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Parents Versus Peers: Assessing the Impact of Social Agents on Decision Making in Young Adults



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Abstract

Young adulthood is a developmental phase when individuals must navigate a changing social milieu that involves considering how their decisions affect close others such as parents and peers. To date, no empirical work has directly evaluated how young adults weigh these relationships against one another. We conducted a preregistered experiment in which we pitted outcomes for parents against outcomes for friends. Participants ($N = 174$, ages 18–30 years) played two runs of the Columbia Card Task—one in which gains benefited a parent and losses were incurred by a friend and another in which the opposite was true. We also tested whether age, relationship quality, and reward type earned for parents and friends (simulated vs. real) acted as moderating influences on parent–friend prioritization. Results showed that individuals were more likely to make decisions that benefited a parent at the expense of a friend. Relationship quality and reward type moderated this effect, whereas age did not.

Keywords

development, decision making, young adulthood, open data, open materials, preregistered

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As social creatures, humans must often consider how their decisions will impact close others. While psychologists have typically studied this phenomenon by comparing decision making when it impacts a close other (e.g., parent, friend, or partner) versus when it does not, individuals in the real world often must make decisions that differentially impact multiple close others. The present study sought to model these trade-offs by pitting opposing outcomes for parents and friends to understand how individuals prioritize these close others when making decisions. We conducted this research in young adults because they still display peer-oriented characteristics of adolescence while simultaneously being required to adapt to novel adult roles and situations (Arnett, 2014), making them an ideal population in which to study other-oriented decision making. In this preregistered study, we tested whether young adults prioritize parents or friends during decision making. Because considerable heterogeneity in behavior exists during the young adult years (Arnett, 2014), we also considered the role of key moderating factors such

as age and relationship quality with parents and friends. Finally, to further examine boundary conditions on decision making, we explored whether young adults made different decisions when presented with the chance to earn real versus simulated rewards for close others.

Young Adulthood Is Marked by a Unique Social Ecology

Psychological scientists have attempted to characterize young adulthood for several decades (Gould, 1972; Levinson, 1986). Though debate exists on whether young adulthood is best defined as the half decade following adolescence or a more protracted period occupying the entire third decade of life, most scholars

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generally agree that young adulthood is a unique transitional period unlike any other during the life span. During this period, individuals face newfound responsibilities and a shifting social milieu (Arnett, 2000, 2014). At the center of these changes lie the relationship dynamics between young adults and their parents and peers. Young adults are similar to adolescents in that they remain highly oriented to peers but are also often dependent on their parents in the financial, emotional, and social domains (Arnett, 2000). Research to date points to young adulthood as a unique developmental phase during which both parents and peers play important roles.

Peers, especially friends, affect the way young adults construe their identities (Arnett, 2014; Hopmeyer & Medovoy, 2017; Roisman, Masten, Coatsworth, & Tellegen, 2004), construct appraisals (Welborn et al., 2015), and make decisions under uncertainty (Fromme, Corbin, & Kruse, 2008; Hopmeyer & Medovoy, 2017; Ohannessian, Vannucci, Flannery, & Khan, 2017; Riedijk & Harakeh, 2018; Silva, Chein, & Steinberg, 2016; White et al., 2006). Despite the seemingly monolithic importance of friends, parents also remain important in the lives of their young adult offspring. Like friends, parents also impact how young adults engage in real-world risk-taking behaviors and make decisions (Abaied & Emond, 2013; Carlson, 2014; Guassi Moreira & Telzer, 2018a), refine existing identities (Kaniūšonytė & Žukauskienė, 2018), and maintain mental well-being (Guassi Moreira & Telzer, 2015; Lucas-Thompson, 2014; Needham, 2008).

In fact, as individuals transition from adolescence to young adulthood, parents appear to become more, rather than less, central in their lives. Relative to adolescents, young adults report higher levels of cohesiveness and obligation toward parents (Tsai, Telzer, & Fuligni, 2013) while becoming increasingly receptive to their advice (Carlson, 2014), perhaps in part because young adulthood is a time of high turnover among friendships (Arnett, 2000). In other words, parent–child relationships can be an important source of stability for young adults during a time of instability. Together, these pieces of evidence demonstrate that both parents and peers play crucial roles in the lives of young adults, but it is unknown how young adults prioritize these two important relationships.

The Moderating Roles of Age and Relationship Quality

Because evidence suggests that age and relationship quality influence the extent to which young adults value their parents and friends, it follows that these variables likely moderate decision making about parents and friends. With regard to age, we anticipated

that older individuals would be more likely to favor parents over friends. This prediction was informed by findings that show parent–child relationship quality increases throughout young adulthood (Tsai et al., 2013) and that young adults experience high friendship turnover (Arnett, 2000, 2014), which may cause them to weigh parent relationships more heavily during this developmental phase. With regard to relationship quality, we predicted that participants who reported better relationship quality with parents would weigh parents more heavily than those with worse relationship quality and that the same would be true for friendship quality. Close relationships in young adulthood are rich with heterogeneity, and the quality of such relationships has been shown to affect other types of decision making (Guassi Moreira & Telzer, 2018a).

Boundary Conditions of Reward Type on Decision Making

Extant evidence indicates that simulated and real rewards can differentially influence decision making. While reward type has not been examined in the context of other-oriented decision making, it is possible that reward type influences other-oriented decisions just as it does for self-oriented decision making. Scenarios with real rewards—compared with simulated ones—recruit different neural systems (Bray, Shimojo, & O'Doherty, 2010; Kang, Rangel, Camus, & Camerer, 2011; Miyapuram, Tobler, Gregorios-Pippas, & Schultz, 2012; Scholl et al., 2015) and elicit different patterns of decision-making behavior (Hinvest & Anderson, 2010). Although some research suggests that simulated and real rewards are equivalent (Locey, Jones, & Rachlin, 2011), these studies have largely been conducted on a narrow set of economic tasks and in largely asocial contexts. Studies that use different tasks or vary the social implications of decisions find that real and simulated scenarios bias decision making in different ways (FeldmanHall et al., 2012; Pronin et al., 2008). Though we had no directional hypotheses about how real versus simulated rewards might influence decisions in the current study, the prior literature suggests that this is nevertheless an important variable to consider.

