Wanting 'the whole loaf': Zero-sum thinking about love is associated with prejudice against consensual non-monogamists

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Consensual nonmonogamy (CNM) is a relationship in which individuals agree that romantic or sexual relationships with others is permissible or desirable (e.g., polyamory or open relationships). Although anti-CNM prejudice is prevalent, it is not well understood. We propose that one of the bases of anti-CNM prejudice is *zero-sum thinking* about love—the perception that one person's love gained is another's love lost. We outline our theory and then present three studies that test our predictions. In these studies, participants read a vignette that depicted characters who were in a CNM or monogamous relationship, and then judged aspects of the characters and their relationship. In Study 1, participants who read the CNM vignette judged the protagonist's love for their initial romantic partner before and after they became involved with a second partner. Zero-sum thinking was operationally defined as the within-subject change in love ratings. In Studies 2 and 3, participants rated their agreement with items from a new preliminary measure of *zero-sum romantic beliefs*. We measured CNM devaluation by asking for ratings of the relationships and of individuals in the relationships. Supporting our predictions, in all three studies we found that zero-sum thinking about love was associated with increased CNM devaluation. We end by briefly discussing the implications of our findings.

Keywords: zero-sum thinking; consensual nonmonogamy; polyamory; open relationships; prejudice; discrimination

Consensual nonmonogamy (CNM) is a relationship in which parties agree that is permissible or desirable to have romantic or sexual relationships with others. CNM includes, but is not limited to, relationships that are 'open', swinging, and polyamorous. These subtypes of CNM differ in their emphasis on emotional versus sexual intimacy (Matsick et al., 2014), with swinging on the

one hand emphasizing sexual encounters outside of a primary relationship, and polyamory on the other hand emphasizing multiple loving partnerships. Recent studies estimate that the prevalence of Americans who practice CNM at any given time is roughly 5% (Rubel & Burleigh, 2016; Rubin et al., in press), and an estimated 20% have engaged in CNM at some point in their lives (Haupert et al., 2016). Research has also found that individuals who practice CNM are stigmatized and greatly misunderstood (Burris, 2014; Conley et al., 2012; Conley et al., 2013; Hutzler, Giuliano, Herselman, & Johnson, 2015; Grunt-Mejer & Campbell, 2016), facing discrimination in situations such as in the workplace, in custody cases, in housing, and from laws that prescribe monogamy (Emens, 2004; Fleckenstein, Bergstrand, & Cox, 2012; Lesher, 2013; Nearing, 2000).

We propose that one of the bases of prejudice against love-based CNM relationships and the individuals who practice them, is *zero-sum thinking* about love—loosely defined as the perception that one person's love gained is another's love lost. We argue that some individuals engage in zero-sum thinking when interpreting love-based CNM relationships, and thus have a tendency to perceive these relationships and the parties to them as less valuable. We suggest that zero-sum thinking derives from underlying beliefs about relationship resources—that they are scarce (scarcity beliefs), and/or that an individual in a relationship deserves all of their partner's relationship resources (entitlement beliefs). We begin by discussing zero-sum thinking generally. We then discuss zero-sum thinking in the context of love-based CNM relationships and how this might relate to anti-CNM prejudice. Finally, we present three quantitative studies that examine the relationship between zero-sum thinking and CNM devaluation.

Zero-sum situations and zero-sum thinking

In a zero-sum situation, outcomes mathematically sum to zero (Von Neumann & Morgenstern, 1944)—when one party gains, another loses by an equal amount. By contrast, nonzero-sum situations are mutually beneficial (positive-sum), mutually destructive (negative-sum), or produce outcomes that are independent. Zero-sum allocation may occur when resources are scarce or finite. When dividing a pie, for example, a larger slice for one person means a smaller slice for another. Zero-sum *thinking* refers to the perception that a situation is zero-sum: that gains produce losses (or losses produce gains) and others are competitors for a mutually desired resource. Zero-sum thinking can occur independent of whether a situation is in fact zero-sum—when it does, it is regarded as a cognitive bias (Meegan, 2010).

Cognitive bases of zero-sum thinking

We argue that zero-sum thinking derives from beliefs about resource scarcity or entitlements. Scarcity beliefs lead to zero-sum thinking because scarcity implies that there is not enough of the resource to meet everyone's needs or desires. This has been observed in the context of negotiations (Bazerman, 1983; Carnevale & Pruitt, 1992; Thompson & Hastie, 1990) and folk economics (Baron & Kemp, 2004; Rubin, 2003; Walker, 2007) where there is often assumed to be a 'fixed pie' of resources. For example, some believe that the number of jobs is finite, which might lead them to oppose immigration (e.g., Esses, Dovidio, Jackson, Armstrong, 2001).

Resource entitlement refers to the belief that one is owed a certain amount of resources. The extreme case is what Blumer (1958) called a 'proprietary claim'—the belief that one has the exclusive right to a resource. Less extreme is the belief that one is entitled to the 'lion's share' of a resource, or simply more resources than others. We suggest that an entitlement belief acts as a

reference point that gives a resource allocation meaning, and in some cases generates zero-sum thinking (Kahneman, 1992). Individuals who believe that they have the exclusive right to a resource should interpret any amount less than the total as a loss, and should perceive that the gains of others reduce their own share. In this way, the proprietary claim transforms the allocation of a resource into what is perceived to be a zero-sum situation.

Monogamy

Presently, we define monogamy as the explicit or implicit expectation of sexual and romantic exclusivity. Monogamy is a dominant cultural ideology (Anderson, 2010; Conley et al., 2013), being that it is mandated by legal institutions and other injunctive social norms. For example, monogamy is central to Western traditional marriage, and nonmonogamy is proscribed by laws and legal decisions that criminalize behaviours such as adultery and bigamy (Emens, 2003). Monogamy is the default romantic relationship in Western stories, while nonmonogamy is rarely explored as a viable alternative, but is instead typically used as a source of narrative tension that ultimately resolves into monogamy (thereby reaffirming monogamy; Saxey, 2010).

Relationships as economies of love

Central to our argument is the premise that individuals construe the activities that go on within romantic relationships in terms of a conceptual metaphor (Landau, Meier, & Keefer, 2010) that maps the domain of relationships onto the domain of economics. Further, we argue that the two bases for zero-sum thinking described earlier (scarcity or entitlement beliefs) exist and operate to generate zero-sum thinking about romantic relationships.

First, individuals' everyday experiences with scarce material resources in other domains may transfer to their understanding of abstract, romantic relationship resources like romantic love. Second, when individuals agree to be monogamous, they are typically agreeing to reserve certain behaviours (like physical intimacy) and emotions (like romantic love) for one other. Some individuals might believe that exclusivity means they are entitled to all of the time, attention, love, and intimacy that their partner has to give. In turn, this entitlement belief may lead to the perception that the love 'spent' on someone else represents a loss.

