



Heterogeneity in the Sexual Orientations of Men Who Have Sex with *Fa'afafine* in Samoa

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Abstract

In Samoa, feminine natal males who possess male-typical genitalia are known locally as *fa'afafine*. Some Samoan men express sexual interest in *fa'afafine*, whereas others do not. To assess the sexual orientation of men who are sexually interested in *fa'afafine*, we collected sexual attraction ratings and viewing times of Samoan men's and women's faces. Study 1 ($N = 130$) focused on men who were insertive or versatile during anal sex with *fa'afafine* partners. These men were compared to each other, as well as to males (i.e., men and *fa'afafine*) who were exclusively sexually interested in either women or men. Study 2 ($N = 180$) compared men who had sex with *fa'afafine* and women; men who had sex with *fa'afafine*, women, and men; and men who had sex with *fa'afafine* and men. These men were compared to each other, as well as to males who were exclusively sexually interested in either women or men. These studies suggest that men who have sex with *fa'afafine* are a heterogeneous group. A small portion of the men who are sexually interested in *fa'afafine* shows a relatively bisexual pattern of sexual attraction ratings and viewing times, namely men who have sex with *fa'afafine*, men, and women. In contrast, a larger number of men who were sexually interested in *fa'afafine* responded in a manner similar to men who were exclusively sexually interested in either women or men. The present research suggests that additional insights into male sexual orientation can be garnered by focusing on how sexuality is expressed in non-Western cultural contexts.

Keywords Sexual orientation · Bisexuality · Viewing time · Anal sex · Gynandromorphophilia · *Fa'afafine*

Introduction

Across a diverse range of cultures, some men have sex with natal males who present in a feminine manner but have male-typical genitalia and, in many instances, other male-typical morphological features (e.g., Bolivia: Wright, 2000; Brazil: Kulick, 1997; Whitam, 1995; Columbia: Bianchi et al., 2014; Guatemala: Tucker, Galindo Arandi, Bolaños, Paz-Bailey, & Barrington, 2014; India: Stief, 2017; Indonesia: Boellstorff,

2004; Latino men in the U.S.: Bockting, Miner, & Rosser, 2007; Malaysia: Lim, 2015; Mexico: Howe, Zarasky, & Lorentzen, 2008; Mohave First Nations: Devereux, 1937; Nicaragua: Lancaster, 1988; Oman: Wikan, 1977; Philippines: Johnson, 1998; Whitam, 1992; South Africa: Donham, 1998; Spain: Haller, 1992; U.S.: Carballo-Diéguez & Dolezal, 1994; Coan, Schrager, & Packer, 2005; Mauk, Perry, & Muñoz-Laboy, 2013; Operario, Burton, Underhill, & Sevelius, 2008). Hereafter, natal males whose gender presentation is feminine will be referred to as MtF transgender individuals. (This can include, for example, individuals who identify as women or transgender women as well as individuals who identify neither as men nor as women but rather as some alternative gender.) The majority of MtF transgender individuals are notably feminine, but it is not uncommon for these individuals to possess qualities that are male-typical (e.g., male genitalia).

Men who are sexually interested in MtF transgender individuals exhibit notable variability in their sexual positioning. For instance, in many cultures, MtF transgender individuals are understood, at least in principle, to be receptive during

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anal intercourse (e.g., Cardoso, 2005; Greenberg, 1988; Haller, 1992; Kulick, 1997; Lancaster, 1988; Sweet & Zwilling, 1993; Wikan, 1977). In practice, however, some males who have sex with MtF transgender individuals are, at times, penetrated by their partners (e.g., Bianchi et al., 2014; Boellstorff, 2004; Lim, 2015; Oetomo & Emond, 1993; Operario et al., 2008; Prieur, 1994; Stief, 2017).

Men who are sexually interested in MtF transgender individuals also exhibit notable variability in their partner selection. For example, many men who are sexually interested in MtF transgender individuals also express sexual interest in women and some express sexual interest in both women and men (e.g., Rosenthal, Hsu, & Bailey, 2017; Stief, 2017). A small portion of men who are sexually interested in MtF transgender individuals also expresses sexual interest in men, but not women (e.g., Hall et al., 2017; Stief, 2017).

Some evidence suggests that sexual interest in MtF transgender individuals is associated with ambiphilia (i.e., sexual interest in both women and men). For instance, when measures of self-reported sexual attraction and viewing time were employed, Samoan (Peterson, Dixon, Little, & Vasey, 2015) and Indian (Stief, 2017) males who were sexually interested in MtF transgender individuals showed patterns of response to images of men and women that were consistent with ambiphilia.

However, in light of the heterogeneity in sexual roles and partner selection among this group, the possibility exists that males who are sexually interested in MtF transgender individuals exhibit a variety of sexual orientations. Consistent with this possibility, sexual attraction ratings and viewing times of women and men vary based on men's oral sex roles with *fa'afafine* (Peterson, Dixon, Little, & Vasey, 2016): whereas Samoan men who both receive and perform oral sex with *fa'afafine* (MtF transgender individuals in Samoa) are relatively ambiphilic, Samoan men who only received fellatio from *fa'afafine* are comparatively gynephilic (i.e., sexually attracted to women). Thus, different sexual behavior patterns may reflect different underlying sexual orientations. Taken together, these results are consistent with the suggestion that males who are sexually interested in MtF transgender individual are relatively ambiphilic compared to other males, but the degree to which they are ambiphilic varies and is associated with how sexual behavior is expressed.

The current research was conducted in Samoa and consisted of two studies examining whether men who were sexually interested in *fa'afafine* were heterogeneous in terms of their sexual orientation. Examining the sexual preferences of men who have sex with MtF transgender individuals may provide insights into potential variation in men's sexual orientation across cultures. In Study 1, we assessed whether men's viewing times and sexual attraction ratings of men and women differed as a function of positioning during anal sex with *fa'afafine*. In Study 2, we assessed whether viewing

times and sexual attraction ratings of men and women differed as a function of their sexual histories (i.e., history of sexual activity with and sexual feelings for men, women, and *fa'afafine*). Men who were sexually interested in *fa'afafine* were predicted to show a relatively ambiphilic pattern of sexual attraction ratings and viewing times, but the degree of ambiphilia was predicted to vary based on their anal-sex positioning and sexual history.

