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A Closer Look at Relationship Structures: Relationship Satisfaction and Attachment

among People who Practice Hierarchical and Non-Hierarchical Polyamory

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Abstract

Although polyamorous relationships have received increasing attention from researchers over the past decade, little attention has been paid to differences in relationship configurations: some individuals arrange their relationships hierarchically, prioritizing a primary partner; other relationship structures are non-hierarchical with no relationships prioritized over others. Across two samples (N_{Study1}=225; N_{Study2}=360), we compared relationship satisfaction and attachment security between individuals in hierarchical and non-hierarchical configurations. Greater variability in attachment security was found between partners in hierarchical relationships than those in non-hierarchical relationships; no differences were found in variability in relationships satisfaction across these groups. Furthermore, individuals in hierarchical relationships reported lower overall relationship satisfaction and attachment security compared to individuals in non-hierarchical relationships. More specifically, although no differences were found between non-hierarchical and primary partners, participants reported lower relationship satisfaction and attachment security with secondary and tertiary partners compared to non-hierarchical and primary partners. Findings suggest that these differences may attenuate with time. Although previous research has found that differences (e.g., in investment) between partners exist in both non-hierarchical and hierarchical configurations, the current research suggests that differences that occur organically rather than in a predetermined manner may be related to greater similarities in attachment security across partners as well as greater overall levels of relationship satisfaction and attachment security for individuals in non-hierarchical configurations. More research is needed to determine if the observed between-partner differences are consistent with the relationship goals of individuals in hierarchical relationships.

Key words: consensual non-monogamy, polyamory, relationship quality, attachment, hierarchy

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Although there is growing academic and public interest in consensually non-monogamous relationships (CNM; relationship agreements in which individuals openly engage in more than one concurrent intimate, romantic, and/or sexual relationship; academic interest: see, for instance, this special issue; public interest: Moors, 2017; for a record of media coverage, see: https://polyinthemedia.blogspot.com), nuances in how people structure and organize their multi-partnered relationships has yet to be fully explored. In the context of polyamory—which is typically distinguished from other forms of CNM based on participants' greater openness to multiple concurrent, long-term *loving* partnerships (Klesse, 2006) —people organize their relationships in different ways. Some individuals explicitly rank their partners with one (or more) partner(s) designated as primary and at least one partner designated as secondary or tertiary (referred to as hierarchical polyamory); others do not endorse hierarchy among their partners (known as non-hierarchical polyamory). To date, only one previous study has examined hierarchical and non-hierarchical relationships, with a focus on the relationship quality of *two* partnerships (Balzarini et al., 2019). This study builds on previous research by including all partners in the examination of relationship quality by hierarchical vs non-hierarchical status and by examining an additional marker of relationship quality: attachment security.

Polyamorous Relationship Configurations

In comparison to other subtypes of consensual non-monogamy, which more often focus on extradyadic sexual involvement (e.g., swinging), polyamorous relationships often involve some form of romantic, emotional, and/ or loving bond in addition to sexual relationships. Polyamory itself is a broad term that covers a wide range of relationship agreements, including

differences in how relationships are structured. Central to the current paper are two common forms of polyamorous relationship structure: hierarchy and non-hierarchy.

In the hierarchical polyamorous relationship configuration, people tend to prioritize one or more partners (designated as primary) over others (often designated secondary or tertiary). This predetermined arrangement between a couple explicitly shapes the nature of their other intimate involvements (Labriola, 2003). Primary relationships (which typically involves two partners, but not always, such as in the case of triads and quads) often predate the other partnerships and primary partners may cohabitate, co-parent, share finances, and/or spend holidays together (Balzarini et al., 2017; Balzarini et al., 2019a). Thus, primary relationships often involve a greater degree of investment than non-primary relationships.

In contrast, polyamorous relationships are considered non-hierarchical when all partners are explicitly labeled primary or when no partners are ranked. Polyamorous individuals with multiple primary partners include polyfidelitious relationships (most typically triads and quads; akin to a 'group marriage,' in which all partners may live together, share responsibilities, and/or have sexual relationships) as well as individuals who have multiple close partnerships, none of which are explicitly prioritized over others (Labriola, 2006). Although primary partners may have influence over their partner's relationships with other partners, typically non-hierarchical partners do not have the power to influence decisions regarding partnerships that do not include them (Labriola, 2006). However, even when non-hierarchical partners are not explicit prioritized over others, differences in marital or cohabitation status, financial, or other forms of interdependence may still exist across partnerships (Balzarini et al., 2019).

Relationship configurations in which none of the partnerships are designated primary may reflect an individual who prioritizes their independence, an individual with little interest or

ability to invest the time and emotional energy that a primary partnership typically entails

(Labriola, 2006) or it may reflect a philosophy that rejects hierarchy among their intimate

partnerships or, going a step further, among any relationships (relationship anarchy; Kale, 2016).

Given these substantial differences in how polyamory is practiced, it would not be surprising if

relationship quality varied between partners in these various relationship configurations.

Relationship Satisfaction among People Engaged in Polyamory

One of the most commonly assessed measures of relationship quality is relationship

satisfaction. Yet, so far, only a few studies have examined relationship satisfaction as a function

of hierarchy in polyamorous relationships. In comparisons of primary and secondary partners in

hierarchical polyamorous relationships, two studies have found higher satisfaction among

primary than secondary partners (Balzarini et al., 2017; Conley et al., 2017). However, there is

some discrepancy among these studies in how the primary partner is determined. For instance,

Balzarini et al. asked participants to identify their primary partner while Conley and colleagues

asked participants to name the partner they were more committed to than the others, which is

likely to approximate primary partner (although may not in all cases). Mitchell, Bartholomew,

and Cobb (2014) found similar results in their sample of individuals engaged in various forms of

consensual non-monogamy (not solely polyamory). They compared "significant others" (a

category meant to approximate primary partners, which combined those partners labeled primary

by the participant with partners designated as the 'significant other' *by the researchers* based on

certain criteria, such as relationship length or cohabitation status) and 'other significant others'

(which combined partners designated as non-primary by the participant or by the researcher),

finding that "significant others" had higher relationship satisfaction compared to "other

significant others." However, it should be noted that for approximately a third of the sample, the

assigned hierarchical distinctions contrasted with the participants' own non-hierarchical labeling of their partners. In sum, although there is a consistent pattern of greater relationship satisfaction reported with primary partners compared to secondary partners, the interpretation of these findings is complicated by inconsistent operationalizations of "primary partners" which may not always map well onto participants' own descriptions of their partners.

Balzarini and colleagues (2019a) were the first to further examine hierarchical and nonhierarchical relationship configurations. They compared a wide range of relationship quality indicators between primary/secondary, co-primary (more than one partner identified as primary), and no-primary (none of the partners identified as primary) relationship configurations. For participants who identified two partners as primary or no partners as primary, the authors designated one partner as 'pseudo-primary' and another as 'pseudo-secondary' based on the length of the relationship and cohabitation status. Across two samples, participants in hierarchical relationships reported being more satisfied with their primary partners than their secondary partners. However, participants with multiple primary partners evidenced no difference in relationship satisfaction between the two partners. Findings were inconsistent across the two samples for participants with no primary partners (with participants significantly more satisfied with the pseudo-primary partner in Study 1 and no differences found in Study 2). These findings lend support for the importance of treating hierarchical and nonhierarchical polyamorous relationships as distinct.

The current study seeks to replicate and extend Balzarini and colleagues' (2019a) research by comparing differences in both relationship satisfaction and attachment security across multiple partners in hierarchical and non-hierarchical relationship configurations. We furthermore hope to clarify past findings by examining individuals' own designations of their

relationships (e.g., not imposing hierarchical designations on participant-identified non-hierarchical structures), in order to avoid confounding factors like relationship length and cohabitation status with how people actually think about their partners. At the core of this strategy is the belief that how individuals think about their relationships may actually influence the quality of those relationships. (Although it is possible that relationship quality may determine decisions about hierarchical structure, we seek to first examine whether a relation exists before gathering evidence to help determine causality, which would require a more resource-intensive longitudinal study as the next step.) An exploratory goal of this study is to determine whether individuals' self-designations of hierarchical/non-hierarchical status make unique contributions to predicting relationship quality, beyond that contributed by factors such as relationship length and co-habitation status. Finally, we seek to build on past research by including all partners reported by the participant, rather than only two.

Attachment Security

One of the most popular theories in the area of romantic relationships is attachment theory. Originally described in the context of infant/caregiver relationships (Bowlby, 1969), the concept was later applied to relationships between romantic partners (Hazan & Shaver, 1987). Attachment theory states that our earliest experiences with our caregivers result in internalized working models of relationships, which are expectancies that we carry with us into future relationships: for example, whether others are trustworthy and dependable (Bowlby, 1969). Based on these experiences, we are thought to have particular ways of relating to others, called an attachment style, which consists of two components: *anxiety*, or how sensitive we are to perceiving and responding (physiologically and emotionally) to relationship-based uncertainty and threats; and *avoidance*, or the discomfort one may feel opening up to and relying on others

(Brennan, Clark, & Shaver, 1998). Although our earlier attachment experiences are thought to shape our expectations and approaches to later attachment relationships, individuals are also thought to experience attachment anxiety and avoidance specific to particular relationships in response to the behaviors of the relationship partner (LaGuardia et al., 2000) and the interaction of the two partners' attachment styles.

