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Identifying with other animals and human well-being: Extending perspectives on the social cure and human-animal relations

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ABSTRACT

Prior research has uncovered a beneficial role for social identities in promoting human well-being. Whether these benefits also arise from the tendency to identify with a highly superordinate category that includes other animals, has never been examined. Building on theories of social and superordinate identification and prior research on human-animal interactions, we explore the associations between the dimensions of identification with animals (solidarity with animals, human-animal similarity, animal pride) and psychological well-being. A cross-sectional questionnaire survey was conducted among a representative sample of Canadian adults (N = 2,424). Controlling for sociodemographic variables, animal pride played a particularly clear role in predicting higher psychological well-being (higher vitality, life satisfaction, presence of life meaning; lower stress, loneliness, psychological inflexibility). In contrast, solidarity with animals predicted lower well-being (lower life satisfaction; higher search for meaning). Our findings provide a nuanced understanding of how the social cure perspective may be extended to highly inclusive superordinate categories.

Social psychological research has demonstrated that belonging to social groups—from close knit groups like families, up to large superordinate categories like nations—can be beneficial for human health and well-being (Haslam et al., 2018). Less clear is whether these beneficial effects extend beyond our sense of identification with human groups and could encompass our connections with other animals. Indeed, our interactions and connections to other animals are common and consequential in everyday life (Amiot and Bastian, 2015). Whether these interactions involve animals we care for on a daily basis (e.g., pets), or consume for human purposes (e.g., meat animals), our connections to other animals have a range of well-being implications for humans (Serpell, 2009). To capture the feeling of being socially connected to other animals, our research focuses on the construct of identification with animals. While we share deep interdependencies with other animals, our human awareness of being an integral part of the animal kingdom is just beginning to receive scientific attention (Amiot and Bastian, 2017; Amiot et al., 2020). Indeed, from a biological point of view, we, humans, are animals (Wilson and Reeder, 2005). Our first aim was to investigate the implications of identifying with other animals for human psychological well-being. Our second aim was to test whether there are particular aspects of our identification with animals that are most conducive to human well-being.

Social identification with animals

Building on models of social identification and intergroup relations (Tajfel and Turner, 1986), research has shown that just as people identify with human groups, they can also see themselves as part of a larger superordinate category incorporating both human and nonhuman animals (Amiot and Bastian, 2017; Amiot et al., 2020). By drawing on social identification theory and research

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(e.g., Leach et al., 2008), 3 distinct dimensions of human social identification with animals were identified: solidarity with animals, human-animal similarity, and animal pride. Solidarity with animals is defined by the feeling of being connected to other animals and the desire to help them. Human-animal similarity is a more cognitive dimension and involves perceiving that animals share similarities and valued characteristics with humans. Animal pride implies a direct recognition of and a positive regard for being an animal oneself. Interestingly, these 3 dimensions of social identification differ somewhat from those that apply to human ingroups, confirming that principles and findings uncovered when investigating human groups do not apply squarely when investigating human-animal relations (Amiot and Bastian, 2015).

Models of superordinate social identification (Gaertner et al., 1993; Mummendey and Wenzel, 1999; Hornsey and Hogg, 2000) are particularly relevant to capture the broad social category that encompasses all animals. These models provide clues as to the likely consequences of such identification, including for psychological well-being. From this perspective, humans can be seen as a subgroup (a species) which is "nested" within the entire animal kingdom (as a larger superordinate group that encompasses both human and nonhuman animals). Identifying with a superordinate group can yield positive and inclusive intergroup relations. Indeed, to the extent that members of another subgroup become included within the same encompassing superordinate category, our attitudes and behaviors toward them are more likely to be positive and supportive. In the realm of human social groups, inducing members of different groups to recategorize themselves as part of a larger superordinate group reduces intergroup threats and negative intergroup attitudes (Gaertner and Dovidio, 2000; Riek et al., 2010). Identifying with all humanity as a particularly large superordinate identity predicted lower generalized prejudice but higher inclusivity (e.g., support for universal human rights; McFarland et al., 2012).

These beneficial intergroup effects of superordinate identities uncovered among human groups were partly corroborated in research on identification with animals (Amiot and Bastian, 2017; Amiot et al., 2020). Specifically, and in line with the principles of superordinate identification models, human-animal similarity was associated with increased moral concern for animal welfare and a greater attribution of typically human traits to other animals (see also Bastian et al., 2012); this dimension was thought to bring animals "closer" to humans. Similarly, solidarity with animals predicted a greater desire to help animals and to engage in collective actions on their behalf, even if doing so implied attributing less resources to humans. Finally, and unexpectedly, animal pride predicted an increased tendency to assign negative animalistic traits to humans (territorial, aggressive) and was associated with the endorsement of more competitive and instrumental intergroup relations (i.e., higher social dominance orientation and nationalism), suggesting a distinct role for this specific dimension.

