



Preliminary evidence for virtue as a cue to long-term mate value

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ABSTRACT

Selecting a long-term romantic partner is largely contingent upon identifying behavioral repertoires indicating an ability to foster individual and communal flourishing through benevolence and relational fidelity. Within this suite of socially desirable traits are virtues that could be critical in selecting long-term mates. The current program of research presents two studies investigating the extent people select mates embodying virtue. Study 1 tasked participants with indicating the desirability of prospective mates espousing high and low levels of the three fundamental virtues, as observed through the VIA Model: caring, self-control, and inquisitiveness. High levels of virtue were especially desirable for long-term mating, with the preference for self-control being largest. Study 2 considered dispositional preferences for long-term mating, as indexed through restricted sociosexuality, with sociosexually restricted individuals reporting aversion to prospective mates exhibiting low self-control. We frame results through an evolutionary context and recommend future research to understand the adaptive function of virtue.

1. Introduction

Identifying a mate who can satisfy one's relational needs is critical in long-term mating. Individuals frequently prefer mates who appear capable of providing care to their partner and offspring while indirectly connoting their interest in monogamous pairbonds (Buss & Schmitt, 1993; Li et al., 2013). Given the importance of selecting a monogamous partner for successful long-term mating, it thus becomes incumbent upon individuals to identify behavioral repertoires in prospective mates that would reliably connote their ability to facilitate such relationships and therefore increase their desirability as long-term romantic partners. One previously defined outlet through which men and women make these decisions is by recognizing an individual's prosociality. Such behaviors have been defined through altruism (Barclay, 2010; Bhogal, Farrelly, Galbraith, Manktelow, & Bradley, 2020; Farrelly, 2013), an aversion to directly harming others (Brown & Sacco, 2019), and direct paternal care in the case of women's evaluation of men (Bleske-Rechek, Remiker, Swanson, & Zeug, 2006). These indicators of moral character would ostensibly foster greater wellbeing within one's relationship.

In expanding our understanding of what traits constitute an ideal long-term mate, it has been argued that specific behaviors fostering individual and communal flourishing within a given environment could be especially desirable. It has been proposed that traits humans have deemed "virtuous" cross-culturally appear particularly effective in

connoting one's long-term mate value (McGrath, *in press*). Such virtuous dispositions could further expand beyond moral domains and encompass other behaviors that would foster positive functioning within society, encompassing domains of self-regulation and intellect. This could include potentially greater interest in relational fidelity and one's ability to secure resources to a pairbond. The current program of research sought to identify the long-term mating value of different virtue domains by considering both their desirability and interest toward virtue espoused by interested in monogamy.

1.1. Evolutionary function of virtue

Though frequently conceptualized through various, and often conflicting, models of what its components are, the concept of virtue nonetheless centers around desired traits that could be deemed *good*. One conceptualization of these ostensibly good traits is derived from the VIA Classification of Character Strengths and Virtues, which included an initial attempt at a comprehensive model of the latent constructs deemed to be virtues (Peterson & Seligman, 2004). Character strengths refer to the components of personality that are identified as socially desirable and thought to contribute to collective thriving based on valued social or moral functioning (Park & Peterson, 2006). These character strengths appear to be components of what is described through folk language, more broadly, as virtues (Dahlsgaard, Peterson,

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Table 1
VIA character strengths and their broad categorization into the three virtues defined by McGrath (2015).

Virtues	Character strengths
Caring	Fairness
	Gratitude
	Kindness
	Capacity to love and be loved
	Teamwork
	Forgiveness & mercy
	Appreciation of beauty and excellence
	Leadership
	Humor
	Religiousness & spirituality
	Inquisitiveness
Curiosity	
Perspective	
Bravery	
Judgment & open-mindedness	
Love of learning	
Zest	
Appreciation of beauty and excellence	
Hope	
Humor	
Social intelligence	
Self-control	Honesty
	Judgment & open-mindedness
	Perseverance
	Prudence
	Modesty & humility
	Perspective
	Self-regulation
	Fairness

& Seligman, 2005).

Although virtue may be a multifaceted construct that has varied in definitions and components historically, recent endeavors have sought to streamline various classifications of virtue by identifying superordinate categories of virtue that are most readily observed in a population. Extensive factor analyses of character strengths have resulted in an empirically replicable model of three superordinate, and observable, virtues derived from character strengths: caring, self-control, and inquisitiveness as key virtues (McGrath, 2015; McGrath, Greenberg, & Hall-Simmonds, 2018; see Table 1). Originally considered from an Aristotelian perspective, these virtues nonetheless appear *fundamental* to individual and communal flourishing, suggesting an evolutionary basis for their emergence, given their existence and valuation cross-culturally (McGrath, in press; Thomas et al., 2020; but see Gurven, von Rueden, Massenkoff, Kaplan, & Lero Vie, 2013). That is, when faced with survival and reproductive problems, ancestral humans who possessed traits deemed virtuous were thought to be afforded an adaptive advantage, which ensured the survival of their own genes. Such traits were deemed particularly desirable in their ability to promote inclusive fitness and foster group living, which prompted individuals to select group members exhibiting these desirable traits (Buss, 2009; Lukaszewski, 2013).

Each of these superordinate virtues affords its own adaptive advantage to an individual that would ensure communal success. First, caring represents a moral domain of virtue and appears to have emerged as part of an ancestral need for group cohesion. It has been argued that the requisite heuristics for morality evolved to ensure cooperation among group members, which rewarded participation in altruism while punishing selfish behaviors (Cosmides & Tooby, 2006). This resulting cooperation ultimately became codified into the appropriate treatment of group members with one's ability to uphold the proper treatment of others a basis for continued interaction (Everett, Pizarro, & Crockett, 2016; Jordan, Hoffman, Bloom, & Rand, 2016; Krebs, 2008).

