Categorisation of Sexual Orientation: a Test of Essentialism

Nick Braisby (Nick.Braisby@winchester.ac.uk)
Department of Psychology, University of Winchester, Winchester, SO22 4NR, UK

Ian Hodges (I.Hodges@wmin.ac.uk)
Department of Psychology, University of Westminster, London, W1B 2UW, UK

Abstract

Psychological essentialism is an important strand of theorising within the study of categorisation, according to which people believe, and act as if, category membership is determined by the possession of an essence. Many authors have developed this position by arguing that people believe and behave as if essentialism is true of social categories. This paper reports the results of a study investigating people's categorization of sexual orientation. Contrary to essentialism, behavioural and not genetic factors were deemed more important in categorizing sexual orientation. These results suggest that the extent of essentialising about such social categories may be over-estimated, and that a similarity-based view may be more appropriate.

Keywords: essentialism, categorization, sexual orientation

Introduction

Psychological essentialism is an important strand of theorising, according to which people believe, and act as if, category membership is determined by the possession of an essence (Medin & Ortony, 1989). People are deemed to believe that objects have essences, that essences are causally responsible for other properties such as appearance, and that essences are responsible for category or kind membership.

There has been much empirical support for psychological essentialism (see Gelman, 2004). Many studies of the categorisation of natural kinds have suggested people act as if they give priority to innate, hidden and causally more central features supporting the idea that a belief in essentialism, and a judgment as to an exemplar's possession of putative essential properties, determines categorisation. For example, Barton & Komatsu (1989) found that transforming function mattered more for artifacts than natural kinds, but that transformations of molecular (or chromosomal) structure mattered more for natural kinds. Other studies have pitted putative essential properties against conflicting appearance or behavioural properties to see which influence categorization more. Rips (1989) described a transformation in which a bird-like animal developed the appearance of an insect as a consequence of exposure to radiation. Participants judged the animal still to be a bird, but more similar to an insect. Keil (1989) describes the results of similar studies with children, e.g., making a raccoon look and behave like a skunk through being painted and implanted with an odour sac. While younger children tended to categorise this as a skunk, older children considered it a raccoon still. Gelman & Wellman (1991) similarly showed 4 and 5 year olds' categorization of natural kinds was influenced more by insides than outsides, and that children believe the properties of category members to be governed by their innate potential.

At the heart of the essentialist doctrine is a commitment to the idea that people's knowledge of a category's essential properties, including which are essential, is always fallible and subject to revision (cf. Kripke, 1980; Putnam, 1975, 1977). Putnam (1977) expressed this idea in his Division of Linguistic Labour, in which people are differentially involved in the semantic task of determining the reference of natural kind terms. Lay-people should defer to expert authorities, typically those scientists who have a greater knowledge of the properties of kind members and better judgment as to which of those properties are essential.

Despite essentialism being committed to the fallibility of knowledge of natural kinds, there is considerable convergence in the literature on the idea that, for biological kinds, the possession of the right kind of DNA is essential. Many authors directly or indirectly make the same assumption that the essences of biological categories are likely to be genetic (e.g., Ahn et al., 2001; Gelman & Wellman, 1991; Putnam, 1977; Strevens, 2000). As Haslam & Whelan (2008) put it, "All tigers and all things made of silver share deep similarities – genetic material in one case and an atomic structure in the other – and these essential similarities determine their identity" (p. 1297).

In spite of the evidence seeming to support essentialism, there is also a body of work presenting difficulties with it, either presenting data that appear recalcitrant from an essentialist point of view or counter-arguments to an essentialist interpretation. Malt (1994), for example, showed that categorization of instances of water is not fully explained by the proportion of H_2O people believe the instances contain: non-waters such as tea and saliva were judged to contain a greater proportion of H_2O than waters such as swamp water, and hard water (see also Markman & Stilwell, 2001). Braisby, Franks & Hampton (1996) considered the original argumentation developed by Kripke and Putnam, such as Putnam's famous case of twin-Earth (Putnam, 1975, 1977). Braisby, Franks & Hampton presented participants with scenarios that described discoveries concerning the putative essence of biological and chemical kinds. They showed that while in many cases participants agreed with the essentialist intuitions, in several critical test cases the participants tended to disagree with essentialism. Braisby (2004) found that people did not, in

general, defer to expert authorities in their categorization of natural kinds; many people were steadfast in maintaining their categorization judgments in spite of those of experts, and those people who switched their judgments to align with the views of experts, also showed a tendency to do so when presented with the views of non-experts. Even the oft cited work of Gelman & Wellman (1991) is disputed: in a series of studies designed to examine essentialist beliefs in children, Lloyde, Braisby & Brace, 2003, failed to replicate the findings of Gelman & Wellman, instead revealing a pattern of context-sensitivity in children's judgments.