The Current Study

We investigated how young adults made decisions that had opposing consequences for a parent versus a friend. Across two samples, as part of a preregistered study, participants played one round of a decision-making task in which they chose between making a decision that benefited their parent while risking a loss for their friend or avoiding a loss for their friend while

forgoing a benefit for their parent. The opposite was true for a second round (counterbalanced order). This manipulation is well suited to address how individuals make decisions about parents versus friends because (a) it directly pits parents and friends against one another, modeling real-world dilemmas; (b) these types of decisions involving risk are highly salient to young adults (Duell et al., 2018); and (c) most important, in everyday life, decisions containing elements of risk tend to be highly consequential. In addition to measuring age and relationship quality to test for moderating influences, we also sought to better understand the generalizability of any observed effect. To this end, we manipulated the reward types that participants could gain for parents and friends (i.e., simulated vs. real rewards).

Experiment Overview

Our research questions were investigated in an experiment conducted across two samples. Although both samples were preregistered as independent studies, we are reporting them as one pooled, aggregate sample here for clarity and ease of interpretability. These two samples differed primarily according to the type of reward that could be won for parents and peers (simulated vs. real). Our primary hypotheses and analyses did not differ between studies, and sample-specific results can be accessed in the Supplemental Material available online.

We used a novel variant of the Columbia Card Task (CCT) to probe whether young adults exhibited a preference when making decisions that had opposing consequences for a parent and a friend. Our primary aim was to test whether participants would prioritize parents or friends (Hypothesis 1). Our secondary aims were to test whether individual differences of age (Hypothesis 2) and relationship quality (Hypothesis 3), in addition to reward type (Exploratory Research Question 1), moderated the extent to which individuals prioritized parents or peers during decision making. We also administered a supplemental experimental task to determine how the effects here might generalize to other forms of decision making (e.g., certain decisions). Though the results of the certain (as opposed to uncertain) decision-making task are beyond the scope of the current study, we report them in the Supplemental Material.

Hypotheses

Our a priori hypotheses and exploratory research questions were preregistered on the Open Science Framework (OSF) prior to data collection (<https://osf.io/rq96w/registrations/>).

Hypothesis 1

There is ample evidence to suggest that parents and peers each play crucial roles in the social ecology of young adulthood. However, prior work has not tested whether parents are more influential than peers (or vice versa) in shaping decision making for young adults. If parents are more central than peers, participants would be more inclined to make decisions that benefit a parent at the expense of a peer. However, if peers are more important than parents, then individuals would be more likely to make decisions that benefit a peer at the expense of a parent. We note here that because extant evidence highlights how both parents *and* peers exert strong pulls over behavior, it is appropriate to formulate a competing hypothesis such as this one. This hypothesis was preregistered a priori.

Hypothesis 2

Because existing literature suggests that closeness and identity with parents increases during late adolescence and young adulthood (Tsai et al., 2013), our second hypothesis was that older participants, compared with younger participants, would be more likely to make decisions that would benefit a parent at the expense of a friend.

Hypothesis 3

Our third hypothesis was that participants who had better relationship quality with their parent would be more likely to make decisions that benefit that parent at the expense of a friend (moderation). Similarly, we hypothesized that participants who had greater relationship quality with their friend would be more likely to make decisions that benefit that friend at the expense of a parent (moderation). This hypothesis was preregistered as an exploratory analysis in our first sample and as a hypothesis in the second sample.

Exploratory Research Question 1

Prior work has demonstrated that reward type (real vs. simulated) can potentially affect decision-making behavior. Here, we examined whether young adults prioritized parents and peers differently in conditions of real and simulated rewards for parents and friends. This manipulation was specified a priori, but directional hypotheses about it were not.

Supplemental hypothesis

Lastly, in an effort to understand potential motivations for parent–peer prioritization during decision making,

we also tested a supplemental hypothesis related to perceived levels of obligation toward family and friends. For purposes of brevity and clarity, this hypothesis, along with its accompanying analyses, is described in the Supplemental Material. Hypotheses regarding both relationship quality and obligation were registered as exploratory research questions for one sample (osf.io/5tm48) and as hypotheses for another (osf.io/4pvxb).

Method

Participants

Participants were two samples of young adults recruited from the West Los Angeles area in the United States. Prior to data collection, we set each of the two sample sizes at 90 participants to be comparable with, or larger than, the sample sizes of other similar studies (Botdorf, Rosenbaum, Patrianakos, Steinberg, & Chein, 2017; Van Hoorn, Crone, & Van Leijenhorst, 2017). In the first sample, parents and friends were compensated with simulated rewards, whereas in the second sample, parents and friends were compensated with real rewards (more information is given below). Participants in Sample 1 were recruited from the psychology subject pool at the University of California, Los Angeles (UCLA) and were compensated with course credit, whereas participants in Sample 2 were recruited from the West Los Angeles community and compensated with \$20. The combined sample included 174 young adults (age: $M = 20.72$ years, $SD = 2.16$, range = 18.06–30.81; 54 males). With respect to race, 48% of participants identified as Asian, 29% identified as Caucasian, 2% identified as African American, 6% identified as mixed race, 1% identified as American Indian/Alaskan Native, and 10% identified as “other.” The remaining participants (4%) declined to report their race. Ethnically, 18% of participants identified as Hispanic/Latinx; 92% of participants were enrolled in classes at UCLA. Six participants were excluded from analyses: 2 because of prespecified exclusion criteria (noncompliance with experimenter instructions), 2 because of technical errors preventing acquisition of data, and 2 because they had no response variability in their decisions across both runs of the task, rendering their data inappropriate for statistical modeling. All participants provided written consent in accordance with the policies of the UCLA Institutional Review Board. All data and materials are publicly available on the OSF (osf.io/b5sar/ and osf.io/c8c6c/, respectively).