Two patterns of response have been identified as ambiphilic (e.g., Bailey, 2009; Bailey et al., 2015). First, ambiphilic individuals are less discrepant in their sexual attraction to men and women relative to monosexual individuals, including those who are primarily gynephilic or androphilic (i.e., sexually attracted to men). Thus, individuals are said to have an ambiphilic response pattern if the difference in their sexual attraction ratings and viewing times of men and women are smaller than to those of monosexual men. Second, ambiphilic individuals have elevated attraction to their lesser-preferred gender relative to monosexual individuals. Thus, individuals are said to have an ambiphilic response if they report greater attraction to their lesser-preferred gender and view their lesser-preferred gender longer than monosexual individuals. If individuals are ambiphilic, both patterns should be observed.¹

To assess whether men who had sex with *fa'afafine* were less discrepant in their response to men and women relative to monosexual natal males, we constructed two indices for each measure (i.e., sexual attraction ratings and viewing times): (1) gender-preference indices and (2) difference-magnitude indices. The gender-preference indices represent the difference in participants' responses to men and women: low scores indicate gynephilia, high scores indicate androphilia, and scores closer to 0 indicate a lack of exclusive preference for women or men, or ambiphilia. However, when these scores are averaged, a group that is comprised of a mix of gynephilic and androphilic individuals would be indistinguishable from a group that is comprised of ambiphilic individuals. Hence, we also calculated difference-magnitude indices, which represent the absolute size of the difference in participants' response to men and women: high scores indicate a discrepant response to the two genders and low scores indicate a similar response to the two genders. Additionally, we constructed indices of participants' responses to their lesser-preferred gender for each measure: low scores

¹ If participants respond to men and women in a similar manner, this could indicate that they are highly attracted to both genders, but it could also indicate that they are minimally attracted to both genders. The latter is inconsistent with ambiphilia. However, if they respond to men and women in a relatively similar manner and also report greater attraction to their lesser-preferred gender and view their lesser-preferred gender longer than monosexual individuals, the second possibility can be ruled out.

Table 1 Description of partner histories of men who engage in sexual interactions with *fa'afafine* throughout participants' lifetime and within the prior year

		<i>Fa'afafine</i> and women		<i>Fa'afafine</i> and men		<i>Fa'afafine</i> , women, and men	
		<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Men who had insertive sex with <i>fa'afafine</i>	Throughout their lives	18	60.0	3	10.0	9	30.0
	Within the prior year	23	76.7	2	6.7	5	16.7
Men who had insertive and receptive sex with <i>fa'afafine</i>	Throughout their lives	9	37.5	9	37.5	6	25.0
	Within the prior year	9	37.5	11	45.8	4	16.7

indicate negligible response to their lesser-preferred gender and high scores indicate more substantial interest in their lesser-preferred gender. Using these indices, we assessed whether men who had sex with *fa'afafine* showed ambiphilic patterns of sexual attraction ratings and viewing times relative to monosexual males.

Hypothesis 1 Regardless of their anal-sex positioning and sexual histories, men who are sexually interested in *fa'afafine* are ambiphilic.

Men who have sex with *fa'afafine* were predicted to show relatively ambiphilic patterns of sexual attraction ratings and viewing times including: (1) gender-preference index scores that were intermediate between those of gynephilic and androphilic males; (2) difference-magnitude indices scores that were lower than those of gynephilic and androphilic males; and (3) responses to their lesser-preferred gender that were greater than those of gynephilic and androphilic males.

Hypothesis 2 Men who are sexually interested in *fa'afafine* are heterogeneous in terms of their ambiphilia.

Men who have sex with *fa'afafine* were predicted to vary in their (1) gender-preference index scores; (2) difference-magnitude index scores; and (3) responses to their lesser-preferred gender based on anal-sex positioning and sexual histories.

Study 1

In Study 1, we assessed the relationship between men's viewing times and sexual attraction ratings of images of men and women and anal-sex positioning with *fa'afafine*. To do so, we compared (1) participants who were exclusively insertive during anal sex with *fa'afafine*, (2) participants who were both insertive and receptive during anal sex with *fa'afafine*, (3) participants who had sex only with women (gynephilic men), and (4) participants who had sex only with men

(androphilic males). Groups 1–3 were comprised of men and Group 4 was comprised of men and *fa'afafine*. We predicted that men who had sex with *fa'afafine*, regardless of the position they adopted during anal sex, would show relatively ambiphilic patterns of sexual attraction ratings and viewing times compared to monosexual natal males. However, this was predicted to vary based on anal-sex positioning. Men who were both insertive and receptive during anal intercourse with *fa'afafine* partners were predicted to show less discrepant responses to images of men and women as well as greater sexual attraction to, and longer viewing times of, their lesser-preferred gender compared to men who were exclusively sexually insertive during anal sex with *fa'afafine* partners.

Method

Participants

The anal-sex positioning analysis included (1) 30 men who had sex with *fa'afafine* in the prior year and who were exclusively insertive during anal sex with *fa'afafine* (hereafter, insertive men), (2) 24 men who had sex with *fa'afafine* in the prior year and who were both insertive and receptive during anal sex with *fa'afafine* (hereafter, versatile men), (3) 31 men who had sex only with women and had done so in the prior year (hereafter, gynephilic men), and (4) 45 natal males (i.e., natal males who identified as *fa'afafine*, $n = 30$; males who identified as men, $n = 15$) who had sex only with men and had done so in the prior year (hereafter, androphilic males). Men who engaged in sexual interactions with *fa'afafine* varied in terms of their sexual partner histories. Table 1 shows participants' prior year and lifetime sexual histories.

All participants were recruited from Upolu, the most highly populated island of Samoa between 2012 and 2015. A network sampling procedure was used, which involved contacting initial participants who displayed qualities of interest (i.e., status as [1] a *fa'afafine*, [2] a man) then obtaining referrals for additional participants. Participants were excluded if they experienced difficulties completing the task or if they were not paying attention during the image-rating

task. Twelve participants were excluded. One androphilic male was excluded, because he had experienced sexual feelings for *fa'afafine*, but he had not had sex with *fa'afafine*. Portions of the data used here have been used in prior analyses (Pettersson, Dixon, Little, & Vasey, 2015, 2016, 2018).²

Age differed between groups, Welch statistic, $F(3, 66.32) = 7.72, p < .001$. Versatile men (M age = 23.46 years, $SD = 4.46$) were younger than gynephilic men (M age = 29.71 years, $SD = 8.88$), $p = .004$, and androphilic males (M age = 28.02 years, $SD = 6.85$), $p = .038$. Insertive men (M age = 23.33 years, $SD = 4.90$) were younger than gynephilic men, $p = .002$, and androphilic males, $p = .018$. No other significant group differences in age were found (p values = .699 and .100). Age did not significantly correlate with participant's sexual attraction or viewing times ($p = .115$ –.893).