Zero-sum thinking and anti-CNM prejudice

We suggest that zero-sum thinking might cause some individuals who practice monogamy to perceive an inequity or inadequacy in a love-based CNM relationship, and thus to devalue CNM and the individuals who practice CNM. Indeed, when individuals who practice monogamy speak negatively of individuals who practice CNM they sometimes use the language of social justice. For example, an individual who practices monogamy might express the belief that one of the parties to a CNM relationship is being exploited by another, or is getting less love than they should (or could) be getting. Necessarily, this implies that other parties to the relationship are exploitative. Consider the following expressed opinions that we found in online discussions of polyamory which illustrate the link between zero-sum thinking and anti-CNM prejudice:

> ...It sounds like [polyamorous individuals] just don't know what they truly want yet or they do but they can't quite have it all so its [sic] about filling up their time with all this potential until they find someone solid... But if I only enjoy you for a 'part' of what you offer me, is it real love? Or is it convenience.... Are you so insecure that you will settle for crumbs of attention because you can't seem to find someone who wants to give you the whole loaf? (DeLaine, 2015)

I believe my daughter is good enough to have a man who really loves her, and I don't think he does, because he has another girlfriend. Now she is thinking about moving in with this man, his girlfriend, and her other boyfriend. She says she's happy but I don't believe she can be in this situation [...] I think they are taking advantage of her and manipulating her into thinking she is happy [...] She has tried to tell me that 'love is infinite' and made analogies about children, but it doesn't work [...] Why should she settle for being with someone who only wants her some of the time, who only loves her with half his heart? (DEZ1255, 2013)

A relationship may be considered fair if it provides parties with the resources they need, want, or deserve to have (e.g., Folger, 1977). Some individuals who practice monogamy might therefore perceive that CNM is unfair or immoral because they believe that individuals deserve more than they may obtain from such a relationship. In this way, prejudice against love-based CNM might be understood as deriving in part from a basic concern for justice or welfare. The two quotes above would seem to *prima facie* support this possibility.

Real-world limits and CNM relationship quality

It is not our position that CNM relationships are in no way zero-sum. Indeed, the management of real-world limits on resources like time have received extensive treatment in the popular CNM literature (Anapol, 2010; Taormino, 2008). It is merely our position that the zero-sum concerns that some individuals who practice monogamy have about CNM relationships are misplaced, as CNM relationships do not generally suffer from the inadequacies implied by these concerns. In support of this, a recent review by Rubel and Bogaert (2015) found that individuals who practice CNM report similar levels of well-being and relationship satisfaction as individuals who practice monogamy. Further, Mitchell, Bartholomew, and Cobb (2014) observed in a recent study of need

fulfillment in polyamorous relationships that the satisfaction individuals report with one of their loving relationships is unrelated to the satisfaction they report with another concurrent loving relationship. Thus, CNM relationships do not appear to conform to zero-sum expectations.

Study 1

In this study, participants read a vignette that depicted characters in a CNM or monogamous relationship, and then judged aspects of the characters and their relationship. To measure zero-sum thinking, participants in the CNM condition judged the protagonist's love for their initial romantic partner, both before and after they became involved with a second partner. Zero-sum thinking was defined as the within-subject change in love ratings. In the Monogamy condition, participants also judged love at two points in time as a baseline for comparison, to rule out the possibility that the differences found between the Monogamy and CNM conditions were due to time. In addition, participants evaluated aspects of the vignette relationship and characters in each condition as a measure of CNM devaluation.

Method

Participants

One hundred and thirty-six US residents (59 women, 76 men, and 1 genderqueer) aged 19 to 70 ($M = 37.04$, $SD = 11.56$) were recruited from Mechanical Turk. A majority stated that they were currently in a relationship (83 in a relationship, 48 single, 5 separated or widowed), and a large majority identified with monogamy (111 monogamous, 10 monogamish, 8 open, 5 polyamorous,

and 2 'other'). As we were interested in the responses of individuals who practice monogamy, only their responses were analyzed.[1]

Materials and procedure

Participants were randomly assigned to read a vignette that depicted two characters who were in a heterosexual monogamous or CNM ('open') relationship. Vignettes were adapted from Conley et al. (2012). The CNM vignette was as follows:

> Dan has been in a serious relationship with Susie for two years and has become very close with her. Dan and Susie both work at full-time jobs and lead exciting lives outside of work, finding many fun activities to do together in their spare time. When they first started dating, Dan and Susie talked about the kind of relationship they wanted to have together. They agreed that an open relationship was what they both wanted, because it would allow them to have sexual and loving relationships with other people. They felt that this type of relationship would make them happiest. In the time that they have been together, neither Dan nor Susie has been sexually or romantically involved with anyone else.

In the monogamy condition, the text was identical, except the relationship agreement was described as: 'a relationship where they could not have sexual or loving relationships with anyone else.' After reading the vignette, participants rated the extent to which the protagonist (hereafter 'Susie') loved their initial partner (hereafter 'Dan'). Participants also judged the quality of the relationship and the trustworthiness of the protagonist.

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[1] Similar results were obtained with the participants who identified as monogamish included. This is also the case with subsequent studies.

After judging the initial vignette, participants read about a development in the relationship. In the CNM condition, this second vignette was as follows:

> It is now the third year of Dan's relationship with Susie. They continue to agree that an open relationship is best for them. Susie has been seeing someone new for a year; his name is Oliver. Susie has developed strong feelings for Oliver. Susie and Oliver have a great sexual chemistry, they also share all of the same values, and Susie often thinks about Oliver when they are apart. Although Dan has dated a few people other than Susie, he has not developed feelings for anyone else.

In the monogamy condition, it was stated that it is the third year of Susie and Dan's relationship, that they continue to agree that monogamy is best for them, and that they had respected the agreement to be monogamous. After reading this second vignette, participants again rated how much Susie loved Dan. Gender was counterbalanced by switching the names in the vignettes (i.e., in one condition Dan was in Susie's position, having a relationship with "Olivia").

A key aspect of this design is that participants provided two ratings of Susie's love for Dan. In the CNM version, love ratings were given before and after Susie developed a meaningful relationship with a second partner. We expected that participants would perceive that Susie loved Dan less after learning about her second partner. This outcome was expected because, although the characters and their relationship agreement are identical, there is now a second partner to receive Susie's relationship resources. Furthermore, we expected that zero-sum thinking would be associated with negative judgments of relationship quality and trustworthiness in the CNM condition as compared to the monogamous condition. Specifically, we predicted that the change in love ratings would mediate the association between relationship type and these judgements.

Measures. Participants rated how much Susie loved Dan ('How much do you think Susie loves

Dan?' and then 'Based on what you know now, how much do you think Susie loves Dan?') on a

scale of 1 (not at all) to 7 (very much). Using these ratings, *love-change scores* were computed

by taking the difference between the first ('before') and the second ('after') love ratings (after

minus before). In the CNM condition, a negative value reflects the judgment that Susie loved

Dan less after she had developed a relationship with Oliver; whereas in the monogamy condition,

a negative value reflects the judgment that Susie loved Dan less after time had elapsed.

