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Further evidence that only children are not more narcissistic than individuals with siblings

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Abstract

Are only children more narcissistic than individuals with siblings? Prior research on the topic has produced conflicting and/or inconclusive results. Dufner et al., 2019 published a recent and widely reported empirical test of this hypothesis and concluded that only children are not more narcissistic than non-only children. One of their acknowledged limitations was that their study was limited to the German population. They called for additional tests in other countries. In this paper, we report results from a high-powered test of this hypothesis using multiple measures of narcissism (i.e., two full-scale and 10 facet-level measures) and a large sample (N = 8,689) of American college students. Despite this study possessing extraordinary statistical power, we likewise fail to observe any notable differences in narcissism between only children and non-only children. Follow up equivalence and Bayesian testing suggested generally strong to very strong support for the null hypothesis that only children and non-only children are equivalent in terms of narcissism.

Further evidence that only children are not more narcissistic than individuals with siblings

There is a long history of only children (OC) being assumed to be psychologically different than non-only children (NOC). More than a century ago, pioneering psychologist, G. Stanley Hall, declared,

> "Being an only child is a disease in itself…Because of the undue attention he [or she] demands and usually receives, we commonly find the only child jealous, selfish, egotistical, dependent, aggressive, domineering, or quarrelsome." (as cited in Fenton, 1928, p. 547)

Since then, numerous studies have examined the putative role that being an OC versus a NOC (as well as birth order, if a NOC) plays in shaping personality (e.g., Campbell, 1933; MacDonald, 1971; Mõttus et al., 2008; Sulloway, 1997). Although it is theoretically plausible that OC would exhibit different personalities than NOC—for example, a number of theories posit that personality is shaped in part by parent-child interactions and familial roles, which may differ between OC and NOC (Roberts, 2018; Thomaes & Brummelman, 2018)—personality differences between OC and NOC appear to be the exception rather than the rule (Mõttus et al., 2008).

The quote referenced above by G. Stanley Hall (as cited in Fenton, 1928, p. 547) clearly connotes a maligning set of expectations regarding OC. Indeed, several of the descriptors, such as "selfish," "egotistical," and "domineering" almost directly imply that OC will be more narcissistic than NOC. This is consistent with widely held stereotypes regarding OC. For example, Mõttus et al. (2008) demonstrated that raters perceive OC as possessing markedly lower levels of warmth and agreeableness compared to NOC. More specifically, Dufner et al. (2019) recently showed that OC are perceived to be more narcissistic than NOC and that the perceived difference is "very large" by current standards of assessment (Funder & Ozer, 2019).

A handful of studies have directly tested whether OC are actually more narcissistic than NOC and they have produced conflicting and/or inconclusive findings. For example, Cai et al. (2012) tested two large samples of Chinese participants (Sample 1: 4445 OC, 6200 NOC; Sample

2: 6679 OC, 8743 NOC) and found small differences (*d*s = .14 and .12, respectively) between OC and NOC with OC reporting slightly higher levels of narcissism. There is some reason to think this difference might be localized to China. As Cai et al. noted in their paper, China's one-child-per-family policy dramatically increased the number of OC and may have increased the level of overvaluation of OC by parents and grandparents (Kuotai & Jing-Hwa, 1985), with overvaluation being a key ingredient theorized to contribute to the development of narcissism (Thomaes & Brummelman, 2018). Watson and Biederman (1989), in contrast, found no differences in narcissism between OC and NOC in an American sample, although their sample was considerably smaller (54 OC, 324 NOC) and possibly too small from which to draw conclusions. Three additional studies also reported conflicting findings, although the sample sizes in these studies were far too small (*N*s < 80) to draw conclusions from (Curtis & Cowell, 1993; Eyring & Sobelman, 1996; Joubert, 1989).