Second, self-control represents a regulatory domain of virtue. It

appears to facilitate the suppression of automatic and prepotent behaviors in the service of ensuring larger organisms possess the requisite metabolic resources necessary for daily functioning (Brumbach, Figueredo, & Ellis, 2009; Stevens, 2014). This conservation could contribute to making these organisms capable of optimal investment in offspring (Griskevicius, Delton, Robertson, & Tybur, 2011). Finally, although relatively understudied compared to the former two virtues, inquisitiveness represents an intellectual domain. Inquisitiveness can be functionally related to non-directive exploratory behavior found in many species. These behaviors provide opportunities to identify additional environmental resources that increase inclusive fitness (e.g., Réale, Reader, Sol, McDougall, & Dingemans, 2007). Those embodying these virtues would appear capable of contributing to flourishing on the individual level, and to foster flourishing in others on a communal level. Although the adaptive function of virtue is likely to foster this flourishing, various downstream advantages may exist in selecting a prospective mate when individuals recognize the signal value of a display of virtue.

1.2. Contextual mate preferences

Successful reproduction in humans has historically relied upon the identification of physical and psychological traits in a prospective mate that would implicate that individual as capable of satisfying salient reproductive goals. Selection has specifically favored individuals who identified mates exhibiting traits connoting heritable fitness that would produce healthy offspring and behaviors that suggest a potential to invest in offspring (Trivers, 1972). It would be ideal to select who is both physically attractive, an indicator of good genes, and capable of exceptional parenting ability. However, it is largely improbable to find a mate capable of completely satisfying both reproductive goals equally. This improbability would thus necessitate individuals prioritizing one aspect of an ideal partner over the other, invoking a tradeoff.

The basis on which this prioritization is frequently made concerns the context of mating, that is, whether one is pursuing a short-term (STM) or long-term mating (LTM) strategy (Buss & Schmitt, 1993; Li et al., 2013). Individuals identify constellations of traits they would find contextually desirable for both contexts, as that constellation would ostensibly optimize their salient reproductive goals (e.g., Jonason, Raulston, & Rotolo, 2012; Jones et al., 2018). STM emphasizes the acquisition of multiple partners for uncommitted sexual encounters. Utilization of STM strategies involves the prioritization of selecting physically attractive mates (Kenrick, Groth, Trost, & Sadalla, 1993; Li & Kenrick, 2006), given its capacity to connote good genes (Thornhill & Gangestad, 2006; cf. Cai et al., 2019). Women prefer more muscular men in STM, given its connotation of good genes (Frederick & Haselton, 2007). Conversely, STM-oriented men particularly value features of women's bodies that purportedly connote fertility (e.g., narrow waists) to increase reproductive success (Brooks, Shelly, Jordan, & Dixon, 2015; Singh, Dixon, Jessop, Morgan, & Dixon, 2010). Furthermore, within this context, individuals select mates whom they infer as exhibiting a matched promiscuity through their behavior or appearance (Brown & Sacco, 2017; Brown, Sacco, & Medlin, 2019a), as similarly promiscuous mates would be willing to dissolve relations following a sexual encounter (Jonason & Buss, 2012).

Individuals interested in LTM are conversely motivated to establish monogamous, committed pairbonds and prioritize mates capable of providing that opportunity *in addition* to physical attractiveness. Altruistic individuals are particularly desirable in LTM, especially by women evaluating men (e.g., Barclay, 2010; Bhogal et al., 2020; Farrelly, 2013; Li, Bailey, Kenrick, & Linsenmeier, 2002; Margana, Bhogal, Bartlett, & Farrelly, 2019). In fact, altruistic and prosocial behavior in men is frequently regarded as a courtship display, while women may infer long-term mate potential through a prosocial behavioral repertoire in a male (Bhogal, Bartlett, & Farrelly, 2019; Ehlebracht, Stavrova, Fetchenhauer, & Farrelly, 2018; Griskevicius

et al., 2007). The presence of attractive female observers specifically heightens men's overall donations to charitable organizations (Iredale, Van Vugt, & Dunbar, 2008; Kawamura & Kusumi, 2017; Latane, 1970). Within these intersexual contexts, these behaviors could specifically signal men's likelihood of investing in long-term pairbonds and investing in offspring, thereby contributing to offspring's survival into adulthood. This would be particularly attractive to women, given their larger minimal costs in reproduction (e.g., gestation, lactation) compared to men (e.g., sperm provision) and interest in identifying mates most capable of offsetting these costs (Trivers, 1972).

The considerable costs women incur through reproduction would have resulted in especially judicious mate selection, thus resulting in their prioritization of other traits for LTM (Haselton & Buss, 2000). Women additionally prefer men with considerable access to resources and willingness to invest those resources into these relationships, a preference that has been documented cross-culturally, even when controlling for socioeconomic differences (Buss, 1989; Jonason, Li, & Madson, 2012; Walter et al., 2020; Zhang, Lee, DeBruine, & Jones, 2019). A further central challenge for LTM-oriented individuals is identifying mates capable of commitment and fidelity. Prosocial mates would solve this adaptive problem for both men and women. Selecting women whom men perceive as committed to a current pairbond would reduce concerns about paternal uncertainty; men's commitment similarly indicates a proclivity to commit resources to a current pairbond rather than allocating resources toward alternative relationships (Platek & Shackelford, 2006). Given what appears to be an interest in fostering flourishing, it would seem likely that those embodying a virtuous behavioral repertoire would be deemed particularly desirable in LTM.

