

Abstract

The stereotype that only-children are more self-centered than others has gained little support from studies on personality traits but had not been previously tested with respect to personal values, which are also an important part of personality. Data from 3085 Australian adults revealed that only-children give more importance to power values and less importance to benevolence values than individuals with siblings. These differences, which are consistent with the stereotype, were strongest in young people but diminished gradually with age and disappeared in those over 62 years old. The results challenge the view that personality is largely unaffected by shared life-experiences associated with family structure, at least regarding the values aspect of personality.

Keywords: Only-children, Personal values, Personality, Personality Development

1. Introduction

In China, only-children are said to be subject to Little Emperor Syndrome (e.g., Fong, 2004). In the West, the alleged self-centeredness of only-children is popularly believed to be part of only-child syndrome (e.g., Hartmann, 2019). While such views are widespread and longstanding (e.g., Bohannon, 1896), they have gained little empirical support. The meta-analysis of 141 studies by Polit and Falbo (1987) found no differences in personality between only-children and siblings. A more recent study concluded that any differences were “vanishingly small” (Stronge, et al., 2019, p.6).

It is typical for research into the effects of family structure and related differences in parental investment on personality development to focus on personality traits using Big-Five or HEXACO instruments (e.g., Stronge, et al., 2019). But values are also part of personality (e.g., Parks-Leduc, et al., 2015) and possible effects on values have yet to be studied. Hence the consistent picture emerging from trait-based research that only-children are little or no different from others (e.g., Polit & Falbo, 1987) is insufficient to determine whether this popular stereotype is wrong. We therefore aimed to investigate the possibility that only-children and those with siblings differ in their values.

The experiences of only-children and those with siblings differ in consistent ways across families. In contrast to children with siblings, only-children do not have to compete with others for parental attention or access to financial resources (Polit & Falbo, 1987). Only-children also miss out on socializing with siblings in the family environment (Mancillas, 2006; Polit & Falbo, 1987), and they do not have as much experience of compromising with peers, such as siblings. The dedicated parental investment and lack of sibling-related socialization increase the chances that only-children may become self-centered (Mancillas, 2006, Stronge, et al., 2019). It has even been suggested that exaggerated effects of this kind

might make only-children more prone to narcissism (e.g., Millon, 1981). While this notion gained support (Cai et al., 2012), it was subsequently undermined by Dufner, et al. (2019), who found no such effects when potentially confounding variables such as age, gender, and socioeconomic status were controlled for.

Narcissism, one part of the ‘Dark Triad’ of personality factors, corresponds and overlaps with the low pole of the honesty-humility HEXACO factor (Hodson, et al, 2019). In their research into HEXACO-related personality differences in only-children, Stronge, et al. (2019) concluded that, while only-children appeared to have lower honesty-humility levels than siblings, the differences were too small to be meaningful. However, their conclusion seems to have been based on the mean differences calculated across all age-groups. The differences reported in their two youngest age-groups of 18-25 and 26-35 years were considerably larger, if not strong. Given that personality changes somewhat throughout the life span (e.g. Specht, et al., 2011), this does not preclude the possibility that only-children are more self-centered than those with siblings in their youth, but the effect fades with time.

Only-children have been found to be different from siblings in many ways, including differences in eyesight (Chu et al., 2015), body mass index (Li, et al., 2017), depressive symptoms (Jin, Zeng, et al., 2019), and perceived stress and studying-related life satisfaction (Chu, et al., 2015). They have also been found to be higher on character strengths such as humor, curiosity, zest, interpersonal wisdom, and leadership (Guo, et al., 2015); the behavioral attribute of self-enhancement (Falbo, 2018); and, when compared to children other than firstborns in general, and lastborns from families of two, achievement motivation (Polit & Falbo, 1987). It is possible that no corresponding effects on personality traits have been found because there are none to be found, or that, as Hughes (2005) suggests, uncontrolled

mediating factors may in some situations inhibit the detection of consistent effects on personality traits.

It is also possible that the aforementioned stereotypical difference between only-children and those with siblings is manifested in a particular aspect of personality that has not been studied yet, namely values. While correlated empirically (see meta-analysis in Parks-Leduc et al., 2015), exactly in which ways values and traits interrelate is not fully understood. Vecchione, et al. (2019) found that values do not tend to predict later traits, yet values and traits tend toward synchronous development.

We aimed to explore whether the stereotype of self-centered only-children might be based on observations of differences attributed to self-enhancement values. We used the Schwartz (1992) system of values, which is arguably the leading and most widely adopted values model used in psychological research.

Values (e.g., benevolence, power) convey important life goals and guide people's judgements and behavior (e.g., Schwartz, 1992). Like personality traits, with which they correlate systematically (Parks-Leduc, et al., 2015), values were found to be somewhat heritable but are also subject to environmental reinforcement (Twito & Knafo-Noam, 2020). Unlike traits, which describe the way we are, values describe what we want in life (e.g., Parks-Leduc, et al., 2015). Values are systematically related to behavior, including when behavior is rated by close others (e.g., Bardi & Schwartz, 2003), and people who prioritize a value very highly tend to behave consistently according to the value (Lee et al., in press). People can correctly identify others' values (Dobewall, et al., 2014), probably through their behavior and verbal judgements, and this could be the basis for the widespread views that only-children and those with siblings differ in their personalities.

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Like personality traits, values are rather stable (see review in Schuster et al., 2019) but can change as individuals adapt to new situations (e.g., Bardi et al., 2014; Daniel, et al., 2013). Research suggests that personal values are affected by upbringing, with both parenting (e.g., Döring et al., 2017; Knafo & Schwartz, 2001) and schooling (e.g., Berson & Oreg, 2016; Hofmann-Towfigh, 2007) having effects on values. Some changes may revert over time (Lönnqvist, et al., 2013), but not if repeatedly strengthened by consistent environmental reinforcement (Bardi & Goodwin, 2011). If the presence or absence of siblings affects the values of children, a stable family environment may provide the consistent reinforcement required to stabilize such effects.