Participants also rated the quality of Susie and Dan's relationship: 'If Susie and Dan

continue to be [monogamous / in an open relationship], how satisfied do you think they will be

with their relationship over the long-term?' on a scale of 1 (very unsatisfied) to 7 (very satisfied),

and 'How likely is it that Susie will still be in a relationship with Dan after 5 years?' on a scale

of 1 (very unlikely) to 7 (very likely). Finally, participants rated Susie's trustworthiness: 'How

trustworthy do you think Susie is?' on a scale of 1 (very untrustworthy) to 7 (very trustworthy).

After responding to the vignette, participants answered demographic questions (age,

gender, education, and relationship status). Participants also reported their relationship

orientation as monogamous, monogamish, swinging, open, polyamorous, or other. A definition

was provided for each option (see Table 1 of the Supplemental).

Analyses

Zero-sum thinking

Zero-sum thinking was examined using a one-sample t-test in the CNM condition, comparing

mean love-change scores against the value of zero. In the CNM condition, zero-sum thinking

would be indicated by a value less than zero. We also performed this test in the monogamy condition, though the difference would be interpreted merely as a change over time.

As predicted, in the CNM condition, love-change scores were less than zero ($M = -1.65$, $SD = 1.23$; $t(56) = -10.11$, $p < .001$, $d = 1.34$). In the monogamy condition, love-change scores were marginally greater than zero ($M = 0.09$, $SD = 0.40$; $t(53) = 1.70$, $p = .096$, $d = 0.23$).

Evaluative judgments

Mean responses to the relationship quality (Satisfaction and Longevity) and Trustworthiness questions were compared between the CNM and monogamy conditions. Mean responses in each condition were also compared to the midpoint of the rating scale, which assumes that the midpoint indicates a neutral judgment—an assumption that seemed reasonable given that the scale was worded to indicate opposite judgments (i.e., 'very unsatisfied' to 'very satisfied').

As expected, all items were higher for monogamy than CNM ($ps < .001$, smallest $d = 2.32$). In the monogamy condition, all items were higher than the midpoint ($ps < .001$, smallest $d = 2.00$). In the CNM condition, all items were lower than the midpoint (smallest $p = .012$, smallest $d = .31$). See Table 1 for a summary.

Table 1. Evaluative item means and standard deviations, from Study 1.

Condition	Item	Mean	SD
CNM[1]	Satisfaction	2.21	1.24
	Longevity	2.07	1.19
	Trustworthiness	3.53	1.54
Monogamy[2]	Satisfaction	6.43	0.72
	Longevity	6.11	1.06
	Trustworthiness	6.33	0.75

[1]$N = 57$; [2]$N = 55$;

Mediation

Theoretically, we suggest that observing a relationship that is CNM (relative to one that is monogamous) should generally trigger zero-sum resource concerns among individuals who practice monogamy. These concerns should manifest as decrease in how much Susie is perceived to love Dan—reflected in more negative love change scores, our measure of zero-sum thinking— and this zero-sum perception should in turn generate more negative evaluations of Susie's relationship with Dan (and of Susie herself). Thus, we hypothesized that zero-sum thinking (love change scores) would mediate the association between relationship type and evaluative judgments. This mediation model is illustrated in Figure 1. To test the model, we performed bootstrap analyses to obtain bias-corrected confidence intervals (Hayes, 2009; 2013). For each analysis, we report the indirect (mediation) effect and the direct effect. Mediation analyses were performed separately for each of the evaluative judgments.
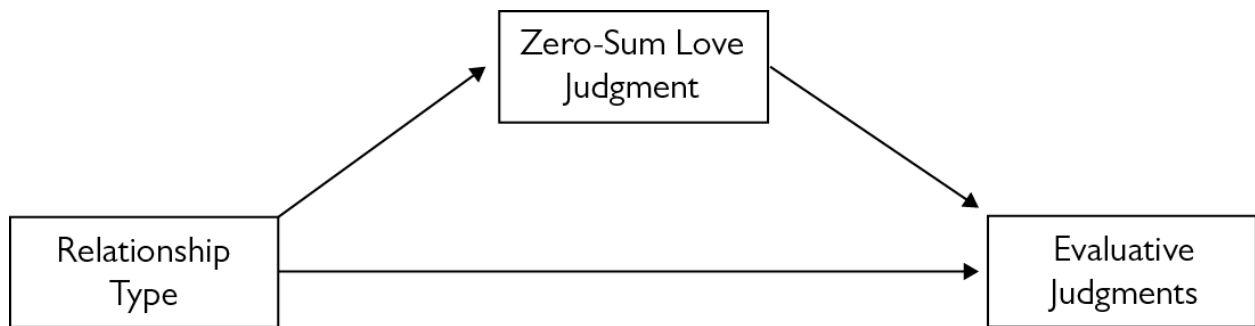

Figure 1. This figure illustrates our hypothesized mediation model, in which zero-sum thinking is hypothesized to mediate the association between relationship type and evaluative judgment.

Zero-sum thinking mediated the effect of relationship type on Satisfaction (*indirect B* = -0.50, 95% CI = [-0.93, -0.14]; *direct B* = -3.72, *t* = -14.41, *p* < .001) and Longevity (*indirect B* = -0.45, 95% CI = [-0.91, -0.03]; *direct B* = -3.59, t= -12.34, *p* < .001). However, no mediation was observed with Trustworthiness (*indirect B* < 0.01, 95% CI = [-0.06, 0.61]; *direct B* = -2.83, t= -8.83, *p* < .001). Thus, the results were generally consistent with our hypothesis.[2]

Discussion

In this study, we asked individuals to judge a CNM character's love for one partner before and after they became involved with a second partner. Zero-sum thinking was defined as a difference between the two love judgments in the CNM condition. CNM devaluation was measured by asking for judgments of relationship quality and trustworthiness. We expected that zero-sum thinking would be associated with more negative evaluations of CNM (vs. monogamous) relationships and individuals.

We found that love ratings were lower in the CNM condition after Susie became involved with someone else. Evaluative judgments were lower in the CNM condition when compared to the monogamous condition, and also when compared to the midpoint of the scale. Thus, participants not only devalued the CNM relationship relative to an equivalent monogamous relationship, but viewed the CNM relationship negatively in general. Crucially, zero-sum thinking mediated the association between relationship type with two out of three evaluative judgments, supporting our proposal that zero-sum thinking promotes anti-CNM prejudice.

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[2] We did not include participants' gender, participants' relationship status, or the vignette protagonist's gender as covariates in the mediation analysis as we did not find any differences in zero-sum thinking or evaluative judgments related to these variables.

We did not find mediation with trustworthiness. One possibility is that trustworthiness is a trait that is not strongly related to resource concerns in this context, whereas other traits may be more relevant. That is to say, because Dan and Susie both agreed to practice CNM, and were behaving in accordance with that agreement, they were trustworthy. The difference in ratings between the conditions was less with trustworthiness than the other judgements, which suggests that trustworthiness reflected a different interpretive process. We speculate that resource concerns may not have been driving this difference.

