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**Constituents of political cognition:
Race, party politics, and the alliance detection system.**

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Abstract

Research suggests that the mind contains a set of adaptations for detecting alliances: an *alliance detection system*, which monitors for, encodes, and stores alliance information and then modifies the activation of stored alliance categories according to how likely they will predict behavior within a particular social interaction. Previous studies have established the activation of this system when exposed to explicit competition or cooperation between individuals. In the current studies we examine if shared political opinions produce these same effects. In particular, (1) if participants will spontaneously categorize individuals according to the parties they support, even when explicit cooperation and antagonism are absent, and (2) if party support is sufficiently powerful to decrease participants' categorization by an orthogonal but typically-diagnostic alliance cue (in this case the target's race). Evidence was found for both: Participants spontaneously and implicitly kept track of who supported which party, and when party cross-cut race—such that the race of targets was not predictive of party support—categorization by race was dramatically reduced. To verify that these results reflected the operation of a cognitive system for modifying the activation of alliance categories, and not just socially-relevant categories in general, an identical set of studies was also conducted with in which party was either crossed with sex or age (neither of which is predicted to be primarily an alliance category). As predicted, categorization by party occurred to the same degree, and there was no reduction in either categorization by sex or by age. All effects were replicated across two sets of between-subjects conditions. These studies provide the first direct empirical evidence that party politics engages the mind's systems for detecting alliances and establish two important social categorization phenomena: (1) that categorization by age is, like sex, not affected by alliance information and (2) that political contexts can reduce the degree to which individuals are represented in terms of their race.

Keywords: Coalitional Psychology; Evolutionary Psychology; Politics; Race; Partisanship

1. Introduction

What cognitive adaptations underwrite the ability to reason about politics? In different forms, this has been a focal question for social scientists at least since Aristotle characterized humans as a political animal, a *Zoon Politikon*. In this paper we focus on the *alliance detection system*, the systems in the mind designed to solve the problems of keeping track of and calling to mind relevant coalitions and alliances (Pietraszewski, Cosmides, & Tooby, 2014). We examine whether this system is engaged when people represent interactions between supporters of the most important entity in modern politics: political parties.

In examining the political relevance of the alliance detection system, we recognize the classical claim from both biologists and social scientists that political power in hyper-social species is attained through alliance-formation, and that therefore human political cognition emerges from adaptations for navigating alliances (Campbell et al., 1960; De Waal, 1982). Importantly, however, because the computational signatures of the alliance detection system have only recently begun to be mapped, it has not been possible until now to support this claim with direct empirical evidence. By taking advantage of recent discoveries about how the alliance detection system up- and down-regulates alliance cues, we are able to remedy this shortcoming and directly and empirically examine if signals of support for and agreement with modern political parties activates the alliance detection system. For the first time, the notion that humans implicitly reason about party politics as a matter of alliance formation can be experimentally-tested.

The empirical test itself also documents an otherwise surprising and previously unknown phenomenon of social categorization: that when we observe different-race people supporting the same political party, and same-race people supporting different political parties, this decreases our implicit categorization of them by their race. And, when we observe this same pattern for other social categories like sex or age—such that different-sex or different-age people support the same political party, and same-sex or same-age people support different political parties—our implicit categorization by these other dimensions does not change. This suggests that political contexts can in fact change how strongly we view others in terms of their race.

In the next sections we explain what, broadly, the alliance detection system is, how it works, and why this pattern of categorization—race decreasing more than sex and age—diagnoses the operation of the alliance detection system in the context of modern party politics.

1.1 The alliance detection system

Alliances are sets of individuals cooperating toward common ends, often in competition with other sets (Chagnon, 1992; Chapais, 2008; 2010; Ember, 1978; Harcourt & de Waal, 1992; Keeley, 1996; Manson & Wrangham, 1991; von Rueden, Gurven, & Kaplan, 2008; Smuts, Cheney, Seyfarth, Wrangham, & Struhsaker, 1987). Although alliances are powerful—amplifying individual abilities and transforming the odds of success—they are surprisingly rare in the animal kingdom. This is in part because alliances produce unique dynamics. For instance, alliances cause *indirect social* consequences, in which the status of non-interactants can change (for example, if A and B are allies,

and A is harmed by Z, then B will also have a negative stance towards Z, even though Z did not directly affect or interact with B at all—a kind of action at a distance (Pietraszewski & German, 2013)). Understanding and predicting alliance behaviors therefore requires cognitive systems specialized for these dynamics (Byrne & Whiten, 1988; Harcourt, 1998; Pietraszewski, 2012; Tomasello & Call, 1997; Tooby & Cosmides, 2010; Tooby, Cosmides, & Price, 2006).

The *alliance detection system* is one such specialized system. It carries out the functions of attending to who is allied with whom and attempting to predict who is likely to be allied with whom prior to an interaction. It does this by (1) monitoring for patterns of coordination, cooperation, and competition out in the world, and (2) extracting any cues from the environment, such as location, dress, proximity, shared knowledge, etc., that happen to correlate with these behaviors, whether these are signaled intentionally or unintentionally.

For example, in a social world where bandana color denotes gang membership, this system will up-regulate the probability that individuals sharing the same color bandana are more likely to be allied, come to each other's aid, have a positive relationship with one another, and so on, and the opposite will be expected of those wearing different colors. If this pattern holds across individuals and across contexts, bandana color will become an important dimension of person perception and categorization and people will be perceived and categorized by their color.

