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Agency Attribution and Biological Dehumanisation: Preliminary Evidence

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ABSTRACT

Dehumanisation is the perception of someone less than human. Several studies have used innovative approaches to investigate the subtle ways in which humanity can be denied. While most of these models clearly distinguish humans from animals and robots, none adequately capture the huge range of dehumanisation that exists in metaphorical thought, such as disease-related metaphors (i.e., biologisation). Building on existing theoretical frameworks concerning dehumanisation, we developed a set of items (i.e., the Tripartite Agency Attribution Scale) measuring the capacity to experience emotions (affective mental states), produce effective actions (behavioural potential), and think rationally (cognitive abilities), and demonstrated the relevance of this approach to assess biological dehumanisation. Study 1 ($N=512$) and Study 2 ($N=237$) consistently showed that viruses (vs. animals vs. humans) are perceived as possessing behavioural potential but lacking affective mental states and higher-order cognitions. Accordingly, Study 3 ($N=250$) showed that biologised (vs. animalised vs. mechanised vs. non-dehumanised) social groups in Italian society are perceived as primarily possessing behavioural potential with limited affective and cognitive abilities. Our research provides empirical evidence of a new, subtle way to investigate one of the most understudied forms of dehumanisation, while also expanding the literature on this process. Please refer to the Supporting Information section to find this article's Community and Social Impact Statement.

Dehumanisation is the process by which people deny others human qualities (Haslam and Loughnan 2014). It can assume different forms, such as animalisation (or animalistic dehumanisation), mechanisation (or mechanistic dehumanisation), and biologisation (or biological dehumanisation), namely the consideration of individuals or groups as more similar to animals, robots, or viruses than to human beings (Volpato and Andrighetto 2015).

Research has used different strategies to examine subtle ways in which we can deny humanity (see Kteily and Landry 2022). One of the most influential approaches (Haslam et al. 2005) argues that we can deny others "uniquely human" (UH) traits—such as civility and rationality—and "human nature" (HN) traits—such as emotional responsiveness and interpersonal warmth. Denying uniquely human traits is associated with animalisation, while denying human nature traits leads to mechanisation. Loughnan and Haslam (2007) investigated subtle dehumanisation of artists and businesspeople by revealing that people implicitly associated artists with human nature (vs. uniquely human) traits, while the contrary was true for businesspeople. Other research (Bain et al. 2009) indicated that Anglo-Australian and ethnic-Chinese people in Australia mechanistically dehumanised ethnic-Chinese people, ascribing them less human nature qualities than Anglo-Australians, but animalistically dehumanised Anglo-Australians, ascribing them less uniquely human features than ethnic-Chinese people.

Although this approach clearly distinguishes humans from animals and robots, it does not adequately account for the metaphorical and discursive nature of certain forms of dehumanisation. Metaphorical thinking—such as describing people as "vermin," "plagues," or "viruses"—has long shaped both cognitive and linguistic representations of social groups (Lakoff and Johnson 1980; Steuter and Wills 2010). These metaphors often surface in political discourse and media narratives, legitimising exclusionary attitudes and policies (O'Brien 2003). Among these, the perception of others as disease-like is a particularly understudied form of dehumanisation. To fill this gap, we conducted three studies aiming to expand the understanding of biological dehumanisation and its associated perceptions.

1 | Biological Dehumanisation

Biological dehumanisation has been used to shape negative attitudes toward various groups, including immigrants (O'Brien 2003) and terrorists (Steuter and Wills 2010). Valtorta et al. (2019) expanded this picture by demonstrating that dirty work environments characterising some low-status occupations (e.g., garbage collectors) elicited people's disgust toward workers, which in turn led to their biologisation, assessed through explicit measures.

Another study on the topic (Valtorta et al. 2021) highlighted the role of physical disgust by using an implicit paradigm (i.e., the Semantic Misattribution Procedure; Imhoff et al. 2011). The participants were instructed to guess the meaning of Chinese ideographs—briefly displayed and then masked—by choosing between the concept of disease and other contrasting categories. Before each ideograph, the participants were presented with prime stimuli eliciting disgust or neutral emotions. Those who were presented with disgusting (vs. neutral) stimuli associated the Chinese ideographs more frequently with the concept of disease rather than with other negative categories, thus suggesting the implicit link between disgust and biologisation.

While the above-mentioned research sheds light on biological dehumanisation, it has focused on explicit or unconscious biologisation, leaving unexplored subtle biologisation, namely the attribution or denial of characteristics associated with full humanity and disease-related representations. In this regard, the ABC model of dehumanisation developed by Tipler and Ruscher (2014) offers a theoretical framework that can be useful for understanding how differential attribution of agency components influences dehumanising metaphors, including those related to disease. Given that this approach has never been empirically tested and research on biological dehumanisation is growing, we believe that investigating people's perceptions of humans and viruses in terms of agency attribution (or denial) might be particularly relevant to the literature on the topic. For this reason, we conducted three studies by adopting the ABC model of dehumanisation as a theoretical framework.

2 | The ABC Model of Dehumanisation

The ABC model of dehumanisation describes three components of agency: affective (A), behavioural (B), and cognitive (C). According to Tipler and Ruscher (2014), full agents possess the ability to (1) experience emotions (i.e., affective mental states), (2) produce an effect on their environment (i.e., behavioural potential), and (3) think rationally and hold beliefs (i.e., cognitive abilities). Thus, when targets are ascribed desires, beliefs, and the capacity to produce effective actions, no dehumanisation occurs. On the contrary, the type of agency that others are denied reflects the dehumanising metaphor applied to them. While the model offers a structured and theoretically grounded approach to understanding different forms of dehumanisation, it is important to acknowledge that the distinction between its components—particularly behavioural and cognitive agency—may sometimes be conceptually subtle. For instance, some goal-directed actions may imply underlying cognitive processes, potentially blurring the boundary between behaviour and cognition. Nonetheless, the value of the model lies precisely in its ability to isolate these dimensions and examine how their presence or absence shapes metaphor-based representations of different targets. Rather than rigid categories, these components should be seen as analytically distinct dimensions that together enhance the explanatory power of the model.

Those to whom are attributed both affective mental states and behavioural potential, but not cognitive abilities, can be considered wild animals. Literature has indicated that animalistic metaphors are often attributed to ethnic minorities (Goff et al. 2008; Martínez Lirola 2022). It is worth mentioning that the conceptualisation proposed by Tipler and Ruscher (2014) offers a more comprehensive view of animalistic dehumanisation compared to Haslam et al.'s (2005) approach. Unlike the HN-UH framework, the ABC model allows for a distinction between metaphors of wild animals (e.g., wolf) and those of prey (e.g., sheep). While Haslam et al.'s (2005) model does not fully capture the wild animal metaphor, the characterisation of groups as predators in the ABC approach is determined by the lack of only the cognitive component. Conversely, the prey metaphor, which aligns with Haslam et al.'s (2005) denial of human uniqueness, is captured by the ABC model through the denial of both cognitive abilities and behavioural potential.

Furthermore, the ABC model argues that individuals denied affective mental states but believed to have higher-order cognitions and the capacity to produce effective actions may be linked to machines and robots. This metaphor is also captured by the HN-HU framework and corresponds to mechanisation. Typical targets of this form of dehumanisation are Asians, Jews, and businesspeople (Fiske et al. 2002; Loughnan and Haslam 2007). Because robotic others display the potential for action and the cognitive mental states to drive effective behaviours, they usually evoke envy and competitive behaviours.

Of relevance to the present research, Tipler and Ruscher (2014) stated that targets denied affective mental states and higher-order cognitions, but imputed behavioural potential, may inspire disgust, and are plausibly likened to viruses and other disease carriers. As reported above, terrorists and immigrants are the main targets of this rhetoric. According to Tipler and Ruscher (2014), these metaphors consistently conceptualise outgroups as engaged in threatening behaviour, but devoid of thought or emotional desire. They simply have the potential to destroy and therefore must be stopped and isolated.

Building on these arguments, this research aimed to empirically examine whether the ABC model of dehumanisation could be applied to the study of subtle biologisation. To do so, we first created a specific measure (i.e., the Tripartite Agency Attribution Scale) assessing the three agency components theorised in the ABC model (Study 1). Next, we investigated whether the attribution or denial of these dimensions was linked to people's perceptions of human and non-human entities (Study 2). Importantly, in both studies, we considered biological and animalistic perceptions, using the latter as a contrasting category. Lastly, we tested whether real social groups in society might be perceived as possessing or lacking the three agency abilities (Study 3). Through this study, we also aimed to address the limitations of Haslam et al.'s (2005) HN-UH model, particularly its lack of a framework for biologisation and its insufficient distinction between metaphors of wild animals and prey.

3 | Overview of the Studies

To reach these aims, we conducted three studies with different participants in each. In Study 1, we examined the relationship between agency attributions and people's perceptions of human beings, viruses, and animals by developing the Tripartite Agency Attribution Scale, a measure assessing the three agency components described by Tipler and Ruscher (2014). We expected that human beings would be perceived as possessing affective mental states, behavioural potential, and cognitive abilities (H1). Furthermore, we assumed that viruses would be perceived as primarily possessing the behavioural component, with little emphasis on affective and cognitive abilities (H2). Lastly, animals were expected to be perceived as especially possessing affective mental states and behavioural potential rather than cognitive abilities (H3).