Although attachment theory is one of the most widely applied theories in the field of relationship research, only two studies have thus far examined attachment in the context of consensually non-monogamous relationships. The first study found consensually non-monogamous (including both swingers and polyamorous) individuals to be lower in attachment avoidance than monogamous individuals, with no differences in attachment anxiety (Moors, Conley, Edelstein, & Chopik, 2015). The second examined individuals engaged in polyamory with at least two concurrent partners and found that, people reported lower levels of attachment anxiety and avoidance with Partner 1 (i.e., the first partner reported on by the participant; on average, this relationship was longer and more likely to be designated a primary partner) than Partner 2 (Moors, Ryan, & Chopik, 2019).

The lack of attention from attachment theorists is particularly salient given that polyamorous individuals may be uniquely positioned to help answer a current debate within the field of attachment theory: to what extent does the development of new attachment bonds depend on the weakening or displacement of existing attachments (Fraley, 2019)? Along with the Moors and colleagues' (2019) study described above, the current study has the potential to contribute in a meaningful way to this debate. Moors and colleagues found that polyamorous individuals were generally securely attached to both partners examined in their study; thus new relationships, even new intimate relationships, do not necessarily undermine the security of existing relationships.

This study will build on Moors et al. (2019) by examining this variability in the context of varying relationship structures (hierarchical vs nonhierarchical). If, as Fraley (2019) postulates, the choice to engage in various forms of CNM may be driven, in part, by distinct attachment motivations, the decision to engage in hierarchical or non-hierarchical forms of polyamory may also reflect different underlying attachment strategies and, thus, attachment security may differ across individuals involved in these two relationship structures. Individuals who choose to engage in hierarchical forms of polyamory may have higher levels of attachment anxiety, for example, and crave the security that having (and being) a primary partner may provide. As of yet, no research has compared attachment security across hierarchical and nonhierarchical relationship configurations. We seek to address this gap by comparing attachment security between participants in hierarchical and non-hierarchical relationship configurations as well as between primary and secondary partners in hierarchical relationship configurations.

The Current Studies

The current study extends previous research by comparing relationship satisfaction and attachment security (anxiety and avoidance) between individuals who practice hierarchical and nonhierarchical forms of polyamory. We furthermore examined variability in reports of relationship satisfaction and attachment security across individuals' multiple partners, testing whether these differences would be larger in hierarchical than in nonhierarchical relationship configurations. We suspected that the prioritization of one relationship over another would likely undercut both relationship satisfaction and attachment security in the non-prioritized relationships. Thus, consistent with Balzarini and colleagues (2019a), we expected to find the largest variabilities in these measures between partners in hierarchical configurations (H1). On the other hand, whether all partners are considered are primary or none of the partners are

considered primary, we expected to see significantly lower variability in relationship satisfaction and attachment security across an individual's multiple relationships when there is no explicit hierarchy.

We furthermore examined reports of relationship satisfaction and attachment security across participants' multiple partners and compared these individual-level relationship indices between hierarchical and non-hierarchical relationship configurations. Because we had no previous findings to draw on, we refrained from offering hypotheses for this question (RQ1).

Finally, considering only people engaged in hierarchical polyamory, we sought to replicate previous findings of greater relationship satisfaction in primary relationships compared to secondary relationships (Balzarini et al., 2017; Balzarini et al., 2019a; Conley et al., 2017; Mitchell et al., 2014). We also examined attachment security, expecting lower attachment anxiety and avoidance with primary, compared to secondary, partners (H2).

Study 1

Method

Participants

Following institutional ethics board approval, participants were recruited online in 2018-2019 through several subreddits (e.g., polyamory, swingers, consensual non-monogamy, sample size) and by sending invitations to the online study to several polyamory meetup groups (with permission of the organizers). The invitation stated that "The broad aim of this project is to look at individuals' experiences in relationships. Items in the survey cover topics such as relationship satisfaction, feelings of closeness, and fulfillment of emotional needs." Previous research has shown that reddit data is both valid and reliable (Jamnik & Lane, 2017). Inclusion criteria were: 1) 18 years of age and 2) currently in a relationship. A total of 797 participants completed the

questionnaires. Participants were asked to describe their relationship and were given the following options: monogamous, having sex or a romantic relationship outside of a monogamous relationship, monogamish, polyamorous, polyfidelity, open, swinging, triad, quad, relationship anarchy and other (open-ended response). For this study, we excluded participants who described their relationship as anything other than polyamorous, polyfidelity, triad, quad, vee (if the participant described their relationship this way in the free form response), or relationship anarchy.

A total of 230 participants satisfied the sample selection criteria: individuals engaged in polyamory who completed the survey for at least two current partners. Of the 230 participants, 97 (43%) were in hierarchical relationships and 128 (57%) were in non-hierarchical relationships. Five participants reported that they did not believe in hierarchy while simultaneously reporting a hierarchical ranking of partners (e.g., one partner was marked as primary, another as secondary); these participants were thus excluded. The 225 participants considered in this study were in a total of 564 relationships, of which 251 were hierarchical and 313 were non-hierarchical. Of the 251 hierarchical relationships, 101 were labeled as primary (40%), 102 were labeled as secondary (41%), 27 were labeled as tertiary (11%), and 20 had other descriptions (8%). Of the 128 participants in non-hierarchical relationships, 100 explicitly described all their relationships as non-hierarchical; 21 described all relationships as primary; and 7 selected "Other" and described their partners in a way that clearly implied no hierarchy.

The relationships' and participants' characteristics by hierarchical classification are reported on Tables 1 and 2, respectively. In summary, participants in hierarchical relationships were significantly older and more likely to be married than those in non-hierarchical relationships. Within hierarchical relationships, marriage was almost always with a primary

partner. Further, within hierarchical structures, relationships with a primary partner were on average significantly longer than those with a non-primary partner, and the proportion of cohabitation and co-parenting was significantly higher for primary partners.

Measures

In addition to demographic questions, participants were asked to complete the following measures for each of their partners (up to 10).

Hierarchy/non-hierarchy status. Participants were given the following options to describe each of their partners: 'only partner,' 'primary partner,' 'secondary partner,' 'tertiary partner,' 'I do not believe in relationship hierarchy, or other (open-ended response). Participants who reported that they did not believe in relationship hierarchy, or whose partners were all marked as primary (or all marked as secondary) were considered non-hierarchical. Participants who had at least one partner marked as primary and another marked as secondary or tertiary (or participants with at least one secondary and at least one tertiary partner) were considered hierarchical.

Attachment security. The Experiences in Close Relationship – Relationship Structures (ECR-RS; Fraley, Heffernan, Vicary, & Brumbaugh, 2011) questionnaire, a nine-item, Likert self-report instrument, assessed attachment between the participant and each of their partners. As recommended, two scores were computed for each partner: one for attachment-related avoidance (discomfort with closeness; sample item: "I try to avoid getting too close to [partner]") and the other for attachment-related anxiety (sensitivity to threats in the relationship; sample item: "I worry that [partner] won't care about me as much as I care about them"). Scores range from 1 to 7, with higher scores reflecting higher levels of anxiety and avoidance. Cronbach's alphas for the current sample were .88 for the avoidance subscale (.88

for hierarchical relationships and .87 for non-hierarchical relationships; .77 for primary

relationships and .87 for non-primary relationships) and .86 for the anxiety subscale (.87 for

hierarchical relationships and .84 for non-hierarchical relationships; .92 for primary

relationships and .82 for non-primary relationships).

Relationship Satisfaction. The Couples Satisfaction Index-4 (Funk & Rogge, 2007) is a

four-item Likert self-report scale that assesses satisfaction with one's partner. One item uses a 7-

point scale and the other three items use a 6-point scale. Scores range from 0-21, with higher

scores indicating greater satisfaction. Scores below 13.5 are thought to connote marked

dissatisfaction with the relationship. Cronbach's alpha for the current sample was .89 (.91 for

hierarchical relationships and .86 for non-hierarchical relationships; .90 for both primary and

non-primary relationships).

Procedure

Participants accessed the study through a link provided in the advertisement, where they

were first presented with information about the study, including that participation in the study is

anonymous and voluntary. Informed consent was obtained from all individual participants

included in the study. Participants who met the inclusion criteria were asked to complete three

surveys, two of which were filled out multiple times by participants in multiple relationships, and

the demographic form. Participants had the option of entering into a raffle for gift cards by

entering their email address in another survey whose data was unconnected with the study data.