The alliance detection system must also (3) be adept at picking up on which alliance categories are currently organizing people's behaviors and inhibit non-relevant alliance categories. This is because alliances can change and people belong to more than one alliance category. For example, if in the bandana scenario the system receives new information that bandana color is no longer predictive of alliance patterns, either generally or in a particularly context, such that individuals wearing different colors have a positive relationship and individuals wearing the same colors do not, the use of bandana as a dimension of categorization should be inhibited, either within that particular context, or if it is a general phenomenon and continues to occur, it will eventually be ignored.

This is a Bayesian updating process. The system makes a best guess of how people will interact, based on whichever available cues have the highest prior probability of being likely to organize a social interaction. Then, as additional information is provided by the context or during the ongoing interaction, estimates of which cues are in fact relevant for predicting alliance behavior will be updated. Cues with high priors that are shown to not be relevant will be reduced, and cues with low or no priors, will—if they are shown to track alliance behavior during the interaction—be up-regulated.

This means that alliance representations (alliance categories and their cues) should behave in a particular way: currently unfolding alliance behaviors and their cues should be capable of reducing or inhibiting the use of a previously-used alliance category or cue, particularly when the old category or cue is shown to not predict alliance behavior within the unfolding context. In other words, if the mind attends to a certain category or dimension of people because it represents a best guess about their alliance relationships (i.e., it is an alliance category), then presenting alliance behaviors that

cross-cut and thus undermine that expectation should then decrease categorization by that dimension. This should not be true of non-alliance categories.

1.2 Racial categorization as a byproduct of the alliance detection system

Recent experimental evidence suggests that the social category [race] is one such alliance category. Previously it was thought that race is a privileged dimension of person perception, automatically and invariantly encoded and used to form impressions and categories, perhaps even underwritten by cognitive systems for attending to race (Hamilton, Stroessner, & Driscoll, 1994; Messick & Mackie, 1989). This conclusion was based on decades of unsuccessful attempts to inhibit or reduce people's implicit categorization of others by race. These included: priming race, priming a dimension that cross-cuts race, manipulating contextual relevance (i.e., showing people discussing race relations or some other topic), and explicit instructions to either attend or not attend to race (e.g., Bennett & Sani, 2003; Hewstone, Hantzi, & Johnson, 1991; Stangor, Lynch, Duan, & Glass, 1992; Susskind, 2007; Taylor, Fiske, Etoff, & Ruderman, 1978).

From an evolutionary perspective, however, it is unlikely that the mind would be designed to attend to race, as race would not have been a feature of the social environment over evolutionary time (Cosmides et al., 2003). The insight that the mind may contain an alliance detection system offered an alternative hypothesis: That categorization by race is a consequence of the alliance detection system operating in a world in which physical features become correlated with patterns of association, cooperation, and competition (Sidanius & Pratto, 1999; Telles, 2004). In such a world, the alliance detection system will encode and store these physical features as probabilistic cues of social interaction, boost their experienced perceptual salience, cause them to be encoded, stored, and retrieved more readily, and become the basis of person perception and categorization (Kurzban et al., 2001; Pietraszewski et al., 2014). On this view, the experienced category [race] is the confluence of otherwise arbitrary shared appearance cues with particular sets of social interaction patterns, and at a computational or information-processing level race is treated as a probabilistic alliance cue¹.

This account makes a prediction: removing the correlation between race and actual alliance behaviors should cause the spontaneous categorization by race to erode away. That is, if cues in the experimental context suggest that racial cues are not predictive of how people are likely to interact, and if an alternate basis of grouping in alliances seems likely, then these experimental cues should down-regulate the activation of race (or any other pre-potent alliance cue used by default when detected).

This is exactly what has been found. When an experimental context contains alliance information, such that an alternative alliance dimension is presented and race no longer correlates who is allied with whom, spontaneous and implicit categorization by race is reduced. The first such

¹ This account converges with the conclusions of historical, sociological, developmental, psychophysiological, and genetic analyses of race: that perceptions of race are grounded in social experiences, not biological reality or visual salience, (Graves, 2001; Hirschfeld, 1996; Sidanius & Pratto, 1999; Stangor et al., 1992; Tishkoff & Kidd, 2004).

study was Kurzban et al. (2001), the first reported successful experimental decrease in racial categorization.

In that study participants were shown an unfolding alliance interaction in which two basketball teams taunted one another. Race was crossed with team membership such that the composition of each team was 50/50 black and white. Race was therefore not correlated who was on whose side in the interaction. Using the same implicit categorization measures that had failed to show a reduction in previous studies, categorization by team and race was recorded. In a first condition participants were shown the interaction, but there was no visual marker of team membership; everyone was wearing a gray basketball jersey and alliance structure had to be inferred based on what was said alone. In that condition participants categorized by team and by race. In a second condition team membership was now marked visually, such that each team wore a different colored jersey, more clearly marking team membership and the orthogonal relationship between team and race. Categorization by team now increased and categorization by race decreased—the first reported experimental decrease in racial categorization. This reduction was replicated with a different set of stimuli, and in fact categorization was not significantly different from zero when jersey colors were present.

On the race-as-alliance-cue account these effects were due to the alliance detection system picking up on an unfolding alliance dimension (team) and down-regulating the use of an alliance cue that is shown to be less predictive than first guessed (race). However, these results cannot rule out a more a general effect of crossing categories and removing relevance. Perhaps when team membership is relevant any and all cross-cutting categories are ignored. Although this alternative account would not be consistent with previous findings in the literature (e.g., Lorenzi-Cioldi, Eagly, & Stewart, 1995; Migdal, Hewstone, & Mullen, 1998; Van Twyver, & Van Knippenberg, 1998), Kurzban et al. nevertheless explored if it could account for the reduction in race. This was done by crossing team membership with another social category that, like race, had also been shown to be a strong, default basis of person categorization: sex².