Study 2 was designed to experimentally investigate the associations between the three agency components and people's perceptions of human beings, viruses, and animals. We manipulated agency attributions through vignettes describing a fictitious group as possessing (or not) the three abilities. Then, the participants were asked to indicate the degree to which they thought the target resembled human beings, viruses, and animals. We assumed that the participants in the ABC (i.e., affective, behavioural, and cognitive attributions) condition would perceive the target as more similar to a human being than an animal and a virus (H4). Also, we hypothesised that the respondents who read the text describing the fictitious group as possessing only the behavioural potential (i.e., B condition) would perceive the target as more similar to a virus than a human being and an animal (H5). Finally, we assumed that the participants in the AB (i.e., affective and behavioural attributions) condition would perceive the target as more similar to an animal than a human being and a virus (H6).

In Study 3, we tested the applicability of our Tripartite Agency Attribution Scale to real social groups that are often dehumanised worldwide. Using a cluster analysis, we first sought to categorise groups based on explicit dehumanising perceptions. Then, consistent with Studies 1 and 2, we focused on examining whether groups in the "biologised" cluster were perceived as primarily possessing behavioural potential, with less emphasis on affective and cognitive abilities (H7). Also, we expected that groups in the "wild animalised" cluster would be perceived as possessing affective mental states and behavioural potential rather than cognitive abilities (H8). For groups in the "prey animalised" cluster, we expected them to be perceived as primarily possessing affective abilities, with a lack of both cognitive abilities and behavioural potential (H9). Additionally, we expected to identify a "mechanised" cluster, where groups would be denied affective mental states but attributed higher-order cognitive abilities and the capacity to produce effective actions (H10). Lastly, we considered humanised targets as a control group, which we expected to form a distinct "non-dehumanised" cluster, perceived as possessing all three components of agency (H11).

All the studies were conducted after receiving ethical approval from the Ethics Committee of the Department of Psychology at the University of Milano-Bicocca for minimal risk studies (approval n. RM-2022-522). Participation was voluntary, and informed consent was obtained before each data collection. Data, syntax for the analyses, the "Supplementary Material" document, and the file with all the items are available on the project's OSF webpage: https://osf.io/rpqja/.

4 | Study 1

After developing the Tripartite Agency Attribution Scale, through this study, we aimed to investigate the link between agency attributions and people's perceptions of humans, viruses, and animals.

In line with the ABC model of dehumanisation (Tipler and Ruscher 2014), we hypothesised that humans would be seen as possessing high levels of all three abilities (H1), viruses as having primarily behavioural potential with limited affective and cognitive abilities (H2), and animals as particularly possessing affective states and behavioural potential, rather than cognitive abilities (H3).

4.1 | Method

4.1.1 | Participants and Procedure

Data were collected online using the Qualtrics survey web system. A snowball sampling strategy was employed. A sample of 535 Italians consented to participate. Of these, we excluded those who did not complete the questionnaire in its entirety ($n = 23$). The final sample comprises 512 participants (87% women, 12% men, 1% others; $M_{age} = 36.44$, SD = 14.28;

age range: 18–82). Referring to the rule of thumb that 5 or 10 observations per variable would be good enough for stable results in factor analysis (Hair et al. 2010), the sample size in this study is satisfactory.

4.1.2 | The Questionnaire

Each respondent completed the Tripartite Agency Attribution Scale, a measure we developed based on the theoretical framework proposed by Tipler and Ruscher (2014) to assess the three dimensions of agency. The participants were asked to rate the extent to which human beings, viruses, and animals possess the ability to experience emotions (i.e., affective mental states; 6 items, e.g., *feeling sadness*, *feeling joy*), act and produce an effect on their environment (i.e., behavioural potential; 6 items, e.g., *taking actions*, *reacting to stimuli*), and think and hold beliefs (i.e., cognitive abilities; 6 items, e.g., *planning actions*, *thinking rationally*) using a 7-point Likert scale from 1 (*not at all*) to 7 (*extremely*). The order of the items and targets was randomised for each respondent. After completing this measure, the participants were asked to provide their demographic information (i.e., gender, age, and nationality). They were then debriefed and thanked for their participation.

4.2 | Analytical Approach

The following analyses were conducted using R version 4.1.2 (R Core Team 2019) with the *lavaan* package (Rosseel 2012) and SPSS version 26 (IBM Corp 2019).

The first step of the analysis of our Tripartite Agency Attribution Scale consisted in evaluating the assumption of normality. Univariate normality was explored via skewness and kurtosis, which, according to Curran et al. (1996), should not exceed |2| and |7| to deem a variable as normally distributed. Multivariate normality was assessed via Mardia's (1980) test and Rizzo and Székely's (2022) energy test.

Since our scale was based on a strong theoretical three-factor structure, we tested a single model comprising three factors (i.e., affective, behavioural, and cognitive) via a Confirmatory Factor Analysis (CFA) with Robust Maximum Likelihood Estimator (MLR). While the chi-square test statistic was reported, it is important to note that this measure is often sensitive to large sample sizes (Palena et al. 2023). Therefore, to ensure a reliable evaluation of model fit, we tested our model through other goodness-of-fit indices that are less affected by sample size. These were the robust Root Mean Square Error of Approximation (rRMSEA), the Standardised Root Mean Square Residual (SRMR), the robust Comparative Fit Index (rCFI), and the robust Tucker-Lewis Index (rTLI). An acceptable fit is indicated by rRMSEA and SRMR ≤ 0.08 and rCFI and rTLI ≥ 0.90, while a good fit is indicated by rRMSEA and SRMR ≤ 0.06 and rCFI and rTLI ≥ 0.95 (Hu and Bentler 1999). Furthermore, the rCFI and rTLI were only reported if the RMSEA of the null model was > 0.158; otherwise, they are deemed non-interpretable (Kenny 2020).

Then, we conducted Multigroup Confirmatory Factor Analysis (MGCFA) to determine whether the factorial structure of the measure was comparable across the targets considered in the study (i.e., human beings, viruses, and animals). We tested three models: configural, metric, and scalar invariance. These models apply increasing constraints on factor structure, loadings, and item intercepts (Palena et al. 2023). We evaluated model differences using changes in fit indices (ΔrRMSEA, ΔSRMR, ΔrCFI, ΔrTLI). Invariance was determined by established criteria such as ΔrRMSEA ≤ 0.015, ΔSRMR ≤ 0.030, ΔrCFI and ΔrTLI ≤ 0.02 (Cheung and Rensvold 2002; Putnick and Bornstein 2016; Rutkowski and Svetina 2014). The scale was deemed to be non-invariant if ΔrCFI and ΔrTLI exceeded its cut-off score and was supplemented by either ΔrRMSEA or ΔrSRMR also above their relative cut-off scores (Cheung and Rensvold 2002).

Internal consistency was computed using Cronbach's alpha and the Alpha if Dropped (AiD) index. The Corrected Item-Total Correlations (CITC) were computed as indicators of item discrimination. CITCs greater than 0.30 were considered acceptable (Wang et al. 2007).

Finally, to test our main assumptions (i.e., H1–H3), we conducted an ANOVA with repeated measures and one-sample *t*-tests.

4.3 | Results

4.3.1 | Preliminary Analyses

Although all items were within Curran et al.'s (1996) limits of skewness (ranging from −1.93 to 0.39) and kurtosis (ranging from −1.52 to 3.33), indicating normal distribution, Mardia's test indicated a potential lack of multivariate normality (multivariate skewness, $p < 0.001$; multivariate kurtosis, $p < 0.001$). The energy test of multivariate normality further confirmed the non-normality of the data (E-statistic = 60.81, $p < 0.001$). This supported the adoption of the MLR estimator.

4.3.2 | Confirmatory Factor Analysis

The RMSEA of the null model was 0.345, allowing for evaluating rCFI and rTLI indices. The model showed a good fit, $\chi^2(132) = 805.45$, $p < 0.001$; rRMSEA 0.069, 90% CI [0.065, 0.074]; SRMR = 0.038; rCFI = 0.965; rTLI = 0.960. All factor loadings were statistically significant (all *p*s < 0.001) and ranged from 0.508 to 0.949, indicating strong relationships between the latent factors and their respective indicators (see Table 1). The correlations between factors were moderate to strong: affective-behavioural ($r = 0.61$), affective-cognitive ($r = 0.75$), and behavioural-cognitive ($r = 0.51$).

4.3.3 | Multigroup Confirmatory Factor Analysis

The configural invariance model demonstrated acceptable fit: $\chi^2(396) = 1096.70$, $p < 0.001$; rRMSEA = 0.072, 90% CI [0.067, 0.077]; SRMR = 0.055; rCFI = 0.918; rTLI = 0.905. This suggests that the basic factorial structure is equivalent across the three target groups.

TABLE 1 | Confirmatory Factor Analysis of the 18 Tripartite Agency Attribution Scale items (Study 1).