Study 2

In contrast to the first study that involved an experimental manipulation of resource concerns, this study measures trait differences in zero-sum thinking about romantic love using a novel preliminary measure. CNM devaluation was also measured using a more comprehensive scale. We predicted that if individuals devalue CNM because of zero-sum concerns, then individuals who more strongly endorse zero-sum beliefs should more strongly devalue CNM.

Method

Participants

One hundred and thirty-one US residents (54 women, 78 men) aged 18 to 69 ($M = 35.42$, $SD = 11.58$) were recruited from Mechanical Turk. A majority stated that they were currently in a relationship (83 in a relationship, 43 single, 4 separated or widowed, 1 other), and a large majority identified with monogamy (112 monogamous, 8 monogamish, 7 polyamorous, and 3 open). As before, we report analyses of monogamous-identified individuals. A script was used to ensure that participants in this study did not previously participate in Study 1.

Materials and procedure

As in Study 1, participants read a monogamous or CNM (open relationship) vignette. The vignettes were identical to those in Study 1, with the major change being that the two parts ('before' and 'after') were combined into a single vignette (see Supplemental for full text).

Measures. After reading the vignette, participants completed a 16-item measure of evaluative judgments adapted from Conley et al. (2012). Participants rated the relationship between the two main characters in comparison to the average relationship ('Compared to most couples, I think Susie and Dan's relationship is...') on the following dimensions: *trusting*, *reliable*, *comfortable*, *mature*, *dependable*, *meaningful*, *safe*, *natural*, and *moral*. Participants also rated the two main characters in comparison to most individuals ('Compared to most individuals, I think Susie and Dan are...') on the following dimensions: *honest*, *committed*, *trusting*, *emotionally secure*, *happy*, *in love*, and *romantic*. Items were presented as interval rating scales ranging from -3 (Less [adjective]) to +3 (More [adjective]); ratings were recoded as 1 to 7 for the analyses.

A four-item measure of zero-sum romantic beliefs was also created for this study. As we were not aware of any existing measures, we created the items so as to avoid redundancy while capturing the essential bases of zero-sum thinking about love. One item was designed to measure entitlement beliefs, and three items were designed to measure scarcity beliefs. Each item was presented with a 7-point interval rating scale ranging from -3 (Disagree strongly) to +3 (Agree strongly). Ratings were recoded as 1 to 7 for the analyses. See Table 3 for the item statements. Finally, participants reported demographics as before.

Analyses

Zero-sum romantic beliefs

First, we performed a principal components analysis (Jolliffe, 2010) and a test of scale score

reliability (Cronbach, 1951). The first component explained 61% of the variance (eigenvalue =

1.57), and the second explained an additional 18% (eigenvalue = 0.86). A visual inspection of

the scree plot (Cattell, 1966) indicated a sharp break after the first component. Thus, we

concluded that a single component solution was appropriate. Scale score reliability was

acceptable, α = 79 (bootstrapped 95% CI = [.68, .86]), and could not be improved. Thus, a

composite score was calculated.

Table 2. Zero-sum romantic beliefs item means and standard deviations from Study 3.

#	Statement	Study 2[1]		Study 3[2]	
		Mean	SD	Mean	SD
1	In a romantic relationship, a person deserves all of their partner's love.	6.00	1.33	6.20	1.00
2[*]	A person's capacity for romantic love is infinite. It is possible to love many people at the same time without loving anyone less.	4.79	1.84	4.77	1.85
3	Romantic love is like a pie — if you share it with more than one person at a time, then each person will get less.	5.25	1.84	5.17	1.68
4	In a romantic relationship, you can only fully love one person at a time.	5.23	1.82	5.53	1.61

Note: [*] indicates reverse-coding; [1]N = 112; [2]N = 109.

There was strong endorsement of zero-sum romantic beliefs among participants who

identified with monogamy. Overall, the mean score was 5.32 (SD = 1.34), and a majority of

participants scored 6 or higher (63%, or 71 out of 112). The mean score was also higher than the

scale midpoint ($t(111) = 10.40$, $p < .001$, $d = .98$). Similarly, mean responses for all individual

items were greater than the midpoint ($ps < .001$, smallest $d = .43$). Thus, individuals who practice

monogamy generally appear to hold the beliefs that we assume underlie zero-sum thinking about

relationship resources. See Table 2 for a summary of item means and standard deviations.

Although the number of participants who identified with CNM was small ($N = 11$), it is

worth noting that their average zero-sum romantic belief endorsement ($M = 2.80$; $SD = 0.86$) was

lower than participants who identified with monogamy ($t(15.30) = -8.79$, $p < .001$, $d = 2.24$), and

also lower than the scale midpoint ($t(10) = -4.66$, $p < .001$, $d = 1.41$). These results support the

known-groups validity of the measure.

Evaluative judgments

Before computing a single composite score for evaluative judgments, we performed a principal

components analysis and a test of scale score reliability. We anticipated the possibility of a two-

component solution, reflecting judgments of Susie and Dan's relationship (component 1; items

1-9), and judgments of Susie and Dan as individuals (component 2; items 10-16).

Because participants in the monogamy and CNM conditions were evaluating different

targets, these analyses could produce different results. Thus, we examined the conditions

separately. In the monogamy condition, the first component explained 71% of the variance in

responses (eigenvalue = 3.37), and the second component explained an additional 7% of the

variance (eigenvalue = 1.03). In the CNM condition, the first component explained 46% of the

variance in responses (eigenvalue = 2.71), and the second component explained an additional

11% of the variance (eigenvalue = 1.33). The scree plots in each condition suggested that a

single-component solution was appropriate. Scale score reliability was also acceptable. In the

monogamy condition, Cronbach's α was .97 (bootstrapped 95% CI = [.95, .98]), and in the CNM

condition it was .91 (bootstrapped 95% CI = [.87, .94]); that it could not be improved. Thus, a

composite score was calculated by averaging ratings.

Scores were more positive in the monogamy (vs. CNM) condition ($M_{Mono.}$ = 5.84, $SD_{Mono.}$

= 0.96; M_{CNM} = 2.95, SD_{CNM} = 0.98; $t(109.95)$ = 15.79, $p < .001$, d = 2.99). In the monogamy

condition scores were above the midpoint ($t(54)$ = 14.18, $p < .001$, d = 1.91), and in the CNM

condition scores were below ($t(56)$ = -8.15, $p < .001$, d = 1.08). See Table 2 of the Supplemental

for a summary of item means.

Correlations

As a preliminary test of our hypothesis, we examined the correlation between zero-sum romantic

beliefs and evaluative judgments separately in the CNM and monogamy conditions. As expected,

in the CNM condition zero-sum romantic beliefs were negatively associated with evaluative

judgments (r = -.71, 95% CI = [-.82, -.56]), whereas in the monogamy condition zero-sum

romantic beliefs were positively associated with evaluative judgments (r = .65, 95% CI =

[.46, .78]). Thus, stronger zero-sum romantic beliefs were associated with more negative

evaluations of CNM and also with more positive evaluations of monogamy.