Social identification and human health and well-being

Emerging research reveals that identifying with large and inclusive human social groups could also have benefits for human psychological well-being. For example, in a representative study conducted in New Zealand, national attachment was associated positively with psychological well-being among all New Zealander participants, regardless of their ethnic subgroup (Zdrenka et al., 2015). In a cross-cultural study conducted during the COVID-19 pandemic, national identification was associated with higher well-being, even after accounting for potential confounds (social belonging, political orientation and extremism, exposure to COVID (Bonetto et al., 2021)). The feeling of social connection with and attachment to millions of potentially supportive peers within one's national ingroup was hypothesized to fuel this positive association observed between national identification and well-being. A representative study conducted in Germany further revealed that identification with humankind assessed at the beginning of the COVID-19 pandemic was negatively associated with the subsequent stress of the epidemic and its constraints when assessed 4 weeks later (Frenzel et al., 2022). While research findings on intergroup attitudes appear to roughly translate across both work on identification with superordinate human groups and work on identification with animals (see Amiot and Bastian, 2017), whether the same pattern of findings observed for psychological well-being will be replicated when focusing on identification with animals is unknown.

The social cure model elaborates on why identifying with social groups can be beneficial to group members' health and psychological well-being. According to this model, to the extent that group memberships provide individuals with meaning, support, and agency (i.e., a positive sense of social identity), health is more likely to be positively affected, constituting a "social cure" (Jetten et al., 2017; Haslam et al., 2018). Indeed, socially identifying with groups has been associated with lower stress and loneliness, but with higher life satisfaction, psychological needs fulfillment, and longer life expectancy (Holt-Lunstad et al., 2010; Jetten et al., 2014; Greenaway et al., 2016; Wakefield et al., 2020). The social cure model further suggests that our social groups allow for a sense of connection to the other members within the group; given the strong human need to belong, this sense of connection directly feeds into personal well-being (Jetten et al., 2017). This beneficial effect of social identification with groups was found to operate even when these social ties to other group members are symbolic and cognitive, rather than grounded in actual social contacts (Cruwys et al., 2015; Wakefield et al., 2016). This symbolic and cognitive benefit raises the interesting question of whether identifying with other animals (of other species) could have similar effects.

Perspectives on human-animal relations

In parallel to this literature on intergroup relations and social identification, research on human-animals relations reveals that humans can benefit from their relationships with animals (Friedmann et al., 1983; Allen et al., 1991; Wells, 2019) and may develop a strong sense of connection to other animals (Serpell, 1996). The relationships between humans and other animals often reflect many of the same tendencies and patterns as those we have with other humans (e.g., attachment types (Zilcha-Mano et al., 2012)), and also provide some forms of social support (McConnell et al., 2011).

One perspective from which the well-being benefits of feeling connected to other animals has been explored comes from the biophilia hypothesis, which refers to the tendency of humans to focus on life and lifelike processes (Wilson, 1984) and the innately emotional affiliation humans have toward other life forms (Wilson, 1993). Indeed, this tendency to seek connections with other living beings was hypothesized to represent a mechanism through which our connections to members of other species may shape human health and well-being (Beetz, 2017; Wells, 2019). The One Health approach also directly acknowledges the many ways through which human health and animal health are interconnected (Mackenzie and Jeggo, 2019). On the more negative side, zoonotic diseases can be transmitted from animals to humans, and vice-versa; on the more positive side, interspecies interactions can be beneficial for both humans and animals (e.g., increased oxytocin

and other "feel good" hormones (Odendaal and Meintjes, 2003)). While prior work highlights the benefits of our relationships to other animals, rigorous research examining the well-being benefits of feeling identified with animals as a superordinate social category, which also includes humans, is lacking.

The present study

Building on theory and research conducted both in social psychology and on human-animal relations, the current study examines whether socially identifying with other animals has implications for human psychological well-being, and explores which dimensions of identification with animals are most conducive to this effect. Solidarity with animals has been found to predict more prosocial, caring, and socially inclusive behavioral intentions (Amiot and Bastian, 2017; Amiot et al., 2020), behaviors that typically also promote positive social relations (Fehr et al., 2014) and well-being (Begen and Turner-Cobb, 2014; Aknin et al., 2019). Hence, we expected the solidarity dimension to be especially related to higher psychological well-being. Furthermore, because by definition solidarity involves a psychological bond with, and commitment to, fellow group members and investment of the self in coordinated activity with those we feel committed to (Brewer and Gardner, 1996; Ellemers et al., 1999; Leach et al., 2008), this dimension may be particularly likely to encapsulate the connectedness aspect, a main factor explaining why identifying with social groups can be beneficial to human health and well-being (Jetten et al., 2017).