Measures

The study consisted of an image-rating task, during which participants' viewing times were recorded, and a brief biographic questionnaire. The image-rating task was conducted using Empirisoft's MediaLab reaction-time software (Eternity and Empirisoft Corporation, 1997).

Prior to the study portion of the image-rating task, participants completed a trial to familiarize themselves with the task. During the trial, participants were presented with a series of 9 images, which included 3 images of clothed Samoan men and 3 images of clothed Samoan women, and 3 control images (described below). Participants were given up to three attempts to familiarize themselves with the task. The study was stopped if participants did not understand the task after the third attempt.

For the study itself, participants were shown a series of 31 images that included 10 composite images of Samoan men's faces, 10 composite images of Samoan women's faces, and 11 control stimuli (i.e., cartoon faces composed of a circle with two dots for eyes and a straight line for a mouth each of which varied slightly). To ensure that the images of men and women were not viewed as androgynous or mistaken for the opposite sex, the composite images of men's and women's faces were manipulated to render them more masculine or more feminine, respectively (in line with Benson & Perrett, 1993; Dixon, Little, Dixon, & Brooks, 2017; Little & Hancock,

2002; Tiddeman, Burt, & Perrett, 2001). For more information on stimulus construction, see Pettersson, Dixon, Little, and Vasey (2015).

The image series was entered in a randomized order, but every participant was shown the same image series. Response to the first image after the trial, a control image, was excluded from analysis to remove any confounds associated with transitioning from the trial to the actual study. Three additional images were removed from analysis: one image of a woman due to its relatively low ratings; one image of a man due to its relatively high ratings; and one randomly chosen control image to ensure that the stimuli categories contained equal numbers of images.

Participants were told that the purpose of the study was to understand males' sexual attraction to men and women. They were informed that they would be required to provide sexual attraction ratings for images of men and women and were instructed to take as long as they needed to appraise each photo before rating it. As each image was displayed, participants were asked to report how they would feel about having sex with each person. Participants responded using a 7-point Likert-type scale ranging from 1 = "very unpleasant" to 7 = "very pleasant." Responses to this question will hereafter be referred to as the sexual attraction ratings. Low ratings indicate sexual aversion, whereas high ratings indicate sexual attraction.

Unbeknownst to the participants, their viewing times were simultaneously recorded. The period between image presentation and participant response, which is typically referred to as a "viewing time," may reflect the time required to respond to the task of rating attraction (Imhoff et al., 2010; Imhoff, Schmidt, Weiß, Young, & Banse, 2012). Thus, the term "response time" may be a more accurate reflection of the measure. However, to remain consistent across studies, the term "viewing time" is used here.

Participants were asked whether they had sexual feelings for and had engaged in sexual interactions with, men, women, and *fa'afafine* (1) at any point in their lives and (2) within the year prior to being interviewed. Participants who had engaged in sexual interactions with *fa'afafine* were asked if they engaged in insertive and/or receptive anal sex with their *fa'afafine* partners. All participants were thanked and given 20 Western Samoan Tala for their time.

Statistical Analysis

The viewing times were winsorized to reduce the influence of outliers. To do so, the raw values that corresponded to z -score values of 3.29 or higher were replaced with the participant's next highest viewing time plus one second. Thirty-four values (0.01%) were replaced using this method. To control for individual differences in responsiveness, within-participant standardized scores (z -scores)

² Pettersson et al. (2015) compared men who had sex with *fa'afafine*, as a group, to *fa'afafine* and men who have sex with only women. Pettersson et al. (2016) compared men who had performed and received oral sex with *fa'afafine* partners and those who had only received oral sex from *fa'afafine*; these men were further compared to *fa'afafine* and men who had sex with only women. Additional participants were recruited following the aforementioned studies. Pettersson et al. (2018) compared cisgender androphilic men and *fa'afafine*.

were calculated for the winsorized viewing times. For the attraction ratings, raw values were used.

Mean sexual attraction ratings and viewing times were calculated for the images of men, images of women, and control images. To control for baseline response, participants' mean response to the control images was subtracted from (1) their mean response to images of men and (2) their mean response to images of women. This was done for both measures.

Gender-preference indices were calculated by subtracting participants' baseline-controlled mean response to images of women from their baseline-controlled mean response to the images of men (response to men—response to women) for both measures (hereafter, the sexual attraction and viewing time gender-preference indices). Difference-magnitude indices were calculated by taking the absolute difference in participants' baseline-controlled response to images of men and women (response to men—response to women) for both measures (hereafter, the sexual attraction and viewing time difference-magnitude indices). The response to one's lesser-preferred gender index was constructed by taking the lower of the two baseline-controlled target image means (hereafter, sexual attraction and viewing time to one's lesser-preferred gender).

Statistical analysis was conducted using RStudio, version 1.1.383 (RStudio Team, 2015). To assess the relationship between sexual attraction ratings and viewing times, a linear regression was conducted with sexual attraction gender-preference index scores predicting viewing time gender-preference index scores.

Due to highly skewed distributions, analyses of sexual attraction ratings were conducted using nonparametric test and median values were reported as the measure of central tendency. Between-group comparisons were conducted using Kruskal–Wallis tests (with the alpha level set at $\alpha = .05$). Post hoc comparisons were conducted using Wilcoxon tests.

Between-group comparisons of viewing times were conducted using one-way analyses of variance (ANOVAs) (with the alpha level set at $\alpha = .05$). Post hoc comparisons were conducted using Tukey's honest significant difference (HSD).

Results

Sexual attraction ratings and viewing time responses are given in Table 2. Sexual attraction gender-preference index scores and viewing time gender-preference index scores are shown in Fig. 1 by group. Sexual attraction gender-preference index scores were moderately associated with viewing time gender-preference index scores, $R^2 = .46$, $F(1, 128) = 112.2$, $p < .001$; $b = .15$, 95% CI (.13, .18), $SE = .01$, $p < .001$.

