

## Original Article

Evidence that accent is a dedicated dimension of social categorization, not a byproduct of coalitional categorization<sup>☆</sup>David Pietraszewski<sup>a,\*</sup>, Alex Schwartz<sup>b</sup><sup>a</sup> University of California, Santa Barbara & Center for Evolutionary Psychology, CA, USA<sup>b</sup> University of California, Santa Barbara, CA, USA

## ARTICLE INFO

## Article history:

Initial receipt 19 June 2013

Final revision received 26 September 2013

## Keywords:

Accent

Coalitional psychology

Race

Social categories

Cognition

## ABSTRACT

The present studies explore whether accent behaves like a byproduct of coalitional categorization, or like a dedicated dimension of social categorization. An experimental manipulation which has previously been shown to reduce coalitional byproducts, such as race, but not affect dedicated dimensions, such as sex and age, was used to test between these two possibilities. Accent behaved like a dedicated dimension, remaining unaffected by the same coalitional manipulation that reduces categorization by race. A second study verified that the exact same coalitional manipulation used with accent in fact reduces categorization by race. These results suggest that accent is not a byproduct of coalitional psychology, unlike race. Implications for the differing proximate psychologies underlying race and accent, and for the construct group, are discussed.

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## 1. Introduction

Despite a large literature on attitudes toward language styles and repertoires (e.g., Giles & Powesland, 1975; Robinson & Giles, 2001; Gluszek & Dovidio, 2010) and recent developmental work (Hirschfeld & Gelman, 1997; Kinzler, Dupoux, & Spelke, 2007; Shutts, Kinzler, McKee, & Spelke, 2009), remarkably little is known about the relationship between social categorization and language differences. Previous studies (Pietraszewski & Schwartz, this volume) establish that accent differences – both native versus non-native and also two different non-native accents – are dimensions of social categorization. These studies were motivated by the idea that linguistic differences, such as accent, would have been a recurrent feature of ancestral environments and would be beneficial to track. Therefore the human mind may be designed to attend to language differences. Four alternative hypotheses as to why categorization by accent may occur were also tested against: (i) categorization by obvious sound differences, (ii) categorization by low-level sound differences, (iii) categorization by familiarity, and (iv) categorization by ease-of-processing.

In the current studies we test against the most viable remaining alternative hypothesis we can think of—the operation of coalitional psychology. Perhaps categorization by accent does not reflect design for attending to accent differences per se, but is instead a byproduct of coalitional psychology. On this account coalitional psychology would

pick up on accent differences over the course of ontogeny, in much the same way it picks up other arbitrary features that happen to correlate with patterns of social interaction and affiliation, leading to spontaneous and implicit categorization by those features (Kurzban, Tooby, & Cosmides, 2001; Cosmides, Tooby, & Kurzban, 2003; Tooby & Cosmides, 2010). Categorization by race, for instance, was once thought to be the result of dedicated design (e.g., Messick & Mackie, 1989; Hamilton, Stroessner, & Driscoll, 1994), but more recently has been shown to reflect the operation of coalitional psychology in just this way (Cosmides et al., 2003; Kurzban et al., 2001; Pietraszewski, 2009; see also Biernat & Vescio, 1993; Cabecinhas & Amâncio, 1999; and Maddox & Chase, 2004 for complimentary evidence). There are good reasons to think race is not the only output of this coalition-tracking capacity—ways of dressing, talking, and behaving can all indicate and mark social alliance and patterns of interaction, cooperation, and competition (Cosmides et al., 2003). If race is an output of this coalition-tracking competence, might not the same be true of accent (e.g., Gudykunst & Ting-Toomey, 1990)? If accent categorization is in fact shown to be a byproduct of coalitional psychology, then this would seriously undermine the proposal that the mind is designed to attend to accent differences.

To test this alternative hypotheses, we used a previously-established experimental manipulation to diagnose if a particular social dimension is a byproduct of coalitional psychology (Kurzban et al., 2001; Cosmides et al., 2003; Pietraszewski, 2009). This involves presenting the social category in question within a coalitional context, such that the category is shown to be no longer predictive of who is allied with whom (e.g., there are an equal number of each category type – e.g., white and black, male and female, old and young, etc. – on each team). Because of the evolved design of coalitional psychology, categories that are coalitional byproducts are reduced by such

<sup>☆</sup> We wish to thank Annie E. Wertz for extensive comments on previous drafts of this paper.