1.3. Virtue as a cue to long-term mate quality

Inferences of LTM value through virtue could occur through various modalities. Most readily, previous findings have centered around espousals of morality in implicating oneself as a desirable long-term mate, particularly through reflexive adherence to social principles of care (i.e., a tendency toward deontology). The aversion to interpersonal harm typifying deontological thinking implicates such actors as conventionally prosocial and elicits perceptions of trustworthiness and disinterest in promiscuity, thereby augmenting their desirability in LTM domains (Brown, Keefer, Sacco, & Brown, 2020; Brown & Sacco, 2019; Everett et al., 2016; Medlin, Brown, & Sacco, 2018; Sacco, Brown, Lustgraaf, & Hugenberg, 2017). This espousal of care to acquire mating opportunities appears most apparent for men, as evidenced by previous work demonstrating experimentally heightened interest in LTM promotes men's public displays of benevolence, potentially reflecting a perception that women will attend to displays of character when identifying optimal fathers (Bleske-Rechek et al., 2006; Griskevicius et al., 2007). In fact, this prioritization of kindness emerges cross-culturally (Thomas et al., 2020).

The three domains of virtue may connote specific social affordances that would implicate a virtuous mate as being capable of solving reproductive problems. Highly caring mates would be especially capable of satisfying the primary quality individuals desire in a mate through kindness (Li et al., 2002). Mates high in self-control would likely be averse to promiscuous mating strategies (Gailliot & Baumeister, 2007; Schmitt & Shackelford, 2008), which would reduce concerns of infidelity. Finally, mates high in inquisitiveness could potentially exhibit greater flexibility in responding to the needs of parenting and pair-bonding.

Nonetheless, much like how espousals of conventional moral sentiment undermine STM desirability (Brown & Sacco, 2019), the social desirability of virtue may be limited. The altruism seen among caring individuals is optimally attractive at moderate levels, but not particularly high levels, as the latter may implicate a prospective mate as willing to allocate too many resources away from their own pairbond's

inclusive fitness (Bhagal et al., 2020). Additionally, the proposed capability to satisfy LTM needs may ultimately implicate virtuous mates as unwilling to, or incapable of, engaging in the conventions of short-term pair-bonding. Highly monogamous individuals may averse to the relational dissolution necessary to pursue multiple partners at one time (Jonason & Buss, 2012; Jonason, Garcia, Webster, Li, & Fisher, 2015).

1.4. Current research

The current research seeks to understand the downstream adaptive consequences in the emergence of virtue in mating domains. That is, as individuals develop a behavioral repertoire deemed virtuous and demonstrate a greater degree of prosociality that would facilitate group living, it seems likely that individuals would additionally perceive virtuous individuals as being particularly capable of solving goals relevant to LTM (e.g., Brown & Sacco, 2019). We specifically hypothesized that prospective mates espousing high levels of virtue would be more desirable in LTM than those espousing low levels of virtue. Additionally, because of the potential detriment of virtue in facilitating the acquisition of STM goals, we further hypothesized that highly virtuous individuals would be less desirable in STM than LTM.

The reproductive asymmetries that position women to incur more costs following a single act of intercourse further suggests women's selection of virtuous mates would be especially critical. This prompted us to hypothesize that women's preference for high levels of virtue in LTM would be greater than men's preference. Finally, although identifying each dimension of virtue could be advantageous in solving various reproductive problems, we were agnostic as to which dimension would be most informative in shaping reproductive decisions and offer no a priori predictions about which virtue is most desirable in LTM. That is, we considered which target would be most desirable in LTM on an exploratory level. We investigated these preferences through a pair of studies assessing specific contextual desirability of virtue (Study 1) in addition to dispositional interest in monogamy (Study 2). We report all measures, manipulations, and exclusion in this program of research while providing all data and materials in the following link: <https://osf.io/8ju2w/>

2. Study 1

Our first study considered the contextual desirability of each virtue by describing a behavioral repertoire for a prospective mate who either embodied the virtue to a high or low degree. We specifically tasked participants with assessing these prospective mates as either long- or short-term partners with the hypothesis that virtuous targets would be perceived as especially desirable in LTM. For this study, we utilized a 2 (Participant Sex: Male vs. Female; between-subjects) \times 3 (Target Virtue: Self-Control vs. Caring vs. Inquisitiveness; within-subjects) \times 2 (Virtue Level: High vs. Low; within-subjects) \times 2 (Context: STM vs. LTM; within-subjects) mixed experimental design.

2.1. Method

2.1.1. Participants

We recruited 159 undergraduates from a private university in the Northeastern U.S. in exchange for course credit (113 women, 46 men; $M_{Age} = 19.64$ years, $SD = 2.10$; 46.5% White). All participants self-reported espousing heterosexual attraction and being under 41 years of age, given the fact that the typical onset of menopause in women is between 40 and 65 (te Velde & Pearson, 2002), prompting us not to remove anyone from final analyses (Brown & Sacco, 2019). Because we did not conduct an a priori power analysis to determine our target sample size, we conducted a sensitivity analysis following completion of data collection using G*Power (Faul, Erdfelder, Lang, & Buchner, 2007). Results from this analysis for considering the mixed-model experimental design required to test our hypotheses indicated that 159

would sufficiently detect small effects (Cohen's $f = 0.06$, $\beta = 0.80$).

2.2. Materials

2.2.1. Virtue targets

Participants evaluated a series of 6 targets for their desirability. Specifically, we presented participants with brief descriptions of 6 prospective mates from a hypothetical dating site describing how each target approaches life. Importantly, targets were described as high or low in one of the three virtues that has emerged repeatedly through factor analyses of the VIA Inventory of Strengths (VIA-IS; e.g., McGrath, 2015; McGrath et al., 2018): caring, self-control, and inquisitiveness.

The verbal articulation of these vignettes was derived from converting the items from the VIA-IS-V3, a subset of items from the VIA Inventory that specifically assesses these virtues (McGrath, 2019), into third-person descriptions of each virtue. Positively scored items were used to create the high-virtue vignettes and reverse-scored items for the low-virtue vignettes. It should be noted that creating vignettes using reverse-scored items did not necessarily result in creating negatively valanced stimuli. Rather, low-virtue targets were described as not possessing the specific behavioral repertoires that would foster flourishing. Each target description was matched on length with descriptions that ensured no target category would necessarily be undesirable across all contexts. For example, with self-control, the target would be described as either having good self-restraint (high) or living in the “here and now” (low); although having good self-restraint may be especially desirable for a long-term partner to reduce concerns of infidelity, that restraint may be a dealbreaker short-term if the goal of the latter pairbond is promiscuity (Jonason et al., 2015). See Table 2 for example passages.