Gender-Preference Indices

There was a main effect of group on sexual attraction gender-preference index scores, $H(3) = 80.18$, $p < .001$. Androphilic males were the only group with a preference for men (gender-preference index scores > 0), and they had higher gender-preference index scores than all other groups, all p values $< .001$. Versatile men were less marked in their preference for women, as indicated by higher sexual attraction gender-preference index scores, than insertive men, $p = .001$, and gynephilic men, $p < .001$. Insertive men and gynephilic men responded similarly, $p = .240$. As such, insertive men were similar to gynephilic men in this regard, whereas versatile men were intermediate between the monosexual groups.

There was a main effect of group on viewing time gender-preference index scores, $F(3, 126) = 51.98$, $p < .001$, $\eta^2 = .55$. Androphilic males were the only group with prolonged viewing times of men (gender-preference index scores > 0), and they had higher viewing time gender-preference index scores than all other groups, all p values $< .001$, Hedge's $g = .98$ – 2.92 . Versatile men had less prolonged viewing times for images of women, as indicated by their higher viewing time gender-preference index scores, than insertive men, $p = .001$, Hedge's $g = .96$, 95% CI (.40, 1.53), and gynephilic men, $p < .001$, Hedge's $g = 1.74$, 95% CI (1.12, 2.37). Insertive men and gynephilic men had relatively similar viewing time gender-preference index scores, although the effect size was moderate, $p = .098$, Hedge's $g = .65$, 95% CI (.14, 1.17). As such, insertive men were similar to gynephilic men in this regard, whereas versatile men were intermediate between the monosexual groups.

Magnitude of the Difference in Response to Images of Men and Women

There was a main effect of group on sexual attraction difference-magnitude index scores, $H(3) = 26.82$, $p < .001$. Androphilic males showed the most marked difference in their ratings of men and women, as indicated by their larger difference-magnitude index scores, than all other groups, all p values $< .005$. No other significant group differences were observed, $p = .629$ – $.987$. As such, these findings were inconsistent with the predicted pattern.

There was a main effect of group on sexual viewing time difference-magnitude index scores, $F(3, 126) = 9.30$, $p < .001$, $\eta^2 = .18$. Versatile men were less discrepant in their viewing times of men and women, as indicated by their smaller difference-magnitude index scores, than gynephilic men, $p < .001$, Hedge's $g = 1.3$, 95% CI (.71, 1.88). Versatile men and insertive men did not differ significantly in this respect, $p = .053$, but the effect size was moderate, Hedge's $g = .73$, 95% CI (.18, 1.29). In contrast to what would be expected, androphilic males ($M = .71$, $SD = .48$) were less discrepant in

Table 2 Mean, median, SD, and inferential statistics for sexual attraction ratings by group

	1. Men who had sex only with women		2. Men who had only insertive sex with <i>fa'afafine</i>		3. Men who had insertive and receptive sex with <i>fa'afafine</i>		4. Males who had sex only with men	
	<i>N</i> = 31		<i>N</i> = 30		<i>N</i> = 24		<i>N</i> = 45	
	Mdn	SD	Mdn	SD	Mdn	SD	Mdn	SD
<i>Sexual attraction rating^a</i>								
Rating of men	1.00	.29	1.33	1.70	5.44	1.83	6.33	1.27
Rating of women	4.67	1.48	5.00	1.48	5.39	2.43	1.00	.33
Rating of cartoons	1.00	.94	1.00	1.24	1.00	1.36	1.00	.79
<i>Sexual attraction indices</i>								
Gender-preference index ^b	-3.44	1.48	-3.06	2.74	-.22	3.78	5.22	1.28
Difference-magnitude index ^c	3.44	1.48	3.28	1.79	3.50	2.03	5.22	1.28
Ratings of one's lesser-preferred gender	0	.92	0	1.11	.43	1.54	0	.83
	<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>Viewing times (s)</i>								
Viewing times of men	5.34	4.39	8.55	9.99	7.26	4.08	5.33	3.23
Viewing times of women	10.94	8.64	12.15	11.50	7.84	4.72	4.27	3.97
Viewing times of cartoons	5.60	4.70	7.29	8.10	5.08	2.68	3.83	3.39
<i>Standardized viewing times</i>								
Viewing times of men	-.41	.25	-.19	.37	.18	.40	.45	.44
Viewing times of women	.76	.32	.60	.40	.29	.43	-.11	.31
Viewing times of cartoons	-.35	.30	-.41	.37	-.47	.37	-.34	.39
<i>Viewing time indices</i>								
Gender-preference index ^b	-1.17	.49	-.79	.68	-.11	.74	.55	.65
Difference-magnitude index ^c	1.18	.46	.92	.46	.60	.43	.71	.48
Viewing time of one's lesser-preferred gender	-.06	.46	.15	.57	.41	.60	.15	.52

^aAttraction rating response range 1 = "very unpleasant" to 7 = "very pleasant."

^bGender-preference index score = response to men—mean response to women; low scores indicate greater sexual attraction and longer viewing times for images of women than images of men

^cDifference-magnitude index score = |response to men—mean response to women| or the absolute value of response discrepancies; low scores indicate a similar response to images of men and women

their viewing times of men and women, as indicated by their smaller difference-magnitude index scores, than gynephilic men, $p < .001$, Hedge's $g = 1.00$, 95% CI (.52, 1.49). No other notable group differences were observed, $p = .146-.793$, Hedge's $g = .23-.55$.³ As such, versatile men were less discrepant in their viewing times of men and women relative to gynephilic men, a pattern that suggests ambiphilia. In contrast to predictions, however, versatile men did not differ from androphilic males, insertive men did not differ from either monosexual group, and androphilic and gynephilic men did differ from one another.

Response to Participants' Lesser-Preferred Gender

There was a main effect of group on participants' sexual attraction ratings of their lesser-preferred gender, $H(3) = 15.37$, $p = .002$. Versatile men provided slightly more positive appraisals of their lesser-preferred gender than all other groups, all p values $< .05$. No other significant group differences were observed, $p = .307-.644$. As such, versatile men were less sexually averse, although not attracted, to their lesser-preferred gender than all other groups, a pattern that would suggest ambiphilia. Insertive men, on the other hand, did not differ from the monosexual groups in this respect.