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manipulations, whereas categories that are dedicated dimensions are relatively unaffected (these include age and sex; Cosmides et al., 2003; Kurzban et al., 2001; Pietraszewski, 2009; see also, Lieberman, Oum, & Kurzban, 2008; Lorenzi-Cioldi, Eagly, & Stewart, 1995; Migdal, Hewstone, & Mullen, 1998; Van Twyver, & Van Knippenberg, 1998). This reduction phenomenon does not reflect a constraint of coalitional psychology (i.e., that it can only keep track of one coalitional cue at a time), but rather reflects an important design feature of coalitional psychology: the ability to track relevant coalitional cues, activate currently-relevant and predictive cues, and inhibit currently non-diagnostic cues (Tooby & Cosmides, 2010). In other words, coalitional psychology continually monitors and updates cue diagnosticity, and when better coalitional cues are provided, less accurate coalitional cues are inhibited (Cosmides et al., 2003; Pietraszewski, 2009).

Applying this test to accent categorization is straightforward. Accent is crossed with strong cues of cross-cutting coalition membership, such that accent is no longer predictive of who is affiliated with whom. If accent is a byproduct of coalitional psychology, then categorization by accent will be reduced. If accent is a dedicated dimension, then categorization will not be reduced. Thus, the results of this experimental manipulation will arbitrate between the two remaining possibilities for the psychology underlying accent: that it is (i) the result a dedicated cognitive system, like sex and age, or (ii) a byproduct of coalitional psychology, like race.

### 1.1. Reasons to expect accent is a dedicated dimension, not a byproduct of coalitional psychology

Prior to conducting our studies, we hypothesized that accent categorization would not be a byproduct of coalitional psychology because accent would have been a recurrent feature of ancestral environments, unlike race (Pietraszewski & Schwartz, 2006, 2007). In modern times, both accent and race appear to mark social origins. Both correlate with socioeconomic status, social class, and area of residence, and both seem to be instances of quasi-essentialized groups (Robinson & Giles, 2001). However, from an evolutionary perspective, accent and race are likely fundamentally different categories in the mind.

The physical features that make up the experienced category “race” would not have been a recurrent feature of the world over evolutionary time. This is because the scale of ancestral travel would have not have exceeded the geographic scale of the features that currently constitute race (physically-superficial adaptations to local climates and environments; Cosmides et al., 2003; Graves, 2001; Manning, Bundred, & Mather, 2004). Ancestrally, people traveled in relatively small numbers over relatively short distances (Lee, 1972; Leacock & Lee, 1982; Kelly, 1995; Chapais, 2008, 2010). Only with rapid intercontinental transportation on a mass scale can large populations of previously isolated people with different recent ancestries come in contact with one another (Cosmides et al., 2003). Because race was not likely an aspect of ancestral environments, it is unlikely that categorization of people according to their race is a consequence of dedicated cognitive systems for that purpose. Rather, categorization by race is a phenomenon driven by other evolved social cognitive processes, including coalitional psychology.

In contrast, linguistic variation – including accent variation – was likely a recurrent aspect of ancestral environments (Chapais, 2010; Nettle, 1999; Pietraszewski & Schwartz, this volume). This is because exposure to linguistic variation does not depend on modern transportation technology (Kelly, 1983). Indeed, populations which travel on foot routinely come in contact with others who speak differently (e.g., Bower, 2010; Hill, 1978; Kelly, 1995; Lee, 1972). Further, because language is acquired from the local social environment, and the acquisition period ends roughly at puberty (likely to be true since the advent of language; see Komarova & Nowak, 2001), variance in language would be encountered whenever the scale of adults’ social interaction is greater than that of children (Kirby,

1998; Nettle, 1999; Pietraszewski & Schwartz, this volume). The generality and recurrence of this pattern of life-stage movements are well-documented, both in hunter-gatherer populations (e.g., Leacock & Lee, 1982; Kelly, 1995), and in estimates of ancestral populations (e.g., Chapais, 2008, 2010). Thus, converging lines of evidence suggest that exposure to accent differences was likely a recurrent feature of human ancestral environments.