There has also been much theoretical dispute over psychological essentialism. Strevens (2000) has argued that the evidence that has been cited in support of psychological essentialism can be just as well explained without reference to essentialist belief (see Ahn et al., 2001 for a rejoinder).

In spite of the conflicting views of the literature, there has been considerable recent interest in extending the scope of essentialism. Though the original essentialist arguments of Kripke and Putnam were based on natural kinds, it has since been argued that key features of natural kinds are possessed by other types of category, and that essentialism applies equally in these cases. For example, there has been much debate concerning the status of emotions as natural kinds (e.g., Charland, 2002; Panksepp, 2000). As Haslam & Whelan (2008) put it, "'psychological essentialism' does seem to be a fact of human cognition" (p. 1297).

Rothbart and Taylor (1992) argued that people typically treat social categories as though they are natural kinds. Others have developed this position by arguing that people beliefs about such categories are essentialist. Hegarty & Pratto (2001), investigating categories of sexual orientation, found that people's beliefs could be explained in terms of two negatively correlated dimensions: immutability and fundamentality. They also found that these dimensions were differently associated with prejudice: more favourable attitudes were linked to immutability while more prejudiced attitudes were related to fundamentality.

In a series of studies, Haslam and colleagues have also argued that people adopt essentialist beliefs with regard to social categories, and that these beliefs play a role in underpinning prejudice. Haslam, Rothschild & Ernst (2000) asked participants to rate 40 different categories on ten items, nine of which were designed to tap aspects of essentialist belief. A principal components analysis (PCA) suggested two underlying dimensions to people's beliefs, one corresponding to the notion of a natural kind, the other to the notion of reification or entitativity. Haslam, Rothschild & Ernst (2002) then employed eight of these nine items in what they called an Essentialist Beliefs Scale. Participants rated the three categories of 'black people', 'women', and 'gay men' on these eight items using a 1-9 scale. PCA yielded a two factor solution to the structure of their beliefs, similar to the two dimensions identified by Haslam et al. (2000). They also found a complex relation between these essentialist beliefs and prejudice, as measured by participants' responses to a number of scales relating to prejudice. Further analysis revealed that some natural kind items (discreteness) and some anti-essentialist beliefs (non-naturalness and mutability) were associated with anti-gay prejudice. No links were found between natural kind beliefs and prejudice towards black people and women.

Haslam & Levy (2006) adapted this method again, employing items from the Essentialist Beliefs Scale as well as items from Hegarty & Pratto (2001). They found evidence for a three dimensional structure to people's beliefs, with dimensions relating to immutability, discreteness, and cultural/historical universality. They also found that this structure explained people's beliefs about male and female homosexuality equally well.

While Haslam and colleagues have uncovered an important feature of people's beliefs, they appear not to have considered deference as a criterion for essentialism and do not explicitly acknowledge opposing explanations of seemingly essentialist beliefs. This may be unsurprising given that this body of work is largely correlational in nature, relying on questionnaires to assess people's general beliefs, and on factor analyses of their responses in order to identify possible underlying dimensions. As such, the studies do not investigate the microstructure of cognition and as such do not reveal whether people's categorization can be explained by psychological essentialism.

Specifically, these studies do not ask participants to engage in categorisation, but instead to express their beliefs about categorisation. While the latter are certainly important, and a rounded theory of categorisation should offer some account of these, it is also possible that such meta-cognitive beliefs may not accurately relate to people's behaviour. Indeed, the premise of deference, itself a hallmark of essentialist belief, is that people may revise their beliefs about category membership in the light of new information (from expert authorities). Thus, meta-cognitive beliefs about categorisation may be subject to revision; indeed, they may be entirely tentative. Even if they are firmly held, one or two carefully chosen examples of categorisation thought experiments may lead to revision of these beliefs. Thus, it is arguably of greater import to ask the question as to how people actually categorise instances relative to these social categories – only then may we determine whether categorisation is indeed essentialist.