Experimental protocol

The following protocol was employed in both samples. The only difference between the two was the type of

compensation for each participant’s parent and friend (i.e., real or simulated).

Parent and friend nomination and salience manipulation. Prior to completing the experiment, participants were asked to nominate a parent and close friend for the study. Participants were told that they could choose any parent and any friend they wished. Afterward, to increase the salience of the chosen parent and friend in participants’ minds, we asked participants to list basic information about their nominated parent and friend (e.g., name, age, sex), a memory with each person, and words and phrases describing each person.

Parent and friend relationship quality. Following parent and friend nominations, relationship quality with each individual was assessed using the Inventory of Parent and Peer Attachment (IPPA; Armsden & Greenberg, 1987). The IPPA has been frequently used as a metric of subjective relationship quality (Branje, Hale, Frijns, & Meeus, 2010; Fanti, Henrich, Brookmeyer, & Kuperminc, 2008) and was initially developed for use in young adult populations. Participants used a 5-point scale (1 = *almost never or never*, 5 = *almost always or always*) to answer 28 items about their relationship quality with their parent and 25 items about their relationship quality with their friend. A sample item for parent relationship quality is, “My parent respects my feelings.” A sample item for friend relationship quality is, “When we discuss things, my friend considers my point of view.” Responses were reverse-scored where appropriate and averaged to yield a single mean score for both parent relationship quality and friend relationship quality (Sample 1—parent: $\alpha = .94$, friend: $\alpha = .91$; Sample 2—parent: $\alpha = .95$, friend: $\alpha = .90$). A self-report measure assessing self-reported perceived obligation to parents and friends was also collected in Sample 2 (real rewards) and is discussed in the Supplemental Material. Additional self-report measures assessing other constructs such as sensation seeking and real-world risk taking (listed in the Supplemental Material) were also collected but not analyzed.

Decision-making task. We used a modified version of the “hot” CCT to assess how participants weighed parents and friends during decision making (van Duijvenvoorde et al., 2015). The hot CCT is a widely used experimental paradigm that measures risky decision making in an incremental, stepwise fashion. During the experimental session, participants performed two runs of the CCT (one run = 24 game rounds, three repetitions of each deck type). During each round, participants were shown 16 overturned cards and were told that they could win points by turning over gain cards or lose points by turning over loss cards (Fig. 1). Above the set of cards was a

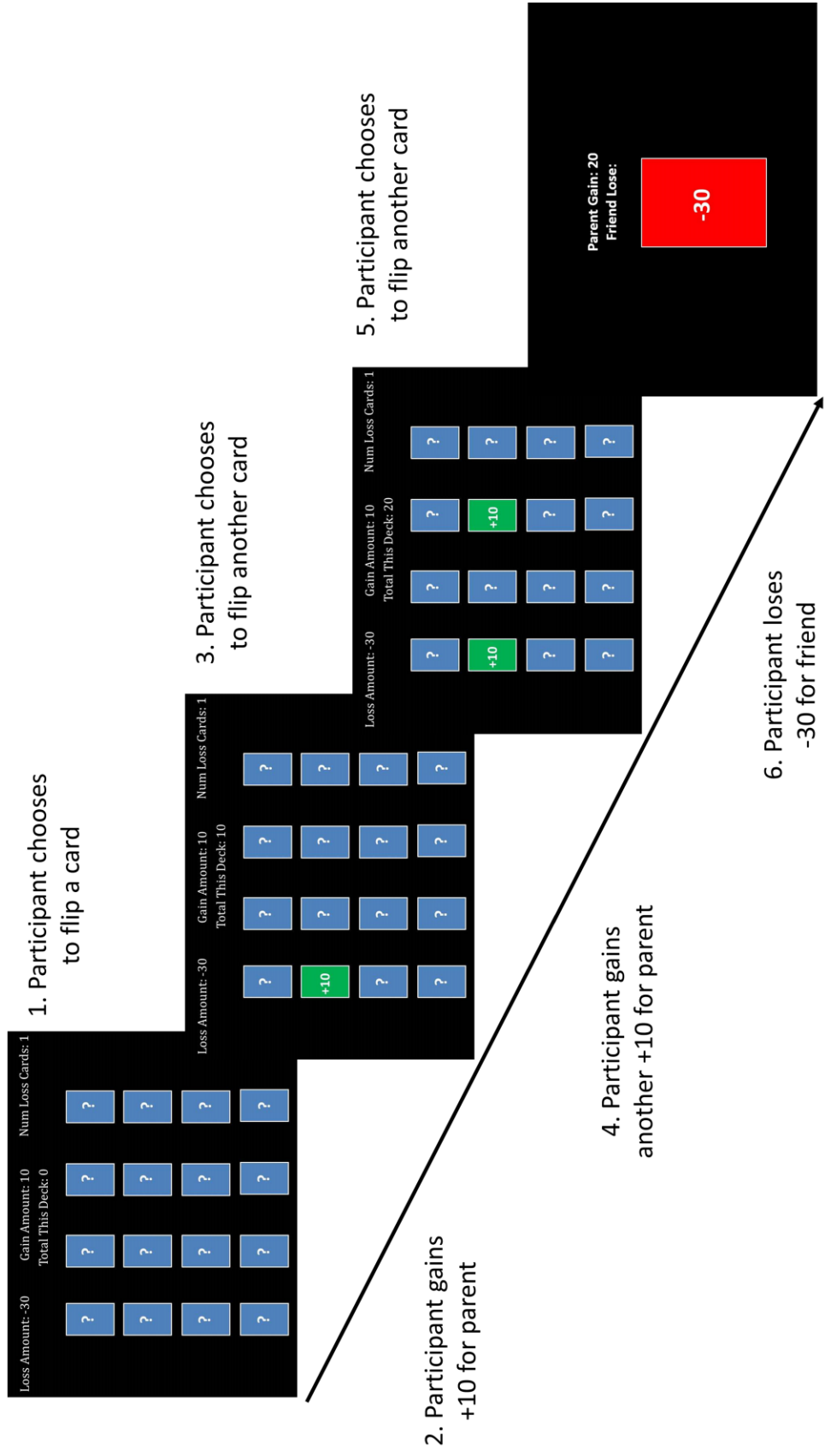


Fig. 1. An example round of the Columbia Card Task. Here, the participant is shown winning 20 points for his or her parent at the expense of a friend.