Most recently, Dufner et al. (2019)—hereafter referred to as DUF2019—conducted a direct test of the hypothesis that OC are more narcissistic than NOC using a large and representative sample of 1810 German citizens (233 OC, 1577 NOC). They observed no differences in narcissism between OC and NOC. In their discussion, they noted the need for additional research outside of Germany to test the generalizability of this null result. Testing whether this null result generalizes to the United States is especially important considering the US has arguably the highest rates of narcissism in the world (Foster et al., 2003) and thus may have cultural elements that permit narcissism to flourish in OC. Additionally, Bayesian testing reported in DUF2019 produced evidence for the null hypothesis that was near the threshold suggesting "moderate" support for one of the two narcissism outcomes tested (Lee & Wagenmakers, 2013). This, combined with the Cai et al. (2012) study that reported slightly higher narcissism in OC versus NOC, suggests the need for additional research and prompted the present study.

We possess a large dataset (*N* = 8,689; 885 OC, 7,804 NOC) of undergraduate students enrolled at a medium-sized university in the Southeastern United States who completed measures of narcissism and number of siblings. Although not fully representative of the general population of the United States, we see no obvious reason that, if being an OC is associated with higher narcissism, we would not observe this effect in a large sample of college students. Our sample, although not quite as large as those tested in Cai et al. (2012), is nearly five times the size of that tested in DUF2019 and offers extraordinary power to detect even very small differences. Additionally, our dataset contains two validated measures of narcissism: the Narcissistic Personality Inventory (NPI; Raskin & Terry, 1988), which is the most widely used measure of narcissism in the narcissism literature, and the Grandiose Narcissism Scale (GNS; Foster et al., 2015), which can reliably measure highly specific facets of narcissism, such as entitlement. Given the sample size and diversity of narcissism measures, we believe this study offers a particularly good chance to detect differences in narcissism between OC and NOC, if they exist.

Method

This study was not preregistered. All data used in this study can be found at: https://osf.io/ecp9z/?view_only=471a9ac5d3124806a705f47bc14833fd. A sample of 9,261 participants completed measures of narcissism and demographic characteristics, including number of siblings. Five-hundred thirty-six participants (6% of the original sample) were excluded because they reported not being American. This exclusion did not affect the results but was done because a primary purpose of this study was to test whether the results from the DUF2019 study conducted on a German sample generalized to an American sample. An additional 36 participants (<1% of the American sample) were removed because they did not answer the question assessing number of siblings. This left a final sample of 8,689 participants (66% female; 66% white, 26% black, 3% Asian, 2% Hispanic, 1% Native American, 3% other ethnicities; *M* age = 19.70, *SD* = 3.80, *Range* = 16 to 50).

The question assessing number of siblings read: "How many siblings (i.e., brothers or sisters) do you have? [Only count step-siblings or half-siblings if they lived with you most of the time you were growing up.]" Eight-hundred eighty-five (10%) participants reported being OC. Of the participants who reported being NOC, 3,241 (37%) reported one sibling, 2,423 (28%) two siblings, 1,150 (13%) three siblings, and 990 (11%) four or more siblings.

Participants completed two measures of narcissism: the Narcissistic Personality Inventory (NPI; Raskin & Terry, 1988) and the Grandiose Narcissism Scale (GNS; Foster et al., 2015). The NPI consists of 40 pairs of statements (e.g., "Modesty doesn't become me" vs. "I am essentially a modest person"). For each pair, participants select the statement that best describes them. One point is awarded each time participants select the more narcissistic statement. Total scores can range from zero to 40, with higher scores reflecting higher levels of narcissism. The GNS consists of 33 items (e.g., "If it's just me versus another person, I almost always win.") that participants respond to using a six-point Likert-type scale (1 = strongly disagree, 6 = strongly agree). Total scores can range from 33 to 198, with higher scores reflecting higher levels of narcissism.

In addition to the full-scale NPI and GNS, 10 subscales (narcissism facet-level) scores were computed. Three subscale scores were computed from the NPI based on recommendations by Ackerman et al. (2011): leadership/authority, grandiose exhibitionism, and entitlement/exploitativeness. Seven subscales were computed from the GNS based on recommendations from Foster et al. (2015): authority, self-sufficiency, superiority, vanity, exhibitionism, entitlement, and exploitativeness.