These associations were examined in a large representative dataset. Doing so allowed us to provide generalizable evidence for the relationships observed between the dimensions of identification with animals and human psychological well-being. The main analyses controlled for sociodemographic variables relevant to both human-animal relations and intergroup relations (e.g., Herzog, 2007; Dhont and Hodson, 2014; Amiot and Bastian, 2015; Saunders et al., 2017) as well as indicators of socioeconomic status to account for people's general access to (social, material) resources. The study was conducted during the current COVID-19 pandemic, a time when issues surrounding the role played by animals (i.e., pets) in human lives (Rocheleau, 2020; Stevens, 2021) and the possible interplay between humans, other animals, and nature (Levitt, 2020; Haseltine, 2021) were socially salient. The particularly stressful and uncertain nature of the COVID-19 context (Salari et al., 2020) also represented an ideal time to investigate the potentially protective nature of feeling identified with a large social group, in this case, a group encompassing all animals. Because social cure effects were found to emerge particularly clearly in stressful conditions and contexts (Haslam et al., 2005), identifying with other animals could hence also significantly predict well-being in the COVID-19 context.

Methods

Recruitment

The data for this study are taken from a larger representative survey (based on age, gender, region, and language) pertaining to relationships with pets, close others, and well-being, conducted among Canadian adults (18 and older) by the survey firm Léger from September 24 to October 7, 2020. The link to the dataset and codes for all analyses can be accessed via the following link, for data verification purposes only: https://osf.io/s3yqn/?view_only=e1462c50f9b34188891b1ebdd0a58584. Data from a total of 2,424 participants were analyzed; this sample size is based on Canada's total population (38 million) at the time of the study, and involves a margin of error of 2% and a 95% confidence level. Whereas 2006 participants (82.8%) completed the questionnaire in English, 418 (17.2%) completed it in French. Participants included 49.5% (1,200/2,424) males and 50.2% (1,218/2,424) females (6 indicated "other" for their gender). Approximately 50% of the sample were older than 50 years. Quotas were imposed to recruit an equal number of pet and non-pet owners (the sample included 1,220 pet owners and 1,204 nonpet owners).

Participants were invited to participate in the study via an email sent by Léger. All invitations were bilingual and participants could complete the questionnaire in either French or English, which are the 2 official languages in Canada. Léger panels have been used in other peer-reviewed academic research (e.g., Chung-Hall et al., 2018; Daoust et al., 2021; Lachapelle et al., 2021). Léger administered the Qualtrics-based online questionnaire. A total of 20,320 email invitations were sent to panel members, of which 3,770 opened the invitation email. Among those, 96 refused to take part in the study, and 192 participants were considered noneligible (i.e., 72 did not consent to taking part in the study, 4 were noneligible on the basis of their age, 3 lived outside of Canada, 113 failed 1 of the 2 attention check questions), and 670 had incomplete data (i.e., they did not reach the end of the questionnaire). This resulted in 2,424 qualified completes used for analysis. When considering the total number of email invitations sent to potential participants, the participation rate is 12%; when not considering the individuals who have not opened the invitation email in this calculation, the participation rate is 64%. Median response time among qualified completes was 32 minutes. Participants were paid the equivalent of CAN$3 directly by Léger for participating in this study (full details available via: www.legeropinion.com/fr/recompenses/) and all participants provided their consent before taking part. The study was approved by the Ethics Committee involving Human Participants of the University of Québec in Montréal and was conducted in line with the Canadian Tri-Council Policy for the Ethical Conduct of Research Involving Human Participants.

Poststratification weight

A poststratification statistical weight variable, prepared by Léger, was used in the analyses (presented in Tables 1-3) to adjust the current sample to the general Canadian population on relevant sociodemographic variables. Table S1 provides additional information regarding the sociodemographic characteristics of the sample. Based on the most recent data from Statistics Canada, the following benchmark distributions of Canadians who are 18 years and older from the general population were used to compute the poststratification weight employed in this study: gender; age; Province of residence; native language; education; type of dwelling; marital status; area lived in (rural or urban); ethnicity; gross annual household income; employment status; number of children living in the household.

Questionnaire and measurement instruments

The measurement instruments were translated from English to French using a back-to-back translation procedure. When conducting this translation, the research assistants were instructed by the lead researcher to give priority to loyalty of meaning and familiarity of the content instead of strict loyalty to the original language (i.e., a decentering approach (van de Vijver and Leung, 1997)). The individual measures included in the current study were taken from a larger representative survey pertaining to relationships with pets, close others, and well-being.

Table 1
Correlations among the identification with animals dimensions and the demographic variables (weighted data).

