



Self-transcendence through the lens of ontological addiction: correlates of prosociality, competitiveness and pro-nature behavior

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Abstract

Self-transcendence and the associated decrease in ego-centeredness are understood to foster altruistic and positive behaviors that promote prosociality and pro-environmental actions. However, the lack of an agreed valid and reliable measure of self-transcendence has posed difficulties in examining this subject. The main aim of this study was to use the recently developed Ontological Addiction Scale (OAS), which assesses dysfunctional ego-centeredness as an inhibitor of self-transcendent change, as a proxy measure to examine whether self-transcendence is indeed related to such “selfless” prosocial and pro-nature behaviors. Secondary aims were to examine ontological addiction (OA) and these behaviors in relation to competitiveness and ego-driven manifestations of prosociality. These relationships were examined via self-report measures in a cross-sectional cohort study of 287 UK adult participants. Findings revealed associations with competitiveness that broadly reflect its association with ego-centeredness through significant correlations with OA, and significant negative correlations with both prosociality and pro-nature behavior. They also supported earlier findings of a significant relationship between OA and measures of anxiety and depression. However, the expected negative correlations between OA and both prosociality and pro-nature behavior were not evidenced, which raises questions regarding the notion of OA as a conceptual antithesis of self-transcendence and/or whether measures of pro-sociality and pro-nature behavior adequately account for “selfish” or “impure” motivations that may underly these behaviors. Implications and future research directions are discussed.

Keywords Transcendence · Self-transcendence · Ontological addiction · Prosociality · Pro-nature behavior · Environmentalism · Competitiveness · Mental illness · Buddhism

The pursuit of *transcendence* is a feature of many spiritual and religious practices (Van Cappellen, 2017). Transcendence refers to going beyond the ordinary limits or boundaries of human experience and often relates to a shift in perspective or awareness that allows individuals to perceive aspects of reality that are normally hidden. In the context of spirituality, *self-transcendence* is an important focus of such experiences. Within this, ordinary individual consciousness is often experienced as giving way to a larger reality in which we are profoundly and harmoniously interconnected with all things (Piedmont, 1999). Across cultures and religions throughout history such experiences have been given

numerous names, though each share important common features (Levin & Steele, 2005). Primarily there is the sense of individual consciousness in some sense extending beyond the psychosocial boundaries that ordinarily define us; thus, the commonplace view of consciousness as being contained by the individual (Ryle, 1949) is often reversed in favor of one where individual consciousness is subsumed by a higher order, transpersonal form of consciousness. This conception of consciousness is broadly aligned with contemporary forms of panpsychism, particularly priority cosmopsychism (Chalmers, 2013; Goff, 2017; Nagasawa & Wager, 2017).

In line with this, also common is the sense of merging or identifying with a ‘divine ground’ or ultimate source of being. Paradoxically, this type of experience is characterized by some as being beyond ordinary human comprehension, yet, for others, it is viewed as being more authentic, more immediate, and more real than everyday experiences (Levin & Steele, 2005). Such transcendence often involves a sense

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of heightened objectivity and deeper insights into the nature of selfhood and reality (Humphreys & Hodge, 2003; Van Gordon et al., 2021). Maslow (1969, p.66) described transcendence as “the very highest and most inclusive or holistic levels of human consciousness, behaving and relating, as ends rather than as means, to oneself, to significant others, to human beings in general, to other species, to nature, and to the cosmos”.

Such transcendence, however, does not necessarily emerge from exclusively religious or spiritual pursuits. Another notable kind of self-transcendence is one encountered through a sense of awe. When we witness something beyond our preconceived view of the world, such as extraordinary or unusual phenomena, the scope of our mental structures may be overwhelmed, forcing us to reassess our understanding in a way that may inspire profound new insights and a heightened sense of perspective (Acevedo & Tost, 2023; Jiang & Sedikides, 2022; Keltner & Haidt, 2003; Yaden et al., 2017). Awe and associated self-transcendent feelings are frequently found in the appreciation of beauty, notably in the context of nature and the natural world (Diessner et al., 2022; Zelenski & Desrochers, 2021). Indeed, dispositional awe has been identified as an important element of self-transcendence (Jiang & Sedikides, 2022; Shiota et al., 2007). Furthermore, it has been proposed that transcendence should be conceptualized as a component of human personality distinct from widely accepted taxonomies such as McCrae and Costa’s (1999) five-factor model. Both Cloninger et al. (1993) and Piedmont (1999) have taken this position, with the former characterizing self-transcendence as “the extent to which a person identifies the self as [...] an integral part of the universe as a whole” (Cloninger et al., 1993, p. 975).

What is commonly agreed upon, however, is that the key obstacle to self-transcendence lies within the human tendency to fixate upon and reify the self and become overly attached to ego-centered concerns, obscuring a deeper sense of our interconnectedness with the wider world (Gilbert & Van Gordon, 2023). Throughout history, religious and spiritual practices have sought to promote transcendence to cultivate personal transformation, and the insights believed to be necessary for a rich and fulfilling existence (Emmons, 2005). To achieve such transcendence, such practices commonly seek to erode the sense of self, shifting our center of consciousness from our individual selves to a more fundamental sense of ourselves as part of a greater interconnected whole.

This shift of perspective is a central focus of Buddhist philosophy and its meditational practices, which are centered upon the concept of non-self (Sanskrit: “anattā”)– the realization that what we regard as our individual selves is

illusory and constructed. While this conception may superficially appear counterintuitive, it is entirely consistent with our unfolding scientific knowledge about the nature of reality (Van Gordon et al., 2017). At its deepest level, the universe is akin to a vast kaleidoscope of matter and energy, passing ceaselessly through an infinite series of combinations in which transient forms emerge and then dissipate to make way for others. Human beings and other life forms are no exception in this respect; complex assemblages of chemical machinery which have evolved over millions of years to survive, prosper and reproduce in a terrestrial environment.

Selfhood can be regarded as an emergent property of complex life-forms which has evolved to safeguard an organism’s survival in a potentially hostile world (Gilbert & Van Gordon, 2023). To ensure as best as possible our continued survival, the self constantly monitors our surroundings, anticipating potential threats and opportunities. At its most basic level, this monitoring relates to our immediate survival; we must ensure that we have sufficient resources to survive as well as shelter to provide security. At a more advanced level, humans process a multitude of cues that reflect our identity as parts of greater interpersonal collectives, such as romantic affiliations, familial and broader social relationships, navigating a complex code of expectations and norms to explore opportunities and threats at more abstract levels.