Power Analysis. The principal hypothesis, that OC would be more narcissistic than NOC, was tested using an independent samples t-test. We used G*Power software (version 3.1) to estimate statistical power of this test given our sample and group sizes. There were 885 participants in the OC group and 7,804 participants in the NOC group (df = 8,687). This

afforded 99.8% power to detect a "very small" effect (d = .17[1]) (Funder & Ozer, 2019) using a two-tailed test (i.e., detecting whether OC are more *or* less narcissistic than NOC).

Results

Analysis Plan

OC and NOC were first compared using t-tests of their raw mean (i.e., no covariates) narcissism total and facet-level scores. These comparisons were followed up with equivalence and Bayesian testing to more firmly establish the extent to which results obtained from the t-tests favored the null/alternative hypotheses.[2] Covariates (age, gender, race/ethnicity, and native language) were then controlled for in a set of ANCOVA tests. These tests were once again followed up with Bayesian testing to test the extent to which results favored the null/alternative hypotheses.

All analyses were performed in Jamovi (version 1.2) and JASP (version 0.1), both open-source statistical software packages that run on top of the R (version 3.6) statistical environment (JASP Team, 2019; R Core Team, 2019; The Jamovi Project, 2020). Jamovi and JASP can both do most of the analyses reported in this paper. The one exception to this is the equivalence testing, which relies on the TOSTER module and is currently only available in Jamovi.

Comparison of Raw Means

Null hypothesis significance testing (NHST). OC were compared to NOC on both the full-scale scores and 10 different facet-level scores derived from the NPI/GNS. For this first set of comparisons, the raw means (no covariates) obtained from OC and NOC were compared using two-tailed t-tests. The results of these comparisons are shown in Table 1. Of the 12 different comparisons, only one reached statistical significance. That was for the GNS subscale measuring superiority and showed that OC (M = 12.72, SD = 4.10) reported *less* superiority than

[1] Funder and Ozer (2019) based their recommended guidelines for effect size descriptions (e.g., "very small") on Pearson's r, which can be converted to Cohen's d. With groups sizes of 885 and 7,804, a d of .17 equals an r of .05, which was the value Funder and Ozer recommended be described as a "very small" effect.

[2] We are grateful to Daniël Lakens for reading a preprint of this paper and suggesting that we conduct equivalence and/or Bayesian testing to more firmly establish the null results.

NOC (M = 13.09, SD = 4.15), $t(8687) = -2.52$, $p = .01$. The effect size of this difference was very small, $d = -.09$. The effect sizes of the other 11 comparisons were uniformly very small to effectively nil ($|ds| = .00$ to $.05$). Kernal density plots illustrating the overwhelming overlap between OC and NOC in terms of NPI total score, GNS total score, and even superiority are shown in Figure 1. In short, this first set of comparisons ran unambiguously counter to the hypothesis that OC are more narcissistic than NOC. Out of 12 comparisons, only one returned a statistically significant result and it was opposite of the "OC are more narcissistic than NOC" hypothesis.

Equivalence testing. None of the comparisons above suggest OC are more narcissistic than NOC and only one of them was statistically significant. The purpose of this next set of analyses was to test whether the differences between OC and NOC were statistically equivalent to zero. A relatively straightforward way to test whether an effect is more likely to be zero than not is to use the *two one-side tests* (TOST) procedure (Lakens et al., 2018). This procedure compares Cohen's d values from the earlier reported t-tests against upper and lower variants of the smallest effect sizes of interest (SESOI; also reported in Cohen's d values). We set SESOI at, $d = .17$, which as described earlier, corresponds to a "very small" effect ($r = .05$). Thus, the TOST procedure computed one-tailed Welch's t-tests comparing each earlier reported effect size against, $d = -.17$, and, $d = .17$. If both tests are statistically significant, this suggests that the difference between OC and NOC is closer to zero than the upper and lower SESOIs, which is interpreted as being statistically equivalent to zero.