header that showed (a) the total number of loss cards (either one or two) in the deck, (b) the point value (either -30 or -60) of each loss card, (c) the point value (either 10 or 20) of each gain card, and (d) a running total tracking the points they earned for that deck. The different possibilities in the number of loss cards, point value of loss cards, and point value of gain cards yielded eight total distinct types of game rounds. At the bottom of the screen, participants were reminded of the CCT condition (“Parent Gain/Friend Lose” or “Parent Lose/Friend Gain”).

Each round began with a score of 0 and all the cards face down. Participants were required to choose between turning over a card (risky choice) or not turning over a card (passing; safe choice). Passing meant that participants were finished with the round; they would not lose any points for that round but could not gain any additional points. If participants chose to turn over a card, the computer selected a card and flipped it over. Although participants were informed that the computer selected a card at random, the first three risky choices participants made were rigged so as to always yield a gain card. This was done to ensure that participants would not turn over loss cards too early in a given round and feel disproportionately discouraged from flipping cards (McCormick & Telzer, 2017). A game round continued until participants decided to pass to the next round or until they flipped over a loss card. The task was self-paced and programmed in PsychoPy software (Version 1.82.01; Peirce, 2007). Prior to beginning the experimental task, participants completed four practice rounds of the CCT to ensure they properly understood the task.

We used a novel variant of the CCT to assess how young adults prioritized parents versus friends when making decisions. During one run of the task, participants were told that all the points associated with gain cards would be gained for their parent, whereas all the losses from a loss card would be incurred by their friend. During another run of the task, participants were told that the opposite was true: All the points associated with gain cards would be gained for their friend, whereas all the losses from a loss card would be incurred by their parent. The run order between these two conditions was counterbalanced. The manipulation modeled real-world trade-offs in decision making by assessing how individuals make decisions that stand to benefit one close other at the risk of harming a second close other. That is, each decision was always associated with a gain for one close other at the potential expense of another close other—there were no trials in which only one close other was affected and the other was not. For example, during the parent-gain/friend-lose run, turning over a card allowed participants to gain points for their parent at the potential expense of their friend. Alternatively, if they chose to pass,

participants were guaranteed to avoid a loss for their friend but gave up the chance to obtain a gain for their parent. This manipulation ensured that there would always be a trade-off for prioritizing one close other over the other.

Manipulating reward type: real versus simulated. We manipulated reward type to assess its impact on other-oriented decision making in young adults. In Sample 1, participants were told to play as if the points could be redeemed for a tangible good or service but were notified that their parent or friend would not actually receive any such rewards. Specifically, participants were asked to imagine that the points won for their parent and friend respectively during the task could be used to benefit them in some material way. For this reason, rewards are said to be simulated.

In Sample 2, participants began the experiment with a $\$5$ endowment for both their parent and friend and were told that their task decisions would result in them gaining or losing actual money for their close others. Thus, the rewards for parents and friends were real, and outcomes were received immediately. The following refers to only the participants in Sample 2. To keep the task in Sample 2 (real rewards) as consistent as possible with Sample 1 (simulated rewards), we told participants from Sample 2 that their decisions would also earn or lose points for their parent and friend, but that the outcome for one deck from each run of the task would be chosen at random, converted to dollars, and then added to or subtracted from the initial endowments. Participants were told that 10 points were equivalent to $\$1$. To ensure that participants believed the rewards were not fixed, we told them that a computer script would be run immediately following the session to determine the amount won or lost for parents and friends. A dummy script was run after the session to give the appearance that actual calculations were being made. After the session, participants were told that they had won an additional $\$2$ for their friend and an additional $\$1$ for their parent. Unbeknownst to participants, these values were fixed. Participants in the real-rewards sample were shown envelopes for each close other with the $\$5$ endowment prior to playing the CCT. These envelopes were labeled with addresses provided by the participants for their parent and friend, respectively, and the earnings were mailed following the session. These participants were debriefed as to the fixed reward amounts after the session.

Analytic approach and decision-making model

Because different facets of risky scenarios tend to exert unique influences on decision making (van Duijvenvoorde

et al., 2015), it can be advantageous to operationalize and model the different components of a risky scenario (Richards et al., 2013). One such technique, known as a risk-return decomposition, involves explicitly portioning risky scenarios into components of reward and risk (van Duijvenvoorde et al., 2015). We conducted a risk-return decomposition to dissociate the effect of return (i.e., earnings) and the effect of risk (i.e., outcome variability) on our participants' decision making. By running a risk-return decomposition, we were able to test how participants use information about risk and return distinct from who stands to gain or lose (condition¹: parent or peer) when making decisions.

Consistent with recent work (van Duijvenvoorde et al., 2015), return was operationalized as the expected value (EV) of a given decision:

$$EV = (\text{Gain Probability} \times \text{Gain Amount}) + (\text{Loss Probability} \times \text{Loss Amount})$$

Risk was operationalized as the standard deviation of the possible outcomes associated with a given decision:

$$SD = \sqrt{\text{Gain Probability} \times (\text{Gain Amount} - EV)^2 + \text{Loss Probability} \times (\text{Loss Amount} - EV)^2}$$

Because the decision to pass did not result in the addition or loss of points, the standard deviation and EV for choosing to pass were both zero. Given the combination of parameters for each possible game round (number of loss cards, value of loss cards, value of gain cards), the standard-deviation values ranged from 9.68 to 40.00,² and EV ranged from -37.67 to 16.88.