These more abstract levels of identity form something of a hierarchy which is reflected in taxonomies of scale such as, amongst others, Maslow’s hierarchy of needs (Maslow, 1943). From an emulated construct of selfhood which forms our ultimate reference point, we also have progressively more abstract levels of identity representing our interconnectedness with broader social modalities, and our identity with the roles, occupations and value systems within which we operate (Llanos & Martínez Verduzco, 2022; Maslow, 1943, 1969). Beyond our social or cultural identity, however, is our sense of belonging to the terrestrial ecosystem within which we survive; we recognize ourselves within this sphere as part of a vastly complex ecosystem of life on this planet– one of millions of species that has emerged and adapted over millions of years to occupy our own unique evolutionary niche. Further still beyond this is our identity with the universal, and the metaphysical domain with which religious and spiritual matters are deeply connected (Cloninger et al., 1993).

However, it is important to remember that the self-construction of the organism which houses our individual existence is no less and no more real than these more abstract, superordinate levels of selfhood reflecting our existence as part of collective entities such as interpersonal and social groups, society, and the larger natural world. It also follows that by diminishing our preoccupation with our own egos and shifting our consciousness over to awareness of

the greater totality, we can better and more harmoniously exist, enriched by a closer unity with more extended sense of identity. This is echoed in recent literature on ‘the quiet ego’ in which an improved balance of concerns between self and other has been posited to be a major factor in personal growth and wellbeing (Wayment & Bauer, 2018).

Though many now understand and accept the reality of human selfhood as essentially constructed, it is nonetheless often very difficult to overcome simplistic dualistic notions of ourselves being somehow of a different class of substance to the world around us. While we may understand and accept that there is no rational basis for accepting the reality of an unchanging, separate self that exists independently of the world around us, in reality this intractable cartesian divide persists and can be very difficult to overcome (Barrows et al., 2022a). It is for this reason that Buddhist practices involve the cultivation of deeper, transformative nondual experiences variously known as *suññatā*, *nirvāṇa* or— within the *Zen* school— *satori* (Humphreys & Hodge, 2003; Lomas et al., 2017). Within these experiences such self-other dualism can be eroded, and the ego transcended such that we recognize our consciousness to be seated in a boundless, interconnected whole from which our finite selves are ultimately inseparable (Van Gordon et al., 2018). Such insights are purported to bring greater objectivity, and an enhanced capacity to identify with, and operate as part of, the greater totality of things. Related to the concept of non-self is the Buddhist practice of *nonattachment*, which has a key role to play in such ego-transcendence. Nonattachment focusses primarily on seeking freedom from desires and attachments that limit us and can be seen as a tool for transcending ego-driven and materialistic facets of our existence (Barrows et al., 2022). As such, it can facilitate self-transcendent experiences (STEs) by freeing individuals from the constraints of attachment and ego, fostering experience of expanded levels of consciousness (Tremblay & Van Gordon, 2023).

Recently the concept of Ontological Addiction (OA) has been proposed as a key mechanism through which psychological illness develops and reinforces itself (Van Gordon et al., 2018a). Drawing on 2,500-year-old Buddhist philosophical concepts, Ontological Addiction Theory (OAT) is a system of psychopathology that places the root of much of human psychological suffering as due to our being disproportionately dominated by ego-related rumination and concerns (Barrows & Van Gordon, 2021). OAT is based on Buddhist teachings regarding the nature of existence. Since all things are impermanent and subject to constant change (Sanskrit: “aniccā”), it implies that they never assume an existence that is fixed in space and time. As such, phenomena are devoid of an inherently existing self and are ‘empty’ or of the nature of ‘non-self’ (Sanskrit: “anattā”), existing only in relative sense as an inseparable component of a dynamic

and transient totality (Nagarjuna, 2005; Shonin et al., 2014). By harboring a belief that they exist as an independent and separate self, an ontological schism emerges whereby a person operates under a fundamentally flawed belief regarding the way that they exist. The illusion of absolute individuality becomes constantly reinforced and entrenching, perpetuating narrow egotistical modes that exacerbate fixation on the self to the extent it meets the criteria of an addiction (Griffiths, 2005; Shonin et al., 2016).

This ‘self-addiction’ impairs function and harms mental health (Barrows et al., 2022a), whereas practices which seek to deconstruct the ego and promote acceptance of non-self can foster personal and spiritual development, including moving towards self-transcendence (Shonin & Van Gordon, 2015; Van Gordon et al., 2018a; Gordon et al., 2019). Consistent with Ontological Addiction Theory (OAT), people who score higher on measures of OA also score higher on screening measures for mental health problems such as anxiety and depression, while those who score higher on nonattachment score lower on OA (Barrows et al., 2022a).

One common complaint about the concept of self-transcendence is the difficulty in conceptualizing the construct in a measurable way. Despite attempts to develop a suitable instrument to assess self-transcendence (Jiang et al., 2018; Levenson et al., 2005; Piedmont, 1999), the lack of a single, widely accepted, valid and reliable measure has caused difficulties in studying STEs in empirical research (Garcia-Romeu, 2010). However, it is reasonable to suppose that OA, with its construct of dysfunctional ego-centeredness can be viewed as essentially antithetical to ego-transcendence. Thus, for the purposes of the present study, due to the challenges of accurately assessing self-transcendence, we assert that OA— for which a scale has recently been validated in the form of the Ontological Addiction Scale (Barrows et al., 2022a)— can be used as a proxy measure representing the antithesis of self-transcendence.

Prosociality and self-transcendence

Eisenberg et al. (2006) described prosocial behavior as voluntary behavior intended to benefit another, while Carlo and Randall (2002) described it as behavior which is intended to help others. Beyond this simple conceptualization, many agree that a common feature of prosocial behavior is that it is inherently altruistic, involving a benefit for others, but at a cost for the self (Wittek & Bekkers, 2015). It seems natural therefore to imagine that those who are less focused on their ego might be more predisposed to exhibit prosocial behavior. The shift in perspective caused by STEs tends to diminish focus on the importance of the self while increasing focus on things beyond the self, including other people,

society and the natural world in which we are more largely situated (Castelo et al., 2021; Li et al., 2019).

The relationship between self-transcendence and prosocial behavior is not always straight forward as dimensions of the latter can sometimes be driven by egoistic motives (Moran, 2016). However, despite these complexities, research typically suggests that self-transcendence and allied constructs show a positive relationship with prosociality. In a study of a large population representative sample ($n=2,078$), dispositional awe predicted greater generosity in an economic game compared to other prosocial emotions such as compassion, while the induction of awe in a natural setting promoted prosocial helping behavior compared to a control condition (Piff et al., 2015). A further study found that eliciting a sense of awe weakened the desire for money and that this relationship was mediated by self-transcendence (Jiang et al., 2018). In this case, reduced material desire was attributed to the power of awe to promote transcendence of mundane concerns, with the authors concluding that awe has implications for economically prosocial motives such as the willingness to donate (Jiang et al., 2018).