Results

Data Analyses

An overarching goal of our data analysis plan was to address the research questions in a

way that included data from all partners of a participant, not limiting it to only two partners. To

account for dependencies among partners of the same participant (since multiple relationships from the same participant are likely to have similarities), we conducted a series of linear mixed effects models with heterogeneous variance. Linear mixed effects models allow for both fixed and random effects and are appropriate for non-independent data arising from a multi-level structure like the one in this study (partners within participants.) The heterogeneous variance component allows for modeling within-participant variability, which in this study is the variation of outcome measures across multiple partners of the same participant. In research that only considers two partners, this variability would be measured by the difference in outcome measures between the two partners. Even though the present modeling approach appears to not have been used yet in CNM research, it has been used in other applications where it is desired to model both central tendency and within-subject variability in a multi-level setting (see, for example, Rast et al., 2012). To build the models to test Hypothesis 1 and Research Question 1, data was structured in a long format where each row represented one partner. Therefore the number of rows per participant equaled the number of partners they had.

To confirm the need for mixed effects models, we checked (via likelihood-ratio test) whether a random-intercept model was an improvement over a fixed-intercept one. Avoidance, anxiety, and relationship satisfaction varied across participants [avoidance $SD = 0.41$, $\chi^2(1) = 12.54$, $p = .0004$, $p_{adj} = .002$; anxiety SD = 0.77, $\chi^2(1) = 46.75$, $p < .0001$, $p_{adj} < .0001$; satisfaction $SD = 1.71$, $\chi^2(1) = 34.60$, $p < .0001$, $p_{adj} < .0001$], which confirmed the need for random intercept models. The models were constructed using the package nlme (Pinheiro 2018) in R.

We completed three analyses, one for each of the outcome variables (relationship satisfaction, attachment anxiety and attachment avoidance). Each of these analyses was

completed in two steps: In the first, we considered only hierarchy as an explanatory variable (so we can assess differences in hierarchical and non-hierarchical relationships); and in the second step, we checked that the results from step 1 held after taking into account the effects of control variables that are found to be significantly related to the outcome (i.e., decisions regarding control variables were made empirically rather than theoretically). This means that step 1 addresses the hypothesis without taking into account any control variable, and step 2 takes them into account to make sure that they are not confounding the results from step 1. Within this study, all p-values obtained from tests of significance were adjusted for multiple testing using the False Discovery Rate (FDR) method by Benjamini-Hochberg (1995).

Variability in Anxiety, Avoidance, and Relationship Satisfaction by Hierarchy Type (H1).

Table 3 displays means, standard deviations, and Spearman correlations for attachment avoidance, attachment anxiety, and relationship satisfaction by hierarchical status. To test whether the within-participant, between-partner variability in avoidance, anxiety, and relationship satisfaction differed by hierarchy type, we first compared (via likelihood ratio test) two linear mixed effects models for each outcome variable: one which assumed a homogeneous variance (the within-participant variances of the hierarchical and non-hierarchical groups were set to be equal) and one which assumed a heterogeneous variance (the within-participant variances of the hierarchical and non-hierarchical groups were set to be different). Both models were set to have a random intercept and no fixed effects.

In a second step, to check whether possible confounding variables should be controlled for, we compared a model with homogeneous variance with one that assumed heterogeneous variance according to the levels or values of the potential control variable. Variables that significantly explained within-participant variability were entered into the variance structure of

the model that included hierarchy type. For numerical control variables (CVs), we considered

heteroscedasticity in three ways: 1) the variance was proportional to the CV, 2) the variance was

a power of the CV, or 3) the variance was an exponential of the CV. The option, if any, that

improved the model the most was selected. We arrived at the final model for within-participant

variability through a process of backward elimination; that is, only variables that significantly

improved a model with fewer variables were left in the final model. The sample characteristics

described in Tables 1 and 2 were considered as potential control variables.

In the first step, hierarchy type was related to within-participant variability in avoidance,

anxiety, and satisfaction. The within-participant standard deviations (between partners) for

avoidance, anxiety, and relationship satisfaction were higher in the hierarchical group (see Table

4). However, after adjusting for multiple testing, the effect of relationship satisfaction on within-

participant variability was non-significant.

In the second step, after carrying out the model selection strategy for control variables,

relationship length [$\chi^2(1) = 22.49$, $p < .0001$, $p_{adj} < .0001$] and number of partners [$\chi^2(2) = 32.19$,

$p < .0001$, $p_{adj} < .0001$] significantly accounted for unexplained variability in the avoidance

variance model including hierarchy type. Specifically, variation in avoidance for participants

with more partners was higher than those with less partners, and longer relationships were

related to lower within-participant variability in avoidance. Cohabitation [$\chi^2(2) = 11.89$, $p =

.003$, $p_{adj} = .007$] was a significant control variable in the anxiety variance model; living together

was associated with lower within-participant variability in anxiety. Number of partners [$\chi^2(2) =

9.89$, $p = .007$, $p_{adj} = .02$] was also a significant control variable for satisfaction, with more

partners being associated with lower relationship satisfaction.

Overall, in the final models which included the control variables, the findings from step 1 held: the within-participant standard deviations for avoidance [$\chi2(1) = 11.05, p = .0009, p_{adj} = .003$], anxiety [$\chi2(1) = 12.44, p = .004, p_{adj} = .01$], and relationship satisfaction [$\chi2(1) = 4.65, p = .03, p_{adj} = .06$] were higher in the hierarchical group. However, after adjusting for multiple testing, the effect of relationship satisfaction was non-significant. Thus, Hypothesis 1, that there would be greater variability across partners in hierarchical structures compared to non-hierarchical structures, was supported for attachment anxiety and avoidance, but not for relationship satisfaction.

Avoidance, Anxiety, and Relationship Satisfaction by Hierarchy Type (RQ1)

To test whether avoidance, anxiety, and relationship satisfaction differed by hierarchy type, we again used a two-step process. In the first step, for each outcome variable, we compared an intercept-only model with one that had hierarchy type as a fixed effect. We used the variance structure (assumptions of heterogeneous variances) of the final models obtained in the previous analyses. In the second step, to check whether other variables should be controlled for, we compared an intercept-only model with one that had the potential control variable as a fixed effect. Variables that significantly explained the outcome measure were all entered into the model that included hierarchy type. We arrived at the final model for each outcome variable through backward elimination. Tables 5 and 6 have the summaries of these models.

In the first step, hierarchy type was related to avoidance [$\chi2(1) = 16.72, p < .0001, p_{adj} < .0001$], anxiety [$\chi2(1) = 13.55, p = .0002, p_{adj} = .001$], and relationship satisfaction [$\chi2(1) = 14.74, p = .0001, p_{adj} = .0006$]. Specifically, taking into account all relationships, avoidance and anxiety were lower, while satisfaction was higher, in the non-hierarchical group. In the second step, after model selection, relationship length significantly accounted for unexplained variability

in avoidance, anxiety, and satisfaction, while cohabitation significantly accounted for

unexplained variability in avoidance and anxiety. Specifically, longer relationships were

associated with lower avoidance and anxiety, and higher relationship satisfaction, while living

together was associated with lower avoidance and anxiety.

After controlling for relationship length and cohabitation, the findings from step 1 held:

participants in nonhierarchical structures had lower attachment avoidance and anxiety and higher

relationship satisfaction than those in hierarchical structures. Further, non-hierarchical

relationships had lower attachment avoidance and anxiety, and higher relationship satisfaction,

than secondary and tertiary hierarchical relationships, but showed no significant difference on

these variables from primary relationships.

Exploratory: Which predictor had the largest effect on the outcome variables?

As shown in Table 5, hierarchical status was the predictor with the largest (statistical)

effect on attachment anxiety and attachment avoidance, in a model with relationship length,

cohabitation status, and long-distance status (co-parenting status was eliminated from the model

because it did not help explain variance in attachment anxiety or avoidance beyond the predictors

already in the model). Similarly, as shown in Table 6, hierarchical status had a larger effect on

relationship satisfaction than relationship length, cohabitation status, long-distance status, or co-

parenting status. Hierarchical status contributed uniquely to the outcome variables, over and

beyond the relationship characteristics.