Within-participants models. We sought to understand the extent to which our experimental condition manipulation (whether a parent stood to gain and a friend to lose, or vice versa) influenced participants' decisions while controlling for other salient features of a given decision (i.e., risk and return). Data were analyzed using a multilevel model because they consisted of repeated measures (decisions) nested within individuals. Hierarchical linear modeling (HLM) was used for data analysis (HLM for Windows, Version 6.06; Raudenbush & Byrk, 2002). Decisions (1 = turn over card, 0 = pass) for the i th participant at the t th trial were modeled as a function of an intercept (π_{0i}), the condition (π_{1i} ; 1 = parent gain/friend lose, 0 = friend gain/parent lose), return (π_{2i} ; EV), and risk (π_{3i} ; SD). To this end, we estimated the following equation at Level 1 (within participants):

$$\text{logit}(\text{decision}_{it}) = \pi_{0i} + \pi_{1i}(\text{condition}) + \pi_{2i}(\text{return}) + \pi_{3i}(\text{risk}) + \varepsilon_{it} \quad (1)$$

Between-participants models. Additional HLM models were analyzed to test whether the effects of condition, return, and risk on decision making varied with age, relationship quality, and reward type (simulated vs. real). Because there are consistent differences in both decision making and parent-peer relationship dynamics for males and females (Guassi Moreira & Telzer, 2015; Mahalik et al., 2013), we also included sex as a covariate. As specified in our preregistration document, the Level 1 model was first run with no predictors entered at Level 2. Next, age and sex were entered as the first Level 2 predictors. Afterward, we included relationship quality (parent and friend) and reward type. This means three models were run: (a) a model with no between-participants predictors (i.e., no Level 2 predictors), (b) a model that contained only age and sex as between-participants predictors, and (c) a full model that included the aforementioned variables in addition to relationship quality and reward type. The final set of Level 2 equations were as follows:

$$\pi_{0i}(\text{intercept}) = \gamma_{00} + \gamma_{01}(\text{age}) + \gamma_{02}(\text{sex}) + \gamma_{03}(\text{PRQ}) + \gamma_{04}(\text{FRQ}) + \gamma_{05}(\text{reward type}) + u_{0i} \quad (2)$$

$$\pi_{1i}(\text{condition}) = \gamma_{10} + \gamma_{11}(\text{age}) + \gamma_{12}(\text{sex}) + \gamma_{13}(\text{PRQ}) + \gamma_{14}(\text{FRQ}) + \gamma_{15}(\text{reward type}) + u_{1i} \quad (3)$$

$$\pi_{2i}(\text{return}) = \gamma_{20} + \gamma_{21}(\text{age}) + \gamma_{22}(\text{sex}) + \gamma_{23}(\text{PRQ}) + \gamma_{24}(\text{FRQ}) + \gamma_{25}(\text{reward type}) + u_{2i} \quad (4)$$

$$\pi_{3i}(\text{risk}) = \gamma_{30} + \gamma_{31}(\text{age}) + \gamma_{32}(\text{sex}) + \gamma_{33}(\text{PRQ}) + \gamma_{34}(\text{FRQ}) + \gamma_{35}(\text{reward type}) + u_{3i} \quad (5)$$

The intercept (π_{0i}) and trial-by-trial associations between condition (π_{1i}), return (π_{2i}), and risk (π_{3i}) represent participant-specific parameters that were allowed to vary randomly across participants. Each were modeled as fixed effects in addition to cross-level interactions with age (continuous), sex (binary), parent relationship quality (PRQ; continuous), friend relationship quality (FRQ; continuous), and reward type (simulated vs. real; binary; e.g., the γ_{js}). Age and relationship-quality variables were centered using the grand mean. Sex and reward type were dummy coded (0 = male, 1 = female; 0 = simulated, 1 = real). The u_{js} represent random error terms that were allowed to vary between participants. That is, they are the error

terms in predicting each participant's Level 1 coefficients from a constant and effects of age, sex, relationship quality, and reward type. Fixed effects were averaged across values of the u_j s. Additional supplemental models with parent/friend obligation were run by swapping out measures of relationship quality for measures of parent/friend obligation (see the Supplemental Material for more information about the measure).

Results

Confirmatory and exploratory results are reported across the entire set of participants (e.g., in the aggregate sample). Results split by sample are reported in the Supplemental Material. Multilevel model statistics are reported in Tables 1 and 2 unless explicitly noted in text. Nonmultilevel tests (e.g., t tests) are reported in text.

Decision making as a function of condition

First, we examined the Level 1 model described in Equation 1 to test whether decision making varied as a function of condition. As shown in Table 1, we found significant associations between decision making and all three predictor variables: condition (i.e., who gains or loses as a result of the decision), return (EV), and risk (SD). Participants were more likely to turn over a card when their parent stood to benefit at the expense of their friend. Consistent with prior work (e.g., van Duijvenvoorde et al., 2015), results showed that participants were more likely to turn over a card if return values were high and if risk values were low. Importantly, the effect of condition remained significant (or marginally significant) when we added sex, age, reward type, parent relationship quality, and friend relationship quality to the model (see Table 2).

Table 1. Results of the Initial Level 1 Model Predicting Trial-by-Trial Risky Decision Making

Predictor	γ	SE	p
Intercept	2.585	0.043	< .001
Condition	0.119	0.028	< .001
Return (EV)	0.046	0.003	< .001
Risk (SD)	-0.055	0.002	< .001

Note: Condition was coded 0 for friend gain/parent lose and 1 for parent gain/friend lose. Return (expected value, or EV) ranged from -60.00 to 16.88, and standard deviation ranged from 9.68 to 40.00. Gammas represent the expected change in log odds. Robust standard errors are reported from a population-average model.