There was a main effect of group on viewing times of their lesser-preferred gender, $F(3, 126) = 3.43$, $p = .019$, $\eta^2 = .08$. Versatile men viewed their lesser-preferred gender longer than gynephilic men, $p = .009$, Hedge's $g = .89$, 95% CI (.33, 1.45). No other significant group differences were observed, $p = .234->.999$, Hedge's $g = <.01-.47$. As such,

³ Although the Hedge's g for the comparison of the magnitude of the difference in viewing times was moderate, the confidence intervals were wide and the lower bracket was near 0.

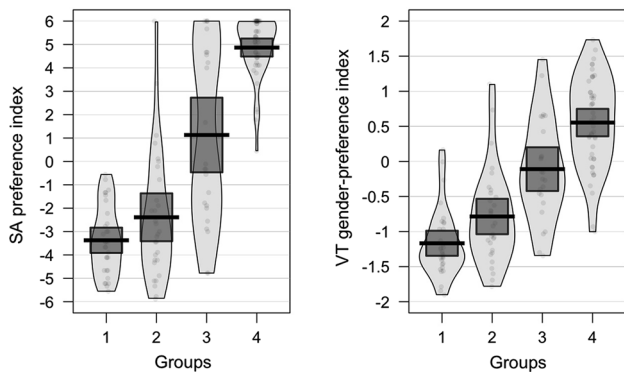


Fig. 1 Self-reported sexual attraction (SA) and viewing time (VT) gender-preference index scores by anal-sex position. Groups: 1=men who had sex only with women; 2=men who had only insertive anal sex with *fa'afafine*; 3=men who had both insertive and receptive anal sex with *fa'afafine*; 4=males who had sex only with men. Black bars equal group mean. Dark gray boxes represent 95% confidence intervals. Light gray shapes indicate the distribution of participants' scores. Light dots represent participants' scores. *Gender-preference index scores*=response to men—response to women (low scores indicate greater sexual attraction for images of women than images of men)

versatile men viewed their lesser-preferred gender longer than gynephilic men, consistent with an ambiphilic pattern. In contrast to predictions, however, versatile men did not differ from androphilic males and insertive men did not differ from either monosexual group.

Discussion

Insertive men demonstrated a pattern of response that was similar, although not identical, to that of gynephilic men. Consequently, these findings indicated that insertive anal sex with *fa'afafine* was not associated with ambiphilia. If a difference does exist and is small, then the group sizes may be ineffective for detecting such an effect. It is noteworthy, however, that some Western heterosexual men who have sex with transgender women try to maintain the illusion that they are cisgender women (Reback, Kaplan, Bettcher, & Larkins, 2016; Weinberg & Williams, 2010). It is possible that many of the men who have sex with *fa'afafine* do so exclusively in the insertive position because they are attempting to maintain the illusion that their partners are cisgender women by avoiding contact with their genitalia.

Study 1 provided some support for the idea that versatile men are relatively ambiphilic. Versatile men showed less of a tendency to view one gender longer than the other relative to gynephilic men, as indicated by their relatively larger viewing time difference-magnitude index scores. Additionally, versatile men were less averse to their lesser-preferred gender (i.e., they reported that their lesser-preferred gender was less sexually unappealing) than androphilic males and gynephilic

men, and they viewed their lesser-preferred gender longer than gynephilic men. Versatile men also reported less aversion to their lesser-preferred gender than insertive men and had smaller viewing time difference-magnitude index scores than insertive men (although not significant the effect size was moderate).

Despite these results, several findings were inconsistent with the idea that versatile men are ambiphilic. First, versatile men were similar to androphilic males with respect to their viewing time difference-magnitude index scores. (See the Limitations and Future Directions section for why this might be the case.) Second, although on average they rated both men and women as attractive, they rated their lesser-preferred gender only minimally higher than the control stimuli. This pattern suggests that versatile men may be a heterogeneous group comprised of (1) men who are primarily attracted to women and (2) men who are primarily attracted to men. When lumped together, their combined means would give the impression of ambiphilia. Visual inspection of the partner histories lends support to this conclusion (Table 1). Moreover, the distribution of sexual attraction gender-preference index scores for versatile men shown in Fig. 1 (Group 3) suggests bimodality, although the viewing time gender-preference index scores did not show the same pattern.

It is worth considering that anal-sex position groups were based on anal-sex behavior and not anal-sex preferences. It is possible that some men hold anal-sex positioning preferences that do not align with their behavior. Future studies of anal-sex positioning in non-Western contexts could benefit from including measures of both anal-sex position preference and anal-sex position enactment.

Study 2

In Study 2, we assessed the relationship between Samoan male's sexual histories (i.e., history of sexual activity with men, women, and *fa'afafine*) and their viewing times and sexual attraction ratings of men's and women's faces. To do so, we compared (1) gynephilic men; (2) men who had sex with *fa'afafine* and women; (3) men who had sex with *fa'afafine*, women, and men; (4) men who had sex with *fa'afafine* and men; (5) androphilic males. We predicted that (1) men who had sex with *fa'afafine* and men, (2) men who had sex with *fa'afafine* and women, and (3) men who had sex with *fa'afafine*, men, and women would show a greater degree of ambiphilia than monosexual males. However, we predicted that men who had sex with *fa'afafine*, women, and men would show relatively similar response to men and women compared to men who have had sex with (1) *fa'afafine* and women or (2) *fa'afafine* and men. The latter two groups were predicted to be relatively gynephilic and androphilic, respectively.

Table 3 Number of participants who were included in each sexual feeling and sexual behavior group

	Men who had sex only with women	Men who had sex with women and <i>fa'afafine</i>	Men who had sex with women, and <i>fa'afafine</i>	Men who had sex with men and <i>fa'afafine</i>	Males who had sex with men
Prior-year feelings <i>N</i> = 180	44	44	24	20	48
Prior-year behavior <i>N</i> = 180	51	48	13	18	50
Lifetime feelings <i>N</i> = 185	39	50	28	20	48
Lifetime behavior <i>N</i> = 180	35	57	23	20	45

Analyses pertain to the bolded participant groupings

Method

The measures, stimuli, and data treatment employed in Study 2 were consistent with those employed in Study 1. However, the two studies differed in their participant groupings and statistical analysis procedures, as outlined below.