Differences in Primary and Secondary Relationships (H2)

Of the 97 participants in hierarchical relationships, 83 labeled at least one partner as

primary and at least one as secondary, 3 had only secondary and tertiary partners (no primary)

and 11 had only primary and tertiary partners (no secondary). The 83 participants who labeled at

least one partner as primary and at least one as secondary were included in this analysis. These participants had a total of 88 partners labeled as primary and 100 labeled secondary (some participants had multiple primary partners and/or multiple secondary partners). Table 3 displays means and standard deviations for attachment avoidance, attachment anxiety, and relationship satisfaction for primary and secondary partners. Considering the hierarchical group only, we recorded the difference between a participant's primary and secondary partners for avoidance, anxiety, and satisfaction. The difference between primary and secondary partners were used as the outcome variables in this analysis. If a participant reported more than one primary or secondary partner, differences between all the primary and secondary relationships were considered. For this analysis, the data was organized in a long format where each row represented a pair of primary and secondary relationships from a participant. Since some participants reported having more than one primary and/or secondary partner, sometimes participants had more than one row. For example, for a participant with one primary partner and two secondary partners, we looked at the differences "primary minus secondary1" and "primary minus secondary2". That is, this participant had two rows in the long-format data for this analysis. For each outcome variable, to account for the nonindependence of this data, we used a linear mixed effects model with a random intercept and no fixed effects to test whether the differences are significantly nonzero. Like in the previous analysis, for each potential control variable, we ran linear mixed effects models with a random intercept and the potential control variable as a fixed effect. Variables that significantly explained the differences between primary and secondary partners were all entered into the model that included hierarchy type, and final control variables were selected through backward elimination.

No potential control variables were found to be associated with differences in avoidance, anxiety, or relationship satisfaction. The estimated differences in avoidance, anxiety, and satisfaction, between primary and secondary partners, was significantly nonzero (avoidance: intercept = -1.01, SE = 0.13, $t(83)$ = -8.07, $p < .0001$; anxiety: intercept = -0.97, SE = 0.17, $t(83)$ = -5.64, $p < .0001$; satisfaction: intercept = 2.35, SE = 0.43, $t(83)$ = 5.43, $p < .0001$). In particular, primary partners had lower avoidance and anxiety, as well as higher relationship satisfaction, than secondary partners. Thus, hypothesis 2 was supported.

Discussion

Overall, taking into account all of their partners, participants in nonhierarchical structures had lower attachment anxiety and avoidance as well as higher relationship satisfaction compared to those in hierarchical structures. These differences were driven by the differences between non-hierarchical and hierarchical non-primary relationships on these variables (no difference was found between non-hierarchical and hierarchical primary partners). As expected, individuals in hierarchical structures had greater variability across their partners, with hierarchical participants reporting larger differences in attachment anxiety and avoidance between their partners than non-hierarchical participants (an equivalent finding for relationship satisfaction was weaker and disappeared when adjusting for multiple testing). Also as expected, hierarchical participants reported significantly lower attachment anxiety and avoidance as well as significantly higher relationship satisfaction with primary partners than secondary partners. Finally, hierarchy status had the strongest effect on attachment anxiety, attachment avoidance and relationship satisfaction and explained unique variance in these outcomes over and above that explained by relationship length, cohabitation status, and co-parenting status.

Study 2

In Study 2, we sought to replicate the findings of Study 1 in a second sample that had been collected independently to analyze a separate set of research questions. Specifically, the present Study 2 is a new analysis of the data in XXXX and colleagues (201x). Because the Study 2 did not gather information on ranking of "non-primary partners", we were unable to replicate the analysis for the third hypothesis from Study 1. Thus, the present study only focuses on the first hypothesis and research question. We briefly describe the methods below; see XXXX and colleagues (201x) for further detail.

Method

Participants

Participants were recruited from online social networking groups, listservs, and websites related to CNM. Individuals who agreed to participate were asked to choose the best description of their relationship from the following options: open relationships/marriage, swinging or 'in the lifestyle,' polyamory, monogamy or other (open-ended response). Only participants who identified as polyamorous and who responded to the variables of interest for this study were included in this sample.

Of the original sample of 589 participants, 360 participants satisfied the sample selection criteria. Of the 360 participants, 239 (66%) were in a hierarchical relationship and 121 (34%) were in a non-hierarchical relationship. The 360 participants were in a total of 1026 relationships, of which 712 were hierarchical and 314 were non-hierarchical. Of the 712 hierarchical relationships, 285 (40%) were labeled as primary and 427 (60%) were labeled as non-primary. Of the 121 participants in non-hierarchical relationships, 59 described all their partners as primary and 62 described all their partners as non-primary. Table 1 displays

relationship length (no other relationship characteristics were collected) and Table 2 displays the participants' characteristics.

Comparison to Study 1 sample. Although the samples for both studies were recruited in a similar manner, participants in Study 2 were significantly older and the non-primary relationships were significantly longer than Study 1's sample. Participants in Study 1 were also significantly more likely to have more than three partners than the Study 2 sample. Finally, the Study 2 sample had a significantly higher percentage of participants in hierarchical relationships (66%) than in the first sample (43%). This may be due to differences in how this variable was measured (see below). However, among hierarchical participants, the percent of primary versus non-primary partners is identical to study 1 and there were no differences between the overall sample compositions in terms of gender, race or sexual orientation.

Procedure and Measures

Participants completed the study online. To avoid confusion when answering questions about multiple partners, participants were asked to provide the initials of each partner and items were personalized with the initials of each partner (e.g., it helps to turn to [partner one's initials] in time of need). Participants were asked to complete the following measures for each of their current partners (up to 8).

Hierarchy/non-hierarchy status. The present study used a different approach to categorize people engaged in polyamory as hierarchical or non-hierarchal than Study 1. Specifically, the first study provided an option for the participant to state that they did not believe in hierarchy, but in the second study, participants were simply given the option to report whether their partner was primary or non-primary. Participants who reported all their partners were primary, or that all their partners were non-primary were identified as non-hierarchical.

Those who identified at least one primary partner and at least one non-primary partner were identified as hierarchical.

Attachment security. The Experiences in Close Relationships Inventory short version (12 items; ECR-S; Wei et al., 2007) assessed attachment anxiety and avoidance with each partner. Both the ECR-S and the ECR-RS (used in the first study) are shortened versions of the ECR but have relatively few items in common. Scores range from 1 to 7, with higher scores reflecting higher levels of anxiety and avoidance. The Cronbach's alpha for these scales in the current sample is .84 for attachment avoidance (.85 for hierarchical relationships and .82 for non-hierarchical relationships; .86 for primary relationships and .77 for non-primary relationships) and .78 for attachment anxiety (.76 for hierarchical relationships and .81 for non-hierarchical relationships; .74 for primary relationships and .79 for non-primary relationships).

Relationship Satisfaction. The 16-item Couples Satisfaction Index Short Form was used to assess relationship satisfaction with each partner. This scale has complete overlap with the CSI-4 (used in the first study) with 12 additional items. For these analyses, we recoded the relationship satisfaction variable (CSI-16) to be consistent with the measure used in the first study (CSI-4). Because all the items were rated on a 7-point scale for this study, scores ranged from 0-24 (rather than 0-21 in Study 1), with higher scores indicating greater satisfaction. The Cronbach's alpha for this recoded variable was .92 (.91 for hierarchical relationships and .94 for non-hierarchical relationships; .91 for primary relationships and .89 for non-primary relationships).

<div align="center">

Results

</div>

Data Analyses

We used linear mixed effects models and followed the same data analysis strategy as in Study 1 to address the research questions. Like in Study 1, a random-intercept model was an improvement over a fixed-intercept one [avoidance $SD = 0.42$, $\chi^2(1) = 19.69$, $p < .0001$, $p_{adj} <$ .0001; anxiety $SD = 0.72$, $\chi^2(1) = 119.41$, $p < .0001$, $p_{adj} < .0001$; satisfaction $SD = 1.59$, $\chi^2(1) =$ 16.18, $p = .0001$, $p_{adj} = .0003$], confirming the need for random intercept models. As in Study 1, all p-values obtained from tests of significance in Study 2 were adjusted for multiple testing using the False Discovery Rate (FDR) method by Benjamini-Hochberg (1995).

Variability in Anxiety, Avoidance, and Relationship Satisfaction by Hierarchy Type (H1)

In the first step, hierarchy type was related to within-participant variability in attachment avoidance, but not in anxiety or relationship satisfaction. The within-participant standard deviation for avoidance was higher in the hierarchical group (see Table 4). In the second step, after carrying out the model selection strategy for control variables, no variables accounted for additional unexplained variability in within-participant variance. Therefore, these findings replicate the findings of Study 1 for attachment avoidance and relationship satisfaction, but not for attachment anxiety.

Avoidance, Anxiety, and Relationship Satisfaction by Hierarchy Type (RQ1)

Table 3 displays the means, standard deviations, and Spearman correlations for attachment avoidance, attachment anxiety, and relationship satisfaction by hierarchical status. The models are summarized in Table 7 for attachment avoidance and relationship satisfaction and Table 8 for attachment anxiety. In the first step, there was no evidence that hierarchy type was related to avoidance, anxiety, or relationship satisfaction. In the second step, relationship length significantly accounted for unexplained variability in avoidance [$\chi^2(1) = 89.85$, $p < .0001$, $p_{adj} < .0001$], anxiety [$\chi^2(1) = 24.22$, $p < .0001$, $p_{adj} < .0001$], and satisfaction [$\chi^2(1) = 16.78$, $p <$

.0001, p_{adj} = .0003]; and number of partners significantly accounted for unexplained variability in avoidance [$\chi^2(1)$ = 9.78, p = .008, p_{adj} = .02]. Specifically, longer relationships were associated with lower avoidance and anxiety, and higher relationship satisfaction, and a higher number of partners was associated with higher avoidance.