A study by Li et al. (2019) also suggested that dispositional awe increases prosocial behavior via an improvement of 'self-transcendent meaning of life', but was also mediated by future time perspective. Furthermore, a literature review identified that three transcendent emotions of (1) awe, (2) elevation and (3) *kama muta* (a Sanskrit term for being moved by love or compassion) were positively associated with motivation to help others, as well as global identification with others (Pizarro et al., 2021).

Another study demonstrated a significant positive association between dispositional awe and self-transcendence, with findings also indicating that self-transcendence mediated the relationship between awe and authentic self-pursuit, and that awe-induced authentic self-pursuit was associated with higher prosociality (Jiang & Sedikes, 2022). Elsewhere Barton and Hart (2023) detail how social activists report self-transcendence through a deep feeling of both communal and global connectedness, and shared causes or objectives to benefit the greater good. In an analysis of recent literature, Stellar (2017) proposed that self-transcendent emotions such as awe, compassion and gratitude serve an essential purpose by fostering connections, attachments and commitments to others, binding us to social collectives of kin and non-kin alike.

Nature and self-transcendence

Much recent research has been concerned with how people can improve their wellbeing by becoming more connected to nature and that this, in turn can foster pro-nature behaviors that are protective of nature. There has been relatively little research into how self-transcendent emotions can directly foster pro-environmental behaviors (Bethelmy & Corraliza 2019; Yang et al., 2018; Zelenski & Desrochers, 2021), however the role of awe appears to have the strongest evidence base.

Donations to a hypothetical environmental organization in a dictator game were increased by induced awe (Ibanez et al., 2017), while evidence from Yang et al. (2018) suggested that induced awe impacts on ratings of likelihood of engaging in pro-nature behavior via increased nature connectedness. A study by Zhao et al. (2018) revealed not only a positive relationship between trait awe and pro-environmental behavior, but also demonstrated that induced awe promoted willingness to make personal sacrifices to benefit the environment.

Wang et al. (2019) found that eliciting awe increased participants' intentions to make environmentally positive purchasing choices compared to other emotions, and that psychological ownership of nature played a mediating role in this relationship. More recently, Diessner et al. (2022) found that transcendence through beauty had indirect effects on pro-environmental behavior, while nonattachment was found to be a predictor of pro-nature conservation behavior (Barrows et al., 2022a). Furthermore, in a review of empirical findings, Zelenski and Desrochers (2021) argue that pro-environmental behaviors are essentially a manifestation of prosociality but in an organized form.

In another literature review and exploration of possible mechanisms through which STEs may promote ecological wellbeing and pro-nature behavior, Isham (2022) examined four key varieties which appeared to be clearly differentiated from one another in the academic literature. These were awe (Keltner & Haidt, 2003), mindfulness (Barbaro & Pickett, 2016), flow (Isham et al., 2019) and psychedelic-induced experiences (Forstmann & Sagioglou, 2017). Drawing an analogy with the experiences of astronauts seeing the Earth from above, the authors suggest a common role of the 'overview effect' (Yaden et al., 2016) as a means by which such experiences foster a shared sense of global citizenship. Such experiences may lead to an improved ecological awareness, fostering motivation to protect the natural world.

In studies of nature connectedness, other studies have concerned themselves with a reversal of this relationship, that is the capacity of nature to inspire STEs. A study by Neill et al. (2019) demonstrated that brief contact with nature reliably evoked STEs, while Castelo et al. (2021)

found that exposure to nature promotes both self-transcendence and prosocial behavior, lending support to Zelenski and Derochers' (2021) contention that pro-nature and prosociality dispositions are related. With regard to pro-nature behaviors, there has been a paucity of direct research owing to the lack of scales focused broadly on habitat conservation and restoration in comparison to energy and resource, which are the focus of the more widely studied pro-environmental behaviors (Barbett et al., 2020). However, in that broader sphere of pro-environmental behaviors, 'nature as community' perspectives, which have links to pro-sociality, have a unique positive effect (Joireman et al., 2001; Lengeiza et al., 2023). This more relational worldview lies at the heart of nature connectedness and is seen as key for ecological well-being (Reichers et al., 2021), but although core to ecological thinking for centuries the competitive notion of 'survival of the fittest' has been misused (Darwin, 1871; Weintribe, 2021).

Competitiveness, ego and self-transcendence

The misuse of the term 'survival of the fittest' and role of narcissistic traits in OA implicate another factor which may be at play in reinforcing egoism and promoting ego-driven motives, that is, competitiveness. A feature of grandiose narcissism, for example, is an intense need to feel superior to others and evidence suggests that both grandiose and vulnerable narcissism are positively associated with competitiveness and wanting to out-do others (Zeigler-Hill et al., 2008). It has also been found that status seeking is associated with narcissism as competitive motive (Bernard, 2014).

Although some evidence suggests an association between altruism and restraint in competition (Axelrod & Hamilton, 1981), there appears to be very little evidence directly examining the role of competitiveness to self-transcendence. However, given the focus of competitiveness on ego-based motives, one might hypothesize, that, through entrenching a dualistic, oppositional relationship between oneself and others, it may serve to bolster and reinforce egoism. As such, competitiveness might well be expected to be positively related to OA and negatively associated with prosociality and pro-nature behaviors.

Aims and predictions

The purpose of this study was therefore: (a) to examine the relationship between OA, prosociality (altruistic and egoistic) and pro-nature identity and behavior; (b) to examine the role of competitiveness in these relationships; and (c) to

corroborate existing findings regarding a negative relationship between OA and mental health.

Based on the supposition that OA as a construct of pathological ego-centeredness is diametrically opposed to self-transcendence, the aforementioned positive relationships between self-transcendence and associated constructs (e.g., dispositional awe) and both prosociality and pro-nature behavior should be reflected in the current study by (1) a negative correlation between OA and scores on prosociality, and (2) a negative correlation between OA and scores on pro-nature identity and behavior. However, as communal narcissism—unlike altruistic prosociality—is motivated by ulterior, egoistic motives, we would expect that OA will show (3) a positive relationship with communal narcissism.

Regarding the role of competitiveness, we might tentatively hypothesize that, since competition tends to reinforce and entrench a dualism between self and other, that 4) OA is positively correlated with competitiveness, that 5) communal narcissism is positively correlated with competitiveness, 6) prosociality is negatively correlated with competitiveness, and 7) pro-nature identity and behavior are negatively correlated with competitiveness.

Finally, we predict that prior findings regarding the relationship between OA and mental health will be supported in the present study, and that 8) OA will be positively correlated with measures of depression and anxiety.

Method

Design

The present correlational study employed a cross-sectional design using a cohort of U.K. adult participants.