Maturation effects may overwrite those associated with youth and upbringing, making them less apparent in adults. For example, only-children were found to have lower levels of social skills relative to their peers in kindergarten (Downey & Condrón, 2004) but were deemed to have learned to overcome this deficit by adolescence, and become as popular with their peers as those with siblings (Bobbitt-Zeher & Downey, 2013). In a longitudinal study tracking value changes in 280 young adults, the value of conformity became increasingly important as individuals progressed from 20 to 28 years of age; a change attributed to socialization effects on young adults adapting to the demands of “conventional social roles” (Vecchione, et al., 2016, p119). In addition to universal experiences such as this, and others related to ageing, life-events particular to individuals also contribute to changes in values. For example, the values of power and achievement became less important, and security and universalism more important, to a sample of individuals after migrating from Russia to Finland (Lönnqvist, et al., 2011). Nevertheless, given the importance of early years to personality development (Wängqvist, et al., 2015), it is possible that universally shared experiences relating to the presence or absence of siblings have lasting effects.

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In the Schwartz (1992) model, values are organized in a circle such that adjacent values tend to be compatible with one another, and opposite values tend to conflict with one another. The adjacent self-enhancement values of power and achievement oppose those of universalism and benevolence, which express the self-transcendence higher order value. Relations of values to other variables also tend to follow the circle shown in Figure 1, hence a positive relation to one value is likely to be accompanied by a negative relation to opposite values (Schwartz, 1992).

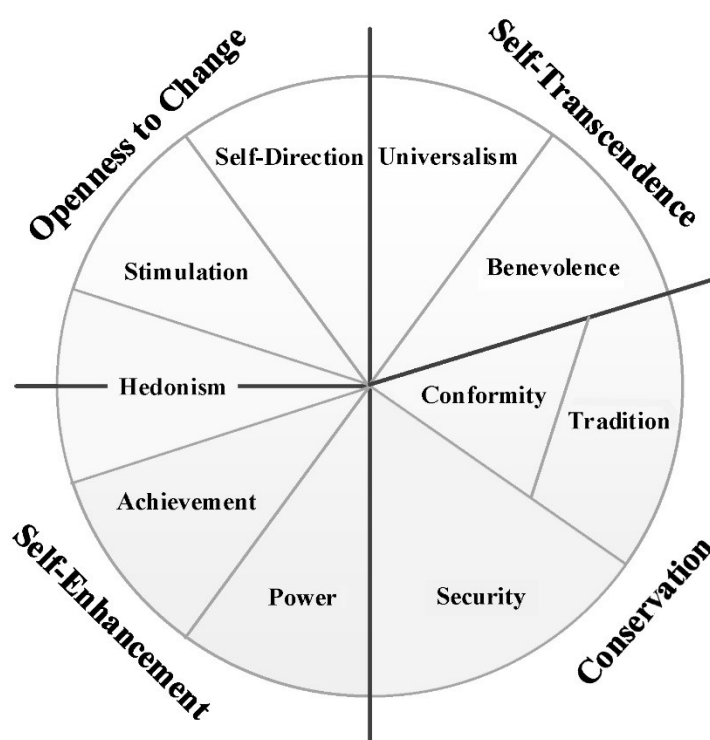


Figure 1 Values Circle (Schwartz, 1992)

If the stereotype of only-children is correct, then self-enhancement values should be relatively more important to only-children, as these convey the motivation for selfish interests, even at the expense of others. This is also compatible with the finding that self-enhancing behaviors were found more frequently in only-children compared with people with siblings (see above, Falbo, 2018). In contrast, self-transcendence values should be relatively

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less important to only-children compared to those with siblings. Honesty, as well as being part of the HEXACO factor of honesty-humility, is also a component value of the self-transcendence value of benevolence. Of the correlations observed between all HEXACO factors and values by Anglim, et al. (2017), the strongest were between honesty-humility and power (negative) and between honesty-humility and benevolence (positive). The power value relates to such goals as enhancing one's social status, and control and dominance over others, whereas benevolence relates to preserving and enhancing the welfare of others. If effects on these values in line with the stereotype were observed, this would be consistent with the small to medium sized differences observed by Stronge, et al. (2019) in their youngest age-groups.

If power values were found to be more important, and benevolence values less important, to only-children relative to individuals with siblings, this would have implications beyond HEXACO measures of personality. Power values are conceptually and empirically related to power motivation (see, e.g., Bilsky & Schwartz, 2008; Frimer & Walker, 2009), which has implications for moral development (see, e.g., Walker & Frimer, 2011). Power, being related to a desire to influence others, is likely to impact the character strength of leadership that Guo, et al. (2015) found to be enhanced in only-children. As a self-enhancement value, it also relates conceptually to the behavioral attribute of self-enhancement that Falbo (2018) found to be greater in only-children. Also, given that achievement is the other self-enhancement value, it would complement the higher achievement-motivation of only-children reported by Polit and Falbo (1987).

To investigate whether differences in the personalities of only-children and those with siblings would be found in their values we tested the values of a large and varied sample of Australian adults. If the stereotype of the self-centered only-child is supported by differences between the values of only-children and those raised with siblings, we would expect only-

children to attach relatively greater importance to self-enhancement values, particularly power values, and relatively lower importance to self-transcendence values, particularly benevolence values. If the popular rationale explaining such differences is correct (i.e. that they are due to the lack of sibling-related socialization and dedicated parental investment during childhood and adolescence) it seems likely that they would be found to fade in adulthood as other environmental factors become more influential. To this end, we also incorporated age in our analyses, once using age as a continuous variable and once by different age-groups. The youngest of our three age-groups overlapped with the three youngest age-groups (18-25, 26-35 and 36-45) used by Stronge, et al. (2019), and our oldest with the two oldest (66-75 and 76 plus) of their seven age-groups.

2. Method

Ethics approval had been granted by the University of Western Australia¹. The data and analysis can be downloaded here https://osf.io/cqf93/?view_only=82faf8c1157a4dac904f5e37afff0bbd. To enable identifying small differences in line with similar previous studies (e.g., Stronge, et al., 2019), a large and diverse sample of adults aged from 18 to 77 years was surveyed.