Factor	#	Item	Mean (SD)	Factor loading	SE
Affective mental states	1	Getting excited	4.79 (2.44)	0.906	0.035
	2	Feeling pain	5.03 (2.51)	0.939	0.036
	3	Feeling pleasure	4.74 (2.48)	0.942	0.032
	4	Feeling fear	4.90 (2.54)	0.945	0.032
	5	Feeling sadness	4.62 (2.55)	0.946	0.028
	6	Feeling joy	4.60 (2.54)	0.949	0.027
Behavioural potential	7	Taking actions	5.78 (1.66)	0.686	0.054
	8	Defending yourself	5.48 (1.73)	0.691	0.049
	9	Moving	6.08 (1.48)	0.779	0.051
	10	Reacting to stimuli	5.84 (1.55)	0.724	0.049
	11	Shifting	6.00 (1.51)	0.754	0.050
	12	Attacking	5.86 (1.56)	0.508	0.055
Cognitive abilities	13	Self-control	3.76 (2.10)	0.762	0.038
	14	Organising	3.94 (2.30)	0.880	0.031
	15	Having beliefs	3.38 (2.45)	0.857	0.033
	16	Planning actions	4.18 (2.27)	0.855	0.033
	17	Thinking rationally	3.51 (2.26)	0.906	0.029
	18	Doing calculations	3.46 (2.33)	0.892	0.030

The metric invariance model, which constrained factor loadings to be equal across groups, showed a slight decrease in fit: $\chi^2(426)=1228.43$, $p<0.001$; rRMSEA = 0.074, 90% CI [0.069, 0.079]; SRMR = 0.073; rCFI = 0.905; rTLI = 0.898. Comparing this to the configural model, we observed ΔrRMSEA = 0.002, ΔSRMR = 0.018, ΔrCFI = 0.013, and ΔrTLI = 0.008. These changes in fit indices were within the acceptable thresholds, indicating that metric invariance was supported.

The scalar invariance model, which additionally constrained item intercepts to be equal across groups, showed a decrease in fit: $\chi^2(456)=1663.51$, $p<0.001$; rRMSEA = 0.088, 90% CI [0.083, 0.092]; SRMR = 0.097; rCFI = 0.858; rTLI = 0.857. Compared to the metric model, we observed ΔrRMSEA = 0.013, ΔSRMR = 0.023, ΔrCFI = 0.047, and ΔrTLI = 0.040. The change in CFI and TLI exceeded the recommended threshold, yet the change in rRMSEA and SRMR did not exceed their respective thresholds, supporting scalar invariance. Since the chi-square test statistic is sensitive to large sample sizes (Palena et al. 2023), the $\Delta\chi^2$ is not discussed and only reported in Table S1 in the "Supplementary Material" document on OSF.

The invariance tests suggest that the Tripartite Agency Attribution Scale demonstrates configural, metric, and scalar invariance across the three targets. This indicates that the factorial structure, factor loadings, and item intercepts are equivalent across groups, allowing for meaningful comparisons of latent means between human beings, viruses, and animals.

4.3.4 | Reliability

The coefficients for internal consistency were excellent ($\alpha=0.98$ for the affective component; $\alpha=0.84$ for the behavioural component; $\alpha=0.94$ for the cognitive component). Also, the reliability analysis for each target yielded excellent results. The elimination of items did not increase reliability, and all the CITCs were above the considered cut-off point, further suggesting good internal consistency and, also, good item discrimination (see Table 2).

4.3.5 | Agency Attribution

To test our assumptions about the attribution of the three agency components to human beings, viruses, and animals, we conducted a 3 (agency: affective mental states, behavioural potential, cognitive abilities) × 3 (target: human beings, viruses, animals) ANOVA with repeated measures.

Mauchly's test indicated that the assumption of sphericity was violated for agency, $\chi^2(2)=71.25$, $p<0.001$, target, $\chi^2(2)=155.32$, $p<0.001$, and the interaction effect agency × target, $\chi^2(9)=396.13$, $p<0.001$. For this reason, degrees of freedom were corrected using Huynh-Feldt estimates ($\varepsilon>0.76$). The results showed a main effect of agency, $F(1.76, 907.03)=2519.93$, $p<0.001$, $\eta_p^2=0.83$, 90% CI [0.82, 0.84], indicating that the participants attributed more behavioural potential ($M=5.84$, SD = 0.76) than affective mental states

TABLE 2 | Analysis of the items of the Tripartite Agency Attribution Scale across the targets (Study 1).

Factor	Item	Mean (SD)	Factor loading	SE	CITC	AiD	α
Human beings							
Affective mental states	1	6.45 (0.91)	0.745	0.070	0.66	0.86	0.88
	2	6.64 (0.77)	0.745	0.074	0.72	0.85	
	3	6.47 (0.91)	0.807	0.067	0.74	0.85	
	4	6.60 (0.85)	0.673	0.072	0.64	0.86	
	5	6.58 (0.82)	0.717	0.067	0.68	0.86	
	6	6.40 (0.98)	0.742	0.071	0.67	0.86	
Behavioural potential	7	6.23 (1.11)	0.734	0.057	0.63	0.80	0.83
	8	5.75 (1.31)	0.681	0.055	0.61	0.81	
	9	6.40 (0.96)	0.686	0.060	0.65	0.80	
	10	6.18 (1.07)	0.722	0.056	0.67	0.79	
	11	6.29 (1.06)	0.718	0.060	0.65	0.80	
	12	6.21 (1.15)	0.555	0.067	0.46	0.83	
Cognitive abilities	13	5.32 (1.45)	0.727	0.063	0.68	0.86	0.88
	14	6.14 (1.09)	0.781	0.053	0.73	0.86	
	15	6.07 (1.29)	0.621	0.067	0.56	0.88	
	16	6.14 (1.17)	0.808	0.059	0.75	0.85	
	17	5.70 (1.42)	0.801	0.057	0.76	0.85	
	18	5.98 (1.21)	0.759	0.057	0.68	0.86	
Viruses							
Affective mental states	1	1.92 (1.67)	0.639	0.094	0.60	0.85	0.86
	2	1.90 (1.68)	0.722	0.088	0.67	0.84	
	3	1.69 (1.48)	0.695	0.093	0.65	0.84	
	4	1.70 (1.48)	0.747	0.090	0.67	0.83	
	5	1.46 (1.25)	0.765	0.094	0.69	0.83	
	6	1.43 (1.14)	0.772	0.100	0.71	0.83	
Behavioural potential	7	5.01 (2.16)	0.619	0.101	0.56	0.78	0.81
	8	4.54 (2.12)	0.629	0.089	0.56	0.78	
	9	5.29 (1.98)	0.748	0.083	0.65	0.76	
	10	4.95 (1.97)	0.624	0.091	0.55	0.79	
	11	5.27 (1.98)	0.705	0.093	0.61	0.77	
	12	5.52 (1.98)	0.550	0.102	0.50	0.80	
Cognitive abilities	13	2.39 (1.93)	0.560	0.088	0.54	0.85	0.85
	14	2.28 (1.89)	0.743	0.081	0.71	0.81	
	15	1.50 (1.29)	0.710	0.097	0.57	0.84	
	16	2.42 (1.94)	0.706	0.076	0.69	0.82	
	17	1.60 (1.32)	0.799	0.085	0.70	0.82	
	18	1.77 (1.46)	0.754	0.079	0.69	0.82	

(Continues)

TABLE 2 | (Continued)

Factor	Item	Mean (SD)	Factor loading	SE	CITC	AiD	α
Animals							
Affective mental states	1	5.99 (1.32)	0.589	0.065	0.51	0.82	0.83
	2	6.55 (0.88)	0.660	0.069	0.58	0.81	
	3	6.05 (1.22)	0.748	0.057	0.68	0.79	
	4	6.40 (1.03)	0.690	0.066	0.61	0.80	
	5	5.83 (1.42)	0.696	0.065	0.64	0.80	
	6	5.97 (1.38)	0.703	0.057	0.65	0.79	
Behavioural potential	7	6.10 (1.21)	0.702	0.062	0.60	0.74	0.79
	8	6.14 (1.18)	0.545	0.072	0.53	0.76	
	9	6.56 (0.89)	0.695	0.075	0.58	0.75	
	10	6.39 (1.01)	0.670	0.068	0.53	0.76	
	11	6.42 (1.01)	0.695	0.067	0.61	0.74	
	12	5.86 (1.36)	0.463	0.067	0.45	0.79	
Cognitive abilities	13	3.58 (1.74)	0.610	0.071	0.53	0.82	0.83
	14	3.40 (1.80)	0.728	0.071	0.65	0.80	
	15	2.57 (1.83)	0.583	0.089	0.52	0.83	
	16	3.98 (1.85)	0.682	0.070	0.61	0.81	
	17	3.24 (1.76)	0.761	0.066	0.69	0.79	
	18	2.62 (1.66)	0.706	0.072	0.64	0.80	

Note: Loadings were taken from the configural MGCFA and all factor loadings were statistically significant (all $ps < 0.001$).
Abbreviations: AiD = Alpha if the item is Dropped; CITC = Corrected Item-Total Correlations.

($M = 4.78$, $SD = 0.60$) and cognitive abilities ($M = 3.70$, $SD = 0.81$), all $ps < 0.001$.

We found a main effect of target, $F(1.59, 811.57) = 2672.88$, $p < 0.001$, $\eta_p^2 = 0.84$, 90% CI [0.83, 0.85]. The respondents attributed more agency traits to human beings ($M = 6.20$, $SD = 0.76$) than to viruses ($M = 2.92$, $SD = 1.02$) and animals ($M = 5.20$, $SD = 0.77$), all $ps < 0.001$.

We observed that agency × target interaction was significant, $F(3.02, 1544.24) = 1445.29$, $p < 0.001$, $\eta_p^2 = 0.74$, 90% CI [0.72, 0.75]. When the participants were asked to evaluate human beings, the effect of agency was significant, $F(2, 510) = 180.34$, $p < 0.001$, $\eta_p^2 = 0.41$, 90% CI [0.36, 0.46]. As shown in Figure 1, human beings were perceived to have more affective mental states than behavioural potential and cognitive abilities, all $ps < 0.001$. The effect of agency was also significant for the evaluation of viruses, $F(2, 510) = 1229.99$, $p < 0.001$, $\eta_p^2 = 0.83$, 90% CI [0.81, 0.84], which were perceived to have more behavioural potential than affective mental states and cognitive abilities, all $ps < 0.001$. A similar trend emerged for the evaluation of animals, $F(2, 510) = 1377.73$, $p < 0.001$, $\eta_p^2 = 0.84$, 90% CI [0.83, 0.86], which were perceived to have more behavioural potential than affective mental states and cognitive abilities, $p < 0.002$.