Like race, sex is visible, mostly permanent, socially-meaningful, and inference-rich. It also, like race, appeared to be a default dimension of person perception and categorization in previous research (Beauvais & Spence, 1987; Cabecinhas & Amâncio, 1999; Frable & Bem, 1985; Jackson & Hymes, 1985; Miller, 1986; Lorenzi-Cioldi, 1993; Sani, Bennett, & Soutar, 2005; Stangor et al., 1992; Susskind, 2007; Taylor et al., 1978; Taylor & Falcone, 1982; Van Twyver & Van Knippenberg, 1998). Unlike race, however, sex is biologically real, has been present since the advent of sexual reproduction, and organizes behavior in all known primate societies, including all human societies (Sidanius & Pratto, 1999; Smuts et al., 1987; Sugiyama, 2005). It is therefore expected to emerge as a category in the mind through mechanisms distinct from the alliance detection system. This does not mean that sex or gender roles or stereotypes are pre-determined or inevitable. Instead it means that the mind may be structured to expect two different sexes and has some inferential, motivational, and

² Sex refers to the two reproductive morphs of the human species. Gender refers to a broader set of experienced and perceived dimensions. The previous and current categorization findings are most precisely about sex rather than gender.

learning systems associated with them (for example, who to be attracted to later in life). These systems would then interact with the environment and the social world, accumulating inferences, and expectations based on experience. This also does not mean sex cannot *become* an alliance cue under the right circumstances—it can and does. Rather, the mind does not need alliance information to categorize by sex because it is attending to sex for other reasons. Therefore, categorization by sex should be relatively robust in the face of cross-cutting alliance information. It should not behave like an alliance category and should not be as strongly reduced when crossed with alliance membership.

Kurzban et al. found some evidence for this. Categorization by team again occurred in both sex conditions, both when team was marked verbally and also when marked by jersey color. Categorization by sex remained at very high levels in both conditions, both when team was only marked verbally, and when team was marked visually unlike categorization by race. However, there was some reduction in sex categorization when the visual cue was added, but it was weaker than the reduction found for race. Thus, although the Kurzban et al studies provided the first demonstration that racial categorization could be reduced, it did not provide unambiguous evidence that the reduction effect more strongly impacted race.

This was done in Pietraszewski et al. (2014). These studies were also a more direct test of the race-as-alliance-category hypothesis because they were able to measure the main effect of crossing race with alliance membership, rather than the secondary effect of adding a visual marker of alliance membership (Kurzban et al. did not directly manipulate the effect of crossing race with team; race was always crossed with team, what varied was whether or not team was visually-marked). In these studies, alliance memberships were based on patterns of cooperation, rather than the antagonism of Kurzban et al.: Two different charity groups were depicted interacting for the first time, in which each group member described their activities and experiences while working and traveling together. Race (and for other participants, sex) was crossed with group membership, such that neither predicted group membership. To measure the effect of crossing race (and sex) with group membership, a set of baseline conditions was also included in which no alliance information was presented, but the same target photos were used. Each baseline could then be compared to each alliance condition. There were also two permutations of each baseline and alliance condition in which the presence or absence of a shared clothing color was also manipulated (analogous to the jersey color manipulations in Kurzban et al.). The effect of crossing race (and sex) with clothing color could therefore be measured both when it did (alliance conditions) and did not (baseline conditions) mark group membership—experimentally isolating the effects of alliance structure from the effects of shared clothing color.

These studies—the first to directly manipulate whether race is presented as crossed with alliance or not—showed a strong reduction in categorization by race (in some conditions categorization was not significantly different from zero) and no significant decrease at all in

categorization by sex³. There was no effect of shirt color on its own for racial categorization (meaning that seeing race crossed with shirt color in the absence of alliance information had no effect on racial categorization) and strong categorization by the novel alliance dimension—charity group membership—was found. Moreover, shirt color differences were not even necessary to produce either effect: Both the decrease in race and the categorization by the novel alliance dimension occurred even when all targets wore the same gray-colored t-shirts, ruling out any counterhypotheses for these effects that rely on shirt color differences (see Pietraszewski et al. 2014, for extended discussion). The task structure itself also seemed to provide cues as to the relevance of the novel alliance dimension, and categorization by race was even effected by this: When the task structure (during which the dependent measure was collected) contained either visual or verbal cues of charity membership, higher categorization by charity group and low categorization by race was found, compared to when neither visual or verbal cues of group membership were present (and this had no effect on categorization by sex). This suggests that the alliance detection system was up- and down-regulating the activation of these categories very sensitively and in real-time throughout the course of the experiment (this has also been found when directly tested; Pietraszewski, forthcoming).

To summarize, these preceding studies demonstrate that cueing the immediacy and relevance of a new, unfolding alliance dimension (1) activates spontaneous categorization along that novel alliance dimension, and (2) differentially down-regulates categorization by race, both in antagonistic (Kurzban et al.), and in cooperative (Pietraszewski et al.) contexts.

2. The Current Studies

In the current studies we explore the boundary conditions of these effects by examining if support for and agreement with modern political parties are sufficient to induce these same effects, even in the absence of any explicit antagonism or cooperation between individuals. That is, if modern political party affiliation is a spontaneous dimension of person categorization, and if it is sufficiently powerful to reduce racial categorization. Looking for this selective pattern allows us to test for the engagement of the alliance detection system in the context of modern politics via a direct experimental dependent measure, and to address a fundamental and open question about the cue-credulity of the alliance detection system.

