relative to *fa'afafine* using multiple regression

	<i>B</i>	<i>SE B</i>	95% CI	β
Relationship partner (1 = <i>yes</i> , 0 = <i>no</i>)				
Predictor 1: Men	.11	.09	-.07, .29	.11
Predictor 2: Women	.22	.10	.03, .42	.20*
Frequency of time spent with partner				
Predictor 1: Men	.19	.40	-.59, .97	.04
Predictor 2: Women	.54	.43	-.31, 1.39	.11
Money allocated toward partner				
Predictor 1: Men	-49.28	140.74	-327.29, 228.74	-.03
Predictor 2: Women	-157.02	152.84	-458.94, 144.90	-.09

Note. Group differences in whether the participant had a relationship partner were assessed using logistic regression, whereas analyses pertaining to the other relationship variables utilized linear regression. Groups were compared using dummy coding such that men were coded as 1 for Predictor 1, women were coded as 1 for Predictor 2, and *fa'afafine* were coded as 0 for both Predictors. Predictors 1 and 2, therefore, show the effects of *fa'afafine* versus men and women, respectively.

* $p < .05$.

monetary and overall investment tendencies. Using stepwise hierarchical multiple linear regression controlling for age, income, and education, we examined whether being involved in a relationship was predictive of monetary and/or overall investment tendencies. We also included two additional interaction terms in the model. These terms were the cross-products of the binary variable for whether the participant had a relationship partner (1 = *yes*, 0 = *no*) and each of the two dummy-coded variables used above to conduct group comparisons. Thus, inclusion of these interaction terms made it possible to also assess whether the prediction of investment tendencies by relationship involvement was moderated by group (i.e., moderated mediation; Preacher, Rucker, & Hayes, 2007). These analyses showed that although avuncular/materteral investment tendencies were not significantly predicted by whether the participant had a relationship partner for the overall sample, significant interaction effects did exist whereby men and women's avuncular/materteral investment tendencies tended to be lower when they had a relationship partner (Table 5).

According to guidelines in the literature (Frazier et al., 2004; Preacher et al., 2007),

the results detailed thus far indicate that having a relationship partner (i.e., *yes* vs. *no*) satisfies the prerequisite conditions for potential moderated mediation of the avuncular/materteral investment tendencies differences between women and *fa'afafine*. Consequently, we examined whether the observed interaction whereby women, but not *fa'afafine*, who were involved in a sexual/romantic relationship tended to show lower investment tendencies toward nieces and nephews mediated the differences in such investment tendencies between *fa'afafine* and women. In a stepwise hierarchical multiple linear regression analysis using the same dummy-coded predictor variables for group comparisons as had been used above, after age, income, education, and the aforementioned interaction term were controlled, compared to women, *fa'afafine* still had significantly greater avuncular monetary, $B = -1.19$, $SE B = .50$, 95% CI [-2.17, -.20], $\beta = -.37$, $p = .02$, and overall investment tendencies, $B = -.78$, $SE B = .39$, 95% CI [-1.56, .00], $\beta = -.30$, $p = .05$. Moderated mediation effects were calculated in accordance with the guidelines provided by Preacher and colleagues, and these effects were significant for the difference between *fa'afafine* and women in monetary (one-tailed:

Table 5. Study 2: Stepwise hierarchical multiple linear regression of investment tendencies on whether the participant is involved in a relationship and its interaction with group

	Monetary investment tendencies				Overall investment tendencies			
	<i>B</i>	<i>SE B</i>	95% CI	β	<i>B</i>	<i>SE B</i>	95% CI	β
Relationship partner (1 = yes, 0 = no)	.47	.27	-.07, 1.00	.17	.37	.22	-.06, .80	.16
Predictor 1 \times Relationship Partner	-.86	.34	-1.52, -.19	-.25*	-.64	.27	-1.17, -.11	-.23*
Predictor 2 \times Relationship Partner	-1.14	.36	-1.84, -.43	-.32**	-.71	.29	-1.27, -.14	-.24*

Note. Statistics related to the controlled effects of age, income, and education are identical to those presented in Table 3. Interaction terms were calculated as cross products using dummy coding such that men were coded as 1 for Predictor 1, women were coded as 1 for Predictor 2, and *fa'afafine* were coded as 0 for both Predictors. Thus, the Predictor 1 \times Relationship Partner and Predictor 2 \times Relationship Partner interaction terms indicate how relationship involvement differentially affects investment tendencies for *fa'afafine* versus men and women, respectively.