2.1 Sample

The data were collected online as part of ‘The Values Project’ from a panel sample of adults in Australia recruited on the online platform Pureprofile, which offers small rewards to research participants. The initial sample included 4086 participants. We employed several pre-planned exclusions of participants from analyses. We excluded those who did not provide an answer to the key variable (whether a person had siblings) and to the potential control

¹ The study reported in this article was not preregistered.

variables specified below. We also excluded participants whose answers about their siblings were incompatible with their answers on family size. Finally, we excluded 377 participants who were born in non-English speaking and African countries. This is because there are known substantial cultural differences in values, and non-African English-speaking countries have a similar cultural value profile (e.g., Schwartz, 2004). Including more than one culture would allow effects due to cultural differences to contaminate any related to differences in family size. Data from the remaining 3085 participants were then analyzed.

Only-children comprised 8.6% ($n = 266$) of the sample, which is broadly representative of the Australian population, given the age distribution of the sample (Qu, 2020). The sample size enabled the detection of small effect sizes ($d = .10$) in three age-group sub-samples with similar numbers of only-children in each. Age of participants ranged from 18 to 77 years ($M = 52.0$, $SD = 14.9$), 63.9% were women, 35.9% were men and four people were gender non-specific.

2.2 Procedure and Measures (Including Control Variables and Their Justifications)

The data were collected in different surveys in different times during Summer/Autumn 2018.

2.2.1 Values.

We measured values of the Refined Values Theory (Schwartz et al., 2012) in which some of the ten original values (Schwartz, 1992) are further divided. We used the Best–Worst Refined Values scale (Lee et al., 2019), which has been validated in Australia. This allowed us to examine possible effects on the ten values (shown in Figure 1.) and on refined components such as power-dominance, power-resources, benevolence-dependability, and benevolence-caring (see supplemental materials Table SM2). This is the only refined-values measure that confirmed the exact predictions of the order of values in the circle in the

Refined Values Theory. Participants were presented with 21 value statements repeated in 21 different combinations in sets of five. For each set of values, participants were asked to choose the value that is most and least important to them. Examples of such statements include ‘Having the authority to get others to do what you want’ (power-dominance) and ‘Helping and caring for the wellbeing of those who are close’ (benevolence-caring). Each statement appeared five times across the 21 sets, once in each of the five possible ordered positions; i.e. 1st (top), 2nd, 3rd, 4th and 5th (bottom). Each of the ‘best’ (i.e. most important) and ‘worst’ (i.e. least important) forced choices of participants generated scores of +.2 and -.2 respectively for their respective values, resulting with a range of total scores from +1.0 to -1.0 for each of the 20 refined values, transposed to a scale of 1-3. Scores for each of the major ten values were then calculated as the means of their component refined values.

2.2.2 *Sibling status.*

We collected data about participants’ sibling status a few weeks apart from the values data collection so that participants could not know that these data will be linked with their values and thereby affect the results through self-stereotyping. It has been suggested that because firstborns begin life as only-children, and lastborns, like only-children, are never ‘de-throned’ by a younger sibling, they may share some characteristics (e.g., Polit & Falbo, 1987). Because this offers a plausible explanation for the similarities in achievement-motivation between only-children and firstborns, and with lastborns in families of two reported by Polit and Falbo (1987), we coded individuals to differentiate only-children and siblings (those belonging to different birth-order groups and twins²) and those from different family sizes.

² While twins do not constitute a birth-order group, because, unlike firstborns and lastborns, they effectively share their birth-order niche, they may be considered to occupy distinctive niches and so tend to be excluded from studies of birth-order effects (e.g. Rohde, 2003).

2.2.3 *Potential Covariates*

We tested for differences in age, gender, education, and religiosity between only-children and those with siblings. Those showing significant differences would be considered as covariates.

2.2.3.1 *Age, gender, and education.*

Since values vary with age, gender, and education (Schwartz, 2005; Schwartz & Rubel, 2005), we treated these constructs as potential covariates. Only-children are known to have higher levels of education (a measure of socio-economic status) on average compared to people with siblings (Falbo & Polit, 1986), and highly educated people tend to value self-direction more and conformity less than others (Schwartz, 2005). Hence, if we were to find that only-children value self-direction more and conformity less than others, this might have been due to their differing levels of education rather than merely being only-children. The educational level of participants was measured on a scale from 1 - 'Never attended school', to 10 - 'Post-graduate degree'. A final score of 11 - 'other, please specify' included no participant in our sub-sample.

2.2.3.2 *Religiosity.*

Religiosity may be considered an expression of an individual's values, but it is culturally transmitted between generations and religious parents tend to have larger families (Fieder & Huber, 2016). Religious people tend to value tradition, conformity, and benevolence more than non-religious people and hedonism, stimulation, and self-direction less than non-religious people (Saroglou, et al., 2004). Hence, if we were to find reciprocal patterns in the values of only-children, this could have been due to their differing levels of

religiosity rather than merely their upbringing as only-children. Participants responded to the question ‘how religious are you’ on a scale from 0 – ‘not at all’, to 7 – ‘very religious’.³

2.3 Data Analysis.

As none of the potential covariates significantly differed between only-children and siblings (see Table SM1), Multivariate Analysis of Variance (MANOVA) on the mean scores of the 10 values comparing only-children to those with siblings was conducted. Pillai’s trace is the reported MANOVA statistic and post-hoc Welch’s t-tests are reported for values that had significant main effects to account for the differences in sample size between the groups. Comparisons between siblings and only-children on the 20 sub-values are presented in the supplementary materials (at the end of this file, Table SM2). As effects arising from childhood experiences may fade over time, we conducted a regression analysis of the whole sample to investigate the interaction between age and only-child status on those values which significantly differed between only-children and those with siblings. The interactions were probed with a p-value <.05, and were calculated using the 16th, 50th and 84th percentile rather than one standard deviation above and below the mean in order to better account for potential variability within the distribution curve. To enable the reporting of effect sizes comparable to those of Stronge, et al (2019), we also conducted MANOVAs by age-group, dividing the sample into three to achieve a roughly even distribution of only-children while maintaining sub-samples large enough to detect small differences ($d = .10$) at 95% CI. The age-groups that enabled this were ages under 41 ($M = 32.1$, $SD = 5.7$, $N = 822$), 41 to 62 ($M = 52.5$, $SD = 6.4$, $N = 1312$) and over 62 ($M = 68.6$, $SD = 3.8$, $N = 951$), which contained $N = 91$, $N = 88$ and $N = 87$ only-children respectively. Given the possibility that only-children may share

³ In the United States, a greater representation of only-children may be found in urban environments than in rural areas (Blake, 1981). However, in Australia 86% of the population lives in urban or suburban environments (United Nations, 2018), hence this variable was not considered likely to affect our findings.

similarities with firstborns in general and children from two-child families, we also tested for differences in the value priorities of firstborns, middle-children, and lastborns from different family sizes. In line with Laken's (2013) recommendations, given the different sizes of the only-child and sibling samples, effect sizes for differences in their means were quantified using Hedge's g (reported as ' d ').