Therefore the literature contains two lines of evidence concerning the essentialism or otherwise of i) people's categorization of natural kinds; and ii) people's beliefs about social categories. However, these ideas cannot currently be tied together. In particular, there is no evidence that people's categorization of social categories accords with psychological essentialism. We set out to explore the idea that social categories are essentialist. Rather than examine participants' general beliefs about categories, we adopted a cognitive approach of investigating what factors influence people's categorisation of exemplars into social categories. We focused on the categories of sexual orientation because of the findings of Haslam et al. (2002) who found a strong linkage between natural kind beliefs and

prejudice only for this particular social category. We also reasoned that this would be a familiar domain to our University-based participants, in part because there has been much speculation in the media as to a potential genetic basis for homosexuality. Lastly, to our knowledge, there has been no prior cognitive study of the categorisation of sexuality.

The experiment involved presenting a range of clear cases and borderlines of sexual categories. As in previous studies, borderlines were designed to pit apparently conflicting essential and superficial properties against one another – the key question being which affect categorization more. The influence of various factors on categorisation was examined. One factor – the presence or absence of a hypothetical gene marker for homosexuality – should, according to the form of genetic essentialism we examined, be relevant to categorisation, and would therefore influence people's categorisations. Other factors – sex and age, for example – should not be relevant to categorisation according to this genetic essentialism, since they are not candidates for a genetic essence nor are they caused by such an essence. By including clear cases and borderlines we sought to assess the whether essentialist beliefs were strong enough to alter the categorisation of clear cases, or only of borderlines. Finally, we also examined response times since even if an effect is too weak to alter categorization decisions, it may yet make those decisions more difficult and protracted.

Method

Design

The experiment adopted a fully within-subjects design with the factors Genetics (Gene marker, No marker), Sex (male, female), Age (in 20s, in 50s), Sexual interest (Same sex, Other sex), and Romantic interest (Same sex, Other sex).

Participants

97 undergraduate Psychology students volunteered to participate. 53 were taking part in an Open University residential school; 44 were from the University of Westminster, participating for partial course credit.

Materials

32 scenarios were constructed fully crossing all levels of the 5 within-subjects factors. These were Genetics (Gene marker, No marker), Sex (male, female), Age (in 20s, in 50s), Sexual interest (Same sex, Other sex), and Romantic interest (Same sex, Other sex). The scenario structure is as follows: "X is a [man/woman], in [his/her] [20s/50s]. [He/she] has had sexual relationships ONLY with [women/other men/men/other women] and had deep, loving romantic attachments ONLY to [women/other men/men/other women] and [has/does not have] the genetic marker for homosexuality."

Thus there were eight types of case (defined by Sex, Sexual interest and Romantic Interest), with four examples of each (corresponding to the four combinations of Age and Genetics). In Table 1, there are two clear cases of Homosexuality (Clear (Ho) – female and male, respectively), two clear cases of Heterosexuality (Clear(He) – female and male, respectively), two cases of Borderline 1 (where the scenario describes someone with heterosexual sexual interests, but homosexual romantic feelings) and two cases of Borderline 2 (defined by the opposite pattern).

Table 1. The Eight Types of Exemplar

	Object of Interest		
Sex	Sexual	Romantic	Exemplar Type
Female	Other sex	Same sex	Borderline 1
Male	Other sex	Same sex	
Female	Same sex	Other sex	Borderline 2
Male	Same sex	Other sex	
Female	Other sex	Other sex	Clear (He)
Male	Other sex	Other sex	
Female	Same sex	Same sex	Clear (Ho)
Male	Same sex	Same sex	

Procedure

The experiment was presented using the experiment generator program E-Prime (Schneider, Eschmann & Zuccolotto, 2002). Participants were first presented with instructions and an example scenario describing a putative individual. They were then asked to categorise the sexuality of the described individual by answering Yes or No to each of three independent categorisation questions: is the person described i) straight/heterosexual; ii) gay/homosexual; iii) bisexual? It is possible therefore for a participant to categorise an individual as belonging to all or none of these categories, or a combination of some and not others. Participants were then presented with the 32 experimental scenarios in random order, with the same three questions for each. Response times were recorded. They were also told to "assume for all of these scenarios that scientists have discovered what they claim is a genetic marker for homosexuality" and to come to a judgment on the basis only of the information given.