In addition to being ancestrally-recurrent, accents would also provide uniquely-informative social information. The more two people share linguistic features, the more likely they share relatively common early social origins (i.e., that they grew up in, or are from, the same language community; Chapais, 2010; see Currie & Mace, 2012). Knowing this information would support valuable inferences and expectations (Moya, 2013; Pietraszewski & Schwartz, this volume), and given the speed, fidelity, and frequency of acoustic communication, such language-based assessments would be relatively easy and inexpensive ways of mapping important parts of the local social world.

Because accents were likely recurrent features of ancestral environments, and because they would be useful to track, it is (i) likely that categorization of people according to their accents is a consequence of dedicated cognitive systems for that purpose, and (ii) unlikely that categorization by accent is simply a byproduct of coalitional psychology, like race. In the context of the current studies, accent is therefore predicted to behave like a dedicated dimension of categorization, like sex and age, and be unaffected when shown to be no longer predictive of coalitional relationships.

### 1.2. Overview of the current studies

Two studies were conducted. Each employed the same memory confusion paradigm used in previous studies to demonstrate (i) that categorization by race is a byproduct of coalitional psychology (Kurzban et al., 2001; Cosmides et al., 2003; Pietraszewski, 2009) and (ii) that categorization by accent occurs in a non-coalitional context and cannot be accounted for by categorization by general sound differences, low level sound differences, differences in familiarity, or differences in ease-of-processing (Pietraszewski & Schwartz, this volume). Both studies also featured a coalitional context that has been previously demonstrated to reduce categorization by race and leave categorization by sex unaffected (Pietraszewski, 2009; Pietraszewski, Cosmides, & Tooby, under review). Study 1 featured the same accent distinctions used in Pietraszewski and Schwartz (this volume), now placed within a coalitional context. This allowed us to examine if accent categorization would be reduced compared to the levels found in the non-coalitional, baseline context of Pietraszewski and Schwartz (this volume) via direct comparison. In Study 2, we verified that these exact coalitional stimuli would in fact reduce categorization by race. Consequently, accent and race were placed within the exact same coalitional experimental context, such that how each was affected could also be directly compared.

## 2. Study 1: Accent crossed with coalition membership

In Study 1 accent was crossed coalitional membership. If accent is a byproduct of coalitional psychology, then it will behave like race and decrease dramatically in this context. In contrast, if accent is a dedicated dimension then it will behave like sex and not be affected.

Coalitional stimuli from a previous set of memory confusion paradigm studies involving race and sex were used to test between these hypotheses (Pietraszewski, 2009; Pietraszewski, Cosmides, & Tooby, under review). These studies, which involved over 1200 participants, extensively tested the hypothesis that categorization by race would be reduced when no longer predictive of coalition membership, and that categorization by sex would remain unaffected.

In order to provide the strongest test of the prediction that categorization by accent will not be reduced by coalition information,

the current studies used the condition from those previous studies which had most strongly reduced categorization by race. This involved presenting both visual and verbal cues of team membership, such that each team wore a different color and the content of each person's statement allowed one to infer that person's team membership. Providing coalition information in both photos and statements in the memory confusion paradigm, however, can lead to an overestimation of the magnitude of coalitional categorization, meaning that categorization by coalition will be somewhat inflated in these studies (increasing the  $r$  effect size by roughly .20; Pietraszewski, 2009). This was not a concern in the current studies because we were interested in employing the most stringent test of our hypothesis, rather than measuring categorization by coalition without inflation (previous studies have already established the levels of coalitional categorization for these exact stimuli, both with and without inflation, and have established that coalitional inflation has no effect on the orthogonal cross-cutting category). This methodology furthermore allowed us to present both coalition and accent information simultaneously and orthogonally, without the accent measurement issues that occurred in Rakić, Steffans, and Mummendey (2011; see Pietraszewski & Schwartz, this volume).

If categorization by accent is not reduced by these cues of cross-cutting coalition membership, this will support the hypothesis that accent is a dedicated dimension of social categorization, and not a product of coalitional psychology (like sex). In contrast, if categorization by accent is reduced, this will suggest that categorization by accent is a byproduct of coalitional psychology (like race).