There was a significant interaction between relationship length and attachment avoidance [$\chi^2(1)$ = 9.26, p = .002, p_{adj} = .006], as well as relationship satisfaction [$\chi^2(1)$ = 7.32, p = .007, p_{adj} = .02]. To further investigate the interaction and help us better understand the differences between this study's findings and those of Study 1, we looked at two subsets separately: those with relationship lengths that were less than or equal to five years, and those with lengths over five years. The choice of five years was based on looking at graphs of the outcome measures vs relationship length. For relationship lengths of five years or less, avoidance was higher [$\chi^2(1)$ = 6.14, p = .01, p_{adj} = .04] while satisfaction was lower [$\chi^2(1)$ = 5.43, p = .02, p_{adj} = .05] in the hierarchical group compared to the non-hierarchical one; for relationship lengths that were greater than five years, there was not strong evidence of a difference between hierarchical and non-hierarchical groups. Therefore, these results replicate the findings of Study 1 for attachment avoidance and relationship satisfaction, but only for relationships of five years or less. Study 1 findings regarding attachment anxiety were not replicated.

Discussion

Overall, in Study 2, as in Study 1, there was significantly larger variability in attachment avoidance across partners of hierarchical compared to non-hierarchical participants. Also as in Study 1, there were no significant differences in the variability of relationship satisfaction across partners of hierarchical and non-hierarchical participants. However, contrary to Study 1, there were no significant differences in the variability of attachment anxiety across partners of hierarchical and non-hierarchical participants.

In addition, for partners of five years or less, hierarchical participants reported greater attachment avoidance and lower relationship satisfaction than non-hierarchical participants (replicating the results of Study 1). However, for partnerships longer than five years, no differences in avoidance or satisfaction were found between hierarchical and non-hierarchical participants. This latter finding is inconsistent with the findings of the first study; however, it should be noted that the average relationship of the first study was less than five years. No differences were found in attachment anxiety between hierarchical and non-hierarchical participants, which is also inconsistent with the findings of Study 1.

General Discussion

The present studies are among the first to examine relationship satisfaction and attachment among people engaged in polyamory with different approaches to how they hierarchically or non-hierarchically organize their relationships. We had three main goals. We sought to understand whether hierarchical and non-hierarchical polyamorous practices differed in relation to overall relationship quality indices such as relationship satisfaction and attachment anxiety and avoidance. We also wanted to see whether hierarchical and non-hierarchical polyamorous practices differed in relation to variability in these indices across individuals' multiple partners. In other words, were levels of attachment security more similar across non-hierarchical participants' multiple partners than across hierarchical participants' multiple partners? Finally, we sought to replicate previous findings of differences in these indices across primary and secondary partners in hierarchical relationship configurations. To extend previous research in the area of consensual non-monogamy, we employed the use of statistical methods that would allow the inclusion of all partners in analyses (as opposed to only two partners per

participant in previous studies) and used participants' own designations of primary, secondary, and non-hierarchical partners.

Although findings differed somewhat across the two samples, several patterns emerged. On average, taking into account all of their relationships, individuals in hierarchical polyamorous configurations reported greater attachment avoidance and lower relationship satisfaction than those in non-hierarchical configurations. We feel particularly confident about these findings for relationships of five years or less, as these findings were replicated across both studies. Furthermore, although avoidance was higher in general in hierarchical relationships, there was also greater variability in avoidance across partners in hierarchical configurations than in non-hierarchical configurations. This was not the case for relationship satisfaction, where variability across partners was not significantly different between people engaged in hierarchical and non-hierarchical polyamorous relationships. A less clear picture emerged regarding attachment anxiety across the two studies: although anxiety was higher, and variability between partners greater, among hierarchical participants in the first study, no differences were found in anxiety between hierarchical and non-hierarchical participants in the second study.

Finally, consistent with previous findings (Balzarini et al., 2017; Balzarini et al., 2019a; Conley et al., 2017; Mitchell et al., 2014), hierarchical participants reported greater relationship satisfaction with their primary, compared to their secondary, partners. We extended this research by also finding that hierarchical participants reported lower attachment avoidance and anxiety with their primary, compared to their secondary, partners.

Comparisons of Hierarchical and Nonhierarchical Relationship Structures

Variability across partners. As expected, there was greater variability in attachment security across partners for individuals in hierarchical polyamorous structures than individuals in

non-hierarchical structures. Given that primary relationships are explicitly prioritized over other relationships, it is not surprising that there were greater differences between primary and non-primary partners (particularly for attachment avoidance) than between multiple partners in non-hierarchical configurations. Primary partners often benefit from higher levels of commitment, greater investment of resources (including time and money), and are sometimes accorded veto power over decisions made in non-primary relationships (Balzarini et al., 2019a). It may be that these and other conditions (often referred to as couple privilege; Dagger, 2018) inhibit the formation of secure attachment bonds with non-primary partners. Although previous research has shown that non-hierarchical relationships also often differ in investment levels between partners (Balzarini et al., 2019a), these differences may occur organically [what Dagger (2018) refers to as *descriptive hierarchies*] rather than intentionally [what Dagger (2018) refers to as *prescriptive hierarchies*] and may, therefore, have less of an effect on attachment security.

Overall levels of relationship satisfaction and attachment security. Taking into account all partners, individuals in non-hierarchical partnerships reported greater relationship satisfaction and lower attachment avoidance (in Study 1 and 2) and anxiety (in Study 1 only). A more nuanced picture emerged when we compared non-hierarchical partners to primary and non-primary (i.e., secondary and tertiary) partners. The relationship quality of partners in non-hierarchical structures was not significantly different from the relationship quality of primary partners. But people engaged in polyamory were significantly more satisfied and more secure with non-hierarchical partners than with secondary and tertiary partners. This suggests that the driving force behind the differences between hierarchical and non-hierarchical relationships found in our study may be the lower relationship satisfaction and attachment security of non-primary (secondary and tertiary) partners. Given that relationship satisfaction with a primary

partner does not appear to change after opening up a relationship (Murphy, Joel, & Muise, 2020),

these findings undermine the conventional stereotype that couples become consensually non-

monogamous because their primary partnership is unrewarding or unfulfilling (Conley, Moors,

Matsick, & Ziegler, 2013).

In terms of attachment and polyamorous relationships, Moors and colleagues (2019)

previously found that individuals had differing levels of attachment security across their multiple

partners. The present studies extend this research to demonstrate that variability in attachment

security across partners is greater for individuals in hierarchical than in non-hierarchical

polyamorous relationship structures. In a recent article, Fraley (2019) poses an important area of

future research to deepen our understanding of attachment theory: to what extent does the

development of new attachments depend on the weakening or displacement of existing

attachments? Moors and colleagues (2019) provide some evidence to contradict the idea that the

development of new attachment relationships weakens other attachment relationships, and the

current findings support that conclusion. However, these findings also suggest that, under certain

conditions, *existing* attachments can undermine the development of *new* attachment

relationships, namely when those new relationships are considered secondary (or tertiary) to the

pre-existing relationship. On the other hand, when multiple relationships develop more

organically, without one explicitly prioritized over others, attachment security appears neither to

be limited by the presence of pre-existing relationships nor jeopardized by the development of

the new attachment bond.

Furthermore, Fraley (2019) postulates that one's choice to engage in a particular from of

CNM may reflect underlying attachment motivations (e.g., differing levels of avoidance). This

does not appear to be entirely the case in terms of engagement in hierarchical vs non-hierarchical

relationship structures: hierarchical individuals had similar levels of attachment security in their primary relationships as non-hierarchical individuals had in their relationships. Their greater attachment insecurity was limited to their non-primary relationships. This evidence supports a growing body of research that finds attachment security varies within-individuals and that relationship-specific cues activate different working models of attachment (e.g., LaGuardia et al., 2000). For polyamorous individuals, one of these cues may be the relationship's placement in the hierarchy (or lack thereof).