3. Results

A MANOVA assessed the differences in the ten values between siblings and only-children; Bonferroni adjustments were applied to all findings.

Across the whole sample, there were significant differences in value priorities between only-children and those with siblings ($V = .012$, $F(10, 3074) = 3.598$, $p < .001$, $\eta_p^2 = .012$) with significant differences found in prioritization of benevolence values ($F(1, 3083) = 23.904$, $p < .001$, $\eta_p^2 = .008$) and power values ($F(1, 3083) = 14.914$, $p < .001$, $\eta_p^2 = .005$), presented in Table 1 and Figure 2. Only-children were found to prioritize power values more ($t(304.9) = 3.47$, $p = .001$, $d = 0.25$, 95% CI: [.033, .119]) and benevolence values less ($t(303.2) = -4.32$, $p < .001$, $d = 0.31$, 95% CI: [-.127, -.048]) compared to individuals with siblings.⁴ The difference in respect of power values was significant in both its refined components of dominance and resources (see Table SM2). It was also significant on both the caring and dependability components of benevolence values. While the difference in universalism, the other self-transcending value, was not statistically significant, the concern and tolerance refined components of universalism, which concern human relations, and so are

⁴ This pattern of differences was not repeated in the 377 participants excluded for reasons of cultural differences. The 53 only-children in this group did not differ significantly from the 324 individuals raised with siblings in prioritizing power ($t(72.1) = 0.44$, $p = .663$, $d = 0.064$, 95% CI: [.073, .115]) and benevolence ($t(68.2) = 0.53$, $p = .597$, $d = 0.080$, 95% CI: [-.069, .119]). With 77 nations represented in this sub-sample, the cultural diversity of this group was such that any statistical effects related to being raised as an only-child or not would likely have been obscured by cultural effects, which tend to be stronger (see, e.g., Schwartz, 2004).

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more likely to be affected by family dynamics, were prioritized significantly less by only-children than those with siblings (see Table SM2), hence the differences were in the same direction as those for benevolence values.

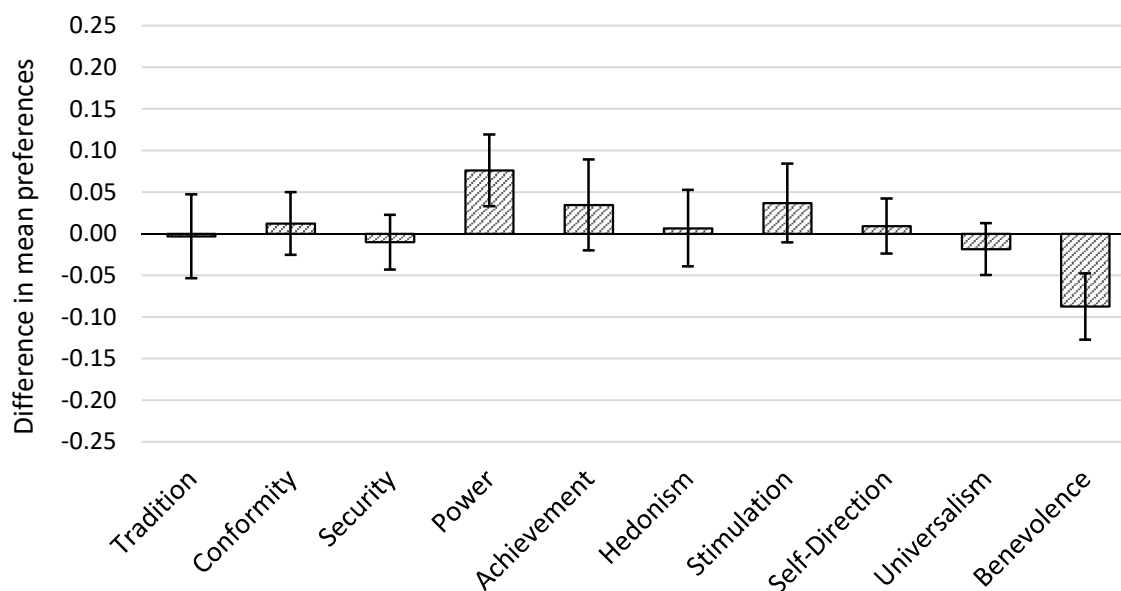


Figure 2. Differences in the mean scores of the 10 values across the whole sample: only-children preference scores minus those of siblings (error bars represent 95% confidence intervals).