Results

Data were scored in terms of the number of Yes responses. For brevity, answers to the third categorization question (bisexual) are not reported here; their omission has no bearing on the following results. Data were analysed by a repeated measures ANOVA with Genetics (2), Sex (2), Age (2), Exemplar type (4), and Question (2) as within-subject factors. The inclusion of Question as a factor allowed a comparison of straight/heterosexual and gay/homosexual categorizations. Exemplar type has four levels: Borderline 1, Borderline 2, Clear (He), Clear (Ho) defined by the combinations of romantic interest and sexual interest. Where appropriate, Greenhouse-Geisser adjustments to the F statistics have been made.

The effect of Question was significant, with the proportion of Yes responses varying according to the

categorisation question: Straight/Heterosexual (mean = 0.34), Gay/Homosexual (mean = 0.43): $F(1,96) = 32.42$, $p < 0.001$, $\acute{\eta}_p^2 = .25$. Thus people considered it more likely that the exemplars described in the scenarios were members of the Gay/Homosexual category. This perhaps is to be expected given that half of the scenarios describe cases where a (gay) gene marker is present, and is suggestive that participants do not see the absence of a (gay) gene marker as a positive indicator of Heterosexuality. There was also an interaction between Exemplar type and Question: $F(1.88, 366.86) = 427.24$, $p < 0.001$, $\acute{\eta}_p^2 = .82$, as shown in Table 2.

Table 2. Responses by Question and Exemplar Type

Exemplar type	Heterosexual	Homosexual
Borderline 1	0.29	0.25
Borderline 2	0.09	0.49
Clear (He)	0.93	0.02
Clear (Ho)	0.05	0.96

Borderline 1 cases were equally likely to be considered members of the Gay/Homosexual and Straight/Heterosexual categories; by contrast, Borderline 2 cases were much more likely to be regarded as members of the Gay/Homosexual category (and hardly at all as members of the Straight/Heterosexual category). This is striking given the symmetry of the scenarios. Sexual interest in same sex categories seems to determine that someone cannot be in the Straight/Heterosexual category. However, the same degree of sexual interest in the opposite sex does not decisively mean that someone is not in the Gay/Homosexual category.

The presence of putative gene markers affected the way in which the categorisation questions were answered, with an interaction between Gene marker and Question, as shown in Table 3: $F(1,96) = 28.07$, $p < 0.001$, $\acute{\eta}_p^2 = .23$

Table 3. Responses by Gene marker and Question

Gene Marker	Heterosexual	Homosexual
Absent	0.36	0.40
Present	0.31	0.46

It is notable that even in the Absent cases, where there is no (gay) gene marker, participants are more likely to categorise the exemplars as belonging to the Gay/Homosexual category than the Straight/Heterosexual category – this despite the symmetrical construction of these scenarios in terms of the crossing of all other factors. Nevertheless, the interaction is as expected with the presence of a (gay) gene marker increasing the likelihood of exemplars being categorised as Gay/Homosexual and decreasing the likelihood for the Straight/Heterosexual category. However, this effect depends upon Exemplar type, as revealed by the interaction between Exemplar type, Gene marker and Question, as shown in Table 4: $F(2.74,263.44) = 4.74$, $p < 0.005$, $\acute{\eta}_p^2 = .05$.