2.2.2. Contextual desirability

Targets were evaluated in terms of their specific contextual desirability along two separate Likert-type scales for LTM and STM on 9-point scales to allow participants considerable latitude in indicating the desirability of each target above and below a decidedly neutral midpoint (1 = *Very Undesirable*; 5 = *Neutral*; 9 = *Very Desirable*). Both items additionally defined what constituted each context, namely that a mate for LTM would be suitable for a long-term romantic relationship, whereas STM would be suitable for short-term dating or one-night stands (Brown & Sacco, 2018). Participants' desirability ratings were not significantly correlated with each other ($r = 0.14$, $p = 0.076$), suggesting LTM and STM preferences are orthogonal to each other and therefore should be considered separately as a within-subjects factor.

2.3. Procedure

Consenting participants initially indicated their age, race, and sex before being directed to evaluate opposite-sex targets in a hypothetical dating site. Targets were presented in a randomized order. Upon completion of evaluation, participants were debriefed.

2.4. Results

We submitted our data to a 2 (Participant Sex: Male vs. Female) \times 3

(Target Virtue: Self-Control vs. Caring vs. Inquisitiveness) \times 2 (Virtue Level: High vs. Low) \times 2 (Context: STM vs. LTM) mixed-model ANOVA with repeated factors over the latter three factors. A Virtue Level main effect indicated that high-virtue targets were more desirable ($M = 6.18$, $SD = 1.99$) than low-virtue targets ($M = 3.30$, $SD = 2.21$), $F(1, 156) = 259.69$, $p < 0.001$, $\eta_p^2 = 0.625$. A Target Virtue main effect additionally emerged, $F(2,312) = 9.23$, $p < 0.001$, $\eta_p^2 = 0.056$. Post hoc LSD tests indicated that self-control was the most desirable virtue ($M = 4.89$, $SD = 2.14$), followed by inquisitiveness ($M = 4.87$, $SD = 2.07$), and then caring ($M = 4.45$, $SD = 2.09$). Caring was significantly different from both self-control ($p = 0.001$, $d = 0.21$) and inquisitiveness ($p < 0.001$, $d = 0.20$); self-control and inquisitiveness did not differ ($p = 0.958$, $d = 0.01$). A main effect for Context indicated that targets were more desirable for LTM ($M = 4.93$, $SD = 1.92$) than STM ($M = 4.55$, $SD = 2.28$), $F(1, 156) = 6.80$, $p = 0.010$, $\eta_p^2 = 0.042$. Another main effect of Participant Sex indicated that men found their respective targets more desirable ($M = 5.03$, $SD = 0.71$) than did women ($M = 4.64$, $SD = 0.85$), $F(1, 156) = 9.32$, $p = 0.003$, $\eta_p^2 = 0.056$.

2.4.1. Sex differences

Effects were initially qualified by a Participant Sex \times Virtue Level interaction, $F(1, 156) = 10.50$, $p < 0.001$, $\eta_p^2 = 0.063$ (Fig. 1). Simple effects tests indicated that men found high-virtue targets more desirable than low-virtue targets, $F(1, 156) = 58.46$, $p < 0.001$, $\eta_p^2 = 0.273$. Conversely, and consonant with hypotheses, women also found high-virtue targets more desirable than low-virtue targets but to a much greater extent, $F(1, 156) = 321.69$, $p < 0.001$, $\eta_p^2 = 0.2673$. Nonetheless, simple effects tests indicated men and women did not differ in their preference for the high-virtue targets, $F(1, 156) = 0.35$, $p = 0.553$, $\eta_p^2 = 0.002$. Men unexpectedly found the low-virtue targets more desirable than did women, $F(1, 156) = 16.93$, $p < 0.001$, $\eta_p^2 = 0.098$. See Table 3 for descriptive statistics in this analysis.

2.4.2. Three-way interaction

Effects were most superordinately qualified by a Target Virtue \times Virtue Level \times Context interaction, $F(2, 312) = 13.61$, $p < 0.001$, $\eta_p^2 = 0.080$. We decomposed the 3-way interaction by conducting three subordinate 2-way repeated ANOVAs, one for each virtue wherein we collapsed across Participant Sex. Effects for each analysis were qualified by significant 2-way interactions. The self-control effect was the largest, $F(1, 157) = 163.04$, $p < 0.001$, $\eta_p^2 = 0.509$ (see Fig. 2a). This was followed by caring $F(1, 157) = 140.51$, $p < 0.001$, $\eta_p^2 = 0.471$ (Fig. 2b), and then inquisitiveness $F(1, 157) = 56.90$, $p < 0.001$, $\eta_p^2 = 0.266$ (Fig. 2c); this prompted us to decompose each subordinate interaction. No other superordinate interactions emerged, $F_s < 2.10$, $p_s > 0.125$. See Table 4 for the descriptive statistics presented in the forthcoming analyses.

2.4.2.1. Self-control. Simple effects for self-control indicated no difference in the desirability of the low self-control and high-self-control targets in STM, $F(1, 157) = 0.24$, $p = 0.622$, $\eta_p^2 = 0.002$. Conversely, and consonant with predictions, participants found the high-self-control target more desirable in LTM than the low-self-control target, $F(1, 157) = 312.09$, $p < 0.001$, $\eta_p^2 = 0.065$. Viewed another

Table 2

Example passages from each vignette. Note. These are examples from male targets; the same phrasing was applied to female targets.