Moderation

If zero-sum thinking about relationships causes individuals to devalue CNM and those who

practice CNM, relative to monogamy and those who practice monogamy, then those who have

stronger inclinations towards such zero-sum thinking should more strongly devalue CNM

relationships and individuals who practice CNM. Therefore, individual differences in zero-sum romantic beliefs should moderate the association between the relationship type (monogamy vs. CNM) of a target and evaluations of that target. To investigate this, we performed a moderated regression analysis in which the dependent variable was evaluative judgments, the moderator was zero-sum romantic beliefs, and the predictor was relationship type (monogamy or CNM). In the first step, zero-sum romantic beliefs and relationship type were entered into the model. In the second step, their interaction was added to the model.

The first step was significant ($F(2, 109) = 123.59$, $p < .001$, $R^2_{adj} = .69$), explaining 69% of the variance in evaluative judgments, and the second step explained an additional 14% of the variance, which was also significant ($F(3, 108) = 184.17$, $p < .001$, $R^2_{adj} = .83$). Next, we decomposed the interaction by performing a simple slope analysis (Bauer, Preacher, & Curran, 2007; Cohen, Cohen, West, & Aiken, 2013; Rogosa, 1980). As recommended by Cohen et al. (2013), we tested the slopes when zero-sum romantic beliefs were one standard deviation above the mean, at the mean, and one standard deviation below the mean. We also calculated the region of significance (Bauer et al., 2007; Rogosa, 1980), which reflects the range of values on the moderator in which the slope is significantly different from zero.

At one standard deviation below the mean of zero-sum romantic beliefs, the simple slope was -1.53 ($SE = .20$, $t(111) = -7.83$, $p < .001$), indicating more positive evaluative judgments for the monogamy (vs. CNM) condition; at the mean, the simple slope was -2.88 ($SE = .14$, $t(111) = -21.18$, $p < .001$); at one standard deviation above the mean, the simple slope was -4.22 ($SE = .19$, $t(111) = -21.92$, $p < .001$). Finally, the region of significance was -1.73 to -2.73, meaning all simple slopes associated with standardized values of zero-sum romantic beliefs that were above -1.73 or below -2.73 were significant. These results suggest that CNM devaluation

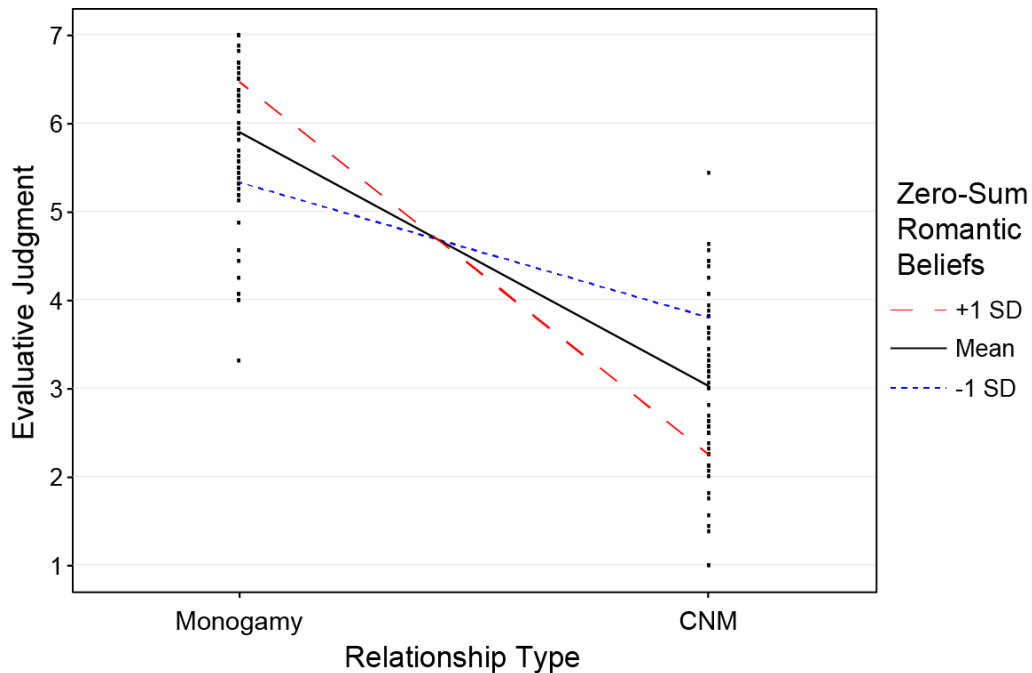increased as zero-sum romantic beliefs increased. See Figure 2 for a visual summary of the simple slopes.

Figure 2. This figure shows that increased zero-sum romantic beliefs were associated with greater devaluation of CNM (steeper slopes) in Study 2. It represents a simple slopes analysis of relationship vignette (monogamous, CNM) predicting evaluative judgment scores at 1 SD above the mean of zero-sum romantic beliefs, at the mean of zero-sum romantic beliefs, and 1 SD below the mean of zero-sum romantic beliefs.

Discussion

This study replicated previous findings that individuals will devalue persons who practice CNM and their relationships (Conley et al., 2012). Crucially, this study provided a further test of our zero-sum thinking hypothesis by administering a measure of trait zero-sum romantic beliefs and testing the role of these beliefs in moderating the association between relationship type and

evaluative judgments. The results of this study suggest that individuals who hold stronger zero-sum romantic beliefs evaluate CNM more negatively relative to monogamy. These results are consistent with the findings of Study 1, and provide additional support for the hypothesized role of zero-sum thinking in promoting CNM prejudice.

Zero-sum romantic beliefs were strongly endorsed by the participants, as evidenced by the mean scores, and by the majority of participants who indicated their strong agreement. It might be tempting to interpret strong endorsement as a sign of poor item construction. For example, items may be skewed if statements use 'weak' wording, such that the only 'reasonable' response is to register an extreme position of agreement or disagreement. Against this criticism we would point out that responses were anchored by 'strong' agreement or disagreement, and the items generally made strong statements about romantic relationships. Instead, we argue that individuals who practice monogamy frequently hold strong zero-sum romantic beliefs.

The findings in this study are consistent with what one would expect if zero-sum romantic beliefs caused CNM devaluation. Because it is a trait measure, it would not be appropriate to draw causal conclusions from the data. However, these findings are consistent with Study 1 in which a causal mediation model was used. We believe these two studies complement each other, in that one evaluated the causal association, whereas the other unequivocally assessed zero-sum thinking at the explicit level.