The effect of the gene marker is most notable for Borderline 1, where its presence results in a fall in the likelihood of a Straight/Heterosexual categorisation and a larger increase in the likelihood of a Gay/Homosexual categorisation. By contrast, the corresponding changes for Borderline 2, whilst in the same direction, are more modest. Also of interest are the changes for the Clear (He) cases, where the presence of the marker leads to a reduction (from ceiling) in the likelihood of a Straight/Heterosexual categorisation and virtually no increase (from floor) in the likelihood of a Gay/Homosexual categorisation. The changes in the categorisation of the Clear (Ho) cases are even more modest, but arguably reflect the fact that categorisation as Gay/Homosexual is already at ceiling and cannot increase further, and that for Straight/Heterosexual is at floor and cannot decrease further. The asymmetry between the borderline cases, however, is not expected, and suggests that the presence of a gene marker has an effect that is mediated by other factors, such as the type of borderline (i.e., the nature of romantic and sexual interest).

Table 4. Responses by Exemplar type, Gene marker and Question

Exemplar type	Gene Marker	Heterosexual	Homosexual
Borderline 1	Absent	0.32	0.19
	Present	0.26	0.31
Borderline 2	Absent	0.10	0.44
	Present	0.07	0.53
Clear (He)	Absent	0.97	0.01
	Present	0.88	0.03
Clear (Ho)	Absent	0.05	0.95
	Present	0.04	0.97

No effect of Sex was predicted, largely because an essentialist point of view predicts an effect of genetically essential properties, or properties believed to be caused by such essential properties. There is no reason to expect an effect of Sex. However, Sex interacted with Question, as shown in Table 5: $F(1,96) = 15.76$, $p < 0.001$, $\acute{\eta}_p^2 = .14$.

Table 5. Responses by Sex and Question

Sex	Heterosexual	Homosexual
Female	0.35	0.41
Male	0.33	0.45

Males were more likely than females to be categorized as gay/homosexual, and less likely to be categorized as straight/heterosexual. There was a three-way interaction between Exemplar type, Sex and Question, as shown in Table 6: $F(2.59,248.21) = 10.82$, $p < 0.001$, $\acute{\eta}_p^2 = .10$.

Whereas the above general pattern holds for the Borderlines, for the Clear (He) case, males were less likely than females to be categorized as gay/homosexual, and more likely than females to be categorized as straight/heterosexual. These effects were independent of the sex of the participant, as revealed by a further analysis in

which sex of participant was entered as a between-subjects factor. There was no significant effect of sex of participant, nor any interactions involving this factor.

Table 6. Responses by Exemplar type, Sex and Question

Exemplar type	Sex	Heterosexual	Homosexual
Borderline 1	Female	0.34	0.23
	Male	0.24	0.27
Borderline 2	Female	0.10	0.43
	Male	0.08	0.55
Clear (He)	Female	0.91	0.04
	Male	0.94	0.01
Clear (Ho)	Female	0.04	0.95
	Male	0.05	0.97

The above analysis suggests that the influence of factors is at its greatest for the borderline cases, but that these are often in different directions. There are relatively modest effects if any for clear cases of category membership. A similar analysis to the above, restricted to the two types of borderline case, and ignoring clear cases, revealed the same effects and interactions as reported above, suggesting that the effects arise primarily because of the way in which borderlines are categorized.

Response time data were also analysed by a repeated measures ANOVA with Genetics (2), Age (2), Sex (2), Exemplar type (4), and Question (2) as within subject factors. Participant group was not entered as a between-subjects factor as initial analysis suggested no significant differences between the groups.

There was a significant effect of Question, with response times for Straight/Heterosexual far exceeding those for Gay/Homosexual: $F(1,94) = 28.70$, $p < 0.001$, $\acute{\eta}_p^2 = .23$; mean Straight/Heterosexual = 4641ms, Gay/Homosexual = 2988ms. There was an effect of Exemplar type, with the response times for borderlines exceeding those of clear cases; $F(2.17,204.23) = 11.85$, $p < 0.001$ $\acute{\eta}_p^2 = .11$; Borderline 1 = 4596ms, Borderline 2 = 4379ms, Clear (He) = 3383ms, Clear (Ho) = 2903ms. This is a characteristic pattern of categorisation response times (cf. Rips, Shoben & Smith, 1973) suggesting that the Borderline 1 and 2 are genuinely borderline members of the categories. This effect interacted with Question, as shown in Table 7: $F(2.01,188.82) = 2.98$, $p = 0.05$, $\acute{\eta}_p^2 = .03$.