	High	Low
Care	“...is quite open with his feelings and does not find it difficult to express his love for others.”	“...he does not like to express his feelings and finds it entirely too difficult to express his love for others.”
Self-control	“...is focused on the future and will often restrain himself from acting impulsively in the moment so that he may have greater successes in the future.”	“...is focused on the ‘hear and now,’ and will often act impulsively so that he may have optimum pleasure at any given time.”
Inquisitiveness	“...a desire to understand everything simply for the sake of understanding it.”	“...not really interested in learning something new unless he sees something practical about it.”

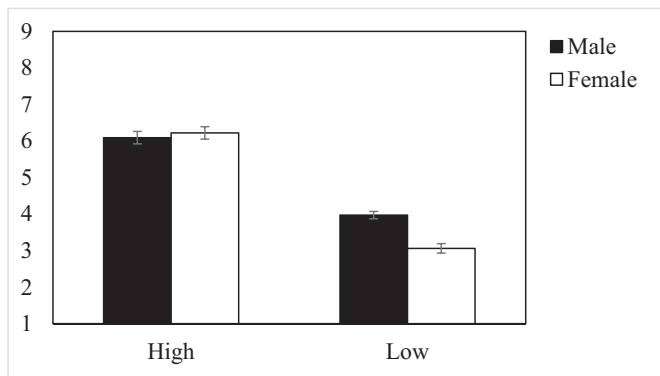


Fig. 1. Men's and women's reported desirability of high- and low-virtue targets, with standard error bars.

Table 3
Mean desirability ratings (and standard deviations) of high- and low-virtue ratings for men and women from Study 1.

	High virtue	Low virtue
Male	6.09 (1.17)	3.97 (1.20)
Female	6.22 (1.09)	3.06 (1.43)

way, the high-self-control target was more desirable in LTM than in STM, $F(1, 157) = 127.07, p < 0.001, \eta_p^2 = 0.447$; the low-self-control target was more desirable in STM than in LTM, albeit at a reduced magnitude, $F(1, 157) = 54.16, p < 0.001, \eta_p^2 = 0.256$.

2.4.2.2. Caring. Unexpectedly, simple effects for caring indicated that participants viewed the high-caring target as more desirable in STM than the low-caring target, $F(1, 157) = 50.81, p < 0.001, \eta_p^2 = 0.243$. Consonant with predictions, the high-caring target was also more desirable in LTM than the low-caring target, although this effect was substantially larger, $F(1, 157) = 587.72, p < 0.001, \eta_p^2 = 0.788$. Viewed another way, the high-caring target was more desirable in LTM and in STM, $F(1, 158) = 151.62, p < 0.001, \eta_p^2 = 0.490$; the low-caring target was more desirable in STM than in LTM, $F(1, 157) = 21.44, p < 0.001, \eta_p^2 = 0.119$.

2.4.2.3. Inquisitiveness. Simple effects for inquisitiveness indicated participants viewed the high-inquisitiveness target as more desirable in STM than the low-inquisitiveness target, $F(1, 157) = 71.46, p < 0.001, \eta_p^2 = 0.313$. Consonant with predictions, high-inquisitiveness target was also more desirable in LTM than the low-inquisitiveness target, $F(1, 157) = 250.29, p < 0.001, \eta_p^2 = 0.615$. Viewed another way, the high-inquisitiveness target was more desirable in LTM than in STM, $F(1, 157) = 27.68, p < 0.001, \eta_p^2 = 0.150$; the low-inquisitiveness target was more desirable in STM than in LTM, $F(1, 157) = 22.52, p < 0.001, \eta_p^2 = 0.125$.

Table 4
Mean contextual desirability ratings (and standard deviations) of high- and low-virtue mates across all three domains from Study 1.

	LTM		STM	
	High	Low	High	Low
Self-control	7.08 (1.72)	2.99 (2.17)	4.84 (2.51)	4.70 (2.18)
Care	7.55 (1.68)	2.88 (2.02)	5.06 (2.26)	3.10 (2.40)
Inquisitiveness	6.91 (1.99)	2.95 (2.05)	5.78 (2.14)	3.84 (2.19)

2.5. Discussion

Results from Study 1 provided mixed support for the initial hypotheses. Most consonant with the hypotheses, there was a considerable preference for targets embodying virtuous principles for LTM compared to those who appeared low in virtue. Given that virtuous individuals are argued to contribute considerably to individual and communal flourishing (McGrath, in press), this finding suggests an adaptive advantage to selecting a virtuous mate who could be capable of effectively satisfying the most salient goals of LTM (e.g., monogamy, child care) in the form of investment that would allow any offspring from this pair-bond to survive into adulthood to reproduce themselves (Li et al., 2013). Conversely, when comparing the desirability of virtuous targets being more desirable for LTM than STM and low-virtue targets being more desirable for STM than LTM. This result could reflect the greater desirability of high virtue in LTM while also recognizing greater potential costs of virtue in STM (e.g., clinginess, lack of dominance) to where people would reduce their interest in virtue for such contexts, because these individuals would be less comfortable with satisfying STM goals (i.e., promiscuous mating strategies) than someone reporting lower levels of virtue (Jonason & Buss, 2012; Lyons, Marcinkowska, Helle, & McGrath, 2015).

A more exploratory part of this analysis attempted to determine which virtue was most valued. Our findings suggest that high levels of self-control may be the most crucial virtue in identifying a contextually desirable mate. This is evident in both the especially large preference for self-control in LTM relative to the other two and the lack of preference for self-control in STM. This finding could represent an understanding that high levels of self-control may implicate someone as disinterested in the promiscuity necessary for STM (Schmitt & Shackelford, 2008). However, the lack of a self-control effect for STM could reflect additional costs for a lack of self-control regardless of context. The desirability of self-control in LTM suggests its overall importance in facilitating the monogamy requisite for LTM.