Study 3

In a final study, we aimed to address an alternative explanation for the previous results. Namely, although both Susie and Dan had agreed to have an open relationship that permitted them to have sexual and loving relationships with others, only Susie had developed a meaningful relationship

with someone else; Dan had dated other people but not had not developed feelings for anyone other than Susie. In other words, the CNM relationship was *asymmetrical*. It is possible that individuals might evaluate asymmetrical and symmetrical CNM relationships differently. For example, asymmetry might seem "unfair" to Dan because it violates the principle of equality of outcomes (even though the CNM agreement provides equality of opportunity). We would argue that asymmetry is likely to reflect the circumstances of many CNM relationships and therefore studying asymmetrical relationships is valuable in its own right. Even when two partners agree to CNM at the same time, they may meet others at different times, develop relationships at different rates, and so forth. It is unlikely that both members of a dyad would develop their extra-dyadic relationships in an identical and simultaneous manner, and thus most CNM relationships are likely to be asymmetrical in practice at some point in time. Nevertheless, if zero-sum thinking was only a useful predictor of prejudice with asymmetrical CNM relationships, then it would have somewhat limited predictive value. Thus, it is important to examine the case of symmetrical CNM in order to determine if it is a more general phenomenon.

Furthermore, although the CNM vignette began by describing Dan's feelings for Susie, it did not communicate how Susie felt towards Dan. This choice was deliberate, as we believed that ambiguity would increase the heuristic value of zero-sum thinking. However, it is possible that this aspect could—perhaps in combination with asymmetry—have resulted in a negative impression of Dan's circumstances and the perception that Susie was exploiting Dan. Individuals might have believed that Dan initially wanted an open relationship, but later he did not. In the present study, we sought to rule out these alternative explanations by using a CNM vignette in which: 1) Dan and Susie's feelings are stated to be symmetrical at the beginning, 2) Dan and

Susie experienced symmetrical outcomes with others, and 3) it is made clear that Dan and Susie continue to agree that an open relationship is best for them.

Another limitation of Study 2 was that the dimensions we used to measure evaluations of Susie and Dan as *individuals* were not entirely separable from evaluations of Susie and Dan's *relationship*. For example, we asked individuals to 'compare Susie and Dan to most individuals' in terms of whether they were 'in love' or 'romantic'. Furthermore, we did not use an equal number of dimensions to measure each of the evaluative categories. In the present study, we used a different set of dimensions to better measure evaluations of Susie and Dan as individuals.

Method

Participants

One hundred and thirty-six US residents (56 women, 79 men, 1 undeclared) aged 18 to 67 ($M = 33.21$, $SD = 10.43$) were recruited from Mechanical Turk. A majority stated that they were currently in a relationship (72 in a relationship, 57 single, 3 dating, 3 divorced or separated), and a large majority identified with monogamy (109 monogamous, 19 monogamish, 4 polyamorous, 2 open, and 2 other). As before, we report analyses of monogamous-identified individuals. A script was used to ensure that participants in this study did not participate in Studies 1 or 2.

Materials and procedure

The vignettes were identical to those used in Study 2, with the major changes being that: 1) Dan and Susie's feelings for one another were initially described as symmetrical, 2) Dan and Susie had each developed a meaningful relationship with someone else, and 3) it was stated that Dan and Susie continued to agree that an open relationship was best for them in the second year. We

also made a minor change to the communication of Dan and Susie's relationship agreement in order to make it more explicit and salient. The CNM vignette was as follows:

> Dan has been in a serious relationship with Susie for two years and in that time they have become very close. Dan and Susie both work at full-time jobs and lead exciting lives outside of work, finding many fun activities to do together in their spare time. When they first started dating, they talked about the kind of relationship they wanted to have together. They agreed that an open relationship was what they both wanted. Specifically, they agreed that it would be acceptable to have sexual and loving relationships with other people. They felt that that this type of relationship would make them happiest.

> In the second year of their relationship, Susie and Dan continue to agree that an open relationship is best for them, and they have each developed feelings for a new person. Susie has been seeing Oliver for a year now, and she has developed strong feelings for him. Susie believes that she and Oliver they have great chemistry, and Susie often thinks about him when they are apart. Dan now has a serious relationship with Erica. Dan believes that he and Erica have much in common and that he is really growing to love her.

The monogamy vignette was identical to Study 2, except that, paralleling the CNM vignette, the wording of the monogamous agreement was made more explicit: 'they agreed that monogamy was what they wanted. Specifically, they agreed that it would not be acceptable to have sexual or romantic relationships with anyone else.' Again, gender was counterbalanced across participants (i.e., in one condition Dan was in Susie's position, having a relationship with 'Olivia,' and Susie had a relationship with 'Eric').

Measures. The measures were similar to Study 2, except for a few key changes. First, we changed some of the dimensions for the judgments of Susie and Dan as individuals. Specifically:

1) *trusting* was changed to *trustworthy*, 2) the items *in love, committed*, and *romantic* were removed, and 3) *kind*, *selfish* (reverse-scored), *ethical*, *intelligent*, and *responsible* were added. With the exception of *emotionally secure*, which we believed was appropriate for the context (e.g., DeLaine, 2015), all dimensions used for evaluating Susie and Dan as individuals are consistent with trait judgments previously shown to discriminate between liked and disliked persons (see Lott, Reed, & Crow, 1970). As before, participants completed the four-item measure of zero-sum romantic beliefs.

A final change was the addition of a question to assess participants' recall and understanding of Susie and Dan's agreement. Participants were presented with the following question: 'Susie and Dan agreed to have a[n open relationship / monogamous relationship]. What was the specific nature of this agreement?'. The answer options were: 1) 'They agreed that it was NOT acceptable to have sexual or loving relationships with anyone else,' 2) 'They agreed that it was acceptable to have sexual BUT NOT loving relationships with other people,' 3) 'They agreed that it was acceptable to have loving BUT NOT sexual relationships with other people,' 4) 'They agreed that it was acceptable to have sexual AND loving relationships with other people,' or 5) 'I don't remember.' Participants who read and understood the scenario should answer 1 in the monogamy condition and 4 in the CNM condition. Participants reported demographics as before.

Analyses

Manipulation check

In the monogamy condition, 93% of participants (67 out of 72) correctly answered the recall question. In the CNM condition, 89% of participants (57 out of 64) correctly answered the

question. Thus, participants generally understood the nature of Susie and Dan's relationship agreement. All participants were retained for the analyses.[3]

Zero-sum romantic beliefs

The principal components analysis revealed a single-component solution (component 1: 65% variance, eigenvalue = 1.61; component 2: 18% variance, eigenvalue = 0.80). Cronbach's α was .80 (bootstrapped 95% CI = [.72, .86]) and could not be improved. As in Study 2, there was a pattern of strong endorsement. The mean score was 5.42 (SD = 1.24), and most participants scored 6 or higher (63%, or 69 out of 109). The mean score was also higher than the scale midpoint ($t(108) = 11.95$, $p < .001$, $d = 1.15$), and all items were greater than the midpoint ($ps < .001$, smallest $d = .42$). See Table 2 for a summary.

Evaluative judgments

The principal components analysis revealed a single-component solution in the monogamy condition (component 1: 61% variance, eigenvalue = 3.31; component 2: 8% variance, eigenvalue = 1.21), and in the CNM condition (component 1: 52% variance, eigenvalue = 3.05; component 2: 12% variance, eigenvalue = 1.45). In the monogamy condition, Cronbach's α was .96 (bootstrapped 95% CI = [.93, .97]), and in the CNM condition it was .94 (bootstrapped 95% CI = [.91, .97]); it could not be improved. Thus, a composite score was calculated by averaging ratings.[4]

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[3] Similar results were obtained with incorrect responders removed from analyses.