Table 1. Differences in Value Preferences between Only-Children and Siblings

	Group	Mean (SD)	F^\dagger	n_p^2	t^\ddagger	df	p^b	95% CI [LL, UL]
<i>Tradition</i>	Only-children	1.73 (0.40)	0.01	.000	0.11	324.17	.912	[-0.053, 0.047]
	Siblings	1.73 (0.42)						
<i>Conformity</i>	Only-children	1.90 (0.30)	0.48	.000	0.64	308.31	.521	[-0.025, 0.050]
	Siblings	1.90 (0.28)						
<i>Security</i>	Only-children	2.33 (0.26)	0.39	.000	0.60	312.61	.547	[-0.043, 0.023]
	Siblings	2.34 (0.25)						
<i>Power</i>	Only-children	1.49 (0.35)	14.91	.005	3.47	304.86	.001	[0.033, 0.119]
	Siblings	1.41 (0.30)						
<i>Achievement</i>	Only-children	1.59 (0.43)	1.69	.001	1.25	311.86	.213	[-0.020, 0.089]
	Siblings	1.56 (0.41)						
<i>Hedonism</i>	Only-children	2.09 (0.36)	0.08	.000				

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	Siblings	2.08 (0.37)		0.29	317.91	.772	[-0.039, 0.053]
<i>Stimulation</i>	Only-children	2.02 (0.38)	2.51	.001			
	Siblings	1.98 (0.36)			1.54	313.81	.124 [-0.010, 0.084]
<i>Self-Direction</i>	Only-children	2.13 (0.26)	0.29	.000			
	Siblings	2.12 (0.27)			0.55	319.63	.581 [-0.024, 0.042]
<i>Universalism</i>	Only-children	2.17 (0.25)	1.52	.000			
	Siblings	2.19 (0.23)			1.16	309.84	.246 [-0.050, 0.013]
<i>Benevolence</i>	Only-children	2.42 (0.32)	23.90	.008			
	Siblings	2.50 (0.27)			4.32	303.20	.000 [-0.127, -0.048]

[†]Sample size for Only Child ($n=266$), Sibling ($n = 2819$); $df1 = 2$; $df2 = 3083$ for all F tests; ^b Bonferroni correction applied

The pattern of findings remained broadly the same when comparing only-children with those belonging to the different birth-order groups. Pairwise comparisons of the estimated marginal means between only-children and siblings of different birth orders showed that only-children had, for the most part, significantly higher power value preferences and lower benevolence value preferences than those with siblings regardless of birth-order or family size, with the exception of twins, which were no different to only-children with respect to these value preferences (see Tables SM3-SM6).

The differences in power and benevolence value preferences between only-children and siblings were found to diminish with age. Regression with interaction showed that age significantly moderated power value preferences ($\Delta R^2 = .03$, $\Delta F(3, 3081) = 33.05$, $p < .001$; $b = .005$, $t(3081) = 3.92$, $p < .001$), and benevolence value preferences ($\Delta R^2 = .04$, $\Delta F(3, 3081) = 45.85$, $p < .001$; $b = -.005$, $t(3081) = -4.49$, $p < .001$) for only-children and those with siblings. Examination of the interaction plots (Figure 3) shows that differences between the two groups approached zero at around 64 and 67 years of age respectively.

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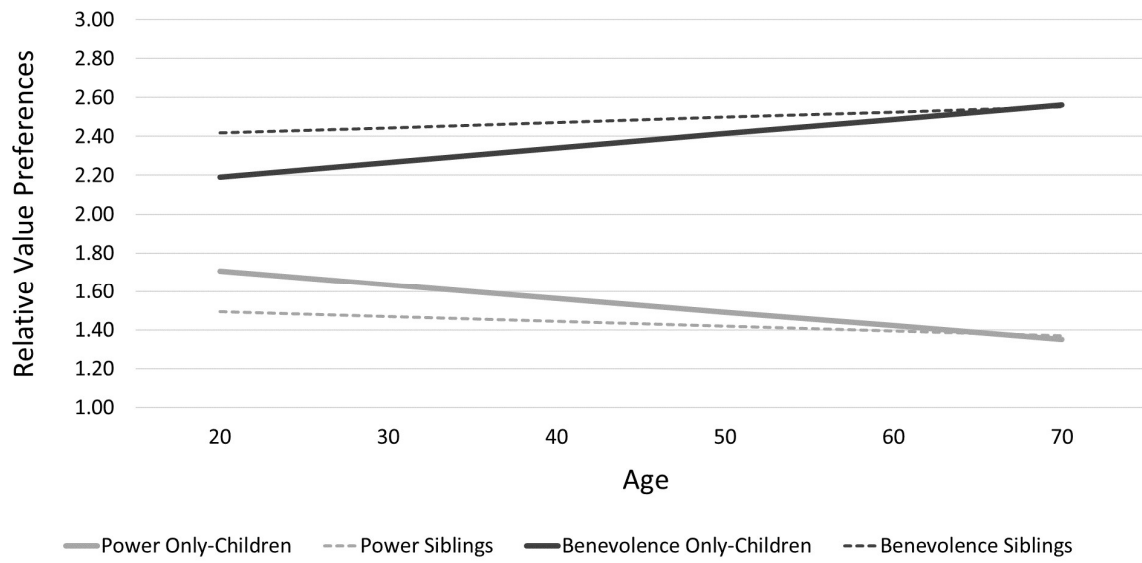