	M	SD	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
1. Human-Animal similarity	4.04	1.37	-											
2. Solidarity with animals	4.60	1.36	0.67***	-										
3. Animal pride	4.02	1.53	0.72***	0.68***	-									
4. Gender (1 = male; 2 = female)	1.52	0.50	0.09***	0.16***	0.04*	-								
5. Age	8.11	3.43	0.01	0.05*	0.11***	0.02	-							
6. Political orientation—Economic issues	3.84	1.66	−0.07**	−0.05*	−0.05*	−0.05*	0.08***	-						
7. Political orientation—Social issues	3.44	1.83	−0.06**	−0.09***	−0.05*	−0.06**	0.11***	0.77***	-					
8. Religion (no = 0; yes = 1)	0.41	0.49	−0.06**	−0.05*	−0.06**	0.05*	0.06**	0.13***	0.24***	-				
9. Education (0 = preuniversity degree; 1 = university degree)	1.28	0.45	−0.01	−0.04*	−0.03	−0.10***	−0.06**	−0.06**	−0.07**	0.08***	-			
10. Employment status (1 = full-type; 0 = other statuses)	0.48	0.50	−0.02	−0.05*	−0.03	−0.18***	−0.23***	0.08***	0.03	−0.02	0.18***	-		
11. Annual gross household income	4.67	2.86	0.00	−0.02	0.03	−0.19***	−0.05*	0.09***	−0.01	−0.05*	0.25***	0.38***	-	
12. Marital status (1 = Married or common law; 0 = other statuses)	0.52	0.50	−0.01	−0.01	0.00	−0.10***	0.13***	0.11***	0.09***	0.04	0.08***	0.20***	0.42***	-
13. Number of children at home	0.71	0.96	−0.04	−0.03	−0.04	0.05*	−0.05*	0.08***	0.10***	0.07**	0.05**	0.27***	0.26***	0.36***

Notes.
* $P < 0.05$.
** $P < 0.01$.
*** $P < 0.001$. Age was assessed by referring to 5-year increments. Higher scores on the political orientation variables indicate more right-wing leanings. Education is recoded such that participants who had obtained a primary school diploma, a high school diploma, a college degree, or a professional studies diploma had a score of 0, and participants who had completed a bachelor's, master's or doctoral degree had a score of 1. Employment status was recoded such that participants who were employed full time had a score of 1, and participants who were employed part-time, or unemployed, or other status (i.e., students, homemakers, retired) had a score of 0. Gross annual household income was assessed by referring to increments of 20K. Number of children at home was coded such that: 0 = no child at home; 1 = 1 child living at home; 2 = 2 children living at home; 3 = 3 or more children living at home.

Sociodemographic variables

The sociodemographic data included the following variables: gender (male, female, other)[1], age (18-21, 22-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-59, 60-64, 65-69, 70-74, >75 years), follower of a religion (yes, no), education level (primary school diploma; high school diploma; diploma of collegial studies (CEGEP); professional studies diploma; bachelor's degree; master's degree; doctoral degree; other), employment status (full-time, part-time, temporary, self-employed, unemployed, student, homemaker, retired), annual gross household income (less than $20,000–$39,999 $40,000-$59,999, $60,000-$79,999, $80,000-$99,999, $100,000-$119,999, $120,000-$139,999, $140,000-$159,999, $160,000-$179,999, $180,000-$199,999, over $200,000), marital status (common-law union, married, separated, divorced, single, widowed, single parent, other), number of children currently living at home. Political orientation was assessed with 2 items: "Please indicate your political beliefs from left/liberal to right/conservative on issues of the economy (e.g., social welfare, government spending, tax cuts)"; "Please indicate your political beliefs from left/liberal to right/conservative on social issues (e.g., immigration, homosexual marriage, abortion)" (1 = *Left/Liberal*; 7 = *Right/Conservative*).

Identification with animals

The Identification with Animals Measure (IWAM) assesses the 3 dimensions by which humans identify with other animals as a social group (Amiot et al., 2020). The 5-item *solidarity with animals* dimension measures participants' feelings of connectedness to other animals (e.g., "I feel solidarity with animals"; $\alpha = 0.91$. The 4-item *human-animal similarity* dimension measures participants' perceptions that animals share similarities with humans and with the self (e.g., "Animals, including human animals, are very similar to each other"; $\alpha = 0.88$). The 6-item *animal pride* dimension measures participants' positive evaluation of being an animal (e.g., "I am proud to be an animal"; $\alpha = 0.96$). All items were rated on a 1 (*not agree at all*) to 7 (*very strongly agree*) scale.

Psychological well-being measures

A broad range of well-being measures were included. Because the survey took place during the COVID-19 pandemic, and to ensure that the participants referred to a specific and uniform timeframe, each measure asked participants to respond by referring specifically to how they feel during the COVID-19 pandemic.

The 7-item *vitality* scale (Ryan and Frederick, 1997) measures the energizing aspect of psychological well-being (e.g., "I feel alive and vital"; $\alpha = 0.92$). Responses were made on a 1 (*does not correspond at all*) to 7 (*corresponds exactly*) scale.