Interestingly, and contrary to the hypotheses, targets espousing high levels of both caring and inquisitiveness were more desirable in STM than those espousing low levels. This discrepancy could reflect the overall importance of kindness that persists across contexts (Li et al., 2002) and the potential benefits for inquisitiveness in both LTM (e.g., increased resource access) and STM (e.g., aloofness that would prevent

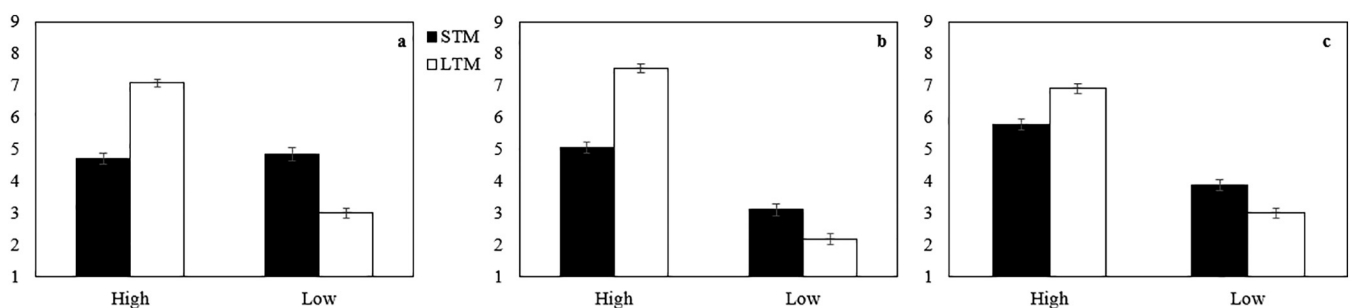


Fig. 2. Contextual desirability of targets high and low in self-control (a), care (b), and inquisitiveness (c), with standard error bars.

a partner from being clingy; Nettle & Clegg, 2006). Despite a level of sensitivity to these results, several were nonetheless not predicted and warranted further consideration. We extended these findings further in Study 2 by considering dispositional interest in monogamy through sociosexuality.

3. Study 2

Life History Theory posits that variation in dispositional mating strategies, which are an evolved response to environmental variation, exists at both between- and within-species levels. Individuals living in harsh, unpredictable environments are likely to benefit more from using a fast life strategy, as such environments would increase the likelihood of mortality, which necessitates early maturation to mitigate the chance of dying before reproduction (Brumbach et al., 2009). Conversely, those in a harsh, but predictable, environment adopt slow life history strategies, which emphasize delayed development and reproduction to ensure increased investment in offspring that facilitate their survival into adulthood. Humans populations notably vary in their use of life history strategies, ensuring at least some can reproduce regardless of environmental changes in harshness and unpredictability.

This natural variability is frequently conceptualized in terms of sociosexuality, a dispositional interest in monogamous (versus promiscuous) mating strategies. This interest exerts considerable influence over various mate choices (Simpson & Gangestad, 1992), including the prioritization of traits in prospective mates conducive to optimizing salient reproductive goals. Those preferring LTM strategies are described as possessing a restricted sociosexuality that fosters interest monogamous pairbonding, which would be conducive to a slow life history. Conversely, those preferring STM possess an unrestricted sociosexuality that fosters facilitates promiscuity, the preferred strategy for fast life history strategies. Sociosexually restricted individuals exhibit a more benevolent interpersonal style, as indexed by high levels of honesty and agreeableness, and are more conscientious (Schmitt & Shackelford, 2008; Strouts, Brase, & Dillon, 2017). These personality profiles align with what could be deemed as virtuous and could be the basis of an assortative mating strategy in which individuals select mates with similar attitudes. Indeed, those with more restricted attitudes toward mating (i.e., opposition to STM) report greater interest in mating strategies that signal benevolence (Medlin et al., 2018) and even disparage prospective mates who do not espouse conventional morality (Moon et al., in press).

These differential preferences prompted us to consider individual differences in sociosexuality as a predictor for interest in virtue to complement the results from Study 1 identifying explicit contextual desirability. We specifically hypothesized that sociosexually restricted individuals would report greater interest in prospective mates who espouse high levels of virtue compared to those reporting an unrestricted sociosexuality. Further, given results of Study 1, we hypothesized that women would report greater preferences for high-virtue mates compared to men. Because we do not have specific predictions for which virtue would be most preferred among restricted individuals, we considered preferences for each variable on an exploratory level. We utilized a 2 (Participant Sex: Male vs. Female; between) \times 3 (Target Virtue: Self-Control vs. Caring vs. Inquisitiveness) \times 2 (Virtue Level: High vs. Low) experimental design for the current study that considered sociosexuality as a moderator.

3.1. Method

3.1.1. Participants

We recruited 212 participants from a mid-sized public university in the Southeastern U.S. in exchange for course credit. We excluded 12 participants from final analyses for reporting themselves as espousing no heterosexual attraction or being older than 40. This resulted in a final sample of 200 participants (164 women, 36 men; $M_{\text{Age}} = 20.43$,

$SD = 2.71$; 54% White). Using a sensitivity analysis considering the required mixed-model design and continuous moderator to analyze these data, we determined our sample was sufficiently powered for a medium effect size (Cohen's $f = 0.22$, $\beta = 0.80$).

3.1.2. Materials

3.1.2.1. Behavioral attraction. Participants evaluated the same six opposite-sex targets from Study 1 in a randomized order, albeit in a different capacity. Specifically, we tasked participants with indicating how interested they would be to interact with each target via messaging through a hypothetical dating site (e.g., Medlin et al., 2018). This would serve as an index of behavioral attraction that was additionally of specific STM and LTM contexts (Montoya, Kershaw, & Prosser, 2018). This was operationalized by a single-item 7-point Likert-type (1 = *Not at All*; 7 = *Very Much*).