Participants

Data were collected for prior-year sexual behavior, prior-year sexual feelings, lifetime sexual behavior, and lifetime sexual feelings. Participant numbers by group for prior-year and lifetime sexual feelings and sexual behavior analyses are given in Table 3. Results were similar for all sexual history scale analyses. As such, only the results for past year sexual behavior are presented. To be included in this analysis, participants were required to have had sex with (1) only men, (2) only women, or (3) *fa'afafine* and at least one other gender. Seven participants were excluded.

Statistical Analyses

To assess the relationship between sexual attraction ratings and viewing times, a linear regression was conducted with sexual attraction gender-preference index scores predicting viewing time gender-preference index scores.

We examined the relationship between participants' past year sexual behavior history and their sexual attraction ratings and viewing times of images of men and women. To do so, a sexual history scale was created. The sexual history scale was: 1 = men who have sex only with women (gynephilic men); 2 = men who have sex with *fa'afafine* and women; 3 = men who have sex with *fa'afafine*, women, and men; 4 = men who have sex with *fa'afafine* and men; 5 = males (i.e., *fa'afafine* and men) who have sex with only men (androphilic males). For the nonparametric analyses of the sexual attraction difference-magnitude index and sexual attraction ratings of participants' lesser-preferred gender, it was not possible to use the 5-point sexual history scales. Instead, a

3-point sexual history scale was created. The 3-point sexual history scale was: 1 = sexual activity with only one gender (i.e., either men or women); 2 = sexual activity with two genders (i.e., *fa'afafine* and either men or women); 3 = sexual activity with three genders (*fa'afafine*, men, and women).

Due to non-normal distributions of sexual attraction ratings, Jonckheere–Terpstra trend tests were used for these analyses and median values were used as the measure of central tendency. These tests were two-sided and *p* values were computed for 1000 permutations. Analyses of the viewing time variables were conducted using regression with the sexual history scales as the independent variables. The alpha level was set at .05 for all tests.

Gender-Preference Indices It was predicted that participants with low sexual history scale scores (i.e., sexual history with only women) would have low gender-preference index scores (i.e., higher attraction ratings and longer viewing times of women), participants with high sexual history scale scores (i.e., sexual history with only men) would have high gender-preference index scores (i.e., higher attraction ratings and longer viewing times of men), and participants with intermediate sexual history scale scores (i.e., sexual history with *fa'afafine* and cisgender individuals) would have intermediate gender-preference index scale scores (i.e., less differentiated sexual attraction ratings and viewing times of men and women). An increasing trend in sexual attraction gender-preference index scores by 5-point sexual history scale scores and a positive linear relationship between viewing time gender-preference index scores and 5-point sexual history scale scores would be consistent with the predicted pattern.

Difference-Magnitude Index It was predicted that higher scores on the 3-point sexual history scale (i.e., sexual history with *fa'afafine* and cisgender individuals) would be associated with low sexual attraction difference-magnitude index scores (i.e., similar sexual attraction ratings of men and women) and intermediate scale scores on the 5-point sexual

Table 4 Mean, median, SD, and inferential statistics for sexual attraction ratings by sexual behavior group

	Men who had sex with only women		Men who had sex with <i>fa'afafine</i> and women		Men who had sex with <i>fa'afafine</i> , women, and men		Men who had sex with <i>fa'afafine</i> and men		Males who have sex with only men in the prior year	
	<i>N</i> =51		<i>N</i> =48		<i>N</i> =13		<i>N</i> =18		<i>N</i> =50	
	Mdn	SD	Mdn	SD	Mdn	SD	Mdn	SD	Mdn	SD
<i>Sexual attraction rating</i>										
Rating of men ^a	1.00	.46	1.83	1.37	4.44	1.29	6.78	1.06	6.33	1.26
Rating of women ^a	4.67	1.70	5.33	1.37	5.56	1.50	1.00	1.24	1.00	.32
Rating of cartoons ^a	1.00	.80	1.33	1.21	1.33	1.50	1.00	1.24	1.00	.76
<i>Sexual attraction indices</i>										
Gender-preference index ^b	-3.44	1.64	-2.83	1.77	-.33	2.04	5.33	1.72	5.22	1.27
Difference-magnitude index ^c	3.44	1.64	2.83	1.66	1.11	1.45	5.33	1.61	5.22	1.27
Rating of one's lesser-preferred gender	0	.89	0	1.22	.78	2.23	0	1.39	0	.79
	<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>M</i>	<i>SD</i>
<i>Viewing times (s)</i>										
Viewing times of men	5.69	4.61	9.55	9.59	9.87	6.76	6.22	6.42	5.28	3.21
Viewing times of women	10.42	7.62	11.60	9.73	11.78	8.78	5.85	5.38	4.13	3.80
Viewing times of cartoons	5.33	4.17	8.13	7.87	7.58	7.53	3.75	2.43	3.74	3.25
<i>Standardized viewing times</i>										
Viewing times of men	-.34	.30	-.10	.39	.14	.47	.28	.37	.46	.43
Viewing times of women	.72	.31	.48	.45	.34	.44	.21	.37	-.12	.31
Viewing times of cartoons	-.38	.30	-.38	.41	-.47	.43	-.49	.31	-.34	.38
<i>Viewing time indices</i>										
Gender-preference index ^b	-1.06	.54	-.58	.73	-.20	.81	.06	.67	.58	.65
Difference-magnitude index ^c	1.10	.46	.79	.48	.68	.44	.55	.36	.71	.49
Viewing time of one's lesser-preferred gender	.03	.48	.19	.61	.37	.69	.46	.49	.15	.51

^aAttraction rating response range 1 = "very unpleasant" to 4 = "neither pleasant nor unpleasant" to 7 = "very pleasant."

^bGender-preference index score = response to men—mean response to women; low scores indicate greater sexual attraction and longer viewing times for images of women than images of men

^cMagnitude index score = |response to men—mean response to women| or the absolute value of response discrepancies; low scores indicate a similar response to images of men and women

history scale (i.e., sexual history with *fa'afafine* and cisgender individuals) would be associated with low viewing time difference-magnitude index scores (i.e., similar viewing times of men and women). A decreasing trend in sexual attraction difference-magnitude index scores by 3-point sexual history scale scores and a positive (U-shaped) quadratic relationship between the viewing time difference-magnitude index scores and 5-point sexual history scale scores and would be consistent with the predicted pattern.