Life satisfaction was measured with the 5-item Satisfaction With Life Scale (Diener et al., 1985; e.g., "I am satisfied with my life"; $\alpha = 0.91$). Agreement was indicated using a 1 (*strongly disagree*) to 7 (*Strongly agree*) scale.

Loneliness was assessed using the 20-item UCLA Loneliness Scale (Version 3; Russell, 1996; e.g., "How often do you feel left out?"; $\alpha = 0.93$). Participants rated each item on a scale from 1 (*never*) to 4 (*always*).

The 10-item Meaning in Life Questionnaire was used to assess *presence of life meaning* ($\alpha = 0.90$) and *search for meaning* ($\alpha = 0.90$) (Steger et al., 2006). Responses were made on a 1 (*Absolutely untrue*) to 7 (*Absolutely true*) scale; whereas higher scores on the

[1] Participants (n = 6) who indicated "other" as their gender were excluded from the analyses involving the gender variable.

Table 2
Correlations among the identification with animals dimensions and the well-being variables (weighted data).

	M	SD	Human-animal similarity	Solidarity with animals	Animal pride
1. Vitality	4.29	1.32	0.05*	0.01	0.11***
2. Loneliness	2.26	0.54	−0.05*	−0.04	−0.10***
3. Life satisfaction	4.44	1.41	0.05*	0.00	0.09***
4. Presence of life meaning	4.65	1.30	0.03	0.04*	0.09***
5. Search for meaning	4.30	1.36	0.10***	0.11***	0.03
6. Stress	2.78	0.60	0.00	0.00	−0.08***
7. Psychological inflexibility	3.34	1.18	−0.02	−0.01	−0.09***

Notes.
* $P < 0.05$.** $P < 0.01$.
*** $P < 0.001$.

presence of life meaning subscale are associated with higher well-being (e.g., "My life has a clear sense of purpose"), higher scores on the search for meaning subscale (e.g., "I am always looking to find my life's purpose") tend to be associated with lower well-being (Li et al., 2020).

The 14-item *Perceived Stress Scale* (Cohen et al., 1983) assesses the degree to which people perceive their lives as stressful (e.g., "How often have you felt nervous and 'stressed'?"; $\alpha = 0.87$). Participants rated each item on a scale from 1 (*never*) to 5 (*very often*).

The 10-items of the Acceptance and Action Questionnaire—II (Bond et al., 2011) were combined to form one score representing *psychological inflexibility and experiential avoidance* (e.g., "Worries get in the way of my success"; $\alpha = 0.91$). Participants rated each item on a scale from 1 (*never true*) to 7 (*always true*). While this measure taps into general psychological functioning, it has direct implications for psychological well-being and mental health (Hayes et al., 2006; Wolgast, 2014).

Results

Descriptive statistics and correlations

Data analyses were conducted in SPSS (version 28) as well as in R (version 4.1.1). Means, standard deviations, and zero-order correlations between the 3 dimensions of identification with animals and the sociodemographic variables are reported in Table 1. A few significant associations were found between the sociodemographic variables and the dimensions of identification with animals. Specifically, solidarity with animals was associated with being female, with a more left-leaning political orientation on both economic and social issues, with the tendency not to follow a religion, and with "other" employment statuses (i.e., nonfull-time). Solidarity with animals also correlated positively with age but negatively with having a university degree. Human-animal similarity was also associated with being female, with a more left-leaning political orientation on both economic and social issues, and with the tendency not to follow a religion. Similarly, animal pride was associated with being female and with a more left-leaning political orientation on both economic and social issues, and it correlated positively with age and with the tendency not to follow a religion. While these correlations align with prior research showing that being a woman and endorsing more liberal and nonreligious orientations generally predict more positive attitudes toward animals (Herzog, 2007; Dhont and Hodson, 2014; Amiot and Bastian, 2015), it should be noted that these significant associations were small in magnitude (*rs* ranged from |0.04| to |0.16|). This suggests the IWAM's dimensions are not a proxy for sociodemographic differences, or for more general life conditions and experiences, but that they specifically represent how people feel about and relate to animals per se.

Means, standard deviations, and zero-order correlations between the 3 dimensions of identification with animals and the psychological well-being measures are reported in Table 2. Significant associations were observed between the animal pride dimension and most of the well-being measures, showing that higher animal pride was associated with higher well-being (higher vitality, life satisfaction, and presence of life meaning, but lower loneliness and stress) and lower psychological inflexibility. The human-animal similarity dimension was also associated with higher well-being (higher vitality, life satisfaction, but lower loneliness), but also with a higher search for meaning. Finally, solidarity with animals was associated with higher presence of life meaning, but contrary to expectations, was also associated with higher search for meaning.