When the participants were asked to attribute the affective, behavioural, and cognitive components of agency, the effect of target was significant, all $ps < 0.001$. Since these comparisons were not central to our main research questions, we reported these results in the "Supplementary Material" document on OSF.

We conducted one-sample *t*-tests to assess whether affective, behavioural, and cognitive perceptions for each target significantly differed from 5, the first positive point of the 7-point Likert scale (see Table 3). Regarding human beings, the results showed that all three scores were significantly higher than 5. In contrast, for viruses, the results indicated that affective mental states and cognitive abilities were significantly lower than 5. The analysis revealed a non-significantly higher attribution of behavioural potential. However, this attribution (but not those of affective and cognitive abilities) was significantly higher than 4, the theoretical neutral point of the scale (see Table S2 in the "Supplementary Material" document on OSF). Finally, the analysis of animals indicated that affective and behavioural abilities were significantly higher than 5, while the cognitive component was significantly lower.

Through this study, we provided a new set of items (i.e., the Tripartite Agency Attribution Scale) potentially useful to investigate the three agency components of the ABC model of dehumanisation. Our results showed that human beings were generally perceived as possessing the ability to experience emotions, produce effective actions, and think rationally (H1). Then, we found that viruses and animals were perceived as lacking

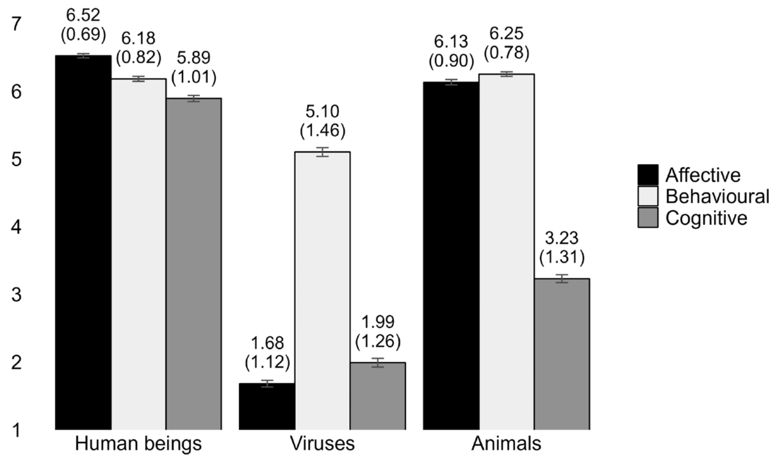

FIGURE 1 | Means and standard deviations (in parentheses) for agency attribution as a function of the target (Study 1).

TABLE 3 | One-sample *t*-tests (Study 1).

Agency	*t*	df	*p*	90% CI Lower	90% CI Upper	*d*
Test value = 5						
Human beings						
Affective mental states	50.09	511	< 0.001	2.07	2.34	2.21
Behavioural potential	32.44	511	< 0.001	1.33	1.54	1.43
Cognitive abilities	19.95	511	< 0.001	0.80	0.97	0.88
Viruses						
Affective mental states	−66.89	511	< 0.001	−3.13	−2.79	−2.96
Behavioural potential	1.48	511	0.141	−0.03	0.11	0.07
Cognitive abilities	−54.07	511	< 0.001	−2.53	−2.24	−2.39
Animals						
Affective mental states	28.74	511	< 0.001	1.16	1.35	1.27
Behavioural potential	36.24	511	< 0.001	1.49	1.71	1.60
Cognitive abilities	−30.48	511	< 0.001	−1.45	−1.25	−1.35

cognitive abilities. Crucially, while viruses were perceived as possessing mainly the behavioural component (H2), animals were perceived as especially possessing affective mental states and behavioural potential (H3).

5 | Study 2

This study aimed to replicate the associations tested in Study 1 by adopting an experimental design. We investigated the relationships between the three agency components and people's perceptions of human beings, viruses, and animals by manipulating agency attributions through vignettes describing a fictitious group as possessing (or not) the ability to experience emotions, produce effective actions, and think rationally. In line with Study 1, we assumed that the participants in the ABC (i.e., affective, behavioural, and cognitive attributions) condition would perceive the fictitious target as more similar to a human being (vs. animal vs. virus) (H4). Then, we assumed that the participants in the AB (i.e., affective and behavioural attributions) condition would perceive the target as more similar to an animal (vs. human being vs. virus) (H5). Finally, we hypothesised that the respondents who read the text describing the fictitious group as possessing only the behavioural component (i.e., B condition) would perceive the target as more similar to a virus (vs. human being vs. animal) (H6).

5.1 | Method

5.1.1 | Participants and Procedure

Data were collected online with a snowball sampling strategy. An a priori power analysis conducted with G*Power 3.1 (Faul et al. 2007), considering an *F*-test with fixed effects, main effects, and interaction with three groups, and a medium effect size $f = 0.25$, with power = 0.80 and alpha = 0.05, suggested a minimum sample size of $N = 196$. A sample of 286 Italians consented to participate. We included one attention check item in our research. Forty-nine participants failed this check question and were removed from the analyses. The final sample comprises 237 participants (55% women, 44% men, 1% others; $M_{age} = 33.93$, SD = 14.17; age range: 18–80).

The respondents were first randomly assigned to read one of three scenarios describing a fictitious target possessing the three agency components (i.e., ABC condition), possessing the affective and behavioural components (i.e., BC condition), or possessing only the behavioural component (i.e., B condition). Then, the participants were asked to complete a brief questionnaire assessing their perceptions of the target and their attention. Finally, respondents indicated their demographic information, were thanked and fully debriefed.

5.1.2 | Agency Attribution Manipulation

To manipulate agency attribution, the participants were randomly assigned to read one of three scenarios describing a target with varying agency components. The participants first read: "The following text describes a newly discovered life form named Rocri. Please, take a few minutes to read the provided information and imagine this species' examples. It is important that you pay attention to the description given as you will be asked questions about it." The subsequent paragraph varied depending on the experimental condition. All three scenarios were created by selecting the three traits of our Tripartite Agency Attribution Scale that best fit the vignette and with the highest factor loadings (i.e., *feeling pleasure*, *feeling sadness*, and *feeling joy* for affective mental states; *taking actions*, *moving*, and *reacting to stimuli* for behavioural potential; *planning actions*, *thinking rationally*, and *doing calculations* for cognitive abilities).

For the ABC condition, the participants read: "Based on initial observations, scientists believe that Rocri, a newly discovered life form, has behavioral potential, that is, it can move, react to stimuli, and take actions, and it can experience emotions, such as joy, sadness, and pleasure. After careful analysis, it also seems that this peculiar life form has the ability to plan actions, think rationally, and do calculations."

For the AB condition, the description was modified to state that Rocri lacked cognitive abilities (i.e., "[…] it also seems that this peculiar life form does not have the ability to plan actions, think rationally, and do calculations.").

Finally, for the B condition, Rocri was described as lacking affective and cognitive abilities (i.e., "[…] but it is not able to feel emotions, such as joy, sadness, and pleasure. […] it also seems that this peculiar life form does not have the ability to plan actions, think rationally, and do calculations.").

5.1.3 | The Questionnaire

After reading the vignette, the respondents were asked to indicate the degree to which they thought Rocri resembled human beings, viruses, and animals from 1 (*not at all*) to 7 (*extremely*). The perception of Rocri as human beings was measured by employing four human-related words (e.g., *people*, *human beings*; $\alpha = 0.86$). The perceptions of Rocri as viruses and animals were measured using, respectively, four virus-related nouns (e.g., *viruses*, *diseases*; $\alpha = 0.88$) and four animal-related nouns (e.g., *animals*, *beasts*; $\alpha = 0.74$). All the items were borrowed from previous research (e.g., Valtorta et al. 2019). Results of the CFA indicated that the scale fitted the hypothesised structure, with each item loading on the corresponding subscale ($\chi^2[51] = 134$, $p < 0.001$; RMSEA = 0.074, 90% CI [0.059, 0.091]; CFI = 0.944; TLI = 0.928; SRMR = 0.058).

After this measure, the respondents were asked to indicate which vignette they had read by selecting one of three responses summarising the scenarios.

5.2 | Results

We performed a 3 (agency: ABC vs. AB vs. B) × 3 (target: human beings, viruses, animals) repeated measures ANOVA with agency as a between-subjects factor.

The assumption of sphericity was violated, $\chi^2(2) = 15.24$, $p < 0.001$; thus, degrees of freedom were corrected using Huynh-Feldt estimates ($\varepsilon = 0.96$). The analysis yielded a main effect of target, $F(1.91, 447.37) = 49.85$, $p < 0.001$, $\eta_p^2 = 0.18$, 90% CI [0.12, 0.23], indicating that Rocri were perceived as more similar to human beings ($M = 3.57$, SD = 1.63) and animals ($M = 3.34$, SD = 1.34), $p = 0.096$, than viruses ($M = 2.53$, SD = 1.53), all *p*s < 0.001.

The main effect of agency was significant, $F(2, 234) = 10.41$, $p < 0.001$, $\eta_p^2 = 0.08$, 90% CI [0.03, 0.14]. Describing a target as lacking affective mental states and cognitive abilities (i.e., B condition) elicited lower perceptions ($M = 2.83$, SD = 0.85) than describing a target as possessing at least two agency components ($M = 3.26$, SD = 0.93 for the AB condition; $M = 3.40$, SD = 0.74 for the ABC condition), all *p*s < 0.005. Furthermore, the difference between the AB and ABC conditions was not significant, $p = 0.987$.