### 2.1. Method

The present studies followed the same general methodology of Pietraszewski and Schwartz (this volume), measuring categorization via the memory confusion paradigm. The same voices and faces from Pietraszewski and Schwartz, Study 1 (this volume), were also used. However, unlike the random set of statements in those studies, in the current studies, targets' statements involved a conversation between two different charity groups, each describing the work they do to achieve their different goals. This charity group membership provided the coalitional information. Targets were evenly divided across the two different groups. One group wore red shirts, and the other wore yellow. The content of each statement marked to which group the person belonged. Photos and statements were used for both the initial presentation phase and the recall phase. (These exact stimuli have been used in previous memory confusion studies to decrease categorization by race and to not affect categorization by sex; Pietraszewski, 2009; see Online Supplementary Materials, available on the journal's website at [www.ehbonline.org](http://www.ehbonline.org), for statements).

Accent was crossed with charity group membership, such that in each group were two English-accented and two US-accented members. During the initial presentation phase, the conversation alternated back and forth between the two groups. Each target made three statements, so each of the two groups made a total of 12 statements, half of which came from English speakers and half from US speakers. During the recall phase, statements were presented acoustically in random order. Participants indicated who they believed said each statement.

Measuring categorization by accent involved collapsing across the coalitional group dimension ((same accent/same coalition + same accent/different coalition) – (different accent/same coalition + different accent/different coalition)). Measuring categorization by coalition involved collapsing across the accent dimension ((same accent/same coalition + different accent/same coalition) – (same accent/different coalition + different accent/different coalition)). Because the current studies featured two orthogonal dimensions, rather than only one dimension as in Pietraszewski and Schwartz (this volume), the formula for correcting for baseline probabilities was

changed. (With two dimensions present (e.g., accent and coalition) in the stimuli, only one target represents a same accent and same coalition attribution error at recall—the second target is the correct speaker. All other error types are represented by two targets at recall—two targets represent a same accent/different coalition error, two represent a different accent/same coalition error, and two represent a different accent/different coalition error. Because a same accent/same coalition attribution error is half as likely as the other three kinds of errors, these other three error types are multiplied by .5. This correction is standard in the paradigm when two orthogonal dimensions are used.) Because of this, the within and between dimension error numbers in the present studies are not comparable to those in Pietraszewski and Schwartz (this volume). However, the error differences that collapse across the dimensions (i.e., same accent – different accent) are comparable, as are the effect sizes.

Because the same accents, faces, voices, and presentation parameters (e.g., statement lengths) were used in both studies, the magnitude of accent categorization in the current study could be directly compared to the level found in Study 1 of Pietraszewski and Schwartz (this volume).

### 2.2. Participants

Thirty-two students from the University of California, Santa Barbara, USA (11 male, 21 female; mean age  $\pm$  SD = 19.06  $\pm$  1.54 years) participated for course credit.