The results of all 12 equivalence tests (shown in Table 1), including the one involving superiority, indicated that differences in narcissism between OC and NOC were significantly higher than the lower SESOI (ps < .02) and significantly lower than the higher SESOI (ps < .001). The NHST and equivalence testing results for superiority combine to produce a somewhat ambiguous finding. On the one hand, OC reported significantly less superiority than NOC, but on the other hand, the difference in superiority between the two groups was significant smaller

than the SESOI. Our interpretation of these results is that the difference between OC and NOC in terms of superiority is trivial, if not necessarily zero, and opposite of the stereotype of OC being more narcissistic than NOC. The remainder of the equivalence tests were unambiguous in their assessment that OC and NOC are statistically equivalent in terms of narcissism.

Bayesian testing. We conclude this set of analyses with a series of Bayesian inferential t-tests. Unlike NHST, which tells us how unlikely an obtained difference is given the null hypothesis (H_0) is in effect, Bayesian inferential testing tells us the probability of the H_0 versus alternative hypothesis (H_1) being correct given the data. Bayesian t-tests produce a posterior distribution of effects that are compared to a prior distribution of effects. The posterior distribution is similar to a confidence interval obtained from research data, whereas the prior distribution contains a range of more or less probable expected effects based on prior study results, logic, etc. There is debate over what prior distributions are most appropriate given different research contexts/purposes. For the purposes of our study, we used a Cauchy distribution centered at zero and tested several widths that ranged from .58 to 2.00.

The Cauchy distribution is similar to a normal distribution except that the tails of the Cauchy distribution are fatter. This has the effect of placing most confidence in effects that occur near the middle of the distribution, but also giving somewhat more credence, relative to a normal distribution, to effects that might occur in the tails of the distribution. Centering the distribution at zero acknowledges uncertainty over whether possible effects will be positive or negative (similar to using a two-tailed test distribution). Finally, the width is the interquartile range and with a Cauchy distribution reflects 50% confidence that effects will fall within the range of the upper and lower bounds of the width parameter. For example, a width of .58 reflects 50% confidence that effects will fall between, d = -.58, and, d = .58.

Comparison of the prior and posterior distributions provides evidence in favor of H_0 or H_1. This evidence can be quantified in the form of Bayes factors (*BF*) that range from infinitely close to zero to infinity, with higher scores indicating more evidence in favor of H_0 or H_1. More

specifically, BF_{10} quantifies evidence in favor of H_1 and BF_{01} quantifies evidence in favor of H_0. BF_{01} is simply $1/BF_{10}$ such that a BF_{10} of .25 is equivalent to a BF_{01} of 4.00 (i.e., there is four times more evidence for H_0 than H_1). All of our results favored H_0, so we report BF_{01} for the following tests.

Table 2 shows the results of the 12 Bayesian t-tests. For 11 out of 12 narcissism outcomes, BF_{01} values ranged from seven to 70 depending on the width parameter. This level of evidence suggests "moderate to very strong" evidence in favor of the null hypothesis (Lee & Wagenmakers, 2013). The one exception to this general pattern was superiority, which produced BF_{01} values ranging from one to three, reflecting "none to anecdotal" evidence in favor the null hypothesis. This finding is consistent with the previous two results involving superiority, suggesting a possibly non-zero but trivial difference between OC and NOC.

Summary. The results of frequentist (both NHST and equivalence testing) and Bayesian testing runs counter to the hypothesis that OC are more narcissistic than NOC and indeed overwhelmingly favors the H_0 that OC are equivalent to NOC in terms of narcissism.

Comparisons Including Covariates

Next, we repeated the above comparisons, but included age, sex, race/ethnicity, and native language as covariates. Specifically, age was coded as a continuous variable, sex was dummy coded (women = 1 [66%], men = 0), race/ethnicity was dummy coded as two variables reflecting whether participants were white or black (white = 1 [66%], not white = 0; black = 1 [26%], not black = 0), and native language was dummy coded (English = 1 [99%], not English = 0).