3.1.2.2. Sociosexuality. Participants reported their dispositional interest in promiscuous mating strategies using the Sociosexual Orientation Inventory-Revised (SOI-R; Penke & Asendorpf, 2008). This 9-item scale consists of three 3-item subscales assessing attitudes (e.g., "Sex without love is okay," $\alpha = 0.86$), behavior (e.g., "With how many different partners have you had sex in the past week?," $\alpha = 0.87$), and desire (e.g., "How often do you have fantasies about having sex with someone with whom you do NOT have a committed romantic relationship?," $\alpha = 0.87$). Subscales were further moderately correlated with each other ($r_s = 0.41$ – 0.52), prompting us to aggregate them.

3.2. Procedure

Consenting participants were directed to their respective opposite-sex targets which they evaluated in randomized order based on their provided demographics information. This was followed by completion of the SOI-R and debriefing.

3.3. Results

We analyzed these data using a 2 (Participant Sex: Male vs. Female) \times 3 (Target Virtue: Self-Control vs. Caring vs. Inquisitiveness) \times 2 (Virtue Level: High vs. Low) mixed-model custom ANCOVA with repeated factors over the latter two factors and SOI-R as a custom covariate to test for interactive effects between categorical and continuous moderators. Such an analytic strategy reduces the number of omnibus analyses, reducing the familywise error rate (Sacco & Brown, 2018). A main effect of Target Virtue indicated that participants reported greater attraction toward high-virtue targets ($M = 5.64$, $SD = 1.33$) than low-virtue targets ($M = 2.15$, $SD = 1.31$), $F(1, 193) = 104.67$, $p < 0.001$, $\eta_p^2 = 0.352$. Results were most super-ordinately qualified by a Target Virtue \times Virtue Level \times SOI-R interaction, $F(1.88, 364.11) = 5.37$, $p = 0.006$, $\eta_p^2 = 0.027$. No other main effects or superordinate interactions emerged, $F_s < 2.54$, $p_s > 0.083$.

We decomposed this interaction by conducting three subordinate one-way ANCOVAs, one for each virtue, by comparing responses at high and low levels using SOI-R as a custom covariate (collapsed across sex). Effects for self-control were qualified by a subordinate 2-way interaction, $F(1, 197) = 4.35$, $p = 0.038$, $\eta_p^2 = 0.022$. In decomposing this interaction by individually correlating SOI-R with attraction to high- and low-self-control targets separately, we found that more sociosexually restricted individuals expectedly reported less attraction toward the low-self-control target ($r = 0.20$, $p = 0.003$); unexpectedly, no association emerged for high-self-control targets ($r = -0.02$, $p = 0.726$). A Fisher Z-test indicated these correlations were significantly different from each other, $Z = -2.21$, $p = 0.027$. Contrary to predictions, no interactions emerged for caring or inquisitiveness, prompting us to consider them no further, $F_s < 2.56$, $p_s > 0.100$.

3.4. Discussion

Results from this study provided additional nuance to the findings reported in Study 1 by demonstrating how individual differences in sociosexuality predict preferences for virtuous behaviors, albeit in an unexpected capacity. First, no evidence emerged indicating that sociosexually restricted individuals reported greater attraction toward those embodying high levels of virtue. This finding mirrors results from Study 1 suggesting that caring and inquisitiveness are nonetheless desirable irrespective of whether one is looking for a long- or short-term mate because of the potential benefits for a caring and inquisitive mate in both contexts (e.g., Li et al., 2002; Nettle & Clegg, 2006).

The lack of effects for high levels of self-control could additionally reflect that these effects could be less rooted in attraction to desirable traits and more rooted in an aversion to undesirable traits (Zebrowitz & Rhodes, 2004). That is, individuals may weigh the costs of selecting a suboptimal long-term mate more heavily than the benefits of an optimal mate, which would result in the derogation of those incapable of meeting reproductive needs. Previous work has conceptualized this so-called *bad gene aversion* largely through physical features connoting a lack of heritable fitness that would increase the likelihood of individuals producing unhealthy offspring (see Brown, Sacco, & Medlin, 2019b). Similar principles could have been the basis of the current findings, with participants recognizing the costs of a partner with low self-control for LTM. Given the importance of biparental investment for long-term pairbonds, selecting such a mate could leave individuals vulnerable to increased concerns for paternal uncertainty or the diversion of resources from the current pairbond in favor of another (Platek & Shackelford, 2006).

4. General discussion

The current program of research found initial evidence demonstrating how traits implicated in individual and communal flourishing can become the basis of mate selection, primarily in a long-term mating context. In Study 1, participants deemed prospective mates embodying the three virtues at a higher degree as particularly desirable in LTM. This heightened desirability may suggest that selecting a virtuous partner solves specific reproductive problems as related to finding a partner capable of optimizing monogamous pairbonding. Specifically, these partners would solve these problems by providing continual warmth and kindness to each other and their offspring (caring), ensuring to their partner that they are trustworthy and unlikely to increase paternal uncertainty of concerns of resource diversion (self-control), and demonstrating continued potential to acquire resources for the pairbond.

Although individuals typically have an idea of what constitutes an optimum long- and short-term mate (Buss & Schmitt, 1993; Li et al., 2013), results from Study 2 nonetheless indicated that a dispositional preference for using LTM strategies uniquely predicts interest in engaging a prospective mate based on their espoused virtue. Specifically, sociosexually restricted individuals reported an aversion to those reporting low levels of self-control, a preference that appears driven by an aversion to mates who would be especially incapable of biparental investment.

This specified preference based on self-control aligns with findings in Study 1 showing that self-control was specifically preferred for LTM, whereas caring and inquisitiveness were preferred in STM because of the possibility that these latter virtues could have benefits in short-term contexts (Li et al., 2002). For example, although women prefer men with dominant behavioral repertoires in STM (Frederick & Haselton, 2007), this dominance may nonetheless leave women vulnerable to greater likelihood of exploitation from a partner within the brief period of the relationship. A preference for caring in STM could serve to minimize this likelihood of exploitation. This finding may further provide nuance in the identification of which aspects of the moral domain

are considered undesirable in STM. Whereas caring was nonetheless preferred in STM, albeit at a reduced magnitude, previous findings suggest that deontological strategies, including those that disallow harm to befall others, are categorically undesirable (Brown & Sacco, 2019). A potential basis for this difference could be rooted in the fact that the prosociality of deontological decisions is based in rule adherence. Deontological tendencies may thus not signal benevolence as effectively explicit descriptions of a person's genuine interest in helping others irrespective of social rules (Capraro et al., 2018). Future research would benefit from specifically identifying which aspect of care is specifically desirable in STM and LTM.