Hierarchical multiple regressions

To systematically test how each dimension of identification with animals uniquely contributes to well-being relative to the others, and over and above the sociodemographic factors, hierarchical multiple regressions were conducted. In these regressions, Step 1 included the sociodemographic variables, and Step 2 included the 3 dimensions of identification with animals. All variance inflation factors values were below 3, which is deemed a typically acceptable level of multicollinearity (e.g., Craney and Surles, 2002). As can be seen in Table 3, some of the sociodemographic variables significantly predicted the psychological well-being and functioning measures. These relationships broadly align with prior research showing that: being female is associated with higher life stress and poorer mental health (Knoll and MacLennan, 2017; Padkapayeva et al., 2018); being older is associated with higher well-being and better mental health (Orpana, 2008); a right-leaning political orientation on social issues, following a religion, having higher socioeconomic status, and being married is associated with higher well-being (Diener et al., 1993; Napier and Jost, 2008; Orpana, 2008; Caron and Liu, 2010); being a parent is associated with lower well-being (Hansen, 2011).

As can be seen in Table 3, while this first block of sociodemographic variables accounted for a significant portion of variance in psychological well-being, adding the 3 dimensions of identification with animals in Step 2 contributed significantly to predicting these outcomes, over and above these important sociodemographic factors. Specifically, the solidarity with animals dimension predicted higher search for meaning and lower life satisfaction. The animal pride dimension predicted higher vitality, life satisfaction, presence of life meaning, but lower loneliness, stress, and psychological inflexibility. The human-animal similarity dimension did not significantly predict any of the well-being variables.

Discussion

An appreciation of the psychological link that ties us to other animals and research investigating both the predictors and consequences of this link is gaining momentum (Amiot et al., 2020). Building on models of social and superordinate identification and

Table 3
Multiple regressions predicting the well-being variables controlling for relevant sociodemographic factors (weighted data).

	Vitality β [95% CI]	Life satisfaction β [95% CI]	Loneliness β [95% CI]	Presence of life meaning β [95% CI]	Search for meaning β [95% CI]	Stress β [95% CI]	Psychological inflexibility β [95% CI]
Step 1.							
Gender (1 = male; 2 = female)	−0.10*** [−0.14, −0.06]	0.03 [−0.01, 0.08]	−0.06** [−0.11, −0.02]	0.02 [−0.01, 0.07]	−0.03 [−0.05, 0.04]	0.05** [0.02, 0.10]	−0.03 [−0.07, 0.01]
Age	0.13*** [0.10, 0.18]	0.10*** [0.06, 0.15]	−0.20*** [−0.25, −0.16]	0.15*** [0.11, 0.19]	−0.29*** [−0.32, −0.24]	−0.35*** [−0.38, −0.30]	−0.33*** [−0.37, −0.29]
Political orientation—Economic issues	0.06 [−0.01, 0.13]	0.06 [−0.02, 0.12]	−0.02 [−0.09, 0.05]	0.01 [−0.05, 0.08]	−0.03 [−0.09, 0.04]	−0.03 [−0.09, 0.04]	−0.00 [−0.07, 0.06]
Political orientation—Social issues	0.09* [0.02, 0.15]	−0.00 [−0.07, 0.07]	0.03 [−0.04, 0.10]	0.06 [−0.01, 0.12]	−0.01 [−0.07, 0.07]	0.03 [−0.03, 0.10]	0.01 [−0.06, 0.07]
Religion (no = 0; yes = 1)	0.05* [0.00, 0.09]	0.03 [−0.02, 0.07]	−0.02 [−0.06, 0.03]	0.13*** [0.07, 0.16]	0.05* [0.01, 0.09]	0.05* [0.01, 0.09]	0.04 [0.00, 0.09]
Education (0 = preuniversity degree; 1 = university degree)	0.02 [−0.03, 0.06]	0.03 [−0.01, 0.08]	−0.01 [−0.05, 0.05]	0.04 [−0.01, 0.08]	−0.02 [−0.07, 0.02]	−0.02 [−0.07, 0.02]	−0.01 [0-.05, 0.04]
Employment status (1 = full-type; 0 = other statuses)	0.03 [−0.02, 0.08]	0.02 [−0.03, 0.06]	−0.00 [−0.05, 0.05]	−0.00 [−0.05, 0.04]	0.01 [−0.04, 0.05]	0.01 [−0.03, 0.06]	−0.01 [−0.06, 0.03]
Annual gross household income	0.04 [0.00, 0.09]	0.16*** [0.11, 0.20]	−0.15*** [−0.18, −0.09]	0.09*** [0.04, 0.13]	−0.04 [−0.08, 0.01]	−0.10*** [−0.14, −0.05]	−0.17*** [−0.20, −0.11]
Marital status (1 = Married or common law; 0 = other statuses)	0.05 [−0.00, 0.09]	0.13*** [0.08, 0.17]	−0.10*** [−0.15, −0.05]	0.06* [0.01, 0.10]	−0.10*** [−0.14, −0.04]	−0.05* [−0.10, −0.00]	−0.07** [−0.11, −0.02]
Number of children at home	0.02 [−0.03, 0.06]	0.01 [−0.04, 0.04]	0.07** [0.03, 0.11]	0.04 [−0.01, 0.07]	0.03 [−0.02, 0.06]	0.08*** [0.03, 0.11]	0.07** [0.02, 0.10]
R^2 Δ	0.08***	0.09***	0.09***	0.08***	0.11***	0.16***	0.16***
Step 2.							
Human-animal similarity	−0.03 [−0.09, 0.03]	0.04 [−0.02, 0.11]	0.02 [−0.05, 0.08]	−0.05 [−0.11, 0.01]	0.03 [−0.03, 0.09]	0.04 [−0.02, 0.10]	0.06 [−0.01, 0.12]
Solidarity with animals	−0.03 [−0.09, 0.04]	−0.08* [−0.14, −0.01]	0.01 [−0.05, 0.08]	0.05 [−0.01, 0.11]	0.15*** [0.09, 0.21]	0.03 [−0.03, 0.09]	0.03 [−0.03, 0.09]
Animal pride	0.15*** [0.08, 0.21]	0.12*** [0.06, 0.19]	−0.10** [−0.17, −0.04]	0.10** [0.03, 0.16]	−0.06 [−0.13, 0.01]	−0.10** [−0.16, −0.03]	−0.12*** [−0.18, −0.05]
R^2 Δ	0.01***	0.01***	0.01**	0.01***	0.02***	0.01*	0.01**
Total R^2	0.09***	0.10***	0.10***	0.09***	0.12***	0.17***	0.17***