Age and relationship quality as moderators of decision making

Age. Next, we examined the Level 2 models described in Equations 2 to 5 to test whether the trial-by-trial associations between condition and decision making differed as a function of age and relationship quality with parents and friends, while controlling for sex and reward type. As we noted earlier when describing our modeling procedures, we first added age and sex to Level 2 of our multilevel model (Table 2). Next, we added parent relationship quality and friend relationship quality in addition to reward type. As shown in Table 2, age moderated the trial-level association between decision making and condition: Older individuals were more likely to favor their friends instead of parents, contrary to what we expected in Hypothesis 2. Age did not interact with either return or risk. Despite the significant effect of age in the first model, it was no longer significant when we added the other moderating terms to the model (Table 2). Thus, we caution against strong interpretation of age effects and ultimately consider them to be inconclusive. These analyses were confirmatory, as opposed to exploratory, because they were testing an a priori hypothesis (Hypothesis 2).

Relationship quality. We found that both parent relationship quality and friend relationship quality significantly moderated the effect of condition on decision making (Table 2). Specifically, the continuous measures of parent relationship quality and friend relationship quality entered at Level 2 moderated Level 1 associations. To follow-up and unpack these interactions, we first conducted a paired-samples t test to compare relationship quality for parents and friends. Although parent relationship quality and friend relationship quality were correlated ($r = .229$, $p = .002$), participants reported greater levels of relationship quality with their friend than with their parent (parent: $M = 3.72$, friend: $M = 4.21$), $t(173) = -8.90$, $p < .001$. Even though participants reported higher quality relationships with a close friend, they were still overall more likely to make choices that benefited a parent at the expense of their friend. These were preplanned exploratory analyses for our first sample and confirmatory analyses for the second sample.

To further probe the interactions, we tested the highest ($n = 55$, $M = 4.40$) and lowest ($n = 58$, $M = 2.97$) thirds of our sample in terms of parent relationship quality and reran the full model (excluding parent-relationship-quality scores from Level 2) in these subsets. Results showed that individuals reporting the highest parent relationship quality had a positive association between condition and decision making ($\gamma = 0.424$, $SE = 0.125$, $p = .002$), whereas those with the lowest parent relationship quality did not show a

Table 2. Results of the Full Models Predicting Trial-by-Trial Risky Decision Making

Predictor and moderator	Models testing Hypothesis 2			Models testing Hypothesis 3		
	γ	<i>SE</i>	<i>p</i>	γ	<i>SE</i>	<i>p</i>
Intercept						
Intercept	2.496	0.092	< .001	2.416	0.100	< .001
Sex	0.130	0.108	.229	0.130	0.108	.233
Age	-0.001	0.020	.949	-0.013	0.020	.536
Parent relationship quality				-0.294	0.057	< .001
Friend relationship quality				0.321	0.081	< .001
Reward type				0.215	0.086	.014
Condition						
Intercept	0.112	0.067	.098	0.225	0.063	.001
Sex	0.015	0.076	.844	0.034	0.070	.624
Age	-0.023	0.012	.049	-0.006	0.011	.599
Parent relationship quality				0.181	0.044	< .001
Friend relationship quality				-0.297	0.062	< .001
Reward type				-0.283	0.053	< .001
Return (EV)						
Intercept	0.070	0.006	< .001	0.057	0.005	< .001
Sex	-0.034	0.006	< .001	-0.031	0.006	< .001
Age	-0.002	0.001	.155	-0.003	0.001	.011
Parent relationship quality				0.000	0.003	.922
Friend relationship quality				-0.011	0.005	.025
Reward type				0.024	0.005	< .001
Risk (<i>SD</i>)						
Intercept	-0.058	0.004	< .001	-0.051	0.004	< .001
Sex	0.004	0.004	.371	0.003	0.004	.531
Age	0.000	0.001	.825	0.001	0.001	.523
Parent relationship quality				0.005	0.002	.029
Friend relationship quality				-0.003	0.004	.455
Reward type				-0.014	0.004	< .001

Note: Sex was coded 0 for male and 1 for female. Condition was coded 0 for friend gain/parent lose and 1 for parent gain/friend lose. Return (expected value, or EV) ranged from -60.00 to 16.88, and standard deviation ranged from 9.68 to 40.00. Reward type was coded 0 for simulated and 1 for real. Gammas represent expected change in log odds. Robust standard errors are reported from a population-average model. Hypothesis 2 predicted that individuals would be more likely to prioritize parents over peers with age. Hypothesis 3 posited that reporting greater parent or friend relationship quality would be associated with more likely parent or friend prioritization, respectively.

significant relationship between condition and decision making ($\gamma = -0.035$, $SE = 0.113$, $p > .250$). These results suggest that participants with relatively higher parent relationship quality were more likely to prioritize their parents over their friends when making decisions. We used the same process to interrogate the friend-relationship-quality interactions: We conducted a separate analysis in which we split the sample into groups on the basis of the highest ($n = 54$, $M = 4.68$) and lowest ($n = 61$, $M = 3.70$) thirds of friend relationship quality and reran the full model, excluding friend relationship quality from the model. A trend similar to the results for parent relationship quality emerged. Individuals with

the highest friend relationship quality were likely to prioritize neither parents nor friends, whereas those with the lowest friend relationship quality prioritized parents over friends (high: $\gamma = 0.157$, $SE = 0.180$, $p > .250$; low: $\gamma = 0.251$, $SE = 0.108$, $p = .023$). Relatively speaking, these results show that individuals with high friendship relationship quality tend to prioritize friends more than parents, compared with those with low friend relationship quality.