Controlling for these covariates made no difference to the results. Once again, the only significant difference was for superiority, $F(1, 8683) = 8.11$, $p = .004$, $\eta^2_{partial} = .001$, and it reflected OC ($M_{marginal} = 12.70$, $SE = .13$) reporting less superiority than NOC ($M_{marginal} = 13.10$, $SE = .05$). All other comparisons were statistically non-significant (ps > .07) and had very small to effectively nil effect size estimates, η^2s$_{partial} < .0004$.

Although we could not locate a TOST procedure for ANCOVA, we did conduct Bayesian inferential tests to better test whether the results reported above favored H_0 or H_1. We used the JASP default priors (Cauchy distribution, width of fixed effects = .50, width of covariate effects = .354). Similar to what was observed from the Bayesian t-test results, 11 out of 12 of the narcissism outcomes produced BF_{01} values that ranged from five (leadership/authority) to 25 (vanity), indicating "moderate to strong" evidence in favor of H_0 (Lee & Wagenmakers, 2013). The one exception was for superiority, which yielded a, $BF_{10} = 2$, indicating that H_1, (i.e., OC feel *less* superior to NOC) is two times more likely than H_0. This may be interpreted as "anecdotal evidence" in favor of H_1. Again, this result is consistent with prior reported tests involving superiority and suggest that the difference between OC and NOC is perhaps not zero, but nevertheless extremely small and inconsequential.

Comparison of Bayesian Inferences Obtained in Present Study Versus DUF2019

DUF2019 tested comparisons between OC and NOC using one-tailed tests. We used two-tailed tests because we wanted to be able to interpret differences opposite of the "OC are more narcissistic than NOC" hypothesis if they emerged. As this relates to prior distributions, DUF2019 used a half Cauchy distribution, whereas we used a full Cauchy distribution. DUF2019 reported BF_{10} values of .056 (admiration subscale of NARQ) and .094 (rivalry subscale of the NARQ). We reproduced these from their reported summary statistics using the JASP summary statistics module and obtained values of .056 and .090, respectively. The latter BF_{10} value is off very slightly, possibly due to rounding error.[3] We next converted these values to what they would be if tested using a full Cauchy prior distribution and obtained values of .344 and .137, respectively.

[3] We were able to precisely reproduce the .094 Bayes factor reported in DUF2019 is we used a prior distribution width estimate of .42 (the width DUF2019 reportedly used for the admiration subscale) as opposed to .44 (the width DUF2019 reportedly used for the rivalry subscale). If correct, this represents a trivial error in the original paper that does not alter the results in any meaningful way.

DUF2019 used prior distribution width parameters of .42 and .44 for admiration and rivalry, respectively. They arrived at these values based on a previous study (Study 1 in their paper) that assessed stereotypes of narcissism differences between OC and NOC. Because these stereotypes were not consistent with the actual differences in narcissism they observed between OC and NOC, we did not use the same prior width parameters and instead used a range of width parameters that included the JASP default of .707. For the present comparison, we focused on this default width parameter. We thus converted the BF_{10} values obtained above to what they would be if DUF2019 had used the JASP default width parameter of .707 and obtained values of .214 and .087, respectively. Converting these to BF_{01} values gives us values of 4.67 and 11.49 for admiration and rivalry, respectively.

In short, had DUF2019 conducted their Bayesian testing making the same decisions as we did, they would have found evidence favoring H_0 at five to 11 times that of H_1. This considered "moderate to strong" evidence favoring the null hypothesis (Lee & Wagenmakers, 2013). Because we did not use the NARQ to assess narcissism, we cannot conduct a direct comparison to the Bayes factors obtained by DUF2019. Nevertheless, as is shown in Table 2, the BF_{01} values we obtained (width parameter = .707) were generally stronger than those obtained by DUF2019. In fact, eight of the 12 BF_{01} values we obtained indicated "strong to very strong" support for H_0. This is at least partly due to our sample size, which was nearly five times the size of that analyzed by DUF2019. Interestingly, had we used one-tailed tests and a half Cauchy prior distribution, we would have obtained even stronger evidence in favor of H_0. BF_{01} values would have averaged 38 (SD = 23, range = 5 to 89), indicating an average of "very strong" support for H_0. In short, the results of this study make the case substantially stronger that OC are not more narcissistic than NOC.