* $p < .05$. ** $p < .01$.

$z = -1.81$, $p = .04$) and overall investment tendencies (one-tailed: $z = -1.64$, $p = .05$). Taken together, these results indicate that the tendency of women in relationships to exhibit lower investment tendencies partially explains why they differ from *fa'afafine* in this regard, but does not completely mediate these group differences.

General Discussion

In Study 1, the previously reported male sexual orientation difference in avuncular tendencies (Vasey et al., 2007; Vasey & VanderLaan, 2010a) was replicated using an independent sample. This additional replication further suggests that the documented male sexual orientation difference in avuncular tendencies in Samoa is genuine and not the result of sampling bias.

In Study 2, we tested the hypothesis that the elevated avuncular tendencies of *fa'afafine* (Table 3) were mediated by their lesser involvement in sexual/romantic relationships. Our findings were generally inconsistent with this hypothesis. First, contrary to the ethnographic literature, *fa'afafine* reported levels of sexual/romantic relationship involvement that were comparable to that of Samoan men and women, particularly in terms of the frequency with which they spent time with sexual/romantic relationship partners as well

as the amount of money they allocated to sexual/romantic relationship partners (Table 4). Second, based on the hypothesis, we predicted that *fa'afafine* would show greater avuncular tendencies due to a relative lack of relationship involvement. However, *fa'afafine*'s investment tendencies were relatively less affected by whether they had a sexual/romantic relationship partner. Instead, it was men and women who showed a relatively greater decline in avuncular/maternal tendencies when they had a sexual/romantic relationship partner (Table 5). Third, the results indicated that relationship involvement was insufficient to account fully for *fa'afafine*'s elevated willingness to invest in nieces and nephews relative to men and women.

Previous research demonstrated that the elevated avuncular tendencies of *fa'afafine* are not a by-product of a lack of parental care responsibilities (Vasey & VanderLaan, 2010a), increased femininity (Vasey & VanderLaan, 2009), or general interest in children (Vasey & VanderLaan, 2010c). On the basis of this study, it appears that the elevated avuncular tendencies of *fa'afafine* are also not simply a by-product of a lack of investment in sexual/romantic relationships. That said, it is important to highlight that women's tendency to lower investment

in nieces and nephews when involved in a sexual/romantic relationship did partially mediate the group difference between women and *fa'afafine* for avuncular/materteral tendencies. There is some evidence, then, to suggest that relationship involvement bears relevance to understanding group differences in avuncular/materteral tendencies. Yet, the manner in which relationship involvement does so may differ from that posited by the hypothesis examined here. Rather than a lack of relationship involvement being associated with an elevation in the avuncular investment tendencies of *fa'afafine*, the present findings tentatively indicate that men and women might have a tendency to lower their avuncular/materteral tendencies when involved in a relationship, thus widening the existing gap in willingness to invest in nieces and nephews between them and *fa'afafine*.

The question remains, then, as to what additional circumstances might influence elevated avuncular tendencies in Samoan *fa'afafine* when compared to women and gynephilic men. Like *fa'afafine*, "gay" male androphiles in Western nations are, on average, more feminine than gynephilic men (reviewed in Bailey, 2003), particularly with respect to their social interests and work preferences (reviewed in Lippa, 2005), but unlike *fa'afafine*, they do not exhibit a transgendered pattern of male androphilia. Instead, Western gay men exhibit an *egalitarian* pattern of male androphilia in which both partners are more or less gender normative for their sex and do not adopt specialized roles, instead treating each other as equals (Murray, 2000). It is noteworthy that although both are androphilic, it is the transgendered *fa'afafine* who exhibit elevated avuncular tendencies relative to gynephilic men (Vasey et al., 2007; Vasey & VanderLaan, 2010a), whereas non-transgendered gay men from Western nations do not (Bobrow & Bailey, 2001; Rahman & Hull, 2005). One possible explanation for this cross-cultural difference is that elevated avuncular tendencies may be more contingent on a male's transgendered status than on a male's androphilic status.