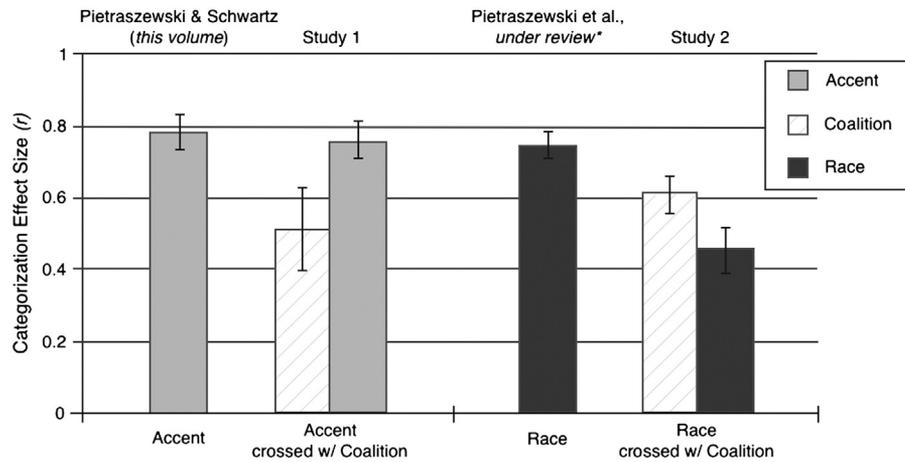
### 2.3. Results

Participants made 12.44 attribution errors on average (SD = 5.20). Of these, participants made more same-team errors ( $M \pm SD = 5.25 \pm 2.90$ ) than different-team errors ( $M \pm SD = 2.83 \pm 2.26$ ),  $t_{31} = 3.29$ ,  $p = .003$ ,  $r = .51$  (see 'Study 1' in Fig. 1) indicating that participants spontaneously represented the coalitional affiliation of the targets to a substantial degree. This level of categorization by team is very similar to those found in previous studies (Pietraszewski, 2009; Pietraszewski, Cosmides, & Tooby, under review). Participants furthermore made more same-accent errors ( $M \pm SD = 5.88 \pm 2.46$ ) than different-accent errors ( $M \pm SD = 2.20 \pm 1.96$ ),  $t_{31} = 6.52$ ,  $p < .001$ ,  $r = .76$ , demonstrating that participants categorized by accent even when accent was crossed with coalition membership.

The critical question is whether categorization by accent is reduced when made no longer predictive of coalition membership. Study 1 of Pietraszewski and Schwartz (this volume) provides a baseline measurement of accent categorization in the absence of a cross-cutting coalition, to which the current levels of categorization can be compared. This direct comparison reveals that that categorization by accent in the present coalitional context (categorization error difference  $M \pm SD = 3.67 \pm 3.18$ ) was in fact no different from the level of categorization by accent found in the non-coalitional context of Pietraszewski and Schwartz (this volume) (error difference  $M \pm SD = 5.17 \pm 4.27$ ),  $t_{60} = -1.57$ ,  $p = .122$ . The strongest possible coalitional manipulation – a manipulation which had dramatically reduced categorization by race in previous studies – had no impact on categorization by accent. These results are precisely consistent with the hypothesis that accent is a dedicated dimension of social categorization, and incompatible with the hypothesis that accent categorization is a byproduct of coalitional psychology.

### 3. Study 2: Race crossed with coalition membership

To ensure that these exact stimuli will in fact reduce categorization by race, the same coalitional stimuli of Study 1 were presented, but now crossed with race, rather than accent. Previous studies (Pietraszewski, 2009; Pietraszewski, Cosmides, & Tooby, under review) have used these same coalitional stimuli, but never with



**Fig. 1.** Categorization effect sizes for each study, the degree to which participants made more within-category attribution errors than between-category attribution errors. X axis indicates the stimulus distinction(s) used in each study. Leftmost column shows the magnitude of accent categorization found in the preceding studies in the absence of a cross-cutting coalition. The third column – denoted with an asterisk – is from a separate project conducted on the same participant population, and shows the magnitude of racial categorization found in the absence of a cross-cutting coalition (Pietraszewski, 2009; Pietraszewski, Cosmides, & Tooby, under review); this column is provided for the reader's convenience. Error bars:  $\pm 1$  S.E.

the complete speakers' statements during both the encoding and recall portions of the paradigm. Conducting the present study with full sentences at recall allowed us to directly compare accent and race when exposed to the exact same experimental context, all within the same study.

Previous results suggest categorization by race should be substantially reduced by these cues of cross-cutting coalition membership, compared to previously-found baseline levels (which tend to range around an effect size of  $r = .70$  for male targets, Pietraszewski, 2009; Pietraszewski, Cosmides, & Tooby, under review; Pietraszewski, Curry, Petersen, Cosmides, & Tooby, under review).

### 3.1. Method

Study 2 presented the exact same coalitional information (i.e., two charity groups) as presented in Study 1, but now crossed with race instead of accent. As in the accent studies, targets were all male. Four targets were white, four were black, and race was crossed with coalition membership such that each charity group had equal numbers of black and white members. Following the procedure of previous race and coalition studies, statements were presented in text, rather than aurally. All other presentation parameters were the same as in Study 1.

### 3.2. Participants

One hundred students from the University of California, Santa Barbara, USA (33 male, 67 female; mean age  $\pm$  SD =  $18.24 \pm .85$ ) participated for course credit.