Discussion

The results of the present study convincingly replicate the null results reported by DUF2019 and stand in contrast to the effects reported by Cai et al. (2019). As was discussed in

the introduction, the sample that Cai et al. analyzed was selected from the Chinese population, which at the time of the study was under a governmental policy that restricted parents to having only a single child. They noted that this might have created a unique situation where OC were especially likely to be overvalued by parents and grandparents, thus magnifying narcissism in OC. In light of this, we believe the combined results of DUF2019 and the present study are more likely to generalize to other populations. Although, to be clear, both of these samples were selected from W.E.I.R.D. populations. This raises the possibility that Cai et al.'s result may reflect more general cultural differences—a hypothesis that should be further explored in samples selected from non-W.E.I.R.D. populations.

Moreover, we relied on a college student sample and thus, unlike DUF2019 was able to make direct inferences about the German population, we cannot say with as much confidence that these null results will generalize to the wider population of Americans. We cannot rule out, although we think it is highly unlikely, the possibility that being an OC is only predictive of higher narcissism in the United States in the *non*-college population. If anything, we think any difference stemming from being an OC would be maximized in college students. The vast majority of the students in our sample were in their first or second years in college. Assuming that many of these students had only recently started living outside of their childhood homes, our sample consisted primarily of students who had spent the vast majority of their lives living in their childhood home environment. Using a baking metaphor, most of the students in our sample were fresh out of the oven and as hot (i.e., shaped by their home environments) as they were going to be. If we are to believe the putative reasons why OC might be more narcissistic (e.g., because they received all the attention from their parents), then surely these effects would diminish the longer individuals live outside of their childhood home environments. If true, then our sample would seem to provide a particularly sensitive test of the association between being an OC and narcissism.

In addition to differences between DUF2019, Cai et al. (2012), and the present study in terms of sampling, there were also differences in terms of the measurement of narcissism. DUF2019 measured narcissism using the Narcissism Admiration and Rivalry Questionnaire (NARQ; Back et al., 2013), whereas Cai et al. used the NPI (as did we), and we also used the GNS. All three of these measures have been used in the literature to assess grandiose narcissism (Foster et al., 2018) and they are almost certainly tapping into overlapping constructs. Nevertheless, it is useful to know that the null results obtained when narcissism was measured with the NARQ appear to generalize to the NPI and GNS.

Finally, it is worth noting that DUF2019 and our study differed to some degree in terms of the covariates used. We attempted to statistically control for age, sex, race/ethnicity, and native language. Our sampling strategy (i.e., excluding all non-American participants) controlled for nationality. DUF2019 statistically controlled for age, sex, socioeconomic status, whether participants grew up in rural versus urban settings, presence or absence of both parents during childhood, and migration background. Their sampling strategy controlled for nationality. Again, we view these differences as a strength rather than a weakness. Both studies found very similar results regardless of whether the raw means (i.e., no covariates) were analyzed or when varying assortments of covariates were added to the comparisons. We think these convergent results despite the studies' methodological differences should produce even greater confidence that OC and NOC are equivalent when it comes to narcissism.

Our dataset contained nearly 9,000 participants, 12 variables assessing global and facet-level narcissism, as well as other demographic variables. We performed a set of analyses that we deemed reasonable and comprehensive, although not exhaustive. No doubt, other researchers might have other ideas regarding the best way to test the hypothesis that narcissism is higher (or lower) in OC. In addition to adhering to the principles of scientific openness and transparency, we made the data used in this study publicly available so that other researchers with other ideas can subject their ideas to empirical tests.

We should also mention that the dataset made available contains an additional five variables relevant to family size and birth order (i.e., birth order, number of stepsiblings, amount of time spent as an OC, number of younger siblings, and number of older siblings). We did not include any of these variables in the present set of analyses because (1) we did not have clear hypotheses regarding how they should relate to narcissism and (2) they were not used in the DUF2019 study on which the present study was based. Nevertheless, we invite researchers to use these variables and the rest of our data to test their own ideas.