Notes.
* $P < 0.05$.
** $P < 0.01$.
*** $P < 0.001$. Age was assessed by referring to 5-year increments. Higher scores on the political orientation variables indicate more right-wing leanings. Education is recoded such that participants who had obtained a primary school diploma, a high school diploma, a college degree, or a professional studies diploma had a score of 0, and participants who had completed a bachelor's, master's or doctoral degree had a score of 1. Employment status was recoded such that participants who were employed full time had a score of 1, and participants who were employed part-time, or unemployed, or other status (i.e., students, homemakers, retired) had a score of 0. Gross annual household income was assessed by referring to increments of 20K. Number of children at home was coded such that: 0 = no child at home; 1 = 1 child living at home; 2 = 2 children living at home; 3 = 3 or more children living at home.

on recent research unpacking the different ways (i.e., dimensions) we can identify with animals, the current study investigated the implications of identifying with animals for human psychological well-being. We specifically sought to explore which of the 3 dimensions of identification with animals (solidarity with animals, human-animal similarity, animal pride) is most likely to predict well-being. These associations were tested in a large representative sample of Canadians. All statistical analyses included a post-stratification weight; doing so allowed to further ensure the representativeness of the current sample relative to the general Canadian population. A range of psychological well-being and functioning measures were taken and assessed by referring to the current COVID-19 context. In addition, the hierarchical multiple regression analyses included relevant sociodemographic variables as covariates, allowing for a particularly strong test of the unique contribution of the dimensions of identification with animals to human well-being outcomes.

Contrary to expectations, solidarity with animals was found to predict lower well-being, namely: lower life satisfaction and higher search for meaning, a variable which can denote lower well-being (Li et al., 2020). These findings could be due to the particularly strong motivation, for people who are high in solidarity with animals, to extend their concern for others beyond the human realm, also feeling an obligation to help animals who are in need, perhaps by contributing their own valued resources (time, money (Amiot and Bastian, 2017)). Because caring for others and attending to their needs can be tiring, and prosociality can be costly (Dakin et al., 2021), this might explain why solidarity with animals contributes to lower well-being. Solidarity with animals might also be endorsed by individuals who generally tend to put others' needs first; a caring orientation that can, more broadly, become burdensome and reduce well-being (e.g., caregivers' burden (Carretero et al., 2009; Girgis et al., 2013)).

Another explanation for why solidarity with animals was associated with lower well-being is that this dimension of identification may orient people's awareness to the disadvantages and inequities experienced by other animals, as well as all that is left to do to help them (e.g., reducing meat-consumption (Carlsson-Kanyama and González, 2009); stopping the destruction of wild animals' habitats to preserve biodiversity (UN Climate Change Conference UK, 2021). In line with this explanation, the social cure model proposes to the extent that we define ourselves by referring to a group, then this group's situation (e.g., of disadvantage) will affect our own health. Indeed, research on the social cure highlights the pitfalls of identifying with social groups that are devalued in some way (Jetten et al., 2017); identifying with such a group makes us more aware of the discrimination and disadvantages experienced by the group (Begeny and Huo, 2017), and this awareness may in turn negatively affect our well-being (Crabtree et al., 2010).