To determine whether another measure of relationship quality would yield similar results, we examined the valence of the words and phrases that participants used to describe their parents and friends during the

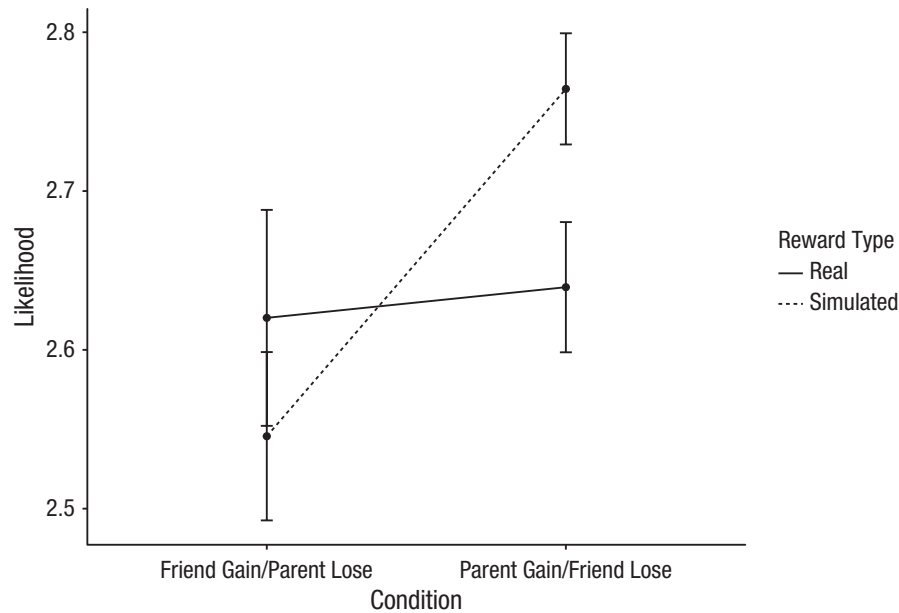


Fig. 2. Likelihood of turning over a card (risky choice) as a function of condition and reward type. A greater value on the y-axis indicates a greater likelihood of turning over a card. Condition refers to whether participants' decisions benefited a friend at the potential expense of a parent or vice versa. Likelihood refers to log odds (logits) of flipping over a card. Values reflect fixed-effect coefficients obtained from running separate models split by reward type. Error bars indicate ± 1 standard error of the parameter estimates.

salience manipulation as an implicit measure of relationship quality (see the Supplemental Material for more details). These adjectives were rated with a sample of participants via Amazon's Mechanical Turk, and the resulting valence ratings were entered into our Level 2 equations in place of self-report measures of relationship quality and yielded very similar results (see the Supplemental Material).

Reward type affects parent–peer prioritization

Interestingly, reward type significantly moderated other-oriented decision making (Table 2): Participants were more likely to favor their parents at the expense of their friends when rewards were simulated (fixed effect of condition from simulated reward sample: $\gamma = 0.219$, $SE = 0.035$, $p < .001$). By contrast, when rewards for close others were real, the fixed effect of condition was not significantly different from zero ($\gamma = 0.019$, $SE = 0.041$, $p > .250$), meaning that participants did not favor parents or friends over the other (Fig. 2). Reward type moderated several other aspects of decision making. For example, individuals were more likely to flip a card at higher EVs when rewards were real (i.e., interacted with return) and to flip a card at lower standard-deviation values when rewards were real rather than simulated (i.e., interacted with risk).

Searching for motivational causes

Post hoc (i.e., not preregistered) analyses were conducted to infer what motivated participants to, on average, weigh parents more heavily than friends. Most notably, we tested whether the effects of return and risk differentially affected decision-making behavior across our two experimental conditions. To this end, we created Condition \times Return and Condition \times Risk interaction terms by multiplying condition with reward and risk, respectively. These were entered into the first level of the model described in the prior section (i.e., Equations 1–5; all Level 2 variables from the final model were also included). These interaction terms did not yield significant results, implying that return and risk did not motivate individuals differentially across conditions. Additional results testing the effect of perceived obligation to parents and friends on our rewards are detailed in the Supplemental Material. The results of said analyses were inconclusive.

Discussion

Young adulthood is a transitional phase of development in which individuals juggle new roles and encounter novel scenarios while trying to adapt to an evolving social landscape. To date, no prior studies had investigated how young adults make decisions that entail

opposing outcomes for close others. In the present study, we found evidence suggesting that young adults are overall more likely to prioritize parents over a close friend. Self-reported relationship quality affected the extent to which individuals prioritized parents and friends, as higher relationship quality with a particular close other was associated with prioritizing that close other during decision making. Last, we found that young adults appear to show no preference between parents and friends (i.e., equal prioritization) when rewards are real, compared with simulated. Together, these results suggest that parents play a significant role in the lives of young adults, helping clarify the whom and the when of other-oriented decision making in young adults.

Overall, young adults in our sample were more likely to make decisions during the CCT that benefited their parents at the expense of their friend. This was the case despite the fact that participants self-reported significantly greater levels of relationship quality with friends than with parents. Bucking popular lay theories of young adulthood (Arnett, 2000), this result is consistent with recent work showing that individuals begin to identify more with their parents and report better cohesion with them during the transition to young adulthood (Tsai et al., 2013). Our findings expand on this work by suggesting that parent relationships are so important that young adults are willing to incur losses for their friends to benefit their parents. One explanation for this is that parent relationships embody stability at a time in the life span when it is difficult to obtain (Arnett, 2014). Another explanation is that participants' tendency to prioritize parents over peers was a result of differences in perceived obligation, defined as feeling as though one ought to support, assist, and respect the wishes of close others (Fulgini & Pedersen, 2002). Simply put, parents typically invest more emotionally and financially in their children than friends do into their peers. Recognizing this, young adults may feel indebted to their parents and subsequently desire to help them more than friends. Though supplemental analyses did not find evidence for this explanation, it nevertheless merits consideration in future studies. These findings will aid subsequent investigations of whom young adults prioritize and may eventually inform work focused on understanding why.