Figure 3. Interaction plot of age and power and benevolence value preferences

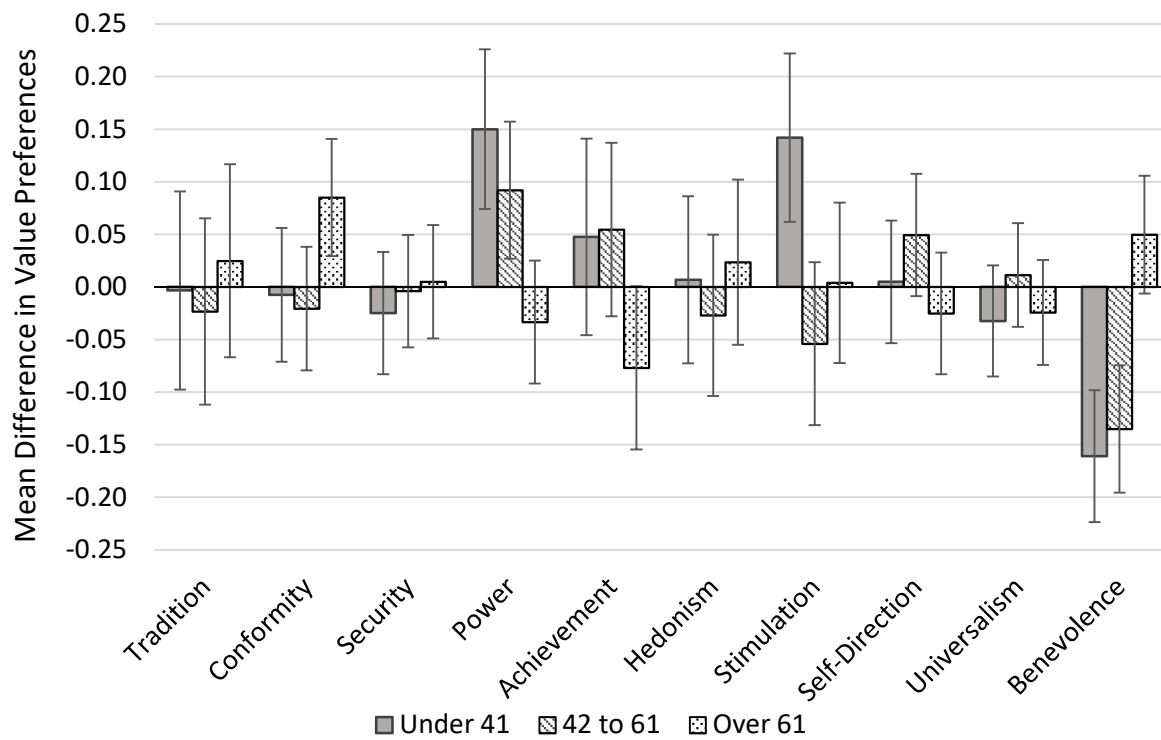


Figure 4. Differences in the mean preferences of the 10 values for different age-groups: only-children preference scores minus those of siblings by age-group (error bars represent 95% confidence intervals).

As illustrated in Figure 4 (and further described in Table SM7), and consistent with the trends illustrated in Figure 3, the differences in power and benevolence were greatest in the youngest age-group, reduced for the 41-62 age-group, and absent in the over 62 age-group. In the under 41 age-group, the main effect was $F(1, 820) = 15.056, p < .001, \eta_p^2 = .018$ with a difference of $t(110.9) = 3.71, p < .001, d = 0.43, CI: [.074, .226]$. The effect on benevolence was $F(1, 820) = 25.225, p < .001, \eta_p^2 = .030$, with a difference between only-children and siblings of $t(111.6) = 4.87, p < .001, d = 0.56, CI: [-.223, -.098]$. When twins were excluded the differences increased to $t(110.9) = 4.07, p < .001, d = 0.47, CI: [.090, .239]$ for power and $t(112.5) = 5.09, p < .001, d = 0.58, CI: [-.231, -.106]$ for benevolence.

Following Funder and Ozer's (2019) recommendation to explain effects in meaningful terms, a $d = 0.58$ is equivalent to a common language effect of 65.9% and $d = 0.47$ to 63.0% - i.e., on average, in almost two thirds of cases, a randomly selected only-child from our under 41 age-group sub-sample will likely prioritize power more and benevolence less than a randomly selected individual with a sibling or siblings.

4. Discussion

Using a large and varied sample, this study is the first to close the gap between the stereotype of only-children's personality and research findings. We found that the stereotype of only-children as being more self-centered than others may be based on a kernel of truth, in that only-children tended to prioritize power values (a self-enhancement value) more and benevolence (a self-transcendence value) less than adults who grew up with siblings. This tendency was largest in younger adults and diminished with age. It vanished completely in

adults in their mid-sixties. This is broadly in line with the effects for honesty-humility observed by Stronge, et al. (2019).

The strongest observed statistical effects were above Cohen's (1988) medium threshold ($d = 0.58$ in one case) and consistent with the trait-based findings of Stronge, et al. (2019) as well as with the persistent and widely believed stereotype that only-children are more self-centered than people with siblings. Hence, it is possible that differences in the upbringing of only-children and siblings, possibly related to factors such as sibling socialization, may have lasting effects on personality. If these effects are strongest in youth and fade through adulthood, as our findings suggest, given our strongest statistical effects were found in a group with an average age of 32.1 years, it is likely they would be considerably stronger, and hence more noticeable, in teenagers and young adults -- groups on which much of research in psychology is conducted, and in respect of which observations contributing to the stereotype were likely made.

5. Limitations and Future Directions

The findings are limited to Australia, as we have not studied other nations. However, Australia is culturally similar to many Western European nations (World Values Survey, 2020) and to other English-speaking cultures (Schwartz, 2004), and it is likely that experiences common to only-children from such cultures are similar. Therefore, the findings may generalize at least to such similar cultures. Further research in other cultures is required if more general conclusions are to be reached.

We suggested that differences between only-children and those with siblings may arise from experiential differences within these contexts; such as those relating to parental attention and sibling socialization. As we did not measure these variables, their influence on the relationship between sibling status and value preferences is unknown. These, and other

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potential explanations for the differences found, could be a promising direction for future research. Also, we have no evidence that would enable us to translate the measured differences in value priorities to the type of observable differences that one might think would be necessary to give rise to a popular stereotype. By studying exactly how individuals can discriminate between the value priorities of others – the nature, frequency, and intensity of verbal and behavioral cues – and how sensitive observers are to differences in values, we may come to better understand how values contribute to perceptions of personality.

The findings suggest that if values were studied together with other aspects of personality such as traits and motives throughout the life span this could provide a more nuanced insight into personality development. When considered in the context of previous research into the influence of upbringing on personality using Big Five and HEXACO traits, they underscore both the distinctness of, and the relationship between, values and personality traits. In revealing differences that are more in line with a longstanding and widespread stereotype than trait-based research findings previously allowed, they highlight the importance of incorporating values into research on personality and personality development.