For reasons that remain unclear, transgendered male androphiles are often described

by the gender-normative members of their societies as being superior to men and women in terms of various labor practices, often combining the best that both sexes have to offer (see Williams, 1992). For example, in Samoa, Chief Vaasili Fiji stated: "Most of the families consider having a *fa'afafine* in the Samoan home as an asset because in the plantation they are men; in the house they are wonderful and great housekeepers" (Croall & Wunderman, 1999). Owing to their "third" gender status, *fa'afafine* may adopt unique (trans)gender role orientations that are distinct from, but combine elements of, the singularly masculine and feminine roles of men and women. The elevated avuncular tendencies of *fa'afafine* may somehow reflect such unique (trans)gender role orientations. In this regard, it is interesting to note that various individuals with whom we spoke emphasized the special role of *fa'afafine* within Samoan families. For example, one *fa'afafine* we spoke with on the island of Savai'i had this to say: "My brothers and sisters have all gone off and started their own families. *Fa'afafine* are more available if the family needs their support. They bring the family together." Similarly, a woman we spoke with on the island of Savai'i said: "A *fa'afafine* is more responsible than a son or a daughter. They contribute more to the family. *Everyone* knows that."

Research conducted in Western societies indicates that when individuals transgress normative gender role expectations, their individual gender role orientations (i.e., "masculine" and "feminine" characteristics and behaviors), as perceived by others, become linked to the social roles they occupy rather than their sex (e.g., stay-at-home dads, women athletes; e.g., Etaugh & Poertner, 1991, 1992; Harrison & Lynch, 2005; Riggs, 1997). For example, men who occupy gender-atypical social roles (e.g., stay-at-home dads) are more likely to be perceived by others as having a feminine gender role orientation compared to men who occupy traditional social roles. Future research should assess whether Samoans hold special (trans)gender role expectations for *fa'afafine*, particularly in relation to familial duties, including avuncularity.

Self-attribution of atypical gender role orientations by individuals who do not conform to normative gender role expectations has been documented in Western (e.g., Colker & Widom, 1980; Lantz & Schroeder, 1999) and non-Western cultures (Koca, Aşçı, & Kirazcı, 2005). For example, Koca and colleagues (2005) showed that female athletes in Turkey perceive themselves as having a more masculine or more androgenous gender role orientation compared to their nonathlete counterparts. Future research should, therefore, also assess whether *fa'afafine* come to hold unique (trans)gender role expectations for themselves, including their role in regards to avuncularity. It is also worth noting that *fa'afafine* tend to have more siblings than Samoan gynephilic men (VanderLaan & Vasey, 2011; Vasey & VanderLaan, 2007) and that having larger families might exaggerate the expectations that *fa'afafine* have of themselves regarding their role as caretakers of the family. Future research may, therefore, also consider how family size influences attitudes toward caring for kin, including attitudes about avuncularity.

Finally, Williams (1992) hypothesized that transgendered androphilic males in many non-Western cultures excel at various labor practices, especially feminine ones, as a way of striving for prestige within their families and communities. He argued that one consequence of this pattern of prestige acquisition was that transgendered androphilic males sometimes behave in a competitive manner when executing feminine labor (Williams, 1992). Anecdotal evidence from Samoa provides some support for these ideas. For example, one *fa'afafine* from the island of Upolu stated "If you cook with a *fa'afafine*, I think a *fa'afafine* will be better than you. If you're cleaning or doing all those kind of stuff that a woman should do, a *fa'afafine* is better than a woman for doing that" (Poe, 2004). Given that child care in Samoa is primarily a feminine labor practice (Freeman, 1983; Nardi, 1983/1984; Ochs, 1988), it would be valuable if future research assessed whether *fa'afafine* strive for prestige by overexcelling in the domain of avuncularity.