There are three goals: (1) To measure if there is activation of the alliance detection system upon exposure to political stimuli. (2) To determine if explicit alliance behaviors, such as cooperation or hostility, are necessary to engage the alliance detection system, or if more ethereal and probabilistic alliance cues, such as support and agreement, are also sufficient (a consideration of the evolved function of the system would suggest that they should be). (3) To conduct a more stringent test of the alliance detection system's selective effects on race as compared to other chronically-activated social categories.

³ Why there was a decrease in sex in the Kurzban et al. studies will have to be explored in future research. One possibility is regression towards the mean, as categorization by sex was unusually high in the all-gray-jersey condition (Pietraszewski et al., 2014). This may reflect noise, or that cross-sex physical conflict amplifies sex categorization, all else equal.

2.2 *The psychology of politics*

If social life is a game, then politics is the process of establishing and negotiating the rules of that game, defining who is entitled to get what, when, and how (Petersen, 2015). Politics conceived in this way extends far back into our species' evolutionary history (see De Waal, 1982), and there has been a recent surge of studies arguing that human biology shapes the way modern humans represent and think about modern politics (for reviews, see Hatemi & McDermott, 2011; Hibbing et al., 2013; Petersen 2015). These studies have forged empirical links between variables that have traditionally been kept separate in the biological sciences and social sciences. For example, it has been found that changes in skin conductance in response to threatening images correlates positively with conservatism (Oxley et al., 2009), that political participation is heritable (Fowler et al., 2008), fluctuations in blood glucose levels influence support for social welfare (Aarøe & Petersen, 2013; Petersen et al., 2014), and that upper-body strength correlates positively with self-interested policy opinions (Price et al., 2011; Petersen et al., 2013; Sell et al., 2009). In the current studies, we explore the political implications of another feature of human biology: cognitive systems for alliance detection.

Within modern science, the notion that humans' evolved capacity for group living has left a mark on political cognition goes back to de Waal's (1982) classic study of how political power within a chimpanzee troop was acquired through a sophisticated forging of alliances. In both chimpanzees and humans, few if any individuals can on their own physically dominate an entire group on their own (Boehm, 2000). Instead, our species (and our cousins) forge alliances to amplify political power through numbers—politics is a group activity (Johnson, 2004; Lopez et al., 2011; Sidanius & Pratto, 2001). Ancestrally, these groups were bands and tribes. Today in modern democratic politics the group *par excellence* is the political party (Aldrich, 1995; Downs, 1957).

Biologically-informed studies have tested predictions related to the idea that modern humans' representations of political parties are shaped by a psychology of coalitional alliances: decreasing testosterone levels (a correlate of status loss) is observed among individuals who vote for a losing political party (Apicella & Cesarini, 2011; Stanton et al., 2009), partisanship plays a significant role in assortative mating today (as more classical group identities such as religion and race also do) (Alford et al., 2011), and partisans have been found to be more likely to contribute to public goods and punish in economic games (a correlate of a disposition to engage in collective action; Smirnov et al., 2010). Importantly, for the purpose of the present study, these past studies assume that political affiliations are cognitively represented as alliances and test predictions that only indirectly bear on this claim.

The indirect nature of the evidence is also clear if we consider studies on partisanship from political science. Pioneers in the study of public opinion claimed that a political party (1) is a "psychological group" (Campbell et al., 1960: 297) and, therefore, (2) identification with a party "raises a perceptual screen through which the individual tends to see what is favorable to his partisan orientation" (Campbell et al., 1960: 130). In recent decades, political scientists have put the second claim to test and found significant partisan bias in both factual and normative matters (for overviews,

see Bullock, 2011; Leeper & Slothuus, 2014). In particular, both observational and experimental studies have shown that supporters of a party support new policies from that party somewhat independently of content of those policies (e.g., Cohen, 2003; Rahn, 1993). Such observations speak in favor of the coalitional, alliance-based nature of party affiliations (Petersen et al., 2013). Again, however, the evidence is indirect. The first claim—that the mind treats supporters of a political party as an instance of an alliance category—has never been directly tested. Thus, a key assumption behind decades of research in the social sciences remains untested.

This is critical to test because it is far from clear that this should be the case, particularly from a purely rational point of view. It seems almost self-evident that those directly engaged in the political process, such as politicians, should be viewed in this way, given that the alliance detection system is activated by cues of explicit cooperation and competition, and given that political professionals often cooperate and compete in small, face to face, spatially-proximate, concrete, cohesive groups for control of votes, offices, and policy (Downs, 1957; Riker, 1962; Schumpeter, 1942/1976). However, it is less clear if *supporters* of political parties should also be viewed in the same way: To the extent that ordinary supporters of modern mass political parties interact at all, they do so as widely-dispersed abstract aggregations in which the contribution of any one member is so negligible that economists and political scientists consider political participation a mystery (Dowding, 2005). From this perspective, it is not at all obvious that supporters of dispersed mass political parties should be treated by the mind in the same way that face-to-face coalitional alliances are.