The interaction agency × target was significant, $F(2, 234) = 49.33$, $p < 0.001$, $\eta_p^2 = 0.30$, 90% CI [0.22, 0.37]. When the participants were shown the vignette describing Rocri as possessing all three agency components (i.e., ABC condition), the effect of target was significant, $F(2, 233) = 85.40$, $p < 0.001$, $\eta_p^2 = 0.42$, 90% CI [0.34, 0.49]. As reported in Figure 2, the respondents perceived the target as more similar to a human being than a virus and an animal, all *p*s < 0.001. Likewise, when the participants read the vignette attributing affective mental states and behavioural potential (but not cognitive abilities; i.e., AB condition), the effect of target was significant, $F(2, 233) = 30.41$, $p < 0.001$, $\eta_p^2 = 0.21$, 90% CI [0.13, 0.28]. The participants in the AB condition perceived Rocri as more similar to animals than human beings and viruses, all *p*s < 0.020. Finally, when the participants read the vignette attributing only the behavioural potential (i.e., B condition), the effect of target was significant, $F(2, 233) = 7.08$, $p = 0.001$, $\eta_p^2 = 0.06$, 90% CI [0.02, 0.11]. Respondents in the B condition perceived Rocri as more similar to viruses than human beings and animals, all *p*s < 0.018. The difference between the perception of Rocri as human beings and animals was not significant, $p = 0.057$.

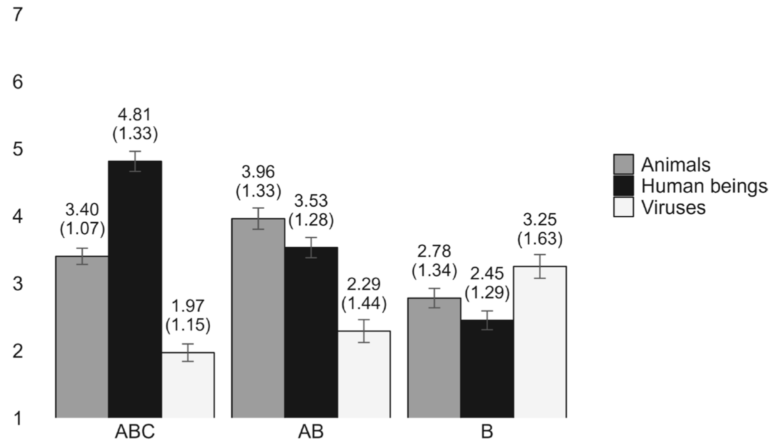

FIGURE 2 | Means and standard deviations (in parentheses) for perceptions of Rocri as a function of the experimental condition (Study 2). AB = affective and behavioural condition; ABC = affective, behavioural, and cognitive condition; B = behavioural condition.

Moreover, simple effects showed that when the participants perceived Rocri as similar to human beings, the effect of agency was significant, $F(2, 234) = 67.70$, $p < 0.001$, $\eta_p^2 = 0.37$, 90% CI [0.29, 0.43]. As shown in Figure 2, the respondents in the ABC condition perceived the target as similar to a human being more than the respondents in the other experimental conditions, all $ps < 0.001$. We also found a significant effect of agency for perceptions as viruses, $F(2, 234) = 17.92$, $p < 0.001$, $\eta_p^2 = 0.13$, 90% CI [0.07, 0.20]. The participants who read the text describing Rocri as possessing only the behavioural potential (i.e., B condition) perceived the target as similar to a virus more than participants in the other experimental conditions, all $ps < 0.001$. Crucially, the perceptions in the ABC and AB conditions did not significantly differ, $p = 0.170$. Finally, the effect of agency was also significant when the participants perceived Rocri as animals, $F(2, 234) = 17.66$, $p < 0.001$, $\eta_p^2 = 0.13$, 90% CI [0.07, 0.20]. The participants in the AB condition indicated that Rocri were similar to animals more than the participants in the ABC and B conditions, all $ps < 0.007$.

In line with our assumptions and Study 1, we found that attributing the abilities to experience emotions, produce an effect on the environment, and think rationally was associated especially with humanity perceptions (H4). Furthermore, denying cognitive abilities to a target led to the perception of that target as more similar to an animal (H5). Finally, our results revealed that denying both higher-order cognitions and affective mental states affected the perception of a target as a virus (H6).

6 | Study 3

In Study 3, we aimed to apply our Tripartite Agency Attribution Scale to real social groups. We selected the targets based on a review of the dehumanisation literature (e.g., Gray et al. 2007; Loughnan and Haslam 2007; Tipler and Ruscher 2014; Valtorta et al. 2024), identifying those that are frequently highlighted as the most dehumanised globally. We prioritised groups that have been consistently and empirically identified as targets of mechanisation, animalisation or biologisation, as well as control groups perceived as fully human. This ensured empirical and theoretical relevance for testing our clustering hypotheses. The selected groups were immigrants, prisoners, children, the elderly, homeless people, drug users, bank staff, and CEOs. Importantly, we also selected two categories that could be considered fully human to serve as control groups, namely the participants' friends and relatives.

After conducting a cluster analysis based on explicit dehumanising perceptions, we assumed that distinct agency attributions would emerge across various social groups. We expected to identify a "biologised" cluster (primarily attributed behavioural potential; H7), a "wild animalised" cluster (characterised by emotional and behavioural capacities but lacking cognitive abilities; H8), a "prey animalised" cluster (mainly attributed emotional capacities, with no cognitive and behavioural potential; H9), and a "mechanised" cluster (perceived as lacking emotional capacities but attributed higher cognitive abilities and behavioural potential; H10). In contrast, non-dehumanised groups were anticipated to form a separate cluster, representing a more complete humanisation, with all dimensions of agency attributed to them (H11). Additionally, through this study, we took the opportunity to examine how Haslam et al.'s (2005) HN-UH traits functioned, expecting that they would not fully capture biologisation, nor the distinction between animalisation in terms of wild animals and prey.

6.1 | Method

6.1.1 | Participants and Procedure

Data were collected online using the Qualtrics survey web system and Prolific Academic. Participants were paid £2,00 for a 15-min study. We aimed to collect at least 250 participants. According to Schönbrodt and Perugini (2013), this sample size would guarantee the stability of the correlations and a power of 0.80 for correlations as low as 0.17, as found in a priori power analysis that we conducted with G*Power 3.1 (Faul et al. 2007). A sample of 255 Italians consented to participate. Of these, we excluded the participants who did not complete the questionnaire in its entirety ($n = 5$). The final sample comprises 250 participants (48% women, 50% men, 2% others; $M_{age} = 33.46$, $SD = 10.14$; age range: 18–71).

Each respondent rated four random social groups from the 10 considered in the study (for a similar procedure, see Valtorta et al. 2024) on scales reflecting explicit dehumanising perceptions, agency attribution, and HN-UH attribution. To dispel any social desirability concerns, the respondents were instructed to express their judgements about how the considered groups are viewed by people in general rather than by themselves (for a similar procedure, see Fiske et al. 2002).

6.1.2 | The Questionnaire

The order of presentation of the following scales was fixed, while the items' order was randomised. After fulfilling the measures, the participants were asked to indicate their demographic information. They were then debriefed and thanked for their participation.

6.1.3 | Explicit Dehumanising Perceptions

The respondents were asked to rate the extent to which, according to the perspective of people in general, each group member could be considered similar to some words (from 1 = *not at all* to 7 = *extremely*). Perceptions of each target as virus-like were measured employing two virus-related words (i.e., *virus*, *disease*; $r[999] = 0.83$, $p < 0.001$). Perceptions of each target as a wild animal and a prey were measured using, respectively, two wild animal-related nouns (i.e., *savage*, *beast*; $r[999] = 0.77$, $p < 0.001$) and two prey-related nouns (i.e., *prey*, *puppy*; $r[999] = 0.30$, $p < 0.001$). Perceptions of each target as a robot were measured by employing two robot-related words (i.e., *robot*, *machine*; $r[999] = 0.77$, $p < 0.001$). Lastly, we measured humanity perceptions with two items (i.e., *person*, *human being*; $r[999] = 0.88$, $p < 0.001$). All the measures were borrowed from previous research (e.g., Valtorta et al. 2019) and Study 2.

6.1.4 | Agency Attribution

Each respondent was asked to rate the extent to which each group possesses the ability to experience emotions, produce an effect on the environment, think and hold beliefs by adopting our Tripartite Agency Attribution Scale tested in Study 1. The answers were given from 1 (*not at all*) to 7 (*extremely*). The fit of the model with the three factors was acceptable ($\chi^2[132] = 1182.30$, $p < 0.001$; RMSEA = 0.083, 90% CI [0.079, 0.088]; CFI = 0.948; TLI = 0.940; SRMR = 0.062) and the reliabilities were excellent ($\alpha_{affective} = 0.95$; $\alpha_{behavioral} = 0.95$; $\alpha_{cognitive} = 0.96$). We also conducted MGCFA and found support for configural and metric invariance, but not for scalar invariance. This confirms that the scale has the same factorial structure across groups and that factor loadings are equivalent. Although scalar invariance was not achieved, which advises caution when comparing factor means between groups, this does not affect our primary objective, namely assessing and comparing factor means within each group (for more details on the MGCFA, see the "Supplementary Material" document on OSF).