[4] Similar results were obtained when repeating subsequent analyses separately for judgments of Susie and Dan's relationship (items 1-9), and judgments of Susie and Dan as individuals

Scores were more positive in the monogamy (vs. CNM) condition ($M_{Mono.} = 5.76$, $SD_{Mono.} = 0.92$; $M_{CNM} = 3.60$, $SD_{CNM} = 1.12$; $t(94.83) = 15.79$, $p < .001$, $d = 2.11$). In the monogamy condition scores were above the scale midpoint ($t(58) = 14.71$, $p < .001$, $d = 1.92$), and in the CNM condition scores were below ($t(49) = -2.50$, $p = .016$, $d = .35$). See Table 3 of the Supplemental for a summary of item means.

Correlations

Next, we examined the correlation between zero-sum romantic beliefs and evaluative judgments separately in the CNM and monogamy conditions. As expected, in the CNM condition zero-sum romantic beliefs were negatively associated with evaluative judgments ($r = -.36$, 95% CI = [-.58, -.09]), whereas in the monogamy condition zero-sum romantic beliefs were positively associated with evaluative judgments ($r = .37$, 95% CI = [.13, .57]). Thus, stronger zero-sum romantic beliefs were associated with more negative evaluations of CNM and also with more positive evaluations of monogamy.

Moderation

Finally, we turn to our primary test of moderation, which was performed following the same procedure as Study 2. The first step was significant ($F(2, 106) = 60.47$, $p < .001$, $R^2_{adj} = .52$), explaining 52% of the variance in evaluative judgments, and the second step explained an additional 6% of the variance, which was also significant ($F(3, 105) = 51.49$, $p < .001$, $R^2_{adj} = .58$). Next, we decomposed the interaction by performing a simple slope analysis. At one

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(items 10-18), with one exception: in the CNM condition, evaluative judgments of Susie and Dan as individuals did not differ from the midpoint ($M = 3.96$; $t(49) = -.20$, $p = .841$).

standard deviation below the mean of zero-sum romantic beliefs, the simple slope was -1.40 (SE = .26, $t(105)$ = -5.32, $p < .001$); at the mean, the simple slope was -2.16 (SE = .18, $t(105)$ = -11.75, $p < .001$); and at one standard deviation above the mean, the simple slope was -2.91 (SE = .26, $t(105)$ = -11.10, $p < .001$). Finally, the region of significance was -1.84 to -5.64. Thus, reproducing the pattern observed in Study 2, CNM devaluation increased as zero-sum romantic beliefs increased. See Figure 3 for a visual summary of the simple slope analysis.

Discussion

This study ruled out an alternative explanation for the results obtained in Studies 1 and 2. Namely, the CNM vignettes used in those studies were *asymmetrical* in that one of the CNM characters had developed a meaningful second relationship whereas the other character had not. This aspect could have led to the perception that the relationship was unfair due to an inequality of outcomes. Therefore, in this study the CNM vignette from Study 2 was modified to create the perception of symmetry. The results were consistent with those obtained from Study 2. Participants evaluated both Susie and Dan's relationship, and Susie and Dan as individuals, more negatively when they were practicing CNM as compared to when they were practicing monogamy. Participants also strongly endorsed zero-sum romantic beliefs, and CNM devaluation was greater among participants who more strongly endorsed zero-sum romantic beliefs. In comparison to Study 2, the effect sizes appear to be smaller, suggesting that the symmetry of the relationship affected how CNM relationships were perceived. However, it is clear that CNM relationships are devalued as a function of zero-sum thinking regardless of the symmetry of the relationships involved. Overall, these findings provide further evidence of the robustness and generalizability of our zero-sum thinking hypothesis.
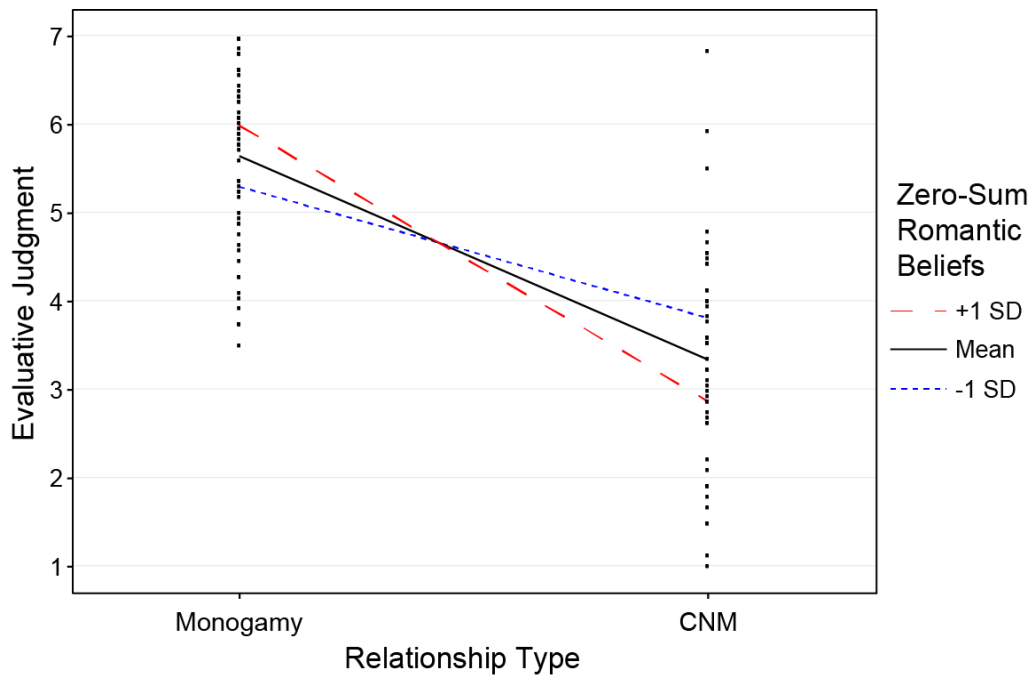
Figure 3. This figure shows that increased zero-sum romantic beliefs were also associated with greater devaluation of CNM (steeper slopes) in Study 3. It represents a simple slopes analysis of relationship vignette (monogamous, CNM) predicting evaluative judgment scores at 1 SD above the mean of zero-sum romantic beliefs, at the mean of zero-sum romantic beliefs, and 1 SD below the mean of zero-sum romantic beliefs.

General Discussion

In this paper, we proposed that zero-sum thinking about love might be one of the bases of anti-consensual nonmonogamy prejudice. We suggested that individuals who believe that relationship resources are scarce, or that parties to a relationship are entitled to all of these resources, will perceive that the allocation of relationship resources is zero-sum. In turn, when these individuals are faced with the prospect of a relationship in which an individual has more than one loving

relationship partner, as the case may be with CNM, they will judge that relationship and the individuals in the relationship to be less valuable.