### 3.3. Results

Participants made 17.36 attribution errors on average (SD = 3.42). Of these, participants made more same-team errors ( $M \pm SD = 7.11 \pm 2.38$ ) than different-team errors ( $M \pm SD = 3.60 \pm 2.50$ ),  $t_{99} = 7.79$ ,  $p < .001$ ,  $r = .62$  (see 'Study 2' in Fig. 1); participants again spontaneously categorized targets by their coalitional affiliation to a substantial degree. Participants also made more same-race errors ( $M \pm SD = 6.09 \pm 1.98$ ) than different-race errors ( $M \pm SD = 4.62 \pm 1.35$ ),  $t_{99} = 5.18$ ,  $p < .001$ ,  $r = .46$ , indicating that they also categorized by race. This level of categorization by race is nearly identical to the levels of categorization by race found in previous

studies when race is crossed with coalition membership, and is significantly lower than baseline levels of categorization by race found in the non-coalitional context directly analogous to the accent baseline condition (a non-coalitional context in which targets are all wearing gray shirts, such that are no alternate visual markers; Pietraszewski 2009; Pietraszewski et al., under review),  $t_{169} = 3.27$ ,  $p = .001$ ,  $r = .24$ . This result verifies that these exact coalitional stimuli do in fact reduce categorization by race (see Fig. 1).

## 4. General discussion

Whether accent categorization is a byproduct of coalitional categorization or is instead a dedicated dimension was tested. Accent differences were presented within a coalitional context which had been previously shown to strongly reduce categorization by race, but leave categorization by sex unaffected. When placed within this context, categorization by accent was not reduced at all. In fact, compared to a context in which accent was the only dimension within the stimuli (Pietraszewski & Schwartz, this volume; Study 1), there was not even a statistically significant change in accent categorization, let alone any significant decrease (c.f. categorization by sex in Kurzban et al., 2001). Accent therefore behaved like a dedicated dimension, eliciting the same high level of categorization when crossed with coalition membership as when in a non-coalitional context. Study 2 furthermore provided a verification that these exact coalitional stimuli do in fact reduce categorization by race. Thus, the exact same manipulation had a reductive effect on race and no effect on accent. This is despite both race and accent being present at all times in the stimuli, both during the initial presentation phase of the paradigm, and also during the surprise recall phase. This lack of reduction in categorization by accent despite strong, cross-cutting cues to coalition membership strongly suggests that accent categorization is not a byproduct of coalitional psychology (like race), but is instead a dedicated dimension of social categorization (like sex).

### 4.1. Implications for accent

The present studies and those preceding [preceding manuscript] tested the hypothesis that accent categorization is the result of dedicated cognitive systems, against five of the most plausible alternate hypotheses we could generate. These were: (i) categorization by more general sound differences, (ii) low level sound differences, (iii)

differences in familiarity, (iv) differences in ease-of-processing, and (v) categorization as a byproduct of coalitional psychology. Every result unambiguously supported the dedicated cognitive system hypotheses and falsified the alternative hypothesis. These results offer substantial support to the notion that accent categorization is the result of natural selection building systems for this purpose. In fact, the present accent studies are one of the most stringently-controlled tests of any social categorization effect in the literature (as the vast majority of studies in this area contain no control conditions, or tests of alternative hypotheses; although for exemplary exceptions see: Brewer, Weber, & Carini, 1995; Delton et al., 2012; Hirschfeld & Gelman, 1997; Kurzban et al., 2001; Lieberman et al., 2008; Stangor, Lynch, Duan, & Glass, 1992). Therefore, at least until shown otherwise, accent belongs on the list of dedicated dimensions of person perception and categorization.

#### 4.2. Accent and coalitional representations

In addition to arbitrating between different hypotheses for the proximate psychology underlying accent categorization, the current results further demonstrate that the mind has no trouble simultaneously representing both the coalitional affiliations and accent differences among people, even when the two are entirely orthogonal to one another. In fact, there are good theoretical reasons to think that accent differences would need to be represented independent of coalitional/alliance relationships. This is because both accent and coalitions were present over evolutionary time, and each picks out a different aspect of the world.