6.1.5 | HN-UH Traits Attribution

The participants were asked to rate the extent to which each group possesses human nature and uniquely human traits developed by Haslam et al. (2005) from 1 (*not at all*) to 7 (*extremely*). Overall, the scale was composed of 20 items, 10 measuring human nature characteristics (e.g., *friendly*, *curious*) and 10 concerning uniquely human characteristics (e.g., *conscientious*, *humble*). The results of the CFA with the two factors, as proposed by Haslam et al. (2005), indicated a very poor model fit ($\chi^2[169] = 5130.50$, $p < 0.001$; RMSEA = 0.171, 90% CI [0.166, 0.175]; CFI = 0.543; TLI = 0.487; SRMR = 0.151) and good reliability ($\alpha_{HN} = 0.71$; $\alpha_{UH} = 0.81$).[1]

6.2 | Results

Table 4 shows the means and standard deviations for each social group. The highest attributions according to our Tripartite Agency Attribution Scale across all three abilities were observed for friends and relatives, who were perceived as the most human. For all other targets, variations emerged. Immigrants and prisoners were primarily perceived as wild animals, children and the elderly as prey, homeless people and drug users as viruses, and bank staff and CEOs as robots. The attribution of agency and HN-UH traits across social groups was further explored through cluster analysis.

6.2.1 | Cluster Analysis

To identify the presence of distinct groups on dehumanising perceptions, we examined their five-dimensional array in cluster analysis. Then, we examined the distribution of social groups into various clusters and assessed differences in affective, behavioural, and cognitive ratings, as well as HN-UH attributions for each cluster.

We first performed hierarchical cluster analysis (Ward's (1963) method) to determine the best fitting number of clusters, using the scree plot as a criterion. On this basis, we adopted a five-cluster solution. We then conducted *k*-means cluster analysis to determine which social groups fit into which cluster.

Table 5 reports the five clusters and their respective social groups. The "biologised" cluster encompassed homeless people and drug users, while the "wild animalised" cluster included immigrants and prisoners. The "prey animalised" cluster consisted of children and the elderly, and the "mechanised" cluster covered bank staff and CEOs. Finally, the "non-dehumanised" cluster comprised friends and relatives.

To assess differences in dehumanising ratings for each cluster, we conducted a repeated-measures ANOVA with the five dehumanising perceptions as a within-subjects factor and the cluster membership as a between-subjects factor.

The assumption of sphericity was violated, $\chi^2(2) = 624.35$, $p < 0.001$; thus, degrees of freedom were corrected using Greenhouse–Geisser correction ($\varepsilon = 0.72$). Results showed a significant interaction effect dehumanising perceptions × cluster membership, $F(11.48, 2856.37) = 168.90$, $p < 0.001$, $\eta_p^2 = 0.40$, 90% CI [0.38, 0.42]. As reported in Table 5, the "biologised" cluster differed significantly from all other clusters on the virus-like rating (all $ps < 0.010$). Pairwise comparisons

TABLE 4 | Means and standard deviations (in parentheses) for each social group considered in the study (Study 3).

Social group	*N*	Virus	Wild	Prey	Robot	Human	Affective	Behavioural	Cognitive	HN	UH
Homeless people	100	4.13 (1.73)	3.01 (1.39)	2.33 (1.10)	1.63 (0.99)	4.68 (1.64)	4.35 (1.37)	5.00 (0.96)	3.02 (1.07)	3.15 (0.89)	3.63 (0.60)
Drug users	100	4.53 (1.69)	3.29 (1.24)	2.15 (0.94)	2.85 (1.78)	4.08 (1.69)	4.44 (1.43)	5.34 (1.15)	2.16 (0.65)	4.02 (0.77)	3.38 (0.51)
Immigrants	100	3.74 (1.63)	4.31 (1.52)	2.26 (1.16)	1.76 (1.18)	4.59 (1.50)	5.39 (0.79)	5.59 (0.70)	3.85 (1.27)	4.11 (0.60)	3.76 (0.52)
Prisoners	99	3.69 (1.91)	5.01 (1.48)	1.64 (0.81)	1.71 (1.00)	4.07 (1.68)	5.17 (0.94)	5.64 (0.76)	3.59 (1.34)	4.13 (0.64)	3.79 (0.44)
Children	99	1.72 (1.02)	2.56 (1.45)	4.32 (1.37)	1.51 (0.97)	6.00 (1.04)	5.98 (0.76)	3.35 (1.48)	2.96 (1.14)	5.22 (0.68)	3.34 (0.62)
The elderly	101	2.42 (1.23)	1.49 (0.84)	3.20 (1.60)	1.62 (0.98)	6.26 (0.91)	5.71 (0.72)	3.34 (1.05)	4.40 (1.03)	3.73 (0.67)	3.93 (0.52)
Bank staff	100	2.11 (1.38)	2.01 (1.30)	1.42 (0.76)	3.38 (1.80)	5.64 (1.50)	4.15 (1.63)	5.87 (0.78)	6.20 (0.67)	3.54 (0.80)	4.17 (0.48)
CEOs	100	2.03 (1.56)	1.99 (1.22)	1.33 (0.62)	3.28 (1.90)	5.25 (1.40)	4.39 (1.40)	6.22 (0.61)	6.26 (0.61)	3.98 (0.66)	4.02 (0.41)
Friends	100	1.21 (0.61)	1.48 (0.74)	1.82 (1.04)	1.41 (0.78)	6.57 (0.71)	5.92 (0.82)	5.88 (0.67)	5.84 (0.72)	4.43 (0.61)	4.20 (0.44)
Relatives	101	1.13 (0.34)	1.27 (0.50)	1.61 (0.88)	1.33 (0.71)	6.71 (0.48)	5.86 (0.71)	5.83 (0.72)	5.87 (0.69)	4.10 (0.64)	4.17 (0.44)

with Bonferroni-adjusted alpha levels revealed significant differences between virus-, wild-, prey-, and robot-like perceptions (all *p*s < 0.001), but no significant difference between virus- and human-like ratings ($p = 0.774$). The "wild animalised" cluster showed significant differences in wild animal perceptions compared to all other clusters (all *p*s < 0.001). Pairwise comparisons indicated a significant distinction between the wild animal ratings and all other perceptions (all *p*s < 0.001). The "prey animalised" cluster differed significantly on the prey-like rating from all other clusters (all *p*s < 0.001), with significant differences also found between prey-like perceptions and all other ratings (all *p*s < 0.001). The "mechanised" cluster significantly differed from the other clusters on robot-like perceptions (all *p*s < 0.001). Pairwise comparisons revealed significant differences between robot-like perceptions and all other ratings (all *p*s < 0.001). Finally, the "non-dehumanised" cluster differed significantly from all other clusters in the human-like rating (all *p*s < 0.010). Pairwise comparisons showed significant differences between human-like perceptions and all other ratings (all *p*s < 0.001).

6.2.2 | Agency Attribution

A repeated measures ANOVA with cluster as a between-subjects factor was conducted to analyse the difference between participants' agency attribution according to the five clusters.

The assumption of sphericity was violated, $\chi^2(2) = 19.19$, $p < 0.001$; thus, degrees of freedom were corrected using Huynh-Feldt estimates ($\varepsilon = 0.99$). The analysis showed a main effect of agency, $F(1.97, 1964.36) = 256.66$, $p < 0.001$, $\eta_p^2 = 0.21$, 90% CI [0.18, 0.23], indicating that the participants attributed higher behavioural ($M = 5.14$, $SD = 1.31$) and affective ($M = 5.21$, $SD = 1.35$) potential, $p = 0.182$, than cognitive abilities ($M = 4.42$, $SD = 1.73$), all *p*s < 0.001.

Additionally, we found a main effect of cluster membership, $F(4, 995) = 216.22$, $p < 0.001$, $\eta_p^2 = 0.47$, 90% CI [0.43, 0.50]. The participants attributed higher agency to the social groups in the "non-dehumanised" cluster ($M = 5.87$, $SD = 0.65$), followed by the "mechanised" cluster ($M = 5.51$, $SD = 0.75$), the "wild animalised" cluster ($M = 4.87$, $SD = 0.75$), the "prey animalised" cluster ($M = 4.29$, $SD = 0.79$), and the "biologised" cluster ($M = 4.05$, $SD = 0.77$), all *p*s < 0.011.

Central to our hypotheses, we found a significant interaction effect agency × cluster membership, $F(7.90, 1964.36) = 324.32$, $p < 0.001$, $\eta_p^2 = 0.57$, 90% CI [0.54, 0.58]. When the participants were asked to evaluate the social groups in the "biologised" cluster, the effect of agency was significant, $F(2, 994) = 494.83$, $p < 0.001$, $\eta_p^2 = 0.50$, 90% CI [0.46, 0.53]. As shown in Figure 3, homeless people and drug users were perceived to have more behavioural potential than affective mental states and cognitive abilities, all *p*s < 0.001. The effect of agency was also significant for the evaluation of the social groups in the "wild animalised" cluster, $F(2, 994) = 277.99$, $p < 0.001$, $\eta_p^2 = 0.36$, 90% CI [0.32, 0.39]. Immigrants and prisoners were perceived to have more behavioural potential and affective mental states than cognitive abilities, all *p*s < 0.001. A significant effect also

TABLE 5 | Means and standard deviations (in parentheses) for the dehumanising perceptions by cluster (Study 3).