2.3 *The credulity of the alliance detection system*

However, from an evolutionary perspective, it has been argued that signals of support and agreement should serve as excellent alliance cues, even when that agreement or support is not explicitly related to social affiliation (Pietraszewski, 2011; 2013; Tooby, Cosmides, Price, 2006). Because cooperation requires coordination, shared opinions should be treated by as probabilistic markers of social affiliation, even in the absence of explicit cooperation or competition⁴. Unraveling ties within a hostile alliance, forming adequate counter alliances, or becoming part of a beneficial alliance structure requires representing potential alliance actions *before* they are actually carried out. This requires sensitivity to subtle and probabilistic cues of cooperation and alliance. On this view, because there is a relationship out in the world between cooperation and shared assessments (such as values, beliefs, and opinions) and because social affiliation motivations partially determine agreement or disagreement with claims and opinions (a consequence of the human ability to use

⁴ In addition to cuing an affiliation, there has been an additional proposal that perhaps attitude similarity also cues kinship (Park & Schaller, 2005)—which is a special and protected kind of social relationship above and beyond regular exchange relationships that involves non-contingent up-regulation of investment (that is, it is independent of how someone treats you), based on cues of differential recent common descent. While we are sympathetic to this view, (and if true, it would reinforce the validity of attitude similarity as an alliance cue) the data thus far—that attitude similarity is more strongly implicitly linked to kinship and social affiliation words than non-similarity—is more readily explained by attitude similarity up-regulating positive regard as an opportunity to coordinate, without appealing to the special case of kinship (see Daly, Salmon, & Wilson, 1997; Lieberman, Cosmides, & Tooby; 2007; Tooby & Cosmides, 1989 for discussion).

communication to signal affiliation, identity, and acquire status), the mind may view cues of agreement and support as probabilistic cues of people's social affiliations (e.g., Jost, Federico, & Napier, 2009). Therefore, even if political party supporters are not observed explicitly cooperating or competing with one another, acts of signaling support for and agreement with different parties and their policies should satisfy the input conditions of the alliance detection system. If this is true, the alliance detection system will be engaged by cues of support for and agreement with modern political parties, even in the absence of explicit conflict or cooperation.

2.4 Tests and predictions

Previous research demonstrates that the detection and acquisition of new alliance categories causes the inactivation of previously predictive but now unpredictable alliance cues and categories (Kurzban et al., 2001; Pietraszewski et al., 2014). Therefore, if the alliance detection system is engaged by support of modern political parties, individuals signaling support of the same political party will be assigned to the same implicit category, and categorization by race should be reduced when race is shown to no longer correlate with these political cues.

Of course, only showing an increase in categorization by a contextually-relevant category (such as political party) and a decrease in a crossed, irrelevant category (such as race) is not sufficient on its own, because such a pattern could be consistent with any number of more general effects, such as shifts in attention, limited resources, or attention to contextual relevance (although previous research suggests that contextual relevance does not reduce chronically-activated social categories such as race; e.g., Hewstone et al., 1991; Stangor et al., 1992). This is why categorization by sex has been used as a contrastive category in previous studies, to which reductions in categorization by race can be compared. Results have shown that the reduction in categorization by race is either greater than the decrease in sex (Kurzban et al., 2001) or entirely restricted to race, such that there is no decrease in categorization by sex whatsoever (Pietraszewski et al., 2014), ruling out these more general effects.

Therefore, in the current studies we adopt the same methodology of Pietraszewski et al. (2014): measuring levels of categorization by both race and sex when crossed with a potential alliance category (in this case cues of political party support), and then comparing these levels to baseline conditions in which the alliance categories are absent. If the alliance detection system is engaged by supporters of modern political parties then categorization by race will be reduced by this manipulation, and categorization by sex will be largely or entirely unaffected.

2.5 Categorization by age: A more stringent test of the selectivity of the alliance detection system's effects

Like sex, categorization by age should not be a product of the operation the alliance detection system (Cosmides et al., 2003). Age is biologically real and would have been present throughout mammalian and human evolutionary history, affording many important inferences and predictions (such as what someone will be capable of, how they will behave, what affordances they provide, and how to act towards them; Lieberman, Oum, & Kurzban, 2008). Age is therefore not expected to

emerge as a category in the mind because of the operation of the alliance detection system (though of course like sex it can become an alliance cue under the right circumstances, but this need not be true for the mind to attend to and categorize others by their age, because it attends to age for other reasons). Thus, age should not behave like an alliance category, which means it should be minimally or not affected at all by cues of an ongoing alliance interaction.

This straightforward prediction has never been tested, though it is important to do so, because the selectivity of the reduction in race (that is, that race is reduced more than other chronically-activated social categories) is the core prediction of the race-as-alliance-cue hypothesis, and thus far only sex has been used as a contrastive category. Including age is an obvious and necessary next step because age is the last remaining category of the “big three”—social categories that have been argued to be equally-primary and chronically-activated modes of person perception and categorization—age, race, and sex (Cosmides, et al., 2003; Lieberman et al., 2008; cf. Cabecinhas & Amâncio, 1999; Maddox & Chase, 2004; Pietraszewski & Schwartz, 2014b)⁵.

Therefore, in the current studies age is included as a second contrastive social category, along with sex. This provides a much more stringent test of the hypothesis that categorization by race will be selectively reduced compared to other social categories⁶. If the alliance detection system is engaged by support of modern political parties, both sex and age should be relatively unaffected by cross-cutting cues of political party support, whereas race should be strongly affected.

3. Method

Categorization was measured using the same “Who Said What?” memory confusion paradigm used by Kurzban et al. (2001) and Pietraszewski et al. (2014), which unobtrusively measures implicit social categorization. This paradigm features three phases: (1) an initial presentation phase featuring a sequence of face and statement pairings, (2) a brief distracter task to suppress recency and rehearsal effects, and (3) a surprise recall phase in which participants are asked to recall which face was paired with each statement, in which patterns of memory attribution errors reveal the degree to which categories in the faces and/or statements are retrieved and activated in the mind at the point of recall (see also Delton et al., 2012; Pietraszewski & Schwartz, 2014a SOM; Taylor, Fiske, Etoff, & Ruderman, 1978).