Importantly, findings from Study 2 suggest that differences in relationship quality between hierarchical and nonhierarchical configurations may attenuate over time. This finding is worthy of closer examination and would be particularly well-suited to a longitudinal design. Several possible explanations for this finding exist. Over time, differences between primary and non-primary relationships may decrease (e.g., investment levels may become more equitable) or, alternatively, individuals may increasingly adapt to the differences between relationships. Furthermore, research suggests that, looking at (presumably monogamous) marriages, relationship satisfaction *decreases* over time while stability *increases* (possibly due to increasing investment in the relationships over time; Karney & Bradbury, 1995). It is possible that changes in satisfaction over time may have different trajectories for primary and non-primary partners, with non-primary partners declining less. It is also possible, given the typically lower level of investment in non-primary relationships, that commitment, and therefore stability, is weaker in these relationships (Balzarini et al., 2017). Thus, over time, less satisfying non-primary relationships may be weeded out through relationship dissolution and those non-primary relationships that endure may be particularly satisfying. Consequently, relationship satisfaction may become more similar between primary and non-primary relationships as relationship length

increases. In contrast, attachment security has been shown to *increase* with relationship length (Davila, Karney, & Bradbury, 1999). However, at some point, diminishing returns are likely expected. Thus, at a certain relationship length, attachment security may become more similar between primary and non-primary partners. Given that this attenuation of differences was found only in Study 2 (and not in Study 1, which averaged significantly shorter non-primary relationships), our confidence in these findings remains reserved until they are replicated.

These findings are consistent with the findings of the only other study that has compared hierarchical to non-hierarchical relationships. Balzarini and colleagues (2019a) also found that differences in relationship satisfaction between non-hierarchical partners was smaller than between primary-secondary partners. They found that, although investment of tangible resources, perceptions of stigma, and proportion of time spent in sexual activity may differ across co-primary partners, participants reported relatively equal levels of satisfaction across these partners. Findings were less clear when both partners were designated non-primary.

Comparisons of Primary and Secondary Relationships

Consistent with previous studies, we found significantly greater relationship satisfaction (Balzarini et al., 2017; Balzarini et al., 2019a; Conley et al., 2017; Mitchell et al., 2014) and attachment security in primary compared to secondary relationships. Findings of greater attachment security with primary partners is consistent with findings of greater closeness, emotional support and security, as well as higher levels of nurturance in primary, compared to secondary, relationships (Balzarini, Dharma, Muise, & Kohut, 2019b; Mitchell et al., 2014). Primary partners often have greater power (e.g., veto power) in their relationships, higher levels of commitment, greater investment of time and resources, as well as greater acceptance by friends and family and lower levels of secrecy than secondary and tertiary partners (Balzarini

2017, 2019a). It seems likely that these factors create conditions that foster greater relationship satisfaction and attachment security (or vice versa), but this is a topic that would benefit from further investigation. What also remains unclear is how individuals in hierarchical relationship structures might view these results: are the significant differences in relationship quality between their partners consistent with their goals for these partnerships?

How Well Do Factors like Relationship Length and Cohabitation Status Serve as Proxies for Hierarchical Status?

Hierarchical status was a stronger predictor of relationship satisfaction and attachment security than any of the relationship characteristics, including relationship length, co-habitation status, and co-parenting status. Even when the relationship characteristics were added to the model, hierarchical status contributed uniquely to the outcome variables. These findings shed light on the choice to use these variables as proxies for hierarchical labels. More specifically, if one was to construct some notion of hierarchy only using variables such as relationship length, cohabitation, or co-parenting status to explain attachment and relationship satisfaction, our model shows there would still be significant aspects of the outcomes that would remain unexplained. Including a self-designation of hierarchical status adds the strongest contribution to such a model. This suggests the importance of including self-designations of hierarchical status as a variable when examining relationship quality among individuals engaged in polyamory.

Possible Methodological Explanations for Inconsistencies in Findings

Several differences between the samples and methods used in Study 1 and Study 2 may help to explain the inconsistencies in their findings. Perhaps most importantly, the definitions of hierarchy differed between the studies. In the first study, participants had the option to explicitly state that they do not believe in relationship hierarchy whereas, in the second study, hierarchy

status had to be inferred based on whether all partners of a participant were marked as primary or all were marked as non-primary (non-hierarchical) or if at least one partner was marked as primary and another partner was marked as non-primary (hierarchical). Perhaps as a result of this difference in measurement and operationalization, the Study 2 sample had a significantly higher percentage of participants in hierarchical relationships than in the first sample. Thus the difference in findings across the studies may be an artifact of differences in how hierarchy was defined across the two studies. Additionally, non-primary relationships in Study 2 were significantly longer than those in Study 1. If differences between primary and non-primary relationships attenuate over time (as suggested by the data), this may explain why the significant differences found in attachment avoidance and relationship satisfaction between hierarchical and nonhierarchical relationships in Study 1 was only found for relationships of five years or less in Study 2. Finally, attachment security was assessed using different measures across the two studies. Significant differences were found in avoidance (for non-hierarchical relationships) and anxiety (for both non-hierarchical and primary relationships) between the samples, suggesting that the distinct ways of measuring attachment may also have contributed to the inconsistent findings between the studies.

Limitations and Future Directions

Several limitations of this study should be noted. Similar to most studies in this field, participants were identified through targeted recruitment and are likely unrepresentative of the broader population of people engaged in polyamory. Other concerns regarding the representativeness of the sample include the preponderance of White participants as well as the greater representation of women in the samples. Furthermore, these studies, also like most studies in this field, were cross-sectional and tell us little about how relationship satisfaction,

attachment security, and other measures of relationship quality may change over time in response to the addition and removal of relationships from one's polycule (network of partners). Our findings provide tentative evidence that relationship length is an important factor to consider when comparing relationship quality across multiple partners. Longitudinal studies focused on understanding how relationship dynamics unfold over time among people engaged in polyamory would do much to improve our understanding of CNM relationships.

In addition to the current study, several studies have produced consistent findings of greater relationship quality in primary compared to secondary relationships (Balzarini et al., 2017; Balzarini et al., 2019a; Conley et al., 2017; Mitchell et al., 2014). What is needed now is a better understanding of why these differences exist. Future research that examines which specific practices involved in the delineation of primary over secondary partners relate to greater attachment security with primary partners would be fruitful. The history of the primary relationship may be particularly telling in this regard: Do primary relationships that begin as monogamous differ from those that do not? Do primary relationships that predate other intimate relationships differ from primary relationships that do not? Additionally, future research should assess whether lower attachment security and relationship satisfaction are consistent with the goals of the individuals in these relationships (including the target individual, the non-primary partner(s), and the primary partner(s).

Finally, given links between attachment and other interpersonal processes, future researchers should consider how hierarchical status may affect other dimensions of relational functioning. For instance, interdependence theory (Kelley & Thibaut, 1978) and the Investment Model of Commitment (Rusbult, 1980) utilize a framework of costs and benefits in relationships. Although originally developed for application to monogamous relationships, polyamory provides

a unique context in which to further our understanding of these models. Future research should examine how costs and benefits, comparison of alternatives, and investments may differ in polyamorous, compared to monogamous, relationships (see Conley et al., 2017 for further discussion), with a particular focus on differences in hierarchical and non-hierarchical forms of polyamory.

In sum, participants in non-hierarchical relationships reported greater relationship satisfaction and attachment security than participants in hierarchical relationships. While no differences were found between non-hierarchical partners and primary partners on these indices, participants reported lower satisfaction and less attachment security with secondary and tertiary partners than with non-hierarchical partners. This study demonstrates the importance of considering relationship structure when examining relationship quality among polyamorous individuals. We hope that this study will be the first of many to examine, or at least account for, relationship configurations such as hierarchy in studies of polyamorous relationships.

References

Balzarini R. N., Campbell L., Kohut T., Holmes B. M., Lehmiller J. J., Harman J. J., & Atkins, N. (2017). Perceptions of primary and secondary relationships in polyamory. *PLoS ONE 12*(5):e0177841. https://doi.org/10.1371/journal.pone.0177841

Balzarini, R. N., Dharma, C., Kohut, T., Campbell, L., Lehmiller, J. J., Harman, J. J., & Holmes, B. M. (2019a). Comparing relationship quality across different types of romantic partners in polyamorous and monogamous relationships. *Archives of Sexual Behavior*. https://doi.org/10.1007/s10508-019-1416-7

Balzarini, R. N., Dharma, C., Muise, A., & Kohut, T. (2019b). Eroticism versus nurturance: How eroticism and nurturance differs in polyamorous and monogamous relationships. *Social Psychology, 50*(3), 185–200. https://doi.org/10.1027/1864-9335/a000378 (Supplemental)

Benjamini, Y., & Hochberg, Y. (1995). Controlling the False Discovery Rate: A Practical and Powerful Approach to Multiple Testing. *Journal of the Royal Statistical Society: Series B (Methodological), 57*(1), 289-300.

Bowlby, J. (1969). *Attachment and loss, Vol. 1: Attachment*. New York: Basic Books.