Participants

Sample size calculations were performed using G*Power3 (Faul et al., 2007) whereby a figure of 287 participants was determined based on a power of 0.8, a significance threshold of 0.01, and a small to medium effect size ($d = 0.2$) for a correlational design employing two-tailed tests. Consequently, 287 adult participants were recruited via the online recruitment system *Prolific*. Each participant received a payment of £2.48 following participation in the survey (mean duration 10 min 8 s). Inclusion criteria for the study were that participants were U.K. resident English-speakers aged over 18 years who were not currently diagnosed with any psychotic disorders, neurological conditions, alcohol use disorders or drug use disorders.

Measures

This study employed eight psychometric scales as detailed below.

The Ontological Addiction Scale (OAS-24; Barrows et al., 2022a) is a 24-item self-report measure to assess ontological addiction (or ‘self-addiction’) and in the present study was used as a proxy measure to represent the antithesis of self-transcendence. Items are reported on a five-point Likert scale from 1 (“never”) to 5 (“always”). The OAS contains items such as “How often during the last year have you felt the need for more attention or recognition?” and “How often during the last year have you found it hard to accept your mistakes and shortcomings?”. The scale has a score total in the range of 0 to 96, with higher scores indicating higher levels of OA. The OAS-24 has demonstrated excellent psychometric properties. Construct validity has been evidenced by strong correlations with an ego-centeredness form of the Five-Factor Narcissism Inventory ($r=0.67, p<0.001$; Krizan & Herlache, 2017). Reliability of the OAS-24 has also proven strong, with a short-interval test-retest reliability of 0.89 and a Cronbach’s alpha of 0.91 (Barrows et al., 2022a). The Cronbach’s alpha in the present study was 0.90, while McDonald’s omega was 0.91.

The Pro-nature Conservation Behavior Scale short form (PROCOBS-8; Barbett et al., 2020) is an eight-item self-report measure to assess behaviors that support pro-nature and biodiversity conservation behavior. Items are reported on a seven-point Likert scale from 1 (“never”) to 7 (“always”), with items such as “When I see litter, I pick it up” and “I vote for parties/candidates with strong pro-nature conservation policies in elections”. The scale has a score total in the range of 7 to 42, with higher scores indicating higher levels of pro-nature conservation behavior. Construct validity has been evidenced by expected correlations with pro-environmental behavior ($r=0.59, p<0.001$) and nature relatedness ($r=0.56, p<0.001$). The PROCOBS-8 has also demonstrated excellent reliability, with a test-retest reliability of 0.85 ($p<0.001$) and a Cronbach’s alpha of 0.89 (Barbett et al., 2020). The Cronbach’s alpha in the present study was 0.86 and McDonald’s omega was 0.87.

The single-item Inclusion of Nature in Self Scale (INS; Schultz, 2002) is a scale consisting of seven Venn diagrams representing a person’s perceived relationship between themselves and nature. The first diagram shows circles with no overlap, while the last shows circles fully overlapping, with intermediate diagrams showing a progressively greater degree of overlap. Participants are asked: “Please circle the picture below which best describes your relationship with the natural environment. How interconnected are you with nature?” Scores are on a range of 0 to 6, with higher scores representing higher self-perceived identity with nature.

Positive associations between scores on the INS, and scores on both general ecological behavior ($r=0.49, p<0.001$) and commitment to the environment ($r=0.53, p<0.001$) have evidenced acceptable construct validity (Davis et al., 2009), as has its correlation with the PROCOBS- ($r=0.40, p<0.001$; Barbett et al., 2020). Excellent test-retest reliability across a two-week interval ($r=0.77, p<0.001$) has also been demonstrated (Martin & Czellar, 2016).

The Prosociality Scale (PS-16; Luengo Kanacri et al., 2021) is a 16-item self-report measure of pro-social behavior. Items are reported on a five-point Likert scale from 1 (“never/almost never true”) to 5 (“almost always/always true”). It consists of items such as “I am pleased to help my friends/colleagues in their activities” and “I do what I can to help others avoid getting into trouble”. The scale has a score total in the range of 16 to 80, with higher scores indicating higher levels of prosocial behavior. The PS-16 was developed to assess engagement in actions intended to take care of, help, share, and empathize with others, and has been cross-gender and cross-nationally validated in a large sample of respondents (). Construct validity of the scale has been supported by expected correlations with agreeableness and emotional and empathic self-efficacy (Alessandri et al., 2009; Caprara et al., 2012), while a moderately high correlation ($r=0.50$) has also been found between self- and other- ratings using this scale (Caprara et al., 2008). In a longitudinal study, the scale has demonstrated excellent reliability, with a four-year test-retest reliability of 0.65 and internal consistency of 0.93 at T1 and 0.94 at T2. (Caprara et al., 2012). Both the Cronbach’s alpha and McDonald’s omega in the present study were 0.93.

The Communal Narcissism Inventory (CNI; Gebauer et al., 2012) was developed to capture how someone with a communal, rather than agentic, orientation could still demonstrate characteristics of grandiosity and superiority. Those with communal narcissism not only report being caring or helpful, but they see themselves as the “most” caring or helpful. Users must rate 16 items on a scale from 1 (“strongly disagree”) to 7 (“strongly agree”). The scale consists of items such as “I am the best friend someone can have” and “I have a very positive influence on others”. The scale has a score in the range of 16 to 112, with higher scores indicating higher levels of communal narcissism. Construct validity of the CNI was evidenced by a pattern of correlations with subscales of the Narcissistic Personality Inventory and a grandiose self-thought listing. The CNI has also shown very good reliability, with Cronbach’s alphas ranging from 0.86 to 0.95 across samples, and an eight-week test-retest reliability of 0.71 ($p<0.001$; Gebauer et al., 2012). Both the Cronbach’s alpha and McDonald’s omega in the present study were 0.93.

The Multidimensional Competitive Orientation Inventory (MDCI; Orosz et al., 2018) assesses competitiveness and has four, four-item subscales: (1) Lack of interest toward competition, (2) hyper-competitive, (3) anxiety-driven competition avoidant, and (4) self-developmental competitive. Items are rated on a scale from 1 (“strongly disagree”) to 7 (“strongly agree”). Each subscale has a score in the range of 7 to 28. For the purposes of this study, only the *lack of interest toward competition* and *hyper-competitive* items were utilized. Confirmatory Factor Analysis has confirmed a good model fit for the MCOI and its scales ($\chi^2 = 116.539$, $df = 48$, $p < 0.001$; RMSEA = 0.040 [95% CI 0.031–0.049]; CFI = 0.99; TLI = 0.987; SRMR = 0.024). The two subscales employed showed very good internal consistency, each with a Cronbach’s alpha of 0.82 (Orosz et al., 2018). The Cronbach’s alpha for both subscales in the present study was 0.86. The McDonald’s alpha was 0.87 for the lack of interest towards competition subscale and 0.89 for the hyper-competitiveness subscale.