Table 7. RTs (msec) by Exemplar type and Question

Exemplar type	Heterosexual	Homosexual
Borderline 1	5190	4002
Borderline 2	5428	3330
Clear (He)	4496	2270
Clear (Ho)	3453	2352

The response time data confirm the status of the borderlines for the Gay/Homosexual category and Straight/Heterosexual category, but also suggest that within the latter, the Clear (He) case is not so easy to categorise as the Clear (Ho) case. Lastly, there was an interaction between Gene marker and Example, as shown in Table 8: $F(1.85,173.70) = 8.42$, $p < 0.001$, $\acute{\eta}_p^2 = .08$. The presence of the gene marker speeds categorisation of the Clear (Ho) case and Borderline 1, but slows categorisation of the Clear (He) case, and has little impact on the Borderline 2 case.

Table 8. RTs (msec) by Exemplar types and Gene marker

Example	Gene Marker	Response Time
Borderline 1	Absent	5594
Borderline 1	Present	3597
Borderline 2	Absent	4425
Borderline 2	Present	4332
Clear (He)	Absent	2926
Clear (He)	Present	3840
Clear (Ho)	Absent	3415
Clear (Ho)	Present	2390

These data confirm the pattern of categorization responses, in that Borderlines 1 and 2 were regarded by participants as genuine borderlines but are subject to different influences, with genetic influences being modest for Borderline 2 and more pronounced for Borderline 1.

Discussion

Overall these data provide confirmation that genetic factors can influence category judgments for sexual orientation categories. In particular, the presence or absence of a putative 'gay gene' marker, has the potential to alter the way in which borderline cases may be categorized. However, the extent of this influence is modest indeed, and these data do not point to genetic factors having over-riding importance or centrality in categorizing sexual orientations.

In particular, though the presence of a genetic marker alters categorization responses, borderline cases continue to be judged as borderline, and clear cases remain clear. The contrast with the oft-cited examples due to Keil and Rips is illuminating. They found that appearance and behavioural factors could be overturned by deeper, more essential properties when categorizing biological kinds – a bird was still categorized as a bird despite being transformed to appear like an insect. However, with sexual orientation categories our findings are opposed – the presence of a genetic marker does not overturn the influence of the behavioural factors of romantic and sexual interest.

Moreover, the influence of genetic factors is not uniform. Presence of a genetic marker has the greatest influence on Borderline 1, cases of individuals displaying heterosexual sexual interest, but homosexual romantic interest. Thus, the influence on categorization depends on the interplay of behavioural and genetic factors, not genetic factors alone.

In addition to the modest influence of genetic factors, there are other findings of note. First, our results reveal an asymmetry between heterosexual and homosexual categories. The heterosexual category appears to be more

narrowly defined. Whereas same-sex sexual interest leads to a reasonable proportion of gay/homosexual categorizations, other-sex sexual interest leads to a much lower proportion of straight/heterosexual categorizations. Thus, whilst same-sex sexual interest may be judged as incompatible with heterosexuality, in a way that same-sex romantic interest is not, other-sex sexual interest is not judged as incompatible with homosexuality.

Second, these results reveal an asymmetry in the way that males and females are categorized. Males are seen as less likely than females to be straight/heterosexual, and more likely than females to be gay/homosexual, this being especially true of borderlines. These effects are also modest, with similar effect sizes to those of genetic factors.

In conclusion, our findings show that, in categorizations, behavioural properties concerning romantic and sexual interest are more central and defining than putative genetic properties, with sex and genetics only gently modulating the influence of these behavioural properties. This pattern is at odds with that seen in the case of biological natural kinds, and that has been taken as evidence for psychological essentialism. We therefore suggest that, even if people possess genetically essentialist meta-beliefs about sexual orientation, their categorizations are not genetically essentialist. Instead, their categorizations are consistent with similarity-based views of concepts, wherein categorization is the product of matching with a multi-dimensional array of different properties.

Acknowledgements

We are very grateful to Maria Flynn for her help in collecting the data reported here.

References

Ahn, W. K., Kalish, C., Gelman, S. A., Medin, D. L., Luhmann, C., Atran, S., et al. (2001). Why essences are essential in the psychology of concepts. *Cognition, 82(1)*, 59-69.