There are a number of respects in which the methodology employed here could be improved in future studies. For example, simply asking participants to report sexual/romantic relationship status, frequency of spending time with a sexual/romantic relationship partner, and the amount of money allocated to a sexual/romantic relationship partner may have provided measures of relationship involvement that were too coarse to effectively test the relationship hypothesis assessed in Study 2. A more refined assessment of sexual/romantic relationship involvement might have entailed gathering additional information about participants' sexual/romantic relationships such as degree of emotional attachment to relationship partners. Also, this study did not consider a number of variables that may affect investment in kin, including, but not limited to, the financial status of the participants' siblings (i.e., parents of nieces and nephews), the sexes of the participants' siblings, and the ages of nieces and nephews. Furthermore, in addition to obtaining reports of willingness to allocate time and money toward nieces and nephews, it might also be worthwhile to assess participants' histories of actually allocating time and money toward nieces and nephews. Consideration of additional information captured by variables such as these would further inform the extent to which sexual/romantic relationship involvement relates to investments in kin.

There are also analytical limitations worth noting. Appropriate tests of mediation effects rely on the use of regression techniques. In certain respects, however, the data analyzed here were not ideal for such techniques. In particular, participant income and money spent on relationship partner had skewed distributions, and time spent with relationship partner was measured in an ordinal fashion. Also, group differences in biographic variables existed, which, although statistically controlled, is less ideal than having matched groups. Yet, from a pragmatic point of view, these limitations are difficult to overcome. Growing economic disparities exist among people in Samoa (Tone, 2010), which naturally skew the distributions of income and money that can be allocated to others.

Quantifying time spent with relationship partners in a continuous fashion (e.g., number of days or hours) seems likely to produce substantial measurement error. Finally, obtaining samples of childless Samoan men and women that were comparable to *fa'afafine* for biographic variables (e.g., age) would also not be ideal because, not only would they be difficult to procure, but they would be peculiar given that *fa'afafine* have very different reproductive life history courses in Samoan society. Given the various limitations of this study, the findings reported here should lead one to tentatively downgrade, as opposed to outright refute, the hypothesis that increased avuncular tendencies in Samoan *fa'afafine* are mediated by their lesser involvement in sexual/romantic relationships.