Across three studies we tested this proposal. In Study 1, zero-sum thinking was defined as the change in love ratings within the CNM condition, from a point in time where the main character had one partner, to a second point in time where he or she had two partners. We found that zero-sum thinking mediated evaluative judgments in two out of three cases. In Studies 2 and 3, zero-sum thinking was defined as a trait variable representing the beliefs that we assume underlie zero-sum thinking. We measured zero-sum romantic beliefs using a novel 4-item measure, and we used a more comprehensive 16-item measure of evaluative judgments. We found that trait differences in zero-sum romantic beliefs moderated the association between relationship type and evaluative judgments. Specifically, individuals with stronger zero-sum romantic beliefs more strongly devalued CNM. These convergent findings support our proposal that zero-sum thinking promotes anti-CNM prejudice, and suggest that CNM prejudice might be reduced through interventions that target zero-sum thinking about love in CNM relationships.

An outstanding question concerns *why* some individuals who practice monogamy interpret CNM relationships in zero-sum terms, or come to believe that resources like love are scarce. One possibility is that individuals' everyday experiences with scarce material resources in other domains transfer to their understanding of abstract, romantic relationship resources like romantic love. Another possibility is that monogamous individuals learn to apply zero-sum logic through their experiences with monogamy.

Concluding Remarks

We believe this research contributes to better understanding societal attitudes towards CNM that involves multiple loving relationships, by demonstrating that individuals who engage in zero-sum thinking about love are more strongly opposed to love-based CNM. Throughout history, individuals who engaged in nonnormative consensual romantic or sexual practices have been subject to ill treatment—homosexuality being one example where society has made progress in understanding and respecting differences, but where much progress still remains. CNM appears to be in the earliest stages of gaining exposure and ultimately tolerance. By understanding one of the reasons why individuals might judge this type of CNM harshly, the present research takes one of the many steps needed towards greater social justice.

Statement of Ethics

All participants consented to participate, and were paid between $0.50 to $0.75 USD. These studies were approved by the University of Guelph Research Ethics Board (#15OC014).

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Supplemental

In Study 2, the CNM vignette was as follows:

Dan has been in a serious relationship with Susie for two years and has become very close with her. Dan and Susie both work at full-time jobs and lead exciting lives outside of work, finding many fun activities to do together in their spare time. When they first started dating, Dan and Susie talked about the kind of relationship they wanted to have together. They agreed that an open relationship was what they both wanted, because it would allow them to have sexual and loving relationships with other people. They felt that this type of relationship would make them happiest.

In the second year of their relationship, Susie started to see someone new; his name is Oliver. Susie has been seeing Oliver for a year now, and she has developed strong feelings for him. Susie and Oliver have a great sexual chemistry, they also share all of the same values, and Susie often thinks about Oliver when they are apart. Although Dan has dated a few people other than Susie, he has not developed feelings for anyone else.

In the monogamy condition, the first paragraph was identical with some modifications, and the second paragraph was omitted. Specifically, in the monogamy condition, Susie and Dan's relationship agreement was described as follows: 'they agreed that monogamy, a relationship where they could not have sexual or loving relationships with anyone else, was what they both wanted.' At the end of the monogamy vignette, it was stated that 'in the time that they have been together, neither Dan nor Susie has been sexually or romantically involved with anyone else.' Again, gender was counterbalanced across participants by switching the names in the vignettes.

Supplemental Table 1. Definitions provided with relationship orientation question.

Relationship	Definition
Monogamy	A relationship where you are committed to one other person and that person is who you share all romantic and sexual experiences with.
Monogamish	A relationship where you and your partner agree that it is acceptable to have sex with other people, but only when you are both present (e.g., in 'threesomes').
Swinging	A relationship where you and your partner exchange partners with other couples for sex.
Open	A relationship where you and your partner have agreed that it is acceptable to have romantic and/or sexual relationships with other people.
Polyamorous	A relationship where you and your partner agree that it is possible, acceptable, and desirable to love multiple people, and to maintain multiple romantic and/or sexual relationships, with the knowledge and consent of everyone involved.
Other	Your relationship orientation is not listed.

Supplemental Table 2. Evaluative item means and standard deviations from Study 2.

#	Statement	CNM[1]		Monogamy[2]	
		Mean	SD	Mean	SD
Susie and Dan's relationship is…					
1	TRUSTING	4.42	1.73	5.75	1.09
2	RELIABLE	2.29	1.31	5.87	1.17
3	COMFORTABLE	3.09	1.77	5.98	1.11
4	MATURE	3.14	1.55	6.12	1.00
5	DEPENDABLE	2.28	1.46	5.92	1.10
6	MEANINGFUL	2.21	1.18	5.80	1.16
7	SAFE	1.90	1.05	6.07	1.07
8	MORAL	2.77	1.38	5.62	1.33
9	NATURAL	2.83	1.48	5.35	1.35
Susie and Dan are…					
10	HONEST	4.65	1.69	5.76	1.05
11	COMMITTED	1.98	1.11	6.20	1.01
12	TRUSTING	4.21	1.89	5.91	1.16
13	EMOTIONALLY SECURE	3.35	1.93	5.84	1.29
14	HAPPY	3.33	1.38	5.72	1.11
15	IN LOVE	2.26	1.18	5.75	1.24
16	ROMANTIC	2.42	1.18	5.76	1.11

[1]$N = 57$; [2]$N = 55$

Supplemental Table 3. Evaluative item means and standard deviations from Study 3.

#	Statement	CNM[1]		Monogamy[2]	
		Mean	SD	Mean	SD
Susie and Dan's relationship is…					
1	TRUSTING	4.62	1.78	5.97	1.07
2	RELIABLE	2.90	1.73	6.03	1.13
3	COMFORTABLE	3.88	1.93	6.03	1.08
4	MATURE	3.64	1.78	6.05	1.20
5	DEPENDABLE	2.74	1.50	6.09	1.04
6	MEANINGFUL	2.62	1.35	5.90	1.21
7	SAFE	2.54	1.37	6.24	.95
8	MORAL	3.08	1.31	5.73	1.27
9	NATURAL	3.16	1.35	5.48	1.30
Susie and Dan are…					
10	HAPPY	4.40	1.37	5.68	1.15
11	(UN)SELFISH*	3.84	4.02	5.09	1.53
12	TRUSTWORTHY	4.02	1.70	5.90	1.12
13	EMOTIONALLY SECURE	4.02	2.00	5.75	1.28
14	HONEST	4.72	1.68	5.85	1.20
15	KIND	3.98	1.44	5.51	1.24
16	ETHICAL	3.42	1.39	5.42	1.39
17	INTELLIGENT	3.90	1.31	5.17	1.32
18	RESPONSIBLE	3.38	1.58	5.86	1.15

[1]$N = 50$; [2]$N = 59$; *Item was reverse-scored (originally "selfish")