Barton, M. E., & Komatsu, L. K. (1989). Defining Features of Natural Kinds and Artifacts. *Journal of Psycholinguistic Research, 18(5)*, 433-447.

Braisby, N. R. (2004). Deference and Essentialism in the Categorization of Chemical Kinds. In, Alterman R., & Kirsch, D. (Eds.), *Proceedings of the Twenty-Fifth Annual Conference of the Cognitive Science Society*. Lawrence Erlbaum Associates, Inc.: Mahwah, NJ.

Braisby, N., Franks, B., & Hampton, J. (1996). Essentialism, word use, and concepts. *Cognition, 59*, 247-274.

Charland, L. C. (2002). The Natural Kind Status of Emotion. *The British Journal for the Philosophy of Science, 53(4)*, 511-537.

Gelman, S. A. (2004). Psychological essentialism in children. *Trends in cognitive sciences, 8(9)*, 404-9.

Gelman, S. A., & Wellman, H. M. (1991). Insides and essences: Early understandings of the nonobvious. *Cognition, 38*, 213-244.

Haslam, N., Rothschild, L., & Ernst, D. (2000). Essentialist beliefs about social categories. *British Journal of Social Psychology, 39*, 113–127.

Haslam, N., Rothschild, L., & Ernst, D. (2002). Are essentialist beliefs associated with prejudice? *British Journal of Social Psychology, 41*, 87–100.

Haslam, N., & Levy, S. (2006). Essentialist beliefs about homosexuality: Structure and implications for prejudice. *Personality and Social Psychology Bulletin*, *32*, 471–485.

Haslam, N. & Whelan, J. (2008). Human natures: Psychological essentialism in thinking about differences between people. *Social and Personality Psychology Compass, 2/3*, 1297-1312.

Hegarty, P. & Pratto, F. (2001). Sexual orientation beliefs: Their relationship to antigay attitudes and biological determinist arguments. *Journal of Homosexuality, 41*, 121-135.

Keil, F. C. (1989). *Concepts, kinds, and cognitive development*. Cambridge, MA: MIT Press.

Kripke, S. (1980). Naming and necessity . Cambridge, MA: Harvard University Press.

Lloyde, J., Braisby, N. & Brace, N (2003). Seeds of Doubt: Are Children Taught to be Essentialists? In: F. Schmalhofer, R.M. Young & G. Katz (Eds.), *Proceedings of EuroCogSci03*. Mahwah, NJ: Erlbaum.

Malt, B. C. (1994). Water is not H_2O. *Cognitive Psychology, 27*, 41-70.

Markman, A.B., & Stilwell, C.H. (2001). Role-governed categories. *Journal of Experimental and Theoretical Artificial Intelligence, 13(4)*, 329-358.

Medin, D. L., & Ortony, A. (1989). Psychological essentialism. In S. Vosniadou & A. Ortony (Eds.), *Similarity and analogical reasoning*. New York: Cambridge University Press.

Panksepp, J. (2002). Emotions as natural kinds within the brain. In M. Lewis and J. M. Haviland-Jones (Eds.), *Handbook of Emotions, 2nd edn*. New York: Guildford Press.

Putnam, H. (1975). The meaning of 'meaning.' In H. Putnam, *Mind, language, and reality: Philosophical papers, vol. 2*. Cambridge: Cambridge University Press.

Putnam, H. (1977). Meaning and reference. In S. P. Schwartz (Ed.), *Naming, Necessity and Natural Kinds*. Ithaca: Cornell University Press.

Rips, L. J. (1989). Similarity, typicality, and categorization. In S. Vosniadou & A. Ortony (Eds.), *Similarity and analogical reasoning*. New York: Cambridge University Press.

Rothbart, M., & Taylor, M. (1992). Category labels and social reality: Do we view social categories as natural kinds? In G. R. Semin & K. Fiedler (Eds.), *Language and Social Cognition* (pp. 11–36). London, UK: Sage.

Schneider, W., Eschmann, A., & Zuccolotto, A. (2002). *E-Prime user's guide*. Pittsburgh, PA: Psychology Software Tools, Inc.

Strevens, M. (2000). The essentialist aspect of naive theories. *Cognition, 74(2)*, 149-175.