Social group	Cluster	Virus	Wild	Prey	Robot	Human
Homeless people and drug users	Biologised	4.33_{aA} (0.28)	3.15_{aB} (0.20)	2.24_{aC} (0.13)	2.23_{aC} (0.86)	4.38_{aA} (0.42)
Immigrants and prisoners	Wild animalised	3.71_{bA} (0.04)	4.66_{bB} (0.50)	1.95_{abC} (0.44)	1.74_{bC} (0.03)	4.33_{aD} (0.37)
Children and the elderly	Prey animalised	2.07_{cA} (0.49)	2.02_{cA} (0.76)	3.76_{cB} (0.79)	1.56_{bC} (0.08)	6.13_{bD} (0.18)
Bank staff and CEOs	Mechanised	2.07_{cA} (0.06)	2.00_{cA} (0.01)	1.38_{dB} (0.06)	3.33_{cC} (0.07)	5.44_{cD} (0.27)
Friends and relatives	Non-dehumanised	1.17_{dA} (0.06)	1.37_{dB} (0.15)	1.71_{bC} (0.15)	1.37_{bB} (0.06)	6.64_{dD} (0.10)

Note: Capital subscripts compare the perceptions within each cluster; small subscripts compare clusters within each perception.

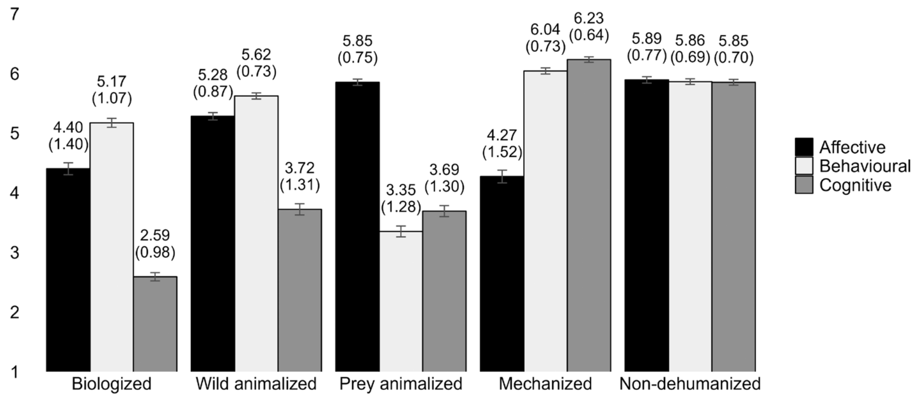

FIGURE 3 | Means and standard deviations (in parentheses) for agency attribution as a function of the cluster membership (Study 3).

emerged for the social groups in the "prey animalised" cluster, $F(2, 994) = 473.46$, $p < 0.001$, $\eta_p^2 = 0.49$, 90% CI [0.45, 0.52], which were perceived to have more affective mental states than behavioural and cognitive abilities, all *p*s < 0.001. The effect of agency was significant also for the "mechanised" cluster, $F(2, 994) = 286.65$, $p < 0.001$, $\eta_p^2 = 0.37$, 90% CI [0.33, 0.40]. Bank staff and CEOs were perceived to have more cognitive abilities and behavioural potential than affective mental states, all *p*s < 0.023. Finally, the effect of agency was not significant for the social groups in the "non-dehumanised" cluster, $F(2, 994) = 0.09$, $p = 0.910$, $\eta_p^2 = 0.0001$, 90% CI [0.00, 0.001]. The participants attributed the same levels of affective, behavioural, and cognitive abilities to their friends and relatives, all *p*s >0.692.

Simple effects showed that when the participants were asked to attribute the affective, behavioural, and cognitive components of agency, the effect of cluster membership was significant, all *p*s < 0.001. Since these comparisons were not central to our main research questions, we reported these results in the "Supplementary Material" document on OSF.

We conducted one-sample *t*-tests to determine whether affective, behavioural, and cognitive attributions for each cluster significantly differed from 5, namely the first positive point of the 7-point Likert scale (see Table 6). As for the "biologised" cluster, results indicated a higher attribution of the behavioural potential and lower attributions of the affective and cognitive abilities. As for the "wild animalised" cluster, the analysis showed higher attributions of the affective and behavioural potential with a lower attribution of the cognitive component. As for the "prey animalised" cluster, the results indicated a greater attribution of the affective mental states and lower attributions of the behavioural and cognitive abilities. For the "mechanised" cluster, we found a lower attribution of the affective component and higher attributions of the cognitive and behavioural abilities. Lastly, the analysis regarding the "non-dehumanised" cluster showed significantly higher attributions of all three agency components.

6.2.3 | HN-UH Traits Attribution

A repeated measures ANOVA with cluster as a between-subjects factor was conducted to analyse the difference between participants' HN-UH traits attribution according to the five clusters.

The analysis showed a main effect of traits, $F(1, 995) = 55.09$, $p < 0.001$, $\eta_p^2 = 0.05$, 90% CI [0.03, 0.08], indicating that the participants attributed more human nature ($M = 4.04$, SD = 0.87) than uniquely human ($M = 3.84$, SD = 0.58) traits.

We found a main effect of cluster membership, $F(4, 995) = 44.33$, $p < 0.001$, $\eta_p^2 = 0.15$, 90% CI [0.12, 0.18]. The participants attributed higher HN-UH traits to the social groups in the "non-dehumanised" cluster ($M = 4.23$, SD = 0.45), followed by the "prey animalised" cluster ($M = 4.05$, SD = 0.60), the "wild animalised" cluster ($M = 3.95$, SD = 0.47), the "mechanised" cluster ($M = 3.93$, SD = 0.50), and the "biologised" cluster ($M = 3.54$, SD = 0.64). The only non-significant differences were between the perceptions of wild animals, prey, and robots, all *p*s >0.182.

TABLE 6 | One-sample *t*-tests (Study 3).

Agency	*t*	df	*p*	90% CI Lower	90% CI Upper	*d*
Test value = 5						
Biologised						
Affective mental states	−6.12	199	< 0.001	−0.55	−0.31	−0.43
Behavioural potential	2.24	199	0.026	0.04	0.28	0.16
Cognitive abilities	−34.74	199	< 0.001	−2.69	−2.22	−2.46
Wild animalised						
Affective mental states	4.54	198	< 0.001	0.20	0.44	0.32
Behavioural potential	11.97	198	< 0.001	0.71	0.98	0.85
Cognitive abilities	−13.75	198	< 0.001	−1.12	−0.83	−0.98
Prey animalised						
Affective mental states	15.85	199	< 0.001	0.98	1.28	1.12
Behavioural potential	−18.31	199	< 0.001	−1.45	−1.13	−1.29
Cognitive abilities	−14.27	199	< 0.001	−1.15	−0.86	−1.01
Mechanised						
Affective mental states	−6.82	199	< 0.001	−0.60	−0.36	−0.48
Behavioural potential	20.15	199	< 0.001	1.26	1.59	1.42
Cognitive abilities	27.15	199	< 0.001	1.72	2.12	1.92
Non-dehumanised						
Affective mental states	16.40	200	< 0.001	1.00	1.30	1.16
Behavioural potential	17.46	200	< 0.001	1.09	1.40	1.24
Cognitive abilities	17.31	200	< 0.001	1.06	1.37	1.22

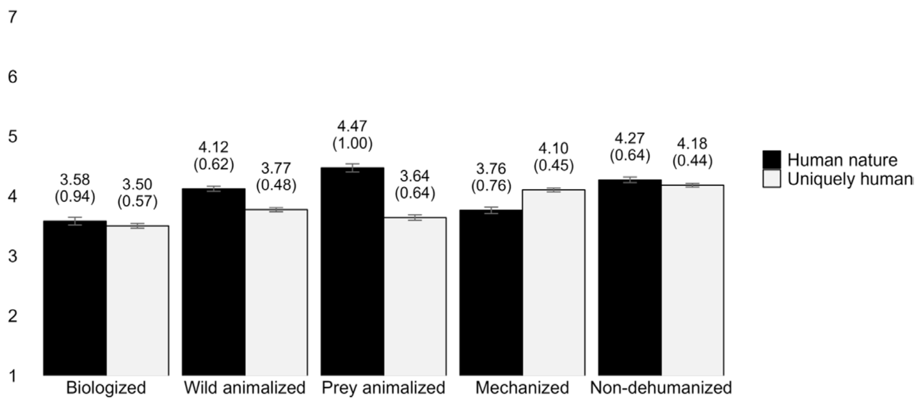

FIGURE 4 | Means and standard deviations (in parentheses) for HN-UH traits attribution as a function of the cluster membership (Study 3).

The interaction effect HN-UH traits × cluster membership was significant, $F(4, 995) = 51.71$, $p < 0.001$, $\eta_p^2 = 0.17$, 90% CI [0.14, 0.20]. When the participants were asked to evaluate the social groups in the "biologised" cluster, the effect of traits was not significant, $F(1, 995) = 1.66$, $p = 0.199$, $\eta_p^2 = 0.002$, 90% CI [0.00, 0.01]. As shown in Figure 4, homeless people and drug users were perceived to have the same levels of human nature and uniquely human traits. The same pattern of results emerged for the "non-dehumanised" cluster, $F(1, 995) = 2.08$, $p = 0.149$, $\eta_p^2 = 0.002$, 90% CI [0.00, 0.01]. The effect of traits was significant for the evaluation of the social groups in the "wild animalised" cluster, $F(1, 995) = 33.24$, $p < 0.001$, $\eta_p^2 = 0.03$, 90% CI [0.02, 0.05]. Immigrants and prisoners were perceived to have more human nature than uniquely human traits. We found the same results for the social groups in the "prey animalised" cluster, $F(1, 995) = 191.99$, $p < 0.001$,

$\eta_p^2 = 0.16$, 90% CI [0.13, 0.20], which were perceived to have more human nature than uniquely human traits. The effect of traits was significant also for the "mechanised" cluster, $F(1, 995) = 32.98$, $p < 0.001$, $\eta_p^2 = 0.03$, 90% CI [0.02, 0.05]. Bank staff and CEOs were perceived to have more uniquely human than human nature traits.