In conclusion, the results of the present study along with those from DUF2019 suggest more strongly than ever that OC are no different from NOC in terms of narcissism. The etiology of narcissism is a fascinating and important topic of study and we believe that family composition and (especially) dynamics likely play some role in the development of narcissism. However, the simple and appealing notion that the presence versus absence of siblings influences narcissism appears to be heading toward extinction.

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Table 1.

Raw Means Comparisons for Only Children (OC) and Non-Only Children (NOC).

	OC	NOC	*d*	*t*	*p*	t_{hi}	*p*	t_{lo}	*p*
NPI									
full-scale score	14.43 (6.59)	14.65 (6.57)	-0.03	-0.92	0.36	-5.71	< .001	3.87	< .001
leadership/authority	5.02 (2.86)	5.17 (2.92)	-0.05	-1.45	0.15	-6.31	< .001	3.36	< .001
grandiose exhibitionism	3.39 (2.40)	3.41 (2.33)	-0.01	-0.19	0.85	-4.92	< .001	4.56	< .001
entitlement/exploitativeness	0.59 (0.81)	0.59 (0.82)	0.01	0.16	0.87	-4.66	< .001	4.99	< .001
GNS									
full-scale score	111.44 (21.65)	111.86 (21.01)	-0.02	-0.57	0.57	-5.29	< .001	4.18	< .001
authority	20.09 (5.64)	20.36 (5.51)	-0.05	-1.38	0.17	-6.11	< .001	3.39	< .001
self-sufficiency	23.32 (4.48)	23.23 (4.31)	0.02	0.58	0.56	-4.16	< .001	5.28	< .001
superiority	12.72 (4.10)	13.09 (4.15)	-0.09	-2.52	0.01	-7.34	< .001	2.28	.01
vanity	20.92 (5.48)	20.84 (5.36)	0.01	0.40	0.69	-4.36	< .001	5.15	< .001
exhibitionism	12.61 (5.45)	12.76 (5.43)	-0.03	-0.79	0.43	-5.57	< .001	4.00	< .001
entitlement	11.42 (4.27)	11.46 (4.19)	-0.01	-0.28	0.78	-5.03	< .001	4.48	< .001
exploitativeness	10.36 (5.25)	10.12 (5.01)	0.05	1.36	0.17	-3.39	< .001	6.02	< .001

Notes. Values in parentheses are standard deviations; *d* = Cohen's *d*; *t* = t-test comparisons (*df*s = 8687) between OC and NOC (*df* = 8,687 for all comparisons); t_{hi} = Welch's *t*-test comparisons (*df*s = 1074 – 1104) between observed difference and high SESOI (*d* = .17); t_{lo} = Welch's *t*-test comparisons (*df*s = 1074 – 1104) between observed difference and low SESOI (*d* = -.17).

Table 2.

Bayesian t-tests Comparing Raw Means of Only Children and Non-Only Children

	Width of prior distribution					Description of evidence in favor of H_0
	0.577	0.707	1.000	1.414	2.000	
NPI						
full-scale score	13	16	23	33	46	"strong to very strong"
leadership/authority	7	9	12	18	25	"moderate to strong"
grandiose exhibitionism	20	25	35	49	69	"strong to very strong"
entitlement/exploitativeness	20	25	35	49	70	"strong to very strong"
GNS						
full-scale score	17	21	30	43	60	"strong to very strong"
authority	8	10	14	19	27	"moderate to strong"
self-sufficiency	17	21	30	42	60	"strong to very strong"
superiority	1	1	2	2	3	"none to anecdotal"
vanity	19	23	33	46	65	"strong to very strong"
exhibitionism	15	18	26	37	52	"strong to very strong"
entitlement	20	24	34	48	68	"strong to very strong"
exploitativeness	8	10	14	20	28	"moderate to strong"

Notes. Numbers are Bayes factors quantifying evidence for the H_0 (BF_{01})