Brennan, K. A., Clark, C. L., & Shaver, P. R. (1998). Self-report measurement of adult attachment: An integrative overview. In J. A. Simpson & W. S. Rholes (Eds.), *Attachment theory and close relationships.* (pp. 46–76). New York, NY: Guilford Press. Retrieved from https://search-ebscohost-com.proxy.lib.csus.edu/login.aspx?direct=true&db=psyh&AN=1997-36873-002

Conley, T. D., Matsick, J., Moors, A. C., & Ziegler, A. (2017). Investigation of consensually nonmonogamous relationships: Theories, methods, and new directions. *Perspectives on Psychological Science, 12,* 205–232. https://doi.org/10.1177/1745691616667925

Dagger, C. (2018, May). What is Couple Privilege? *Polyamory For Us.*

http://polyfor.us/couple-privilege/

Davila, J., Karney, B. R., & Bradbury, T. N. (1999). Attachment change processes in the

early years of marriage. *Journal of Personality and Social Psychology,* 76, 783-802.

https://doi.org/10.1037/0022-3514.76.5.783

Fraley, R. C. (2019). Attachment in adulthood: Recent developments, emerging debates, and

future directions. *Annual Review of Psychology, 70,* 401-422.

https://doi.org/10.1146/annurev-psych-010418-102813

Fraley, R. C., Heffernan, M. E., Vicary, A. M., & Brumbaugh, C. C. (2011). The experiences in

close relationships—Relationship Structures Questionnaire: A method for assessing

attachment orientations across relationships. *Psychological Assessment*, *23*(3), 615–625.

https://doi.org/10.1037/a0022898

Funk, J. L., & Rogge, R. D. (2007). Testing the ruler with item response theory: Increasing

precision of measurement for relationship satisfaction with the Couples Satisfaction

Index. *Journal of Family Psychology*, *21*(4), 572–583. https://doi.org/10.1037/0893-

3200.21.4.572

Hazan, C., & Shaver, P. (1987). Romantic love conceptualized as an attachment process. *Journal

of Personality and Social Psychology, 52*(3), 511–524. https://doi.org/10.1037/0022-

3514.52.3.511

Jamnik, Matthew R., & Lane, David J. (2017). The Use of Reddit as an Inexpensive Source for

High-Quality Data. *Practical Assessment, Research & Evaluation*, *22*(5). Available

online: http://pareonline.net/getvn.asp?v=22&n=5

Kale (2016). The Difference between Relationship Anarchy and Non-Hierarchical Polyamory.

Retrieved June 21, 2019 from http://www.relationship-anarchy.com/videos/2016/6/20/the-difference-between-relationship-anarchy-and-non-hierarchical-polyamory

Karney, B. R., Bradbury, T. N. (1995). The longitudinal course of marital quality and stability: A review of theory, methods, and research. *Psychological Bulletin, 118,* 3–34. doi:10.1037/0033-2909.118.1.3

Klesse, C. (2006). Polyamory and its 'Others': Contesting the Terms of Non-Monogamy. *Sexualities, 9*(5), 565–583. https://doi.org/10.1177/1363460706069986

Labriola, K. (2003). *Models of open relationships*. Retrieved April 15, 2018, from http://www.cat-and-dragon.com/stef/poly/Labriola/open.html.

La Guardia, ,J.G., Ryan, R. M., Couchman, C. E., & Deci, E. L. (2000). Within-person variation in security of attachment: A self-determination theory perspective on attachment, need fulfillment, and well-being. *Journal of Personality and Social Psychology, 79*(3), 367-384. https://doi.org/10.1037//0022-3514.79.3.367

Mitchell, M. E., Bartholomew, K., & Cobb, R. J. (2014). Need fulfillment in polyamorous relationships. *Journal of Sex Research, 51*(3), 329–339. https://doi.org/10.1080/00224499.2012.742998

Moors, A. C. (2017). Has the American public's interest in information related to relationships beyond "the couple" increased over time? *Journal of Sex Research*, *54*(6), 677–684. https://doi.org/10.1080/00224499.2016.1178208

Moors, A. C., Conley, T. D., Edelstein, R. S., & Chopik, W. J. (2015). Attached to monogamy?

Avoidance predicts willingness to engage (but not actual engagement) in consensual non-

monogamy. *Journal of Social and Personal Relationships*, *32*(2), 222–240.

https://doi.org/10.1177/0265407514529065

Moors, A., C., Ryan, W., & Chopik, W. J. (2019). Multiple loves: The effects of attachment with

multiple concurrent romantic partners on relational functioning. P*ersonality and

Individual Differences,* 147, 102-110.

Murphy, A. P., Joel, S., & Muise, A. (2020). A Prospective Investigation of the Decision to Open

Up a Romantic Relationship. *Social Psychological and Personality Science.*

https://doi.org/10.1177/1948550619897157

Pinheiro, J., Bates, D., DebRoy, S., Sarkar, D., & R Core Team (2018). Nlme: Linear and

Nonlinear Mixed Effects Models, R package version 3.1-137. https://CRAN.R-project.or

g/package=nlme

Wei, M., Russell, D. W., Mallinckrodt, B., & Vogel, D. L. (2007). The experiences in close

relationship scale (ECR)-short form: Reliability, validity, and factor structure. *Journal of

Personality Assessment, 88*(2), 187-204. https://doi.org/10.1080/00223890701268041

Table 1

Relationship Characteristics in Studies 1 and 2

Relationship characteristic	Non-hierarchical	Hierarchical		
		All Partners	Primary	Non-primary
Study 1 relationship length (years)	3.70 (5.12) *Mdn* = 1.64	4.67 (6.38) *Mdn* = 1.31	9.05 (7.29)*** *Mdn* = 8.29	1.65 (3.15)*** *Mdn* = 0.70
Study 2 relationship length (years)	4.61 (6.15) *Mdn* = 2	5.57 (7.12) *Mdn* = 2.17	9.46 (8.29)*** *Mdn* = 7.00	2.94 (4.60)*** *Mdn* = 1.08
Marital status (study 1)				
Married	47 (15%)*	57 (23%)*	53(52%)***	4 (3%)***
Not married	266 (85%)*	194 (77%)*	48 (48%)***	146 (97%)***
Cohabitation (study 1)				
Living together	114 (36%)	88 (35%)	77 (76%)***	11 (7%)***
Living separate, local	144 (46%)	126 (50%)	17 (17%)***	109 (73%)***
Long distance	55 (18%)	37 (15%)	7 (7%)***	30 (20%)***
Co-parenting (study 1)				
Co-parent	31 (10%)*	33 (13%)*	30 (30%)***	3 (2%)***
Not a co-parent	252 (80%)*	178 (71%)*	64 (63%)***	114 (76%)***
Partner is a parent, but no co-parenting role	30 (10%)*	40 (16%)*	7 (7%)***	33 (22%)***

Note. Entries show *M*(*SD*) or Count(proportion). The 'All Partners' column under hierarchical relationships represents all partners from hierarchical participants. Differences in sample characteristics between hierarchical and non-hierarchical groups, as well as primary and non-

primary relationships in hierarchical groups, were tested via t-tests (for numerical variables) and Fisher's exact test (for categorical variables). Random intercept models were considered but showed no significant variance in intercepts across participants. For Study 1, non-hierarchical participants had a total of 313 (55%) relationships and hierarchical participants had 251 (45%) relationships. Of hierarchical participants in Study 1, there were 101 primary partners (40%) and 150 non-primary partners (60%). In Study 2, non-hierarchical participants had a total of 314 (31%) relationships and hierarchical participants had 712 (69%) relationships. Of hierarchical participants in Study 2, there were 285 primary partners (40%) and 427 non-primary partners (60%). Some entries may have slightly different n due to participant non-response. P-values were adjusted for multiple testing using the BH/FDR method. Asterisks indicate within-row differences.

* $p<0.05$, ** $p<0.01$, ***$p<0.001$.

Table 2

Participant Characteristics in Study 1 and Study 2

	Study 1		Study 2	
Participant characteristic	Non-hierarchical	Hierarchical	Non-hierarchical	Hierarchical
	n=128 (57%)	*n* = 97 (43%)	*n* =121 (34%)	*n* =239 (66%)
Age (years)	30.66 (6.14)*	33.67 (8.82)*	36.19(10.89)	34.54(10.32)
	Mdn = 30	*Mdn* = 32	*Mdn* = 34	*Mdn* = 33
Income per people in	36678 (29918)	45493 (27409)	NA	NA
household (USD/year)	*Mdn* = 27500	*Mdn* = 39250	NA	NA
Race				
African American / Black	2 (1.8%)	0 (0%)	1 (0.4%)	2 (1.7%)
Asian / Pacific Islander	4 (3.7%)	2 (2.6%)	1 (0.4%)	0 (0%)
European / White	90 (82.6%)	68 (88.3%)	205 (89.1%)	100 (85.5%)
Hispanic / Latinx	3 (2.8%)	1 (1.3%)	2 (0.9%)	2 (1.7%)
Native American	3 (2.8%)	0 (0%)	1 (0.4%)	0 (0%)
Multi-racial	8 (7.3%)	6 (7.8%)	11 (4.8%)	7 (6.0%)