References

- Bailey, J. M. (2003). *The man who would be queen: The science of gender-bending and transsexualism*. Washington, DC: Joseph Henry Press.
- Bailey, J. M., Dunne, M. P., & Martin, N. G. (2000). Genetic and environmental influences on sexual orientation and its correlates in an Australian twin sample. *Journal of Personality and Social Psychology*, *78*, 524–536.
- Bailey, J. M., Gaulin, S., Agyei, Y., & Gladue, B. A. (1994). Effects of gender and sexual orientation on evolutionarily relevant aspects of human mating psychology. *Journal of Personality and Social Psychology*, *66*, 1081–1093.
- Bartlett, N. H., & Vasey, P. L. (2006). A retrospective study of childhood gender-atypical behavior in Samoan *fa'afafine*. *Archives of Sexual Behavior*, *35*, 559–566.
- Bell, A. P., & Weinberg, M. S. (1978). *Homosexualities: A study of diversity among men and women*. New York: Simon & Shuster.
- Besnier, N. (1993). Polynesian gender liminality. In G. Herdt (Ed.), *Third sex, third gender* (pp. 285–328). New York: Zone.
- Bobrow, D., & Bailey, J. M. (2001). Is male homosexuality maintained via kin selection? *Evolution and Human Behavior*, *22*, 361–368.
- Brooks, P., & Bocahut, L. (Directors). (1998). *Woubi Cheri* [Motion picture]. San Francisco: California Newsreel.
- Chifias, B. (1995). Isthmus Zapotec attitudes toward sex and gender anomalies. In S. O. Murray (Ed.), *Latin American male homosexualities* (pp. 293–302). Albuquerque: University of New Mexico Press.
- Colker, R., & Widom, C. (1980). Correlates of female athletic participation: Masculinity, femininity, self-esteem, and attitudes toward women. *Sex Roles*, *6*, 47–59.
- Croall, H., & Wunderman, E. (Directors). (1999). *Paradise bent: Gender diversity in Samoa* [Motion picture]. New York: Filmmakers Library.
- Dolgoy, R. (2000). *The search for recognition and social movement emergence: Towards an understanding of the transformation of the fa'afafine of Samoa*. Unpublished doctoral thesis, University of Alberta, Edmonton, Canada.
- Etaugh, C., & Poertner, P. (1991). Effects of occupational prestige, employment status, and mental status on perceptions of mothers. *Sex Roles*, *26*, 311–321.
- Etaugh, C., & Poertner, P. (1992). Perceptions of women: Influence of performance, marital, and parental variables. *Sex Roles*, *24*, 345–353.
- Frazier, P. A., Tix, A. P., & Barron, K. E. (2004). Testing moderator and mediator effects in counseling psychology research. *Journal of Counseling Psychology*, *51*, 115–134.
- Freeman, D. (1983). *Margaret Mead and Samoa: The making and unmaking of an anthropological myth*. Cambridge, MA: Harvard University Press.
- Haldane, J. B. S. (1955). Population genetics. *New Biology*, *18*, 34–51.
- Hamer, D., & Copeland, P. (1994). *The science of desire: The search for the gay gene and the biology of behavior*. New York: Simon & Schuster.
- Hamilton, W. D. (1963). The evolution of altruistic behavior. *American Naturalist*, *97*, 354–356.
- Harrison, L. A., & Lynch, A. B. (2005). Social role theory and the perceived gender role orientation of athletes. *Sex Roles*, *52*, 227–236.
- Iemmola, F., & Camperio Ciani, A. (2009). New evidence of genetic factors influencing sexual orientation in men: Female fecundity increase in the maternal line. *Archives of Sexual Behavior*, *38*, 393–399.
- Kendler, K. S., Thornton, L. M., Gilman, S. E., & Kessler, R. C. (2000). Sexual orientation in a US national sample of twin and non-twin sibling pairs. *American Journal of Psychiatry*, *157*, 1843–1846.
- Kinsey, A. C., Pomeroy, W. B., & Martin, C. E. (1948). *Sexual behavior in the human male*. London: Saunders.
- Koca, C., Aşçı, F. H., & Kirazcı, S. (2005). Gender role orientation of athletes and non-athletes in a patriarchal society: A study in Turkey. *Sex Roles*, *52*, 217–225.
- Långström, N., Rahman, Q., Carlström, E., & Lichtenstein, P. (2010). Genetic and environmental effects on same-sex sexual behavior: A population study of twins in Sweden. *Archives of Sexual Behavior*, *39*, 75–80.
- Lantz, C., & Schroeder, P. J. (1999). Endorsement of masculine and feminine gender roles: Differences between participation in and identification with the athletic role. *Journal of Sport Behavior*, *22*, 545–557.
- Lippa, R. A. (2005). *Gender, nature, nurture* (2nd ed.). Mahwah, NJ: Erlbaum.