Accent picks out the early social history of people—the language community in which someone's language repertoire crystallized. Coalitions mark who is cooperating to achieve a common goal, who is allied with whom, and who is differentially affiliating. The relationship between accent and coalition over the statistical average of evolutionary time predicts their computational relationship: Alliances are fast-paced and volatile; new alliances can be initiated, others dissolved, membership can shrink, expand, or change, and any one person can belong to multiple, overlapping, non-mutually exclusive relationships (Harcourt & de Waal, 1992; Tooby & Cosmides, 2010). Linguistic shifts, in contrast, involve relatively slow and sequential intergenerational or residency shifts (Bower, 2010). Moreover, alliance dynamics occur at every social scale—siblings can join up against a third sibling, neighbors can be good friends or bitter rivals, and far away groups can represent a serious threat or an attractive partnership (Bower, 2010; Chapais, 2010). Linguistic differences, in contrast, occur over scales of frequent to semi-frequent interaction as a function of relative proximity, accessibility, and long-term social interaction (Nettle, 1999; Currie & Mace, 2012).

Because of these differences, coalitional alliances and accent boundaries would have recurrently cross-cut each other over evolutionary time, such that coalitional alliances occurred within and across accent boundaries. In other words, linguistic markers of origins – even if they do facilitate cooperation and coordination (Nettle, 1999) – would not always map onto social alliances (see Hill, 1978 for a review of the varied relationships between language differences and alliance across the ethnographic record). In order for the mind to unconfound accent from coalitional alliance (for example, to consider that someone who shares your accent can still hurt you, or that someone with a different accent could be an ally), accent and coalition must be underwritten by distinct psychological systems and represented as distinct entities. Moreover, because accents can mark coalitional boundaries (Hill, 1978), the systems underwriting each also need to be able to 'talk' to one another (it would be a poor a design to not be able to consider that "people from language community X tend to be violent towards me" or that "language community Y is unknown and is thus treated as an antagonist by default"). This means systems for keeping track of

coalitional alliances would need to operate independently of systems for attending to and categorizing by accent differences; the exact pattern of results found in the present studies.

It is important to note that is a computational requirement, and does not depend on the actuarial relationship between accent and coalitional relationships over evolutionary time. Even if accent was actuarially correlated with coalitional relationships, such that accents are probabilistically-tagged with coalitional or coordination expectations as a default in the mind (e.g., Nettle, 1999), indices of the two – accent and coalition membership – must remain distinct if proximate psychology systems are to attend to accent information uncoupled from coalitional relationships. Otherwise, it would be impossible to represent the full range of possible correlations between linguistic and coalitional relationships (Hill, 1978; for recent experimental economic evidence supporting this view see also Jensen, Petersen, Høgh-Olesen, & Ejstrup, under review). That is, accent indices need the capacity to become both more and less diagnostic of coalitional status upon receipt of information from the local social environment. This same conclusion is also a corollary of a proposal by Nettle (1999); that language differentiation is driven by long-term use of language as basis of cooperating and trusting others. Such a scenario requires that signalers and receivers are able to monitor and update the shifting relationships between linguistic repertoires and actual patterns of cooperation and trust.

Finally, although in the present studies accent was the basis of strong categorization even when not coalitionally-relevant, this result does not preclude that there may be certain default social (including coordination or coalitional) expectations attached to accents. However, if these default expectations do exist, the present evidence suggests that these can be overridden when better information about alliance structure is provided (as demonstrated by the novel coalitional dimension being attended to at similar levels as in previous studies; see Jensen et al., under review, for converging evidence). Future research using other dependent measures than categorization will be able to more fully map out the coalitional structure of accent representations, and how accent and coalition interact over ontogeny in response to cues from the local environment (e.g., Cohen & Haun, 2013).

In sum, both the present empirical findings and considerations of recurrent computational requirements over evolutionary time suggest that (i) accent and coalition are interestingly distinct categories in the mind, and (ii) are underwritten by different proximate psychological systems.