3.1 Participants

One hundred ninety-three undergraduates (123 female; mean age = 19.5 years, SD = 1.8)

⁵ Most social categories are not chronically-activated, meaning that they are not used by default such that categorization occurs regardless of contextual relevance (e.g. Stangor et al, 1992; Hewstone et al., 1991). Using a non chronically-activated category is not theoretically interesting to cross with alliance because these categories are trivially-easy to reduce, such that categorization will be unlikely to occur even in the baseline condition, let alone in contexts when crossed with alliance membership.

⁶ The addition of this third category also allowed us to examine if consistency with or violation of superficial expectations could be driving any observed changes in categorization. Consistent with previous findings (van Kippenberg, van Twuyver, & Pepels, 1994), the current results suggest that they cannot (see Supplementary Online Materials).

participated in one of three race conditions, one hundred forty-seven (102 female; mean age = 20 years, $SD = 3.5$) participated in one of three sex conditions, and one hundred fifty-one (80 female; mean age = 19.6 years, $SD = 5.3$) participated in one of three age conditions. Participants received either pay or course credit.

3.2 Design

There were nine between-subjects conditions, three for each of the categories presented: race, sex, and age. The first condition was a neutral, non-partisan context designed to provide a baseline measurement of categorization by race, sex, or age in the absence of any information about who was affiliated with which political party. The two other conditions were partisan, featuring cues of political party membership, such that race, sex, and age were crossed with cues of support and agreement with one of the two different political parties.

3.3 Materials and Procedure

Participants were told that they would be viewing a discussion about politics either “among some people” (in the non-partisan condition), or “among Republicans and Democrats” (in the partisan conditions), and that “we are interested in the impressions that these people make on you”. Participants then watched a sequence of eight targets make three different statements.

3.3.1 Target photos

In all conditions each target was presented wearing a gray t-shirt and a button. In the two partisan conditions, four Democrats wore a blue donkey button and four Republicans wore a red elephant button. In the neutral, non-partisan condition the donkey and elephant images were scrambled beyond recognition and the colors of the buttons were changed to green and gray. This preserved both the color difference between the buttons and also some of the low-level features of the donkey and elephant icons.

Standardized head and torso shots were used. Targets all had neutral expressions and wore gray t-shirts. Buttons were added digitally. The race conditions featured eight young men in their 20's, four white and four black. The sex conditions featured the same four white men from the race conditions and four white women in their 20's (the women's hair was always tied back). The age conditions featured male and female sets: one featured the same four white women in their 20's from the sex conditions and four white women in their 70's, the other featured the same four white men from the race conditions and four white men in their 70's⁷. Photos of targets in their 70's came from the Center for Vital Longevity Face Database (Minear & Park, 2004).

⁷ The age conditions were conducted with both male and female targets for exploratory purposes, as age had not been used as a contrastive category in any previous studies, unlike race and sex. Male targets were used for the race conditions because previous studies (Kurzban et al., 2001; Pietraszewski et al., 2014) show that categorization by race for male targets is more resistant to change than categorization by race for female targets, thus stacking the deck against the alliance detection hypothesis.

3.3.2 *Assignment of targets to party*

Race, sex, and age were crossed with political party (in the partisan conditions) or with button color (in the non-partisan condition). Following the procedures of Kurzban et al. (2001) and Pietraszewski et al. (2014), the first four targets always represented all four social category/political party combinations (e.g., Black Republican, Black Democrat, White Republican, White Democrat), which establishes from the outset that the two categories are crossed with one another. The order of target presentation was randomized thereafter, within the constraint that each target only every made a total of three statements, targets always alternated back and forth between Republican and Democrat (or between button color), and each target only ever belonged to one party. Which target was assigned to which political party (including the first four) was randomized between-subjects, within the constraint that each race/sex/age category had to have an equal number of Republicans and Democrats (e.g., among the four female targets, two were Republican and two were Democratic).

3.3.2 *Statements*

Each of the eight targets made three different statements. These 24 statements expressed a typical Republican or Democratic view of 12 topics (in the partisan conditions). The content of the statements were issues derived from the Wilson-Paterson Conservatism Scale (Wilson & Patterson, 1968), and modified to represent topical policy debates. The topics were: health care, the Iraq war, domestic surveillance, teaching evolution, gay marriage, welfare, stem-cell research, immigration, gun control, separation of church and state, global warming, and taxation (see Supplementary Online Materials).

Importantly, there was no explicit antagonism or disagreement present in the statements—the statements merely expressed alternative views on each issue—because we were interested in the effects of holding different opinions and supporting different parties, not on the effects of explicit antagonism. We were also careful to avoid priming race or sex either explicitly or implicitly in the content of the statements; topics such as affirmative action and abortion were not included. Each statement had two parts. One served to introduce or comment on the issue in a neutral or counter-partisan way. For example:

“I’m worried about healthcare. People are scared they’ll get sick and lose all their money. The system just is not working.”

The remainder of the statement was partisan. For example, the Republican’s statement on healthcare would conclude with:

“Getting government out of healthcare is the only way to go. The free market can give people better, more efficient care at a lower price.”

The neutral, non-partisan baseline condition featured only the neutral non-partisan portion of the statements. The two partisan conditions each featured the partisan portion (in one condition, only the partisan portion was presented, in the other, both the non-partisan and partisan portions were presented; see below).