- Mageo, J. M. (1992). Male transvestism and cultural change in Samoa. *American Ethnologist*, 19, 443–459.
- Murray, S. O. (2000). *Homosexualities*. Chicago: University of Chicago Press.
- Mustanski, B. S., Chivers, M. L., & Bailey, J. M. (2002). A critical review of recent biological research on human sexual orientation. *Annual Review of Sex Research*, 13, 89–140.
- Nanda, S. (1998). *Neither man nor woman: The hijras of India*. Belmont, CA: Wadsworth.
- Nardi, B. A. (1983/1984). Infant feeding and women's work in Western Samoa: A hypothesis, some evidence and suggestions for future research. *Ecology of Food and Nutrition*, 13/14, 277–286.
- Nash, G. (2001). The subversive male: Homosexual and bestial images on European mesolithic rock art. In L. Bevan (Ed.), *Indecent exposure: Sexuality, society and the archaeological record* (pp. 43–55). Glasgow, Scotland: Cruithne Press.
- Ochs, E. (1988). *Culture and language development: Language acquisitions and language socialization in a Samoan village*. Cambridge, UK: Cambridge University Press.
- Poasa, K. (1992). The Samoan *fa'afafine*: One case study and a discussion of transsexualism. *Journal of Psychology and Human Sexuality*, 5, 39–51.
- Poe, C. (Producer). (2004). *National geographic taboo: Sexual identity* [Motion picture]. Washington, DC: National Geographic Film and Television.
- Preacher, K. J., Rucker, D. D., & Hayes, A. F. (2007). Addressing moderated mediation hypotheses: Theory, methods, and prescriptions. *Multivariate Behavioral Research*, 42, 185–227.
- Rahman, Q., & Hull, M. S. (2005). An empirical test of the kin selection hypothesis for male homosexuality. *Archives of Sexual Behavior*, 34, 461–467.
- Riggs, J. M. (1997). Mandates for mothers and fathers: Perceptions of breadwinners and caregivers. *Sex Roles*, 37, 565–580.
- Saghir, M. T., & Robins, E. (1973). *Male and female homosexuality: A comprehensive investigation*. Baltimore, MD: Williams & Wilkins.
- Schmidt, J. (2003). Paradise lost? Social change and *fa'afafine* in Samoa. *Current Sociology*, 51, 417–432.
- Shore, B. (1981). Sexuality and gender in Samoa: Conceptions and missed conceptions in sexual meaning. In S. B. Ortner & H. Whitehead (Eds.), *The cultural construction of gender and sexuality* (pp. 192–215). Cambridge, UK: Cambridge University Press.
- Tone, C. (2010, November 21). Capital shame. *Samoan Observer*. Retrieved November 25, 2010, from <http://www.samoanobserver.ws/>
- Totman, R. (2003). *The third sex kathoey: Thailand's ladyboys*. London: Souvenir Press.
- VanderLaan, D. P., & Vasey, P. L. (2008). Mate retention behavior of men and women in heterosexual and homosexual relationships. *Archives of Sexual Behavior*, 37, 572–585.
- VanderLaan, D. P., & Vasey, P. L. (2011). Male sexual orientation in Independent Samoa: Evidence for fraternal birth order and maternal fecundity effects. *Archives of Sexual Behavior*, 49, 495–503.
- Van de Ven, P., Rodden, P., Crawford, J., & Kippax, S. (1997). A comparative demographic and sexual profile of older homosexually active men. *Journal of Sex Research*, 34, 349–360.
- Vasey, P. L., & Bartlett, N. H. (2007). What can the Samoan *fa'afafine* teach us about the Western concept of “gender identity disorder in childhood”? *Perspectives in Biology and Medicine*, 50, 481–490.
- Vasey, P. L., Pocock, D. S., & VanderLaan, D. P. (2007). Kin selection and male androphilia in Samoan *fa'afafine*. *Evolution and Human Behavior*, 28, 159–167.
- Vasey, P. L., & VanderLaan, D. P. (2007). Birth order and male androphilia in Samoan *fa'afafine*. *Proceedings of the Royal Society of London, Series B: Biological Sciences*, 274, 1437–1442.
- Vasey, P. L., & VanderLaan, D. P. (2009). Maternal and avuncular tendencies in Samoa: A comparative study of women, men and *fa'afafine*. *Human Nature*, 20, 269–281.
- Vasey, P. L., & VanderLaan, D. P. (2010a). Avuncular tendencies in Samoan *fa'afafine* and the evolution of male androphilia. *Archives of Sexual Behavior*, 39, 821–830.
- Vasey, P. L., & VanderLaan, D. P. (2010b). Monetary exchanges with nieces and nephews: A comparison of Samoan men, women, and *fa'afafine*. *Evolution and Human Behavior*, 31, 373–380.
- Vasey, P. L., & VanderLaan, D. P. (2010c). An adaptive cognitive dissociation between willingness to help kin and non-kin in Samoan *fa'afafine*. *Psychological Science*, 21, 292–297.
- Whitam, F. L. (1983). Culturally invariable properties of male homosexuality: Tentative conclusions from cross-cultural research. *Archives of Sexual Behavior*, 12, 207–226.
- Wikan, U. (1977). Man becomes woman: Transsexualism in Oman as a key to gender roles. *Man*, 12, 304–319.
- Williams, W. (1992). *The spirit and the flesh: Sexual diversity in American Indian culture*. Boston: Beacon.
- Wilson, E. O. (1975). *Sociobiology: The new synthesis*. Cambridge, MA: Belknap Press.
- Wilson, G., & Rahman, Q. (2005). *Born gay: The psychology of sex orientation*. London: Peter Owen.
- Yankelovich Partners. (1994). *A Yankelovich MONITOR perspective on gays/lesbians*. Norwalk, CT: Yankelovich Partners.
- Yates, T. (1993). Frameworks for an archaeology of the body. In C. Tilley (Ed.), *Interpretive archaeology* (pp. 31–72). Providence, RI: Berg.