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Supplementary Materials for The Values of Only-Children: Power and Benevolence in the Spotlight

Table SM1. Independence Tests

	Sibling Status	N	Mean	SD	SE Mean
<i>Age</i>	Only-Children	266	50.3	16.84	1.033
	Siblings	2819	52.19	14.674	0.276
<i>Education</i> ⁵	Only-Children	266	4.64	2.101	0.129
	Siblings	2819	4.49	1.887	0.036
<i>Religiosity</i> ⁶	Only-Children	266	1.96	2.238	0.137
	Siblings	2819	2.22	2.309	0.043

⁵ Education recorded on a scale of 1 - 'Never attended school', to 10 - 'Post-graduate degree'

⁶ Religiosity recorded in response to the question 'how religious are you?' on a scale of 0 - 'not at all' to 7 - 'very religious'

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Levene's Test for Equality of Variances

		<i>F</i>	<i>Sig.</i>	<i>t</i>	<i>df</i>	<i>Sig. (2-tailed)</i>	<i>Mean Difference</i>	<i>Std. Error Difference</i>	95% CI	
									Lower	Upper
<i>Age</i>	Equal variances assumed	21.982	0	-1.972	3083	.049	-1.881	0.954	-3.751	-0.011
	Equal variances not assumed			-1.76	304.191	.079	-1.881	1.069	-3.984	0.222
<i>Education</i>	Equal variances assumed	5.985	0.014	1.238	3083	.216	0.151	0.122	-0.088	0.391
	Equal variances not assumed			1.133	306.725	.258	0.151	0.134	-0.112	0.414
<i>Religiosity</i>	Equal variances assumed	0.812	0.368	-1.724	3083	.085	-0.255	0.148	-0.544	0.035
	Equal variances not assumed			-1.769	320.601	.078	-0.255	0.144	-0.538	0.029

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Table SM2. Differences in Refined Value Preferences between Only-Children and Siblings

	<i>Group</i>	<i>Mean (SD)</i>	<i>F</i> †	<i>n_p²</i>	<i>t</i> ‡	<i>df</i>	<i>p</i> ^b	95% CI [LL, UL]
<i>Tradition</i>	Only-children	1.73 (0.40)	0.01	.000				
	Siblings	1.73 (0.42)			-0.11	324.17	.912	[-0.053, 0.047]
<i>Conformity Rules</i>	Only-children	2.01 (0.39)	0.48	.000				
	Siblings	1.99 (0.35)			0.65	308.54	.519	[-0.033, 0.064]
<i>Conformity Interpersonal</i>	Only-children	1.78 (0.37)	0.14	.000				
	Siblings	1.78 (0.36)			0.37	313.40	.715	[-0.038, 0.056]
<i>Security Societal</i>	Only-children	2.39 (0.32)	0.96	.000				
	Siblings	2.41 (0.31)			-0.96	314.95	.336	[-0.059, 0.020]
<i>Security Personal</i>	Only-children	2.27 (0.31)	0.00	.000				
	Siblings	2.27 (0.30)			-0.03	313.86	.973	[-0.040, 0.038]
<i>Face</i>	Only-children	1.65 (0.32)	1.70	.001				
	Siblings	1.62 (0.33)			1.33	319.26	.186	[-0.013, 0.069]
<i>Power Resources</i>	Only-children	1.52 (0.44)	7.51	.002				
	Siblings	1.45 (0.40)			2.57	309.19	.011	[0.017, 0.126]
<i>Power Dominance</i>	Only-children	1.46 (0.35)	16.41	.005				
	Siblings	1.38 (0.31)			3.65	305.02	.000	[0.037, 0.125]
<i>Achievement</i>	Only-children	1.59 (0.43)	1.69	.001				
	Siblings	1.56 (0.41)			1.25	311.86	.213	[-0.020, 0.089]
<i>Hedonism</i>	Only-children	2.09 (0.36)	0.08	.000				

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	Siblings	2.08 (0.37)		0.29	317.91	.772	[-0.039, 0.053]
<i>Stimulation</i>	Only-children	2.02 (0.38)	2.51	.001			
	Siblings	1.98 (0.36)		1.54	313.81	.124	[-0.010, 0.084]
<i>Self-Direction Action</i>	Only-children	2.22 (0.34)	0.17	.000			
	Siblings	2.21 (0.32)		0.39	312.00	.694	[-0.034, 0.051]
<i>Self-Direction Thought</i>	Only-children	2.04 (0.33)	0.20	.000			
	Siblings	2.03 (0.35)		0.46	322.93	.644	[-0.032, 0.052]
<i>Universalism Tolerance</i>	Only-children	2.17 (0.39)	5.99	.005			
	Siblings	2.23 (0.37)		-2.37	312.87	.019	[-0.107, -0.010]
<i>Universalism Animals</i>	Only-children	2.14 (0.43)	1.67	0.001			
	Siblings	2.11 (0.40)		1.22	310.18	.224	[-0.020, 0.087]
<i>Universalism Nature</i>	Only-children	2.13 (0.38)	0.09	0.000			
	Siblings	2.13 (0.37)		0.29	312.90	.770	[-0.041, 0.055]
<i>Universalism Concern</i>	Only-children	2.22 (0.36)	5.75	0.002			
	Siblings	2.28 (0.36)		-2.39	316.55	.018	[-0.101, -0.010]
<i>Benevolence Dependability</i>	Only-children	2.42 (0.38)	15.15	0.005			
	Siblings	2.51 (0.35)		-3.60	307.81	.000	[-0.135, -0.040]
<i>Benevolence Caring</i>	Only-children	2.41 (0.35)	18.15	0.006			
	Siblings	2.50 (0.32)		-3.87	306.07	.000	[-0.132, -0.043]
<i>Humility</i>	Only-children	1.89 (0.31)	2.39	0.001			
	Siblings	1.92 (0.32)		-1.58	320.29	.114	[-0.071, 0.008]

†Sample size for Only Child ($n=266$), Sibling ($n = 2819$); $df1 = 2$; $df2 = 3083$ for all F tests; ‡ Welch's t -test reported due to unequal sample sizes. ^b Bonferroni correction applied

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Table SM3. Differences in Value Preferences between Only-Children and Siblings from different Birth Order Groups