3.3.3 Surprise recall task

After viewing the target photo/statement pairings, participants were given a one-minute distracter task to avoid recency or rehearsal effects. Next, participants were then given a surprise memory task in which a randomized array of all the speakers seen previously was presented. Participants then attempted to recall who had said each of the statements. Statements appeared in a random order and participants indicated their choice by clicking on the speaker's photo (see Figure 1).

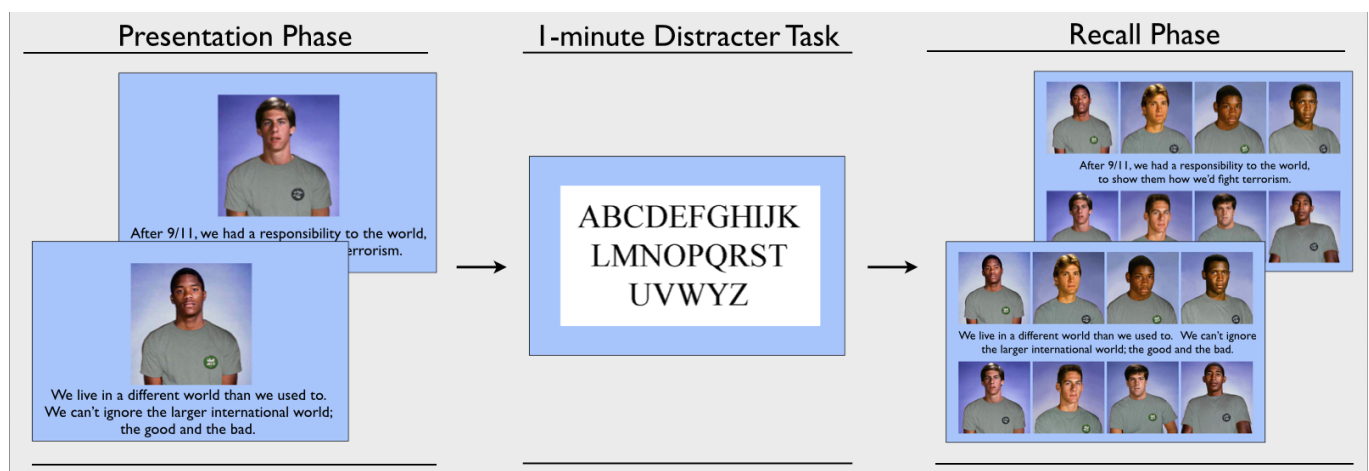


Figure 1. The three phases of the “Who Said What?” memory confusion paradigm. In an initial presentation phase a sequence of 24 photo/statement pairings are presented one after another. This is followed by a one-minute distracter task (to think of foods beginning with different letters of the alphabet) to prevent recency and rehearsal effects. In the final phase, a randomized array of all eight target photos seen during the presentation phase is shown and each of the 24 statements seen earlier appear in random order. Participants are instructed to click on the photo of the speaker that they believe said each statement. (The neutral non-partisan race stimuli, featuring non-meaningful button differences and non-partisan statements, are shown here).

For the partisan conditions, two different variants of the recall task were used—cues of political party affiliation were presented either verbally or visually—in order to avoid a potential experimental artifact. If the statements are themselves partisan, and buttons are included on the photos, then participants could simply match buttons with partisan statements at the recall phase. This would show up as very strong categorization by political affiliation, even without any implicit encoding. To prevent this, two different partisan conditions were created. In one, full statements (both partisan and non-partisan portions) were presented during the presentation phase, but only the non-partisan statement portions were presented during the recall phase (following the procedure of Pietraszewski et al., 2014). In the other, the partisan statement portions were presented at both presentation and recall, but the buttons were removed from the target photos for the recall phase (see Pietraszewski et al., 2014 SOM, and Pietraszewski & Schwartz, 2014a SOM, for an extended

discussion and review of previous research using this method). Although running only one of these two variants was strictly necessary, running both tests the replicability of each experimental effect with a second between-subjects condition.

The recall task is difficult, and participants typically make many misattribution errors. Categorization is inferred by the degree to which these errors cluster around a particular dimension. For example, if statements originally made by Republican supporters are more often misattributed to other Republican supporters than to Democratic supporters in the recall phase, then this indicates that participants had categorized targets by their political party support. Comparing within-category mistakes to between-category mistakes in this way reveals whether participants have spontaneously and implicitly categorized targets along a particular dimension, such as by political party. Categorization is quantified by the degree to which within-category errors exceed between-category errors, thus providing not only a significance test of categorization, but also a continuous measure of effect size (Kurzban et al., 2001; Pietraszewski et al., 2014).

Every condition featured two orthogonal dimensions: In the non-partisan conditions race, sex, or age was crossed with button color. In the two different partisan conditions, race, sex, or age was crossed with political party. Within each condition, the magnitude of categorization by each dimension was calculated independent of the other dimension. For example, in the non-partisan race condition, same-race errors included *same-race/same-button* targets and also *same-race/different-button* targets. Different-race errors included *different-race/different-button* targets and *different-race/different-button* targets. Same-race errors were combined, as were the different-race errors, and then the difference between these was tested. The calculation for the crossed dimension (e.g., button color) followed the same structure (e.g., (*same-race/same-button* + *different-race/same-button*) vs. (*same-race/different-button* + *different-race/different-button*)).