The Patient Health Questionnaire (PHQ-9; Kroenke et al., 2001) gives a brief assessment of depressive symptoms. It contains nine items, and respondents are asked if they have been affected by symptoms such as “Little interest or pleasure in doing things” and “Feeling down, depressed, or hopeless”. Participants rate their responses on a 4-point Likert scale (not at all, several days, more than half the days, nearly every day). Total scores for the PHQ-9 are in the range of 0 to 27, with higher scores indicating greater severity of depression symptoms. Kroenke et al. (2001) reported a sensitivity of 88% and specificity of 88% for a diagnosis of major depression based on a psychiatric interview using a cut-off of PHQ-9 ≥ 10 . Cut-offs of 5, 10, 15, and 20 were established for mild, moderate, moderately severe and severe depression respectively. Test-retest reliability and internal consistency were also excellent, with a test-retest correlation of 0.84 over across a 48-hour interval and a Cronbach’s alpha of 0.89. The Cronbach’s alpha for the present study was 0.89, while the McDonald’s omega was 0.90.

The GAD-7 (Spitzer et al., 2006) is a seven-item scale which gives a brief assessment of general anxiety. Items such as “Feeling nervous, anxious or on edge” and “Trouble relaxing” are scored on a the same 4-point Likert scale as the PHQ-9, and total scores are in the range of 0 to 21, with higher scores indicating greater symptoms of anxiety. Construct validity was evidenced by high correlations with the Beck Anxiety Inventory ($r = 0.72$) and anxiety subscale of the Symptom Checklist-90 ($r = 0.74$). Very good reliability and internal consistency was also evidenced, with an intraclass correlation of 0.83 and a Cronbach’s alpha of 0.92 (Spitzer et al., 2006). Both the Cronbach’s alpha and McDonald’s omega for the present study were 0.93.

Procedure

Participants were invited to take part via the *Prolific* participant recruitment bank. A summary of the study was provided with a link to a Qualtrics survey containing the participant information sheet, participant consent form and psychometric scales as outlined above. Ethical approval for the study was provided by the Research Ethics Committee of the researchers’ academic institution based in the East Midlands, U.K. (Ref: ETH2122-5124).

The survey first requested demographic information, including sex, age, and ethnicity. The psychometric scales were administered beginning with the OAS-24 followed by the PS-16, PROCBS-8, INS, PS-16, CNI, MCOI, PHQ-9, and finally the GAD-7. The psychometric scales took around 10 min to complete. Participants were then presented with a debrief form reiterating the main points regarding consent, the right to withdraw, and information governance. On this page, participants were asked again to consent to having their data included in the analysis.

Results

Of the 287 U.K. adult participants enrolled in the study, 80 were male, 202 were female and 4 classified themselves as ‘other’. The mean age for males was 37.9 years (standard deviation [SD] = 14.1; range = 19–80), while the mean age for females was 38.6 years (SD = 12.7; range = 19–76). A total of 263 (92%) reported their ethnicity as “White,” four (1.4%) as “Black,” 22 (7.7%) as “Asian,” seven (2.4%) as “Mixed,” and one (0.3%) as “Not stated.”

Data for one participant was excluded due to failing a test of vigilance, and three null values in the dataset were replaced by means. As shown in Table 1, tests of skewness and kurtosis revealed that all variables except hyper-competitiveness were within the expected parameters (< 1 and > -1). Q-Q plots for all of these variables also revealed a pattern consistent with normal distribution. Therefore, Pearson’s correlations were performed on all variable pairs except for those including hyper-competitiveness, for which Spearman’s correlations were employed (Table 2).

Two linear regressions were then performed using the enter method. For the first, prosociality was set as the outcome measure, with age, gender and the other variables set as predictor variables. For the second, pro-nature conservation behavior was set as the outcome measure, with age, gender and the others as predictors. Because gender was included as a predictor, four participants who detailed their gender as ‘other’ were omitted from this analysis.

For both of the regressions on prosociality and pro-nature conservation behavior, a Kolmogorov-Smirnov test

Table 1 Descriptive statistics for test measures ($n=286$; 80 male, 202 female)

Measure	Mean	SD	95% Confidence Interval for Mean		Skewness		Kurtosis	
			Lower bound	Upper bound	Statistic	Std Error	Statistic	Std Error
Age	38.15	13.17	18	80	0.838	0.144	0.006	0.287
OAS-24	45.34	12.29	6	82	-0.171	0.144	-0.071	0.287
PROCOBS-8	25.74	9.88	8	49	0.200	0.144	-0.798	0.287
INS	3.63	1.40	1	7	0.466	0.144	-0.254	0.287
PS-16	55.81	10.88	24	80	-0.267	0.144	-0.354	0.287
CNI-16	57.9	15.53	16	100	-0.012	0.144	0.257	0.287
LCK_COMP	13.45	4.17	3	21	-0.230	0.144	-0.360	0.287
HYP_COMP	3.43	3.40	0	17	1.212	0.144	1.278	0.287
PHQ-9	7.03	5.70	0	27	0.969	0.144	0.570	0.287
GAD-7	6.37	5.40	0	21	0.837	0.144	-0.061	0.287

OAS-24 Ontological Addiction Scale, *PROCOBS-8* Pro-nature Conservation Behavior Scale, *INS* Inclusion of Nature in Self Scale, *PS-16* Prosociality Scale, *CNI-16* Communal Narcissism Inventory, *LCK_COMP* Lack of Interest in Competition Subscale of Multidimensional Competitiveness Inventory (MCOI), *HYP_COMP* Hyper-competitiveness Subscale of Multidimensional Competitiveness Inventory (MCOI), *PHQ-9* Patient Health Questionnaire, *GAD-7* Generalised Anxiety Disorder Scale.

Table 2 Correlation matrix of test measures

Measure	Age	OAS-32	PROCOBS-8	INS	PS-16	CNI-16	PHQ-9	GAD-7	LCK_COMP	HYP_COMP
Age	1	-0.227**	0.379**	0.332**	0.031	-0.045	-0.128*	-0.182**	0.281**	-0.318^{a**}
OAS-24		1	-0.084	-0.084	0.156**	0.083	0.445**	0.495**	-0.173**	0.193^{a**}
PROCOBS-8			1	0.578**	0.270**	0.134*	-0.049	-0.064	0.226**	-0.185^{a**}
INS				1	0.209**	0.165**	-0.065	-0.080	0.157**	-0.110*
PS-16					1	0.415**	0.012	0.028	0.026	-0.120*
CNI-16						1	-0.157**	-0.135*	-0.114*	0.323^{a**}
PHQ-9							1	0.820**	0.062	0.052 ^a
GAD-7								1	0.028	-0.003 ^a
LCK_COMP									1	-0.512^{a**}
HYP_COMP										1

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. Pearson tests (two-tailed) were used for all scales except HYP_COMP; Spearman tests (two-tailed) were used for HYP_COMP scores. ^aIndicates Spearman test results.