Only one sex difference emerged in overall desirability in the form of men's heightened interest in low-virtue mates relative to women. Although this lack of sex difference was not specifically predicted, it remains nonetheless unsurprising. This difference could reflect sex-specific minimal standards for a mate rooted in women's considerable judiciousness compared to men (Haselton & Buss, 2000). That is, women's criteria to identify men as viable mates are typically higher compared to men's criteria for women (Kenrick et al., 1993). This difference could reflect specific adaptations related to reproductive asymmetries men and women face that necessitate women selecting higher quality mates to minimize the potential costs of reproduction. For men, the lower costs of reproduction could have resulted in having lower mate criteria to facilitate their acquisition of more mates compared to women (Schmitt, 2003). The sex similarity reported in preferences for high virtue may simply be rooted in the fact that both men and women would prefer high-quality mates. Such a principle may be bolstered by the fact that prosociality could have evolved through a mutual mate choice to select those more capable of engaging their partner fully (Bhagal et al., 2019). These results further did not emerge when considering sociosexuality as a moderator in Study 2, which necessitates future research to determine how robust these sex differences are.

In further identifying a basis for the discrepancies of findings in Studies 1 and 2, it could be possible that Study 1 was specifically assessing partner ideals, whereas Study 2 could have been assessing actual mate choices through a behavioral attraction measure (Eastwick & Finkel, 2008). Although men and women's mate preferences do indeed predict actual mate choices in theoretically predicted capacities (Li et al., 2013; Meltzer, McNulty, Jackson, & Karney, 2014), whether such principles specifically apply to virtue nonetheless remains an empirical question that necessitates future research. Future work would benefit from considering additional measures of behavioral attraction toward virtuous mates (Montoya et al., 2018). This could include, for example, the use of ipsative scales that would force participants to decide between high- and low-virtue targets across contexts (Jonason, Luevano, & Adams, 2012), paradigms that measure proximity between participants and prospective mates (Kawakami, Phills, Steele, & Dovidio, 2007), and sustained eye gaze toward a mate (e.g., Cappella, 1981). Moving in a more ecologically valid direction, future research could benefit from using a speed dating paradigm, wherein partners interact with confederates espousing high or low levels of virtue before selecting the person they would like to see further for a potential romantic relationship or one-night stand (e.g., Finkel, Eastwick, & Matthews, 2007; Valentine, Li, Penke, & Perrett, 2014).

4.1. Limitations and future directions

Though the current program of research provides initial evidence for how virtue shapes mate preferences, several limitations present themselves. One of the most notable is our consideration of virtues individually. Our descriptions of each prospective mate focused on single virtues without considering different possible constellations of virtue that would afford us the opportunity to identify which unique combinations of high and low virtue would be deemed most desirable. Future research would benefit from presenting these combinations of

high and low levels for individual targets to identify which aspects of virtue are indeed more desirable and which could potentially invoke tradeoffs for selection, which would be possible through a conjoint analysis (Mogilski, Vrabell, Mitchell, & Welling, 2019).

Although Study 2 provided evidence for how dispositional motivation to acquire a long-term mate predicts preferences in prospective mates as a function of their virtue, such evidence nonetheless lacks an understanding of causality. Because of humans' understanding of what mates constitute optimal LTM and STM opportunities and their capability to use both strategies (Figueredo & Jacobs, 2000), it could be possible for situationally primed LTM motives to influence interest in these targets. A future study could prime participants with contextual mating motives before having them evaluate prospective mates based on their virtue, a paradigm that calibrates individuals' perceptions and behaviors to facilitate either STM or LTM (e.g., Brown & Sacco, 2019; Griskevicius et al., 2007).

In considering the overall desirability of virtue across mating contexts, it could be possible that individuals ultimately down-regulate their preference for virtue in the presence of another cue connoting overall mate value. For example, because of the prioritization of physical attractiveness in STM, particularly among women (Frederick & Haselton, 2007; Jones et al., 2018; Li et al., 2013), it could be possible that individuals would be willing to incur the costs of a low-virtue mate in the presence of good gene cues that would offset these costs. Future research could directly test for this potential tradeoff by presenting images of attractive and unattractive mates with the descriptions of these behaviors. If the benefit of attractiveness is weighted more heavily in STM than is virtue, individuals should be particularly willing to incur the tradeoff of selecting a low-virtue mate in the presence of good gene cues to offset potential costs.

5. Conclusion

The identification and selection of a high-quality long-term mate is crucial to humans' ability to facilitate the biparental investment necessary to ensure an offspring's flourishing. Therefore, it would be advantageous to identify prospective mates with behavioral repertoires that would foster their own flourishing or that of their community. The current program of research considered this propensity through the three domains of virtue and how individuals embodying care, self-control, and inquisitiveness are deemed desirable. We found evidence that such virtues are indeed desirable, albeit with additional nuance suggesting some level of desirability in both LTM and STM. We further demonstrated that self-control appears to be particularly valued in LTM. This work stands to inform how an interest in flourishing may have evolutionary roots and how it facilitated mating.

CRedit authorship contribution statement

Mitch Brown: Conceptualization, Data curation, Formal analysis, Writing - original draft. **Bina Westrich:** Writing - review & editing. **Francesca Bates:** Writing - review & editing. **Alec Twibell:** Writing - review & editing. **Robert E. McGrath:** Supervision, Writing - review & editing.

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