#### 4.3. Accent, race, and the construct "group"

It is important to note that if accent is a dedicated dimension, whereas race is a byproduct, this in no way implies that accent is more important than race, or that accent is a better or stronger index of coalition/group membership than is race under modern circumstances (c.f. claims in developmental and social psychology: Kinzler et al., 2009; Kinzler & Spelke, 2011; Spelke & Kinzler, 2007; Rakić et al., 2011). Instead, even if accents are assigned a strong coalitional default – either because of phylogenetic actuarial relationships or ontogenetic inputs – other markers of coalitional alliance, such as behaviors, appearance cues, proximity, shared labels, etc. (including novel and culturally-idiosyncratic markers), will often readily trump and be more important than accent in predicting coalitional behavior, because these can in many cases provide a more precise map of the local coalitional landscape, due to their flexibility (e.g., Richerson & Boyd, 2001; Cosmides et al., 2003). Whereas the relative permanence of linguistic repertoires make them highly desirable bases of coordination and forming coalitional relationships (Jensen et al., under review; Nettle, 1999), their inertia renders them poor ways to track most coalitional relationships most of the time, as coalitional relationships occur over multiple nested scales, and change in

complex ways in response to specific events (Tooby & Cosmides, 2010). Indeed, because markers of language community origins can either be coalitionally-predictive or not within a local social environment (see Hill, 1978, for evidence of the varied relationships between language and affiliation in the ethnographic record), it is unlikely that accent will simply serve as a coalitional marker in the same manner as the coalitional byproduct of race, and also unlikely that accent will always be a better or stronger marker of coalitional affiliation, especially when more predictive cues are present. In other words, although categorization by accent is a robust phenomenon and occurs independent of coalitional affiliation (as demonstrated in the present studies), it does not follow that accent will always be a better or more important group marker, or that accent and race will even pick out and mark the same type of “group” membership.

Instead, whether accent or race is a better or more important marker of “group” membership depends on what is meant by “group”. If “group” means language community, then yes, accent is the better marker. If “group” means a collection of people coordinating, cooperating, or competing, then it is unlikely that accent is always or invariably going to be a better marker (Barth, 1969; Hill, 1978; Sapir, 1921). We suspect that much of the confusion surrounding claims about the relationship between accent, race, and the construct “group” in the social and developmental literatures stems from the assumption that “coalition” refers to any kind of a “group” or collection of people. That is, that “coalition” and “group” are simply interchangeable, and that accent and race thus mark the same kind of group. This assumption then forces a false choice of whether accent is generally a better marker than race. Instead, the present results suggest that accent and race have different underlying proximate psychologies, and as has been pointed out by generations of linguists and anthropologists (e.g., Sapir, 1921; Barth, 1969; Gudykunst & Ting-Toomey, 1990), language and race correspond to different aspects of the world, and have complex and varied relationships with one another. As Barth (1969) points out: “...the traditional proposition that a race = a culture = a language and that a society = a unit which rejects or discriminates against others...prevents us from understanding the phenomenon of ethnic groups and their place in human society and culture...[and] implies a preconceived view of what are the significant factors in the genesis, structure, and function of such groups.” (p. 409).

In fact, there is room for a plurality of types of collectives, rather than a single “group”, and there is room in the minds’ evolved taxonomy of human kinds for more than just coalitions. That is, there are likely adaptations for picking out and attending to more kinds of human collectives than just coalitions (or kinship), such that not every “group” need pick out a coalition. For instance, the mind’s evolved taxonomy likely also includes tribe, connubium, or band level cohorts (e.g. Richerson & Boyd, 2001), particularly as these mark out important clines of social and cultural transmission, coordination, status-seeking, exposure to pathogens, and so on (Kelly, 1983, 1995; Nettle, 1999; Chapais, 2008, 2010). There are likely others as well. Indeed, we view the present accent results as direct experimental evidence that the mind – at a very fundamental and implicit level – cares about collectives of people that are neither directly coalitional nor kinship-based. This and other recent evolutionarily-informed work (e.g., Moya, 2013; Cohen & Haun, 2013; Jensen et al., under review) represent the beginnings of a larger movement to decompose the folk-construct “group” into more precise and evolutionarily-sophisticated types of human relationships and kinds.

## Supplementary Materials

Supplementary data to this article can be found online at <http://dx.doi.org/10.1016/j.evolhumbehav.2013.09.005>.

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