Table 3 Multiple regression on prosociality (PS-16) ($n=282$; 80 male, 202 female)

Model	B	Std. Error	β	T	Sig.	95% Confidence interval for B		Collinearity Tolerance	VIF
						Lower bound	Upper bound		
Age	-0.03	0.05	-0.03	-0.52	0.606	-0.12	0.07	0.74	1.35
Gender	2.47	1.29	0.10	1.91	0.057	-0.08	5.01	0.89	1.13
OAS-24	0.13	0.06	0.15	2.40	0.017	0.02	0.24	0.67	1.50
INS	0.43	0.49	0.06	0.88	0.378	-0.53	1.40	0.64	1.56
PROCOBS-8	0.18	0.07	0.16	2.43	0.016	0.03	0.32	0.59	1.68
CNI-16	0.31	0.04	0.45	7.92	<0.001	0.24	0.39	0.80	1.25
LCK_COMP	-0.26	0.16	-0.10	-1.63	0.103	-0.57	0.05	0.69	1.45
HYP_COMP	-0.91	0.20	-0.29	-4.53	<0.001	-1.30	-0.51	0.64	1.56
PHQ-9	0.09	0.17	0.05	0.53	0.594	-0.25	0.43	0.33	3.08
GAD-7	-0.07	0.19	-0.04	-0.39	0.699	-0.44	0.29	0.31	3.24

confirmed that the underlying residuals were normally distributed ($D=0.035$, $p=0.200$ and $D=0.042$, $p=0.200$, respectively). The assumptions of lack of multicollinearity and independence of errors were also met, while homoscedasticity was evidenced by P-P plots of residuals against predicted values. Results for multiple regression results on prosociality and pro-nature conservation behavior are shown in Tables 3 and 4.

Correlation findings

Examining the correlation matrix (Table 2) in relation to the predicted relationships, the expected negative correlation between OA and scores on prosociality (1) was not found. In fact, a slight, but significant, positive correlation ($r=0.157$, $p < 0.01$) was observed between scores on the OA and prosociality. The predicted negative correlation

Table 4 Multiple Regression on Pro-Nature Conservation Behavior (PROCOBS-8) ($n=282$; 80 male, 202 female)

Model	B	Std. Error	β	T	Sig.	95% Confidence Interval for B		Collinearity Tolerance	VIF
						Lower bound	Upper bound		
Age	0.15	0.04	0.20	3.79	<0.001	0.07	0.23	0.78	1.28
Gender	2.19	1.08	0.10	2.03	0.043	0.07	4.31	0.89	1.13
OAS-24	-0.02	0.05	-0.02	-0.42	0.678	-0.11	0.07	0.65	1.53
INS	3.25	0.36	0.46	9.06	<0.001	2.54	3.96	0.84	1.20
PS-16	0.12	0.36	0.13	2.43	0.016	0.02	0.22	0.70	1.42
CNI-16	0.01	0.05	0.01	0.24	0.811	-0.06	0.08	0.65	1.53
LCK_COMP	0.15	0.13	0.06	1.10	0.272	-0.11	0.41	0.69	1.45
HYP_COMP	-0.06	0.17	-0.02	-0.34	0.737	-0.40	0.28	0.60	1.68
PHQ-9	0.00	0.14	0.00	0.00	0.999	-0.28	0.28	0.32	3.08
GAD-7	0.01	0.16	0.01	0.01	0.933	-0.29	0.32	0.31	3.24

between OA and scores on pro-nature identity and behavior (2) was also not found, with no significant correlation between scores on OA, and scores on either the pro-nature behavior or inclusion of nature in self. The predicted positive relationship between OA and communal narcissism (3) was also not evident, with no correlation between scores on the corresponding measures. The findings on competitiveness, however, were consistent with our hypotheses in respect of the predicted relationship (4). A positive correlation ($\rho=0.193$, $p<0.01$) was found between scores on hyper-competitiveness and those on OA, while a negative relationship ($r=-0.173$, $p<0.01$) was found between scores on lack of interest in competition and OA.

The findings on the relationship between communal narcissism and competitiveness were also consistent with our hypothesis in this respect (5). A significant positive correlation ($\rho=0.323$, $p<0.01$) was found between scores on the hyper-competitiveness and communal narcissism, while a negative relationship ($r=-0.114$, $p<0.05$) was found between scores on lack of interest in competition and communal narcissism.

The predicted negative relationship between prosociality and competitiveness (6) was somewhat supported by the findings. A small but significant negative correlation ($\rho=-0.120$, $p<0.05$) was found between scores on hyper-competitiveness and scores on prosociality, however no significant positive relationship was found between lack of interest in competition and prosociality.

The predicted relationship between pro-nature identity and behavior and competitiveness (7) was also supported. A small negative correlation ($\rho=-0.185$, $p<0.01$) was found between scores on hyper-competitiveness and scores on pro-nature behavior, while a positive relationship ($r=0.226$, $p<0.01$) was found between scores on lack of interest in competition and pro-nature behavior. A small negative correlation ($\rho=-0.110$, $p<0.05$) was also found between hyper-competitiveness and scores on inclusion of nature in self, while a positive relationship ($r=0.157$, $p<0.01$) was found

between lack of interest in competition and inclusion of nature in self.

Finally, the positive relationship between OA scores and measures of anxiety and depression previously observed (Barrows et al., 2022a) were also evidenced by the findings in the current study (8). A moderate, positive correlation ($r=0.445$, $p<0.01$) was observed between scores on OA and depression, while a similar correlation ($r=0.495$, $p<0.01$) was observed between OA and anxiety scores.

In addition to these findings, some other interesting relationships were evident.

1. There was a weak but significant correlation between prosociality and pro-nature behavior scores ($r=0.270$, $p<0.01$).
2. There was a negative correlation between age and scores on (i) OA ($r=-0.23$, $p<0.001$), (ii) depression ($r=-0.128$, $p<0.05$) and (iii) anxiety ($r=-0.182$, $p<0.01$).
3. There was a positive correlation between age and scores on (i) pro-nature behavior ($r=0.387$, $p<0.001$); (ii) inclusion of nature in self ($r=0.331$, $p<0.001$); and (iii) lack of interest in competition ($r=0.296$, $p<0.001$).

Regression findings

Next, we examined the findings of two regression models in which our measures, including age and gender, were observed as predictors of prosociality and pro-nature conservation behavior (Tables 3 and 4). These were evaluated in relation to the four hypotheses predicting relationships with OA and competitiveness, but also noting any other significant relationships.