Because there was one correct speaker, and because choosing that correct speaker cannot be used to infer categorization, a correction for different base-rate probabilities was also applied. Because only one target represents a *same-race/same-button* error, whereas two targets represent each of the *same-race/different-button*, *different-race/different-button*, and *different-race/different-button* errors, the number of errors of these last three types was first divided in half prior to calculating the overall error difference measures. This correction is standard in the paradigm (e.g., Taylor et al., 1978; Stangor et al., 1992).

After completing the surprise recall task participants filled out demographic surveys and were then given a debriefing statement, thanked, and excused.

4. Results

Before examining categorization by race, sex, and age separately, an overall ANOVA was performed to probe for the predicted interaction between type of social category (race, sex, and age) and effect of experimental manipulation (partisan conditions vs. baseline). As predicted, there was a significant interaction between type of social category and the effect of the experimental manipulation: $F(2, 485) = 4.09, p = .017, \text{partial } \eta^2 = .017$, suggesting that the effect of inserting

cross-cutting political party affiliations into the stimuli had different effects depending on which social category was crossed, such that categorization by race, sex, and age were affected differently by the same experimental manipulation.

Next, the magnitude of categorization by each of the two orthogonal dimensions (button/party and race, sex, or age) was examined for each of the three between-subjects conditions (the non-partisan baseline condition and the two different partisan conditions: buttons present at recall and partisan statements at recall). The prediction is that both sex and age categorization should be relatively unaffected by the partisan manipulations compared to their non-partisan baseline levels, whereas categorization by race should be reduced. Categorization by political party affiliation should also occur.

4.1 Race Conditions

4.1.1 Non-partisan baseline condition

Same-button errors ($M = 4.51$, $SD = 2.02$) and different-button errors ($M = 4.26$, $SD = 1.35$) did not significantly differ, $t(87) = .88$, $p = .381^8$, $r = .09$, indicating that participants did not significantly categorize targets according to the buttons they were wearing. In contrast, same-race errors ($M = 6.01$, $SD = 1.94$) far exceeded different-race errors ($M = 2.76$, $SD = 1.50$); $t(87) = 11.48$, $p < .001$, $r = .78$, indicating strong categorization by race.

4.1.2 Partisan condition I (buttons present at recall)

Participants categorized targets according to their political party affiliation (same-party errors $M = 5.96$, $SD = 2.20$; different-party errors ($M = 4.91$, $SD = 1.50$; $t(51) = 2.26$, $p = .028$, $r = .30$). Categorization by race was substantially lowered compared to the level found in the non-partisan baseline condition, $t(138) = 3.72$, $p < .001$, $r = .30$. The effect size of categorization by race was nearly halved (same-race errors $M = 6.15$, $SD = 1.97$; different-race errors $M = 4.72$, $SD = 1.43$; $t(51) = 3.46$, $p = .001$, $r = .44$).

4.1.3 Partisan condition II (partisan statements at recall)

Again, in a second between-subjects replication, categorization by political party occurred (same-party errors $M = 7.02$, $SD = 2.32$; different-party errors $M = 3.29$, $SD = 2.09$; $t(52) = 6.73$, $p < .001$, $r = .68$) and categorization by race was again substantially lowered compared to the level found in the non-partisan baseline condition ($t(139) = 3.01$, $p = .003$, $r = .25$), leading to a diminished effect size (same-race errors $M = 6.08$, $SD = 1.78$; different-race errors $M = 4.24$, $SD = 1.48$; $t(52) = 4.90$, $p < .001$, $r = .56$).

4.1.4 Summary

Categorization by political party support occurred in each partisan condition, and no categorization by button occurred in the non-partisan baseline. Racial categorization was significantly lowered in each of the two different partisan conditions compared to baseline levels. Although there was no prediction about the relative magnitude of categorization of race versus party,

⁸ p values are two-tailed, and because all comparisons were pre-planned and had directional predictions, are not Bonferroni adjusted. The Pearson correlation coefficient r is used to report effect size (Rosenthal et al., 2000).

when lowered, categorization by race was either not significantly different from political party categorization (in the buttons present at recall condition: $t(51) = .73$, $p = .47$, $r = .10$) or was lower than political party categorization (in the partisan statements at recall condition: $t(52) = 3.13$, $p = .003$, $r = .40$).

4.2 Sex Conditions

4.2.1 Non-partisan baseline condition

Same-button errors ($M = 3.88$, $SD = 1.72$) and different-button errors ($M = 4.01$, $SD = 1.73$) did not significantly differ, $t(36) = -.42$, $p = .679$, $r = -.07$, indicating that participants did not categorize targets according to the buttons they were wearing, replicating what was found in the baseline race condition. Same-sex errors ($M = 5.99$, $SD = 2.44$) far exceeded different-sex errors ($M = 1.91$, $SD = 1.07$); $t(36) = 9.97$, $p < .001$, $r = .86$, indicating strong categorization by sex.

4.2.2 Partisan condition I (buttons present at recall)

Participants categorized targets by political party (same-party errors $M = 5.86$, $SD = 2.17$; different-party errors ($M = 4.45$, $SD = 1.63$; $t(51) = 3.11$, $p = .003$, $r = .40$). Categorization by sex did not differ from the level found in the non-partisan baseline condition, ($t(87) = -.36$, $p = .720$, $r = .04$), occurring at the same high level (same-sex errors $M = 7.31$, $SD = 2.27$; different-sex errors $M = 3.00$, $SD = 1.44$; $t(51) = 9.69$, $p < .001$, $r = .80$).

4.2.3 Partisan condition II (partisan statements at recall)

Again, in a