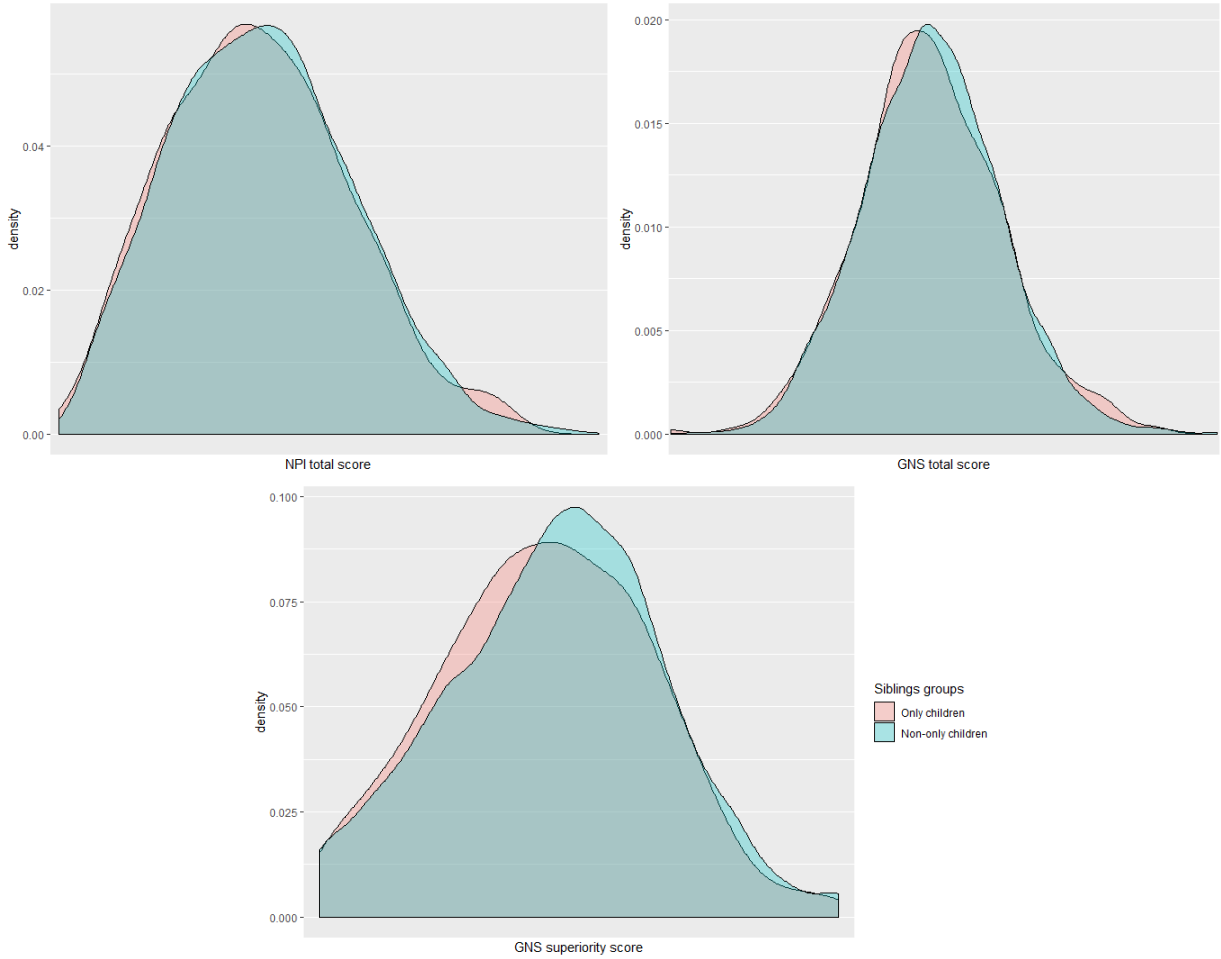

Figure 1. Kernal density plots showing distributions of only children and non-only children for NPI total scores, GNS total scores, and GNS superiority scores.