Simple effects showed that when the participants were asked to attribute the human nature and uniquely human traits, the effect of cluster membership was significant, all *p*s < .001. Since these comparisons were not central to our main research questions, we reported these results in the "Supplementary Material" document on OSF.

This study confirmed our hypotheses. The "biologised" cluster was primarily attributed behavioural potential (H7); the "wild animalised" cluster was characterised by emotional and behavioural capacities but lacked cognitive abilities (H8); the "prey animalised" cluster was mainly attributed emotional capacities, with no behavioural or cognitive potential (H9); and the "mechanised" cluster was perceived as lacking emotional capacities but attributed higher cognitive and behavioural potential (H10). Finally, the "non-dehumanised" cluster exhibited a more complete humanisation, with all dimensions of agency attributed (H11). Furthermore, the analysis of HN-UH traits revealed that they did not fully capture the nuances of dehumanisation, particularly with respect to the distinction between wild animals and prey.

7 | General Discussion

Although the literature on subtle dehumanisation is relevant (e.g., Haslam and Loughnan 2014; Loughnan and Haslam 2007), no research on this topic has considered biologisation, namely the perception of others as disease carriers. To fill this gap, we conducted three studies to examine whether the theoretical ABC model of dehumanisation proposed by Tipler and Ruscher (2014) might be applied to the study of subtle biologisation.

After creating a specific measure (i.e., the Tripartite Agency Attribution Scale) assessing the three agency components that define the ABC framework (i.e., affective mental states, behavioural potential, cognitive abilities), we investigated whether the attribution or denial of these dimensions might be associated with people's perceptions of human beings, viruses, and animals. Also, we examined the applicability of our Tripartite Agency Attribution Scale to real social groups. In line with the theoretical approach that we followed in this research, the results revealed that human beings were perceived as possessing all three agency abilities. Furthermore, we found that both viruses and animals were perceived as lacking higher-order cognitions; however, while animals were perceived as especially possessing affective mental states and behavioural potential, viruses were perceived as possessing mainly the behavioural component. This pattern was replicated through an experimental study in which we manipulated agency attributions through vignettes describing a fictitious group.

Study 3 extended these findings by demonstrating that the pattern observed in Studies 1 and 2 applies to real-world social groups frequently subjected to dehumanisation. Using a cluster analysis, we found that biologised groups in Italian society (i.e., homeless people and drug users) were perceived as possessing behavioural potential but lacking affective and cognitive capacities. This provides empirical confirmation that biologisation is not merely a conceptual metaphor but a tangible process affecting human social perception. Moreover, the study highlights how different forms of dehumanisation relate to distinct agency attributions, further refining our understanding of subtle dehumanisation in social contexts.

Our results enrich literature in different ways. First, as far as we know, this is the first empirical evidence of a potential new way to assess subtle biological dehumanisation. According to the HN-UH framework (Haslam et al. 2005), animalisation is the denial of human uniqueness, while mechanisation corresponds to a denial of human nature traits. Our research adds a tile to this picture by providing evidence of a new, subtle way to investigate the perception of others as contagious entities through the denial of affective mental states and cognition, and the attribution of the capacity to produce effective actions.

Furthermore, our findings suggest that the ABC framework can be considered a valid approach for distinguishing between two forms of animalisation that were not captured by Haslam et al.'s (2005) model, namely the distinction between prey-like and wild animal-like dehumanisation. While the denial of cognitive abilities is common to both, wild animalisation includes the attribution of both behavioural potential and affective mental states, reinforcing perceptions of groups as dangerous and impulsive. On the other hand, prey-like dehumanisation involves the denial of both behavioural potential and cognitive abilities, reducing groups to passive, defenceless entities. While Haslam et al.'s (2005) approach remains crucial to the dehumanisation literature, this distinction is important as it suggests that different social groups may be animalizsed in distinct ways, leading to different forms of discrimination.

In addition, the present studies highlighted the difference between animalisation and biologisation from an unexplored point of view. Animalistic and biological dehumanisation are the only two forms of dehumanisation that imply subhuman metaphors, namely representations of others as less evolved. For this reason, they are not always easily distinguishable (O'Brien 2003). Valtorta and Volpato (2018) showed that physical and moral disgust affect these two kinds of dehumanising processes differently. They found that while physical disgust (i.e., a rejection response to dirt) increased the view of outgroup members as viruses, moral disgust (i.e., a form of disgust elicited by immorality) led to an increased association of others with animalistic metaphors. Our research expands this literature by demonstrating that animalisation and biologisation differ also considering the subtle facet of dehumanisation.

Our findings open promising avenues for future research. We provided a new instrument to assess the role of agency in the dehumanisation process. Starting from the theoretical work by Tipler and Ruscher (2014), we developed a set of items measuring the attribution (or denial) of affective mental states, behavioural potential, and higher-order cognitions. Although our Tripartite Agency Attribution Scale needs a more accurate validation, we believe this scale may be considered a useful tool to further investigate people's perceptions of humanity and extend the literature on the subtle ways through which we can dehumanise others.

Another interesting direction concerns the relationship between dehumanisation and individuals' affective versus cognitive orientations. Prior work has shown that these orientations influence different judgements and behaviours (see Aquino et al. 2024). Given the structural similarities between the ABC model of dehumanisation and ABC models of attitudes (Maio et al. 2018), future studies could investigate how affective-cognitive orientation moderates dehumanisation tendencies. For instance, individuals with stronger affective orientations might be more sensitive to the denial of emotional states, while those with cognitive orientations might focus more on the denial of rational agency. Exploring this interaction could shed light on the psychological mechanisms underlying dehumanising perceptions.

Furthermore, future research should examine whether different configurations of agency denial—affective, behavioural, or cognitive—are linked to distinct behavioural outcomes. Biologised targets (denied affect and cognition but attributed behavioural potential) may elicit fear and avoidance; mechanised targets (denied affect but attributed cognition and behaviour) may provoke envy or utilitarian attitudes; and animalised targets (denied cognition but perceived as emotional and active) may prompt derogation or paternalism. These patterns may have significant implications for understanding how dehumanisation contributes to stigma, social exclusion, policy support or even public health responses. By mapping how specific forms of agency denial translate into different behavioural consequences, future research can inform both theory and applied interventions aimed at reducing dehumanising attitudes and their societal impact.

Despite the relevance of this research, we should consider that the cross-sectional nature of Study 3 prevents causal inferences about the factors shaping perceptions of biologisation, animalisation and mechanisation. Future research should employ longitudinal or experimental designs to better understand the mechanisms underlying these forms of dehumanisation.

In addition, our research is limited to an Italian population, which may restrict the generalisability of our findings to other cultural contexts where different historical and social factors shape dehumanising processes.

Also, although the affective component of our scale showed high internal consistency, it is important to consider that positive and negative emotions may not always align on a single continuum. Prior research has shown that positive and negative affect can follow distinct psychological and neural pathways and may elicit different behavioural responses (Cacioppo and Berntson 1994; Larsen et al. 2001). Therefore, while our measure effectively captured overall affective attributions, future studies might explore whether biologised and animalised targets are differentially associated with positive versus negative emotions. This could provide a more nuanced understanding of how emotional valence shapes dehumanisation processes.

Lastly, it is noteworthy that we removed 49 participants from the analyses of Study 2 because they failed the attention check question. This relatively high exclusion rate (approximately 17%) is likely attributable to the online nature of the data collection procedure, which can increase the risk of distraction and reduced attentiveness. However, this rate is consistent with other online studies employing attention checks (e.g., Hauser and Schwarz 2016), and the remaining sample size was sufficient to ensure statistical power.

8 | Conclusions

Dehumanisation impacts both intergroup and interpersonal relations, with serious consequences for victims and oppressors. Research has used innovative approaches to demonstrate the subtle ways through which we can dehumanise others. However, current models of dehumanisation cannot fully account for the variety of dehumanisation that occurs in metaphorical thought, such as metaphors of virus and disease. Since biologisation has been relatively unexplored, we hope our research can be considered an important starting point for further investigations. Indeed, a deeper understanding of how people can subtly deprive others of humanity may lead to novel interventions for better comprehending conflicting relationships and defusing intergroup and interpersonal violence.

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Ethics Statement

All the studies were conducted after receiving ethical approval from the Commission of the Department of Psychology for minimal risk studies at the University of Milano-Bicocca (approval n. RM-2022-522). Participation was voluntary, and informed consent was obtained before each data collection.

Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

Data, syntax for the analyses, the "Supplementary Material" document, and the file with all the items are available on the project's OSF webpage: https://osf.io/rpqja/.

Endnotes

[1] We conducted an exploratory factor analysis (EFA) with the extraction of two factors to identify problematic items and examine the scale. The

resulting structure did not align with Haslam et al.'s (2005) original division, as one item of human nature (i.e., *helpful*) was grouped with those uniquely human. Furthermore, despite eliminating problematic items one by one due to cross-loadings, the resulting structure remained unstable and led to an imbalance between the positive and negative traits. Consequently, we decided to retain the two factors in their original form, with 10 items for human nature and 10 for uniquely human traits. See Tables S3 and S4 in the "Supplementary Material" document on OSF for more details on the results of the EFA.

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Supporting Information

Additional supporting information can be found online in the Supporting Information section. **APPENDIX S1:** Supporting Material.