Firstly, in line with findings of the correlational analysis, the expected negative association between OA and scores on prosociality (1) was not found. Instead, a small but significant positive predictive relationship was found between OAS-24 and PS-16 scores ($\beta=0.15$, $t=2.40$, $p<0.05$). The

predicted negative association between OA and scores on pro-nature behavior (2) was also not found, with scores on OA showing no significant predictive relationship with those of the pro-nature behavior ($\beta=-0.02$, $t=-0.42$, $p=0.678$).

The predicted negative relationship between competitiveness and prosociality (6) was again somewhat supported by the findings. Scores on hyper-competitiveness negatively predicted scores on the prosociality ($\beta=-0.29$, $t=-4.53$, $p<0.001$), however scores on lack of interest in competition did not significantly predict those on prosociality ($\beta=-0.10$, $t=-1.63$, $p=0.103$). The predicted negative association between competitiveness and pro-nature behavior (7) however was not supported in these findings. Neither scores on hyper-competitiveness or those on lack of interest in competition significantly predicted scores on the pro-nature behavior.

Beyond our hypotheses, there were also some other significant relationships of note. Age was a significant predictor of pro-nature behavior ($\beta=0.20$, $t=0.79$, $p<0.001$) but not of prosociality. Communal narcissism was by and large the greatest and most significant predictor of prosociality ($\beta=0.45$, $t=7.92$, $p<0.001$).

Gender was found to be a significant predictor of pro-nature scores but not scores on prosociality, with females scoring higher on pro-nature behavior. To further examine gender differences, the regression analyses were repeated on male ($n=80$) and female ($n=202$) subgroups, again using prosociality and pro-nature behavior respectively as outcome variables. While prosociality scores did not predict pro-nature behavior scores and pro-nature scores did not predict pro-sociality scores for the male subgroup ($t=0.802$, $p=0.402$), these variables did predict one other in the respective models for the female subgroup ($t=2.348$, $p<0.05$). These statistics apply to both models due to the predictor and outcome variables being reversed between the two analyses in this relationship.

Discussion

The focus of this study was to examine the relationship between OA, prosociality and pro-nature behavior. It was expected that OA, as a measure of the dysfunctional ego-centeredness hypothesized to play a major role in human psychopathology, would also serve as a useful proxy for self-transcendence. Conceptually, self-transcendence appears to embody the diametric opposite of OA; it is a primary means through which the self can be deconstructed, and OA and its accompanying adverse effects can be remedied. It was expected that those scoring lower on OA, with their less pronounced focus on selfish concerns, might therefore show greater positive concern for the wider world of which they

form a part, and that this would be reflected in higher scores in prosociality and pro-nature behavior. However, this was not the case. In fact, a small but significant positive correlation was found between OA and prosociality, while no significant relationship was found with pro-nature behavior.

In terms of theoretical implications, one possible reason why OA and prosociality were positively rather than negatively correlated is the complex nature of the motives widely believed to underpin prosocial behaviors. Prosociality is not necessarily altruistic, and the evidence suggests a more complex relationship. More specifically, prosocial behaviors can be both altruistic and egoistic in nature, with apparently altruistic behaviors being driven by underlying egoistic motives (Moran, 2016). Furthermore, a distinction has been drawn between *pure altruism*, where the prosocial behavior benefits others at a cost to the individual (Bowles & Gintis, 2011), and *impure altruism*, where prosocial behavior involves some degree of ulterior self-interest, though this may be in addition to a genuine concern for others. Chief amongst these ulterior motives are reciprocity (a belief that we will be rewarded by such actions), social reputation (the enhanced esteem that people may hold for us as a result of such actions), and empathic joy (the sense of satisfaction gained from adhering to deeply held belief in the rightness of such actions).

Some findings also indicate an association between non-pathological narcissism and positive perceptions of relationships with others (Barry & Wallace, 2010). Furthermore, pathological narcissism in adolescents has also been found to be positively correlated with self-reported prosocial behavior but not with prosocial behavior as rated by peers and parents (Kauten & Barry, 2014). Therefore, certain types of people may either engage in prosocial behavior as a disguised self-serving strategy to boost self-esteem and a sense of status in the community, or else over-report their prosocial behavior to project a positive image, potentially distorting findings in studies using such measures.

This is problematic for exploring the proposed positive relationship between self-transcendence and prosociality when using OA as a proxy measure, as the criterion measure used in the development of the OAS employed an ego-centeredness form of the five-factor narcissism scale (Sherman et al., 2015). A significant correlation was found between this criterion measure and OA, suggesting a significant positive relationship between narcissism and OA, and implying a negative correlation with self-transcendence. Attesting to this more complex relationship, the concept of communal narcissism had been proposed, and a scale—the communal narcissism inventory (CNI-16)—was developed to specifically target this dimension of prosociality (Gebauer et al., 2012). Used in conjunction with our measure of prosociality, we hoped that this may shed light on the relationship

between OA, and both altruistic prosociality and forms of prosociality driven by ulterior ego-serving motives.

The results showed that communal narcissism was by far the strongest and most significant predictor of prosociality. Since both the OAS and the PS-16 thereby reflect narcissistic features, it is unsurprising that the expected negative correlation was not in evidence. Our assumption that the prosociality scale would tap essentially altruistic or ‘selfless’ types of prosociality therefore appears not to capture the full complexity of the dynamic, as it may be that the PS-16 cannot discern whether prosocial motives are altruistic or selfish. The same may also be said of our use of the PROCOSBS-8. Although the correlation between the INS and PROCOSBS-8 broadly supports self-conceptualized nature-relatedness as a factor in pro-nature behavior, one must be careful not to assume that pro-nature behavior necessarily reflects altruistic concerns. Consistent with this, research into the structure of environmental concern has yielded a model consisting of three key factors: *egoistic concerns*, *altruistic concerns*, and *biospheric concerns* (Schultz, 2001). On the other hand, more recent findings characterize environmental behaviors as being part of a broader factor *sustainable behavior*, associated with altruistic and equitable motives (Neaman et al., 2018; Tapia-Fonllem et al., 2013).

Also noteworthy in the present study is that the correlation between prosociality and pro-nature behavior was markedly dichotomized by gender, with no association in males but a relatively marked one for females. Although this finding is interesting, there is evidence that prosociality may not be a core factor in pro-nature behaviors, with a close relationship and care for the environment being the key factor (Kesenheimer & Greitemeyer, 2021). It is also possible that cultural factors may have played a role in these results. Given the overarching individualistic nature of Western culture it is possible that less altruistic and more transactional motives dominate social relationships in the U.K.-based sample studied, and that this may have also influenced our findings. It would be interesting to see as part of future research if this relationship were reversed in more collectivist societies such as those of South-East Asia.