Response to Participants' Lesser-Preferred Gender It was predicted that higher scores on the 3-point sexual history scale (i.e., sexual history with *fa'afafine* and cisgender individuals) would be associated with greater attraction to one's lesser-preferred gender and intermediate scale scores on the 5-point sexual history scale (i.e., sexual history with

fa'afafine and cisgender individuals) would be associated with longer viewing times of one's lesser-preferred gender. An increasing trend in sexual attraction ratings of participants' lesser-preferred gender by 3-point sexual history scale scores and a negative (inverted U-shaped) quadratic relationship between viewing times of participants' lesser-preferred gender and 5-point sexual history scales scores and would be consistent with the predicted pattern.

Results

Sexual attraction and viewing time responses are given in Table 4. Gender-preference index scores, difference-magnitude index scores, and response to one's lesser-preferred gender are shown in Fig. 2 by group. Sexual attraction gender-preference index scores were moderately related to

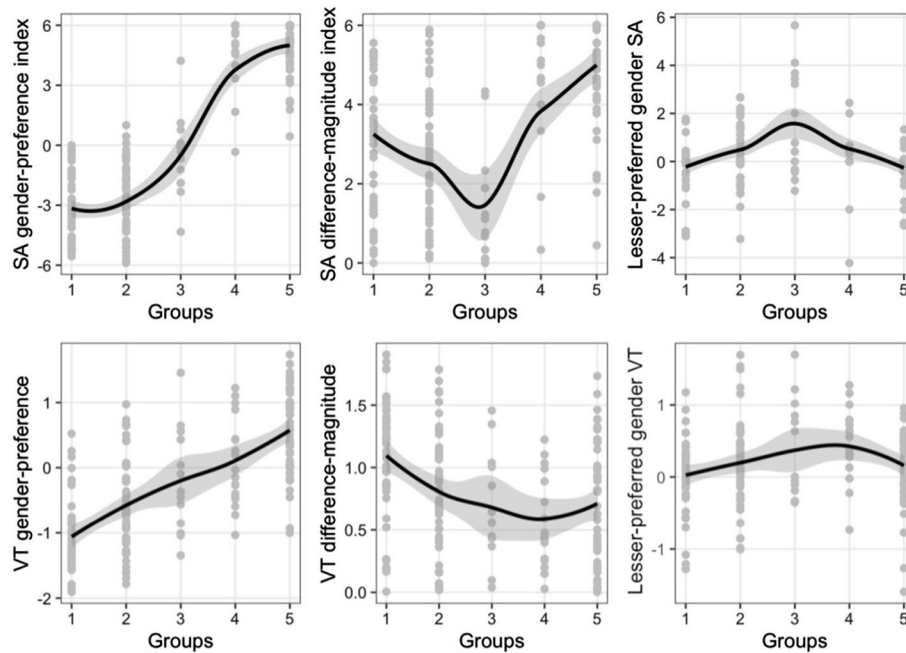


Fig. 2 Sexual attraction (SA) ratings and viewing times (VT) by prior-year sexual behavior. Groups: 1=men who have sex with only women; 2=men who have sex with *fa'afafine* and women; 3=men who have sex with *fa'afafine*, women, and men; 4=men who have sex with *fa'afafine* and men; 5=males (i.e., *fa'afafine* and men) who have sex with only men. Regression lines are in black. 95% confidence intervals are shown in shaded gray. Dots represent participants' scores. *Gender-preference index scores*=response to men—response

to women (low scores indicate greater sexual attraction for images of women than images of men). *Magnitude index scores*=|response to men—response to women| (low scores indicate a similar response to images of men and women). *Response to one's lesser-preferred gender*=the lower value of participants' response to the 2 image categories (high scores indicate greater sexual attraction to one's lesser-preferred gender)

viewing time gender-preference index scores, $R^2 = .43$, $F(1, 178) = 135.10$, $p < .001$; $b = .15$, 95% CI (.12, .17), $SE = .01$, $p < .001$.

Gender-Preference Index

Sexual attraction gender-preference index scores increased based on participants' sexual history scores ($J = 10,485$, $p = .002$). A positive linear relationship was found between viewing time gender-preference index scores and sexual history scale scores, $b = .40$, 95% CI (.34, .46), $SE = .03$, $p < .001$, $R^2 = .49$. These findings were consistent with the predicted patterns.

Magnitude of the Difference in Response to Images of Men and Women

Sexual attraction difference-magnitude index scores decreased based on the number of genders (from 1 to 3) with whom participants engaged in sexual behavior ($J = 2990$, $p = .002$). A positive quadratic relationship was found between viewing time difference-magnitude index scores and sexual history scale scores, $\beta = 1.39$, $p = .002$, $\Delta R^2 = .05$. These findings were consistent with the predicted

patterns. However, it is worth noting that, for viewing time, the lowest point of the curve was among men who had sex with *fa'afafine* and men, not among men who had sex with *fa'afafine*, women, and men.

Response to Participants' Lesser-Preferred Gender

Participants' sexual attraction ratings of their lesser-preferred gender increased based on the number of genders (from 1 to 3) with whom they engaged in sexual behavior ($J = 5525.5$, $p = .002$). A negative quadratic relationship was found between viewing times of participants' lesser-preferred gender and their sexual history scale scores, $\beta = -1.19$, $p = .010$, $\Delta R^2 = .04$. These findings were consistent with the predicted patterns.

Discussion

Androphilic males and men who had sex with *fa'afafine* and men both reported greater sexual attraction to men than women and they viewed men longer than women. The remaining groups (i.e., gynephilic men; men who had sex with *fa'afafine* and women; men who had sex with *fa'afafine*,

women, and men) reported greater attraction to women than men and they viewed women longer than men.

Men who had sex with *fa'afafine* (i.e., men who had sex with *fa'afafine* and women; men who had sex with *fa'afafine*, women, and men; and men who had sex with *fa'afafine* and men) exhibited gender-preference index scores that were intermediate between those of gynephilic men and androphilic males. Compared to monosexual males, men who had sex with *fa'afafine* were less marked in their self-reported sexual attraction to one gender over the other and the difference in their viewing times of the two image categories was less pronounced. Additionally, compared to monosexual males, men who had sex with *fa'afafine* were less averse to their lesser-preferred gender and showed prolonged viewing times of their lesser-preferred gender. This pattern suggests relatively greater ambiphilia among men who expressed sexual interest in *fa'afafine*.