Unexpectedly, the animal pride dimension was found to predict higher well-being on a majority of indicators, specifically: higher vitality, life satisfaction, presence of life meaning, and lower loneliness, stress, and psychological inflexibility. From a terror management theory perspective, animal pride, because it conceptually involves directly recognizing and valuing being an animal, could possibly reduce and even short-circuit the internal conflict or tension associated with the thought of being an animal oneself and the threat it may evoke (Solomon et al., 1991; Goldenberg et al., 2001). In this sense, endorsing the animal pride dimension may involve a profound level of acceptance, of both our own positive and negative self-aspects—including of the negative animalistic aspects (e.g., amorality, aggressiveness; Haslam, 2006) that are typically associated with animal pride (Amiot et al., 2020)—, but which could have positive implications for well-being. Indeed, previous research indicates that those high on animal pride are more likely to eat meat, report higher speciesism, and harbor preferential attitudes toward their ingroup, suggesting that high animal pride individuals feel justified in prioritizing their own needs. Animal pride may hence be capturing a level of self-acceptance that goes beyond human-animal relations, an aspect which involves being comfortable with our animal nature. Herein, animal pride was associated with more psychological flexibility, a concept which involves accepting one's negative emotions, suggesting that this dimension may also have implications for self-acceptance more broadly.

Finally, human-animal similarity did not significantly predict any of the well-being or psychological functioning measures. This dimension, which involves recognizing that animals and humans have a lot in common, and that the self is similar to animals, is highly cognitive. This possibly more cerebral and "colder" dimension of identification with animals was not found to have implications for psychological well-being in the hierarchical multiple regressions, which also accounted for the sociodemographic variables and the other dimensions of identification with animals. In prior work, human-animal similarity was found to be associated with greater recognition of the valued characteristics shared by animals and humans (e.g., intelligence, morality), and higher moral concern for animals. These features and cognitive specificities of human-animal similarity may hence not necessarily be depleting nor draining—as is possibly the case for solidarity—, but do not appear to have benefits for human well-being either.

It should be noted that these differentiated associations uncovered between the dimensions of identification with animals and the well-being and psychological functioning outcomes—whereby animal pride is the more consistent predictor of well-being—were found most clearly in the hierarchical multiple regression analyses, also in line with prior research on the dimensions of social identification (Leach et al., 2008). In contrast, the correlations did not uncover such clear differentiated roles for the dimensions; specifically, while significant correlations were also observed between human-animal similarity and some of the well-being indicators (i.e., higher vitality, lower loneliness, higher life satisfaction) as well as between solidarity and higher presence of life meaning, these associations became nonsignificant in the multiple regressions. This suggests that it is when statistically partialling out the variance associated with other dimensions of identification, that the "clearer" or purer effect of one specific dimension (i.e., animal pride) emerges.

Limitations and future research

While the current study relied on a large representative dataset, and that the statistical analyses further adjusted (using the post-stratification weight) the current data to the Canadian population on relevant sociodemographic variables and included sociodemographic controls, the design employed remains correlational, and no causality can be inferred on the basis of the current findings. Future research could test these associations longitudinally to provide an indication for the direction for these effects, and also to directly investigate the psychological underpinnings associated with each dimension of identification with animals. For example, animal pride may involve higher self-compassion (Neff, 2003).

Future work could also further investigate how the dimensions of identification develop over time and are shaped by people's broader sociostructural context and life conditions. In the current sample, animal pride was correlated positively with age, again suggesting that learning to accept oneself over time may have implications even for human-animal relations more broadly. Future research assessing age continuously could further test for the possible quadratic effects of age. And while gender was associated

positively (albeit weakly) with each of the 3 dimensions of identification with animals in the correlations, in line with prior work showing that women generally report slightly more positive attitudes toward animals (see Herzog, 2007), the dimensions of identification with animals correlated with very few of the socioeconomic status indicators (only one small correlation was found between employment status and solidarity with animals). Together, these findings suggest that people's objective and general life conditions have little effect on their subjective feelings of connection to other animals. It is also possible that it is the more specific (vs. general) life circumstances and experiences—possibly experiences and contexts involving interactions with other animals more directly (e.g., family socialization and norms regarding animals; contacts with pets)—that shape the dimensions of identification with animals and their development. Future research is also needed to test this contention.

Clearly, a variety of socially relevant and theoretically exciting questions regarding the psychological underpinning and implications of the dimensions of identification with animals remain to be investigated. With the growing need to build mutually beneficial relationships between humans and other animals—in line with a One Health approach—, the current research is timely. We hope that the current data and findings regarding the dimensions of identification with animals will guide further investigations about the implications of our psychological connection to other animals.

Ethical statement

The study presented in this manuscript was approved by the Ethics Committee involving Human Participants of the University of Québec in Montréal and was conducted in line with the Canadian Tri-Council Policy for the Ethical Conduct of Research Involving Humans.

Conflict of interest

The authors declare no conflict of interest.

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Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.jveb.2022.10.003.

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