We also examined the role of competitiveness, reasoning that competitiveness may have an important role to play in the ego dynamics. It is possible that excess competitiveness may promote an adversarial relationship between ourselves and the world at large, and act as a means through which this duality is entrenched and the ego is reified and reinforced. This predicted relationship was partly supported by the results; although the pattern of correlations seemed to suggest a negative relationship between competitiveness and both prosociality and pro-nature behavior, the regression analyses revealed that competitiveness was only a significant negative predictor of prosociality. This offers some

support for the notion that hyper-competitiveness may be a prominent feature of the dysfunctional ego dynamics at the heart of OA.

This negative framing of competitiveness may seem unusual in that it appears to be at odds with the overarching social and political philosophy which dominates contemporary Western society. In contrast to Buddhist teachings wherein the ego is something to be transcended, Western culture appears to do the very opposite, revering individualism and glorifying the reification of ego. The predominant paradigm of neoliberal capitalism frames our existence in stark social Darwinian terms as a competition in which winners prosper at the expense of losers. This competition, with its cycle of craving, grasping and rejecting, and pain, seems to epitomize the cycle of *samsāra* (or “wandering existence”) from which Buddhist practice seeks liberation. These results suggest that excessive competitiveness may indeed play an important role in OA. This may have significant practical implications for the cultivation of wellbeing, as it suggests an important role of the cultural environment in this respect, implicating excessive competitiveness as an obstacle to wellbeing outcomes.

Finally, there were some interesting *post hoc* findings in relation to age. There was a small but significant negative association between age and OA; this is encouraging in that it broadly supports the notion that life experience cultivates a self-developmental trajectory that is generally positive, with increasing years marking a decline in the dysfunctional egotism posited by OA to be a major feature of mental ill health. Consistent with the negative association between OA and measures of mental health, age was also found to show a small but highly significant negative association with GAD-7 scores. This is consistent with a growing body of evidence supporting a slight upward trend in wellbeing in older compared to younger people despite a deterioration in objective life conditions such as failing health (Hansen & Blekesaune, 2022)– though with a pronounced U-shape relationship indicating a slump in wellbeing in middle age (Blanchflower, 2021). It would be interesting to see in future studies if this age-wellbeing relationship differed in those who employ meditation to cultivate a more self-transcendent and harmonious relationship with the world. The highly significant correlations between age and competitiveness are consistent with the trajectory of OA with age and add to the evidence that competitiveness may be a significant component of OA. Also of note was a highly significant correlation between age and both inclusion of nature in self, and pro-nature conservation behavior. This is consistent with previous findings showing that age was a positive predictor of PROCOSBS-8 scores (Barbett et al., 2020; Richardson et al., 2020).

Though the present study was a novel and innovative way of seeking to examine self-transcendence as it relates to prosociality and pro-nature behavior, there were some methodological limitations. Though the predicted relationship between OA measures and the latter variables were not found, the evidence offers some support for the belief that this was more likely down to the limitations of behavioral measures to tap altruistic motives than the usefulness of OA as such a proxy measure. It would also have been useful to include criterion measures reflecting key components believed to comprise self-transcendence so that the inferred relationship between OA and self-transcendence could have been directly examined. The use of a social desirability measure might also have been useful in offering an alternative prosocial perspective.

The present study was also limited by its use of a U.K.-based sample, which—given the possible influence of cultural factors—may also have impacted the findings. To address these limitations, future studies could benefit from (1) inclusion of more targeted measures of self-transcendence to better understand the role of its components as they relate to OA measures, (2) the use of measures that better tap altruistic motives as they relate to prosociality and pro-nature behaviors, and (3) a more inclusive international sample spanning both Eastern and Western cultures.

Conclusion

The main objective of this study was to explore the use of OA as a proxy measure for self-transcendence examining relationships between OA, prosociality and pro-nature identity and behavior. Other objectives were to explore the role of competitiveness in these relationships, and to corroborate existing findings regarding a negative relationship between OA and mental health measures.

Although the expected negative correlations between OA and both prosociality and pro-nature behavior were not evidenced, the findings revealed associations with competitiveness that broadly reflect its association with ego-centeredness through significant correlations with OA, and significant negative correlations with both prosociality and pro-nature behavior. The findings also supported earlier findings of a significant relationship between OA and measures of anxiety and depression. Though it is possible that the former findings suggest that competitiveness may be a component of OA that serve better as a conceptual antithesis of self-transcendence than OA itself, this may also reflect a methodological implication relating to insufficient sensitivity of the measures of pro-sociality and pro-nature behavior to adequately capture the altruism commonly assumed to underly such behaviors.

The results also revealed a possible role of gender in the relationship between prosociality and pro-nature behavior which may have implications for nature connectedness and environmentalism. A negative association was also found between age, and OAS and GAD-7 scores, broadly supporting extant findings in relation to age and wellbeing.

Future research in this area could benefit from inclusion of criterion measures of commonly measured attributes of self-transcendence and altruism, as well as a more inclusive international sample of participants.

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Data availability The dataset for the study is available from a public repository (*ResearchGate*).

Code availability Not applicable.

Declarations

All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2000 (5). Informed consent was obtained from all patients for being included in the study.

Ethics approval All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2000 (5). Informed consent was obtained from all patients for being included in the study. Ethical approval for the study was provided by the Research Ethics Committee of the University of Derby, U.K.

Consent to participate Informed consent was given by all participants.

Consent to publish Informed consent included consent for publication of reports using data from this study.

Repository: ResearchGate

<https://doi.org/10.13140/RG.2.2.10357.14564>.

This project contains the following underlying data:

OAS_PS_PNCB_Final.sav. [This includes all the measures analysed in the present study (n=286)]:

- Age
 - Gender
 - Ontological Addiction Scale (OAS-24; Barrows et al., 2022a)
 - Pro-nature Conservation Behaviour Scale scores (PROCOBS-8; Barbett et al., 2020)
 - Inclusion of Nature in Self Scale (INS; Schultz, 2002)
 - Prosociality Scale (PS-16; Luengo Kanacri et al., 2021)
 - Communal Narcissistic Inventory (CNI; Gebauer et al., 2012)
 - Multidimensional Competitive Orientation Inventory (MDCI; Orosz et al., 2018)
 - Patient Health Questionnaire (PHQ-9; Kroenke et al., 2001)
 - Generalised Anxiety Disorder (GAD-7; Spitzer et al., 2006)
- Data are available under the terms of the Creative Commons Zero "No rights reserved" data waiver (CC0 1.0 Public domain dedication).

Conflict of interest The authors declare no potential conflicts of interest with respect to the research, authorship, or publication of this article.

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