Nevertheless, for both sexual attraction ratings and viewing time, one would expect the difference-magnitude index scores to be largest at the monosexual tail ends of the sexual history scale and increasingly smaller toward the center, and each side should mirror the other. Similarly, one would expect participants' response to their lesser-preferred gender to be smaller at the tail ends of the sexual history scale and increasingly larger toward the center, and each side should mirror the other. This pattern was not found (see Table 4). First, in terms of their sexual attraction ratings, men who had sex with *fa'afafine* and men responded similarly to androphilic males. But, on the basis of their viewing times, men who had sex with *fa'afafine* and men responded similarly to men who had sex with *fa'afafine*, women, and men. Secondly, in contrast to their sexual attraction ratings, androphilic males differed in their viewing times of men and women to a lesser extent (i.e., they had smaller difference-magnitude index scores) than gynephilic men.

Thus, greater support for the predicted relationship was found on the gynephilic to ambiphilic side of the sexual history scales than the ambiphilic to androphilic side. Regarding the gynephilic to ambiphilic side of the sexual history scale, men who had sex with *fa'afafine* and women and men who had sex with *fa'afafine*, women, and men had smaller viewing time difference-magnitude index scores, reported lower aversion to their lesser-preferred gender, and had prolonged viewing times of their lesser-preferred gender compared to gynephilic men. However, if we restrict our comparison to the ambiphilic to androphilic side of the sexual history scale (from [1] men who had sex with *fa'afafine*, women, and men to [2] men who had sex with *fa'afafine* and men to [3] androphilic males), this pattern is less evident. These departures from the expected response patterns were likely owing to differences in the relative cognitive demand that primarily androphilic males and primarily gynephilic men encounter when assessing sexual stimuli in a Samoan cultural context.

General Discussion

Some of the men who were sexually interested in *fa'afafine* showed relatively ambiphilic patterns of sexual attraction ratings and viewing times to images of men and images of women, namely men who have sex with *fa'afafine*, men, and women. However, this was not true of all men who were sexually interested in *fa'afafine*: some showed response patterns that were fairly consistent with those of monosexual individuals. As such, although ambiphilia may be associated with sexual interest in *fa'afafine* for some men, additional factors may be relevant to men's sexual interest in *fa'afafine*. Furthermore, the present study found that behavioral differences, namely sexual position during anal intercourse, and partner selection differences among the men who were sexually interested in *fa'afafine* were associated with sexual orientation variability. As such, men who were sexually interested in *fa'afafine* appear to be heterogeneous in terms of their sexual orientations.

Given this variability, the groups examined and even the individuals comprising these groups may have different motivations for engaging in sexual activity with *fa'afafine*. For some men, this behavior may be facilitated by attraction to, or lower aversion to, qualities of one's lesser-preferred gender. However, it is possible that some men, particularly insertive men, are no more attracted, or less averse, to their lesser-preferred gender than monosexual individuals but engage in sexual activity with *fa'afafine* for other reasons. For example, some insertive men may perceive *fa'afafine* as belonging to the same sexual category as cisgender women, they may have financial motivations for having sex with *fa'afafine*, they may do so because they are inebriated, or they may be motivated by the sexual activity, itself, as opposed to the sexual partner.

Whereas the psychological literature has traditionally focused on individual's peak sexual response, the present findings expand on research that has shown that additional insights can be garnered by focusing on lower-levels of sexual response (i.e., sexual response to individual's lesser-preferred gender; e.g., Rieger & Savin-Williams, 2012; Rosenthal, Sylva, Safron, & Bailey, 2011, 2012; Savin-Williams & Vrangalova, 2013; Semon, Hsu, Rosenthal, & Bailey, 2017; Vrangalova & Savin-Williams, 2012). Natal males engage in sexual behavior that challenges our current understanding of male sexual orientation—including, but not limited to, sexual interest in both men and women, as well as sexual interest in MtF transgender individuals. Research may benefit from considering whether participants' sexual response to their lesser-preferred genders or patterns of sexual aversion are relevant to partner selection and interest in activities that are not predicted by existing theory.

Limitations and Future Directions

The viewing times of androphilic males and men who had sex with *fa'afafine* and men seemed to belie their sexual attraction ratings. Observations of their raw viewing times indicated that natal males who were exclusively or primarily androphilic (i.e., [1] androphilic males and [2] men who had sex with *fa'afafine* and men) were much quicker at rating their preferred gender relative to the other groups, but they were also quicker at rating their lesser-preferred gender and the control images. In part, this could be an artifact of the decision-making process that underlies viewing time measures. As discussed in Imhoff et al. (2010), to assess a target's sexual attractiveness, individuals are required to make a series of decisions (e.g., they must determine whether the target is a member of their preferred gender, whether they have attractive characteristics). This process ends once a target fails to meet a participant's criterion for sexual attractiveness.

In Samoa, this process may take longer for predominantly gynephilic men compared to predominantly androphilic males. Gynephilic men must assess whether potential partners exhibit gender characteristics associated with their preferred gender (i.e., femininity) or their lesser-preferred gender (i.e., masculinity). If an individual is feminine, gynephilic men must then decide whether the target individual is a *fa'afafine* or a cisgender woman. In contrast, this process may be abbreviated for men who are primarily interested in cisgender men; once they determine that the individual is masculine, they can assume with virtual certainty that that individual is a cisgender man. Thus, a process that only involves one step for androphilic males involves two steps for gynephilic men. Consequently, their quick positive appraisal time places a constraint on the extent to which their viewing times can vary for the two genders.

Our study provides evidence that men who have sex with *fa'afafine* differ in their anal-sex positions and sexual partner histories and these differences are associated with patterns of sexual attraction ratings and viewing times of men and women. Thus, it appears that the men who have sex with *fa'afafine* are not a homogeneous group in terms of their sexual behavior or sexual orientations. Additional investigations of male sexual orientation which consider sexual interest in MtF transgender individuals, particularly in non-Western contexts, would enrich our understanding of the structure of male sexual orientation.

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Compliance with Ethical Standards

Conflict of interest The authors declare that they have no conflict of interest.

Ethics Approval This research was approved by an institutional human participants research ethics board. A Samoan Research Visa was obtained from Samoan Immigration.

Informed Consent Participants were required to provide informed written consent prior to taking part in the study.

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