Other / Prefer not to answer	1 (0.9%)	1 (1.3%)	9 (3.9%)	6 (5.1%)
Gender				
Woman	67 (61%)	57 (74%)	143 (62%)	75 (64%)
Man	30 (28%)	15 (19%)	72 (31%)	32 (27%)
Non-binary	12 (11%)	5 (7%)	15 (7%)	10 (9%)
Transgender				
Yes	12 (11%)	3 (4%)	NA	NA
No	96 (89%)	73 (96%)	NA	NA
Sexual orientation	32 (29 %)	26 (34%)		
Heterosexual	4 (3.7%)	1 (1.3%)	72 (31%)	36 (31%)
Heteroflexible	22 (20%)	27 (36%)	NA	NA
Bisexual	25 (23%)4	12 (16%)	113 (49%)	47 (40%)
Pansexual	(3.7%)	2 (2.6%)	5 (2%)	6 (5%)
Gay/Lesbian	20 (18%)	7 (9.2%)	38 (17%)	27 (23%)
Queer	2 (1.8%)	1 (1.3%)	NA	NA
Asexual	NA	NA	NA	NA

Other			2 (1%)	1 (1%)
Children				
Has children	23 (21%)	25 (32%)	NA	NA
Doesn't have children	86 (79%)	52 (68%)	NA	NA
Number of partners				
Two	91 (71%)	54 (56%)	111 (46%)	78 (64%)
Three	25 (20%)	34 (35%)	64 (27%)	24 (20%)
More than three	12 (9%)	9 (9%)	64 (27%)	19 (16%)
Education				
12th grade or lower	3 (2.8%)	3 (3.9%)	NA	NA
Some university or BS	82 (77%)	46 (61%)	NA	NA
Graduate school	22 (21%)	27 (36%)	NA	NA

Note. Entries show M(SD) or Count(proportion). Differences in sample characteristics between hierarchical and non-hierarchical groups were tested via t-tests (for numerical variables) and Fisher's exact test (for categorical variables). Significances are adjusted for multiple testing (FDR).

* $p < 0.05$.

Table 3

Means, Standard Deviations, and Spearman Correlations for Attachment Avoidance, Anxiety, and Relationship Satisfaction in Study 1 and Study 2

		Study 1						
Measure	Non-hierarchical	Hierarchical						
		All	Primary	Non-primary				
				All	Secondary	Tertiary/other	1	2
1. Avoidance (1-7)	1.90 (0.97)**	2.41 (1.18)	1.66 (0.79)	2.91 (1.13)	2.72 (1.02)	3.34 (1.255)		
2. Anxiety (1-7)	2.02 (1.27)***	2.57 (1.45)	2.05 (1.36)***	2.92 (1.41)	2.92 (1.54)	2.94 (1.12)	.50	
3. Satisfaction (1-21)	16.54 (3.25)	15.18 (3.57)	16.77 (3.22)	14.11 (3.40)	14.72 (3.23)	12.87 (3.41)	-.69	-.45
		Study 2						
Measure	Non-	Hierarchical						

	hierarchical	All	Primary	Non-primary	1	2
1. Avoidance (1-7)	2.19 (1.09)**	2.43 (1.23)	1.63 (0.86)	2.97 (1.34)		
2. Anxiety (1-7)	2.86 (1.32)***	2.77 (1.21)	2.64 (1.08)***	2.87 (1.29)	0.2	
3. Satisfaction (1-24)	17.89 (4.74)	17.36 (4.60)	19.73 (3.71)	15.78 (4.46)	-0.69	-0.29

Note. Asterisks mark significant differences in the attachment variables between the samples (tested with Mixed Effects models).

Satisfaction could not be compared due to the use of distinct scales between the two samples (although the questions used were the same, 3 items had different likert scales).

** *p*<0.01, ***p*<0.001.

Table 4

Studies 1 and 2 Linear Mixed Effects Model for Within-Participant SD for Attachment Avoidance, Anxiety, and Relationship Satisfaction by Hierarchy Type

		Study 1			
		Within-participant SD			
	Intercept (SD)	Non-hierarchical	Hierarchical	$\chi2(1)$	*p*
Avoidance	2.07 (0.39)	0.91	1.14	10.89	.001
Anxiety	2.23 (0.77)	1.01	1.28	10.72	.001
Satisfaction	16.05 (1.71)	2.78	3.22	4.36	.037
		Study 2			
		Within-participant *SD*			
	Intercept (*SD*)	Non-hierarchical	Hierarchical	$\chi2(1)$	*p*
Avoidance	2.32 (0.48)	0.92	1.16	15.56	.0001
Anxiety	2.84 (0.71)	1.06	0.99	1.35	.25
Satisfaction	17.57 (1.62)	4.27	4.39	0.27	.60

Note. Significances are adjusted for multiple testing (FDR).

Table 5

Study 1 Linear Mixed Models for Attachment Avoidance and Anxiety

	Avoidance				Anxiety			
	b	*SE*	*DF*	*p*	*b*	*SE*	*DF*	*p*
Step 1								
Hierarchical (intercept)	2.18	0.08	333	< .0001	2.55	0.11	339	< .0001
Non-hierarchical	-0.40	0.09	223	< .0001	-0.53	0.14	223	.0002
Step 2								
Intercept	2.46	0.08	330	< .0001	2.75	0.12	330	< .0001
Non-hierarchical	-0.43	0.08	223	< .0001	-0.54	0.14	223	.0001
Relationship length	-0.16	0.03	330	< .0001	-0.21	0.06	330	.0005
Long distance	-0.01	0.12	330	.91	-0.04	0.15	330	.79
Living together	-0.41	0.09	330	< .0001	-0.47	0.13	330	.0003
3-level hierarchy								
Non-hierarchical (intercept)	1.76	0.06	310	< .0001	2.03	0.09	310	< .0001
Primary	-0.13	0.09	310	0.18	-0.01	0.17	310	.96

Secondary	0.93	0.11	310	< .0001	0.93	0.17	310	< .0001
Tertiary/other	1.70	0.22	310	< .0001	0.96	0.29	310	.001

Note. Relationship length was standardized. Significances are adjusted for multiple testing (FDR).

Table 6

Study 1 Linear Mixed Models for Relationship Satisfaction

	b	*SE*	*DF*	*p*
Step 1				
Hierarchical (intercept)	15.25	0.26	339	< .0001
Non-hierarchical	1.32	0.34	223	.0001
Step 2				
Intercept	15.21	0.26	332	< .0001
Non-hierarchical	1.39	0.34	223	.0001
Relationship length	0.54	0.14	332	.0001
3-level hierarchy				
Non-hierarchical (intercept)	16.57	0.21	310	< .0001
Primary	0.24	0.39	310	.54
Secondary	-1.95	0.40	310	< .0001
Tertiary/other	-4.44	0.68	310	< .0001

Note. Relationship length was standardized. Significances are adjusted for multiple testing (FDR).

Table 7

Study 2 Linear Mixed Models for Attachment Avoidance and Anxiety

	Avoidance				Satisfaction			
	b	*SE*	*DF*	*p*	*b*	*SE*	*DF*	*p*
Step 1								
Hierarchical (intercept)	2.25	0.06	529	< .0001	17.42	0.20	644	< .0001
Non-hierarchical	-0.16	0.09	303	.08	0.47	0.35	345	.19
Step 2								
Intercept	2.15	0.08	330	< .0001	17.39	0.22	527	< .0001
Non-hierarchical	-0.17	0.08	223	< .0001	0.58	0.39	303	.13
Relationship length	-0.09	0.03	330	< .0001	0.94	0.18	527	<.0001
3 partners	0.23	0.11	301	.03				
More than 3 partners	0.36	0.10	301	.0006				
Non-hierarchy:Length	-0.27	0.07	527	.0001	-1.00	0.37	527	.007
Less than 5 years								
Intercept	2.40	0.11	290	< .0001	16.66	0.25	290	< .0001

Polyamory Relationship Quality

Non-Hierarchical	-0.38	0.12	269	.002	1.24	0.44	271	.006
3 partners	0.38	0.15	269	.01				
More than 3 partners	0.45	0.13	269	.001				
More than 5 years								
Intercept	1.69	0.10	192	< .0001	18.94	0.30	194	< .0001
Non-Hierarchical	0.09	0.13	192	.48	-0.64	0.67	194	.34
3 partners	-0.06	0.13	192	.65				
More than 3 partners	0.04	0.14	192	.79				

Note. Relationship length was standardized. Significances are adjusted for multiple testing (FDR).

Table 8

Study 2 Linear Mixed Models for Anxiety

	b	*SE*	*DF*	*p*
Step 1				
Hierarchical (intercept)	2.71	0.06	529	< .0001
Non-hierarchical	0.22	0.11	303	.05
Step 2				
Intercept	2.72	0.06	528	< .0001
Non-hierarchical	0.20	0.11	303	.08
Relationship length	-0.17	0.03	528	<.0001

Note. Relationship length was standardized. Significances are adjusted for multiple testing (FDR).