Relationship quality was a key moderating influence on how young adults prioritized parents and peers during the task. These results are noteworthy because they highlight that the extent to which one may favor a parent or friend is limited by the nature of one's relationships. For instance, individuals may realize that their friend could benefit more from money than a parent, but if they do not like their friend very much (relatively speaking), they will not prioritize the friend during

decision making. These results contribute to a broader, increasingly recognized trend in psychological science that underscores how social decision making across development is modulated by a myriad of additional social variables whose moderating interactions are almost as important as the main effects themselves (e.g., Guassi Moreira & Telzer, 2018b).

Surprisingly, we did not find strong evidence to support our hypothesis that older participants weigh their parents more heavily than younger ones. This finding warrants at least two potential explanations. The first is methodological—it may be that to properly observe such an effect, we would need a broader age range that included adolescents, as has been used in prior studies finding significant age differences on related phenomena (Steinberg et al., 2018; van Duijvenvoorde et al., 2015). The other explanation is that this is a true null finding and that across age, individuals consistently prioritize their parents over their friends to the same extent when making decisions that affect both.

One of the most intriguing findings in our study was that the type of rewards participants could gain for their parents and friends (simulated vs. real) affected their prioritization of these close others during decision making. Earning simulated rewards for a parent and friend was related to greater parent-over-friend prioritization during the CCT. By contrast, earning real rewards was tied to showing neither a preference for parents nor friends. Simulated rewards could result in individuals pursuing idealized representations of goal structures—the intrinsic arrangement of how various goals are prioritized in relation to one another. Real rewards force individuals to modulate their goal structures according to reality's demands (Freitas, Gollwitzer, & Trope, 2004). It follows that the young adults in the simulated rewards condition could have been making decisions according to an ideal goal structure in which their parents were more important than friends. After all, prioritizing a parent is easier when one's friends do not actually incur any losses. However, once rewards become real, young adults were forced to face the reality that losses were no longer immaterial and may have had difficulty making decisions that rigidly favored an ideal goal structure. Alternatively, it is possible that earning real rewards elicited greater emotional salience, perhaps causing individuals to behave more impulsively and discount long-term goals in favor of short-term ones (Freitas et al., 2004).

Additional research is needed to address the limitations of the current study. First, future work should explicitly examine whether financial obligations moderate the extent to which individuals in this age range prioritize parents over peers. Second, this study tested one class of rewards and losses, and it is presently

unknown whether these results would generalize to other kinds of reward (e.g., social). Using easily quantified rewards (e.g., money, points) is a common first step for new research questions because they allow for a clean operationalization of mathematic reward and risk probabilities. However, future work could nevertheless benefit from employing a greater diversity of risks and rewards. Last, follow-up studies could seek to probe whether specific decision-making processes (e.g., loss aversion) are affected disproportionately by the opportunity to win for parents while losing for friends, compared with the opposite.

The present study presents several constraints on generalizability (Simons, Shoda, & Lindsay, 2017). First, participants were exclusively recruited and tested in the western United States. It is possible that a different pattern of results would be observed elsewhere because of cultural differences surrounding parent–child relationships. Second, our procedure involved each participant nominating just one parent and one friend. If we repeated the study with a different parent and close friend and the same participants, it is possible that the results would differ because of qualitative differences in relationship dynamics between the original and novel sets of parents and friends. Last, because parts of our study used monetary rewards, the economic climate may have swayed decision-making behavior. Future replications taking place during an economic recession or depression may produce different results because of different financial pressures that individuals may be currently facing. We have no reason to believe that our results depend on other characteristics of the participants, materials, or context.

In sum, the present study makes a novel contribution by showing how young adults make decisions that pit rewards for a parent against rewards for a friend. Here, we show that individuals prioritize their parents over their friends when winning simulated rewards on their behalf. Together, these results contribute to a nuanced understanding of how close others affect decision-making processes during young adulthood.

Action Editor

Ralph Adolphs served as action editor for this article.

Author Contributions

J. F. Guassi Moreira and J. A. Silvers developed the study concept with feedback from S. M. Tashjian. J. F. Guassi Moreira, S. M. Tashjian, and J. A. Silvers designed the study. Data were collected by J. F. Guassi Moreira and S. M. Tashjian. Data were first prepared and analyzed by J. F. Guassi Moreira under the supervision of J. A. Silvers and later independently replicated by S. M. Tashjian. All authors interpreted the results. J. F. Guassi Moreira drafted the first version of the manuscript

with extensive input from J. A. Silvers. S. M. Tashjian, A. Galván, and J. A. Silvers all provided critical revisions. All the authors approved the final manuscript for submission.

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Declaration of Conflicting Interests

The author(s) declared that there were no conflicts of interest with respect to the authorship or the publication of this article.

Supplemental Material

Additional supporting information can be found at <http://journals.sagepub.com/doi/suppl/10.1177/0956797618778497>

Open Practices



All data and materials have been made publicly available via the Open Science Framework (OSF) and can be accessed at osf.io/b5sar/ and osf.io/c8c6c/, respectively. The design and analysis plans for the experiments were preregistered at the OSF and can be accessed at <https://osf.io/rq96w/registrations/>. The complete Open Practices Disclosure for this article can be found at <http://journals.sagepub.com/doi/suppl/10.1177/0956797618778497>. This article has received badges for Open Data, Open Materials, and Preregistration. More information about the Open Practices badges can be found at <http://www.psychologicalscience.org/publications/badges>.

Notes

1. *Condition* was initially termed *context* in our preregistration document but has here been changed to *condition* for clarity.
2. Technically, 0 was the lowest-value risk standard deviation that one could take, provided one had flipped all of a given deck's gain cards, and only loss cards remained. However, because this event was probabilistically unlikely, we included the next lowest possible value to give a more realistic range of what our participants encountered. Similarly, the lowest possible minimum for EV was –60, but the lowest the participants actually encountered is what is listed in the text.

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