<i>Value</i>	<i>Group</i>	<i>n</i>	<i>Mean (SD)</i>	<i>Comparison Group</i>	<i>n</i>	<i>Mean Difference</i>	<i>t⁺</i>	<i>df</i>	<i>d</i>	<i>p^b</i>	<i>95% CI [LL, UL]</i>
<i>Power</i>	Only-children	1.49 (0.35)		Firstborns	266	0.071	3.09	361.7	0.23	0.006	[0.013, 0.130]
				Middle Children	1213	0.098	4.12	410.3	0.32	0.000	[0.036, 0.160]
				Lastborns	719	0.083	3.51	402.8	0.27	0.001	[0.022, 0.144]
				Twins	95	-0.085	1.87	150.6	-0.24	0.210	[-0.187, 0.018]
<i>Benevolence</i>	Only-children	2.42 (0.32)		Firstborns	266	-0.088	4.18	355.9	-0.31	0.000	[-0.141, -0.035]
				Middle Children	1213	-0.105	4.80	406.0	-0.38	0.000	[-0.161, -0.049]
				Lastborns	719	-0.080	3.65	411.0	-0.28	0.000	[-0.135, -0.025]
				Twins	95	0.000	0.01	177.4	0.00	1.000	[-0.094, 0.093]

⁺Welch's *t*-test reported due to unequal sample sizes ^b Bonferroni correction applied

Table SM4. Differences in Power and Benevolence Value Preferences between Only-Children and Siblings in Families of 2

<i>Value</i>	<i>Group</i>	<i>n</i>	<i>Mean (SD)</i>	<i>Comparison Group</i>	<i>n</i>	<i>Mean Difference</i>	<i>t⁺</i>	<i>df</i>	<i>d</i>	<i>p^b</i>	<i>95% CI [LL, UL]</i>
<i>Power</i>	Only-children	266	1.49 (0.35)	Firstborns	562	0.054	2.14	478.1	0.16	0.079	[-0.004, 0.111]
				Lastborns	354	0.051	1.88	547.0	0.15	0.154	[-0.012, 0.114]
<i>Benevolence</i>	Only-children	266	2.42 (0.32)	Firstborns	562	-0.078	3.46	452.8	-0.27	0.001	[-0.129, -0.028]
				Lastborns	354	-0.074	3.00	525.9	-0.25	0.004	[-0.129, -0.018]

⁺Welch's *t*-test reported due to unequal sample sizes ^b Bonferroni correction applied

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Table SM5. Differences in Power and Benevolence Value Preferences between Only-Children and Siblings in Families of 3

<i>Value</i>	<i>Group</i>	<i>n</i>	<i>Mean (SD)</i>	<i>Comparison Group</i>	<i>n</i>	<i>Mean Difference</i>	<i>t⁺</i>	<i>df</i>	<i>d</i>	<i>p^b</i>	<i>95% CI [LL, UL]</i>
<i>Power</i>	Only-children	266	1.49 (0.35)	Firstborns	330	0.068	2.57	515.6	0.22	0.042	[0.001, 0.135]
				Middle-Children	223	0.055	1.81	479.9	0.16	0.282	[-0.018, 0.129]
				Firstborns	235	0.108	4.00	484.6	0.35	0.001	[0.036, 0.181]
<i>Benevolence</i>	Only-children	266	2.42 (0.32)	Firstborns	330	-0.093	3.68	539.6	-0.31	0.001	[-0.156, -0.029]
				Middle-Children	223	-0.072	2.71	487.0	-0.24	0.039	[-0.142, -0.002]
				Lastborns	235	-0.080	2.97	498.8	-0.26	0.013	[-0.150, -0.011]

⁺Welch's *t*-test reported due to unequal sample sizes ^b Bonferroni correction applied

Table SM6. Differences in Power and Benevolence Value Preferences between Only-Children and Siblings in Families of 4 and more

<i>Value</i>	<i>Group</i>	<i>n</i>	<i>Mean (SD)</i>	<i>Comparison Group</i>	<i>n</i>	<i>Mean Difference</i>	<i>t⁺</i>	<i>df</i>	<i>d</i>	<i>p^b</i>	<i>95% CI [LL, UL]</i>
<i>Power</i>	Only-children	266	1.49 (0.35)	Firstborns	321	0.105	3.86	536.1	0.32	0.000	[0.040, 0.171]
				Middle-Children	496	0.117	4.79	440.4	0.39	0.000	[0.057, 0.177]
				Lastborns	203	0.111	3.79	463.5	0.34	0.000	[0.037, 0.185]
<i>Benevolence</i>	Only-children	266	2.42 (0.32)	Firstborns	321	-0.101	4.10	515.7	-0.35	0.000	[-0.161, -0.040]
				Middle-Children	496	-0.120	5.29	455.4	-0.43	0.000	[-0.176, -0.065]
				Lastborns	203	-0.091	3.30	459.5	-0.30	0.003	[-0.159, -0.023]

⁺Welch's *t*-test reported due to unequal sample sizes ^b Bonferroni correction applied

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Table SM7. Differences in and between Power and Benevolence Value Preferences between Only-Children and Siblings by Age Group

<i>Value</i>	<i>Comparison Groups</i>	<i>n</i>	<i>Mean (SD)</i>	<i>Age Group (years)</i>	<i>Mean Difference</i>	<i>t⁺</i>	<i>df</i>	<i>d</i>	<i>p^b</i>	<i>95% CI [LL, UL]</i>
<i>Power</i>	Only-children	91	1.62 (0.37)	Under 41	0.150	3.71	110.9	0.43	.000	[0.074, 0.226]
	Siblings	731	1.49 (0.35)							
	Only-children	88	1.49 (0.35)	41-61	0.092	2.40	96.2	0.31	.006	[0.027, 0.157]
	Siblings	1224	1.40 (0.30)							
	Only-children	87	1.35 (0.25)	Over 61	-0.033	1.16	105.8	-0.13	.264	[-0.092, 0.025]
	Siblings	864	1.38 (0.27)							
<i>Benevolence</i>	Only-children	91	2.29 (0.30)	Under 41	-0.161	4.87	111.6	-0.56	.000	[-0.223, -0.098]
	Siblings	731	2.45 (0.29)							
	Only-children	88	2.37 (0.32)	41-61	-0.135	3.84	96.4	-0.48	.000	[-0.195, -0.074]
	Siblings	1224	2.52 (0.28)							
	Only- child	87	2.59 (0.25)	Over 61	0.050	1.75	104.1	0.20	.081	[-0.006, 0.106]
	Siblings	864	2.54 (0.25)							

⁺Welch's *t*-test reported due to unequal sample sizes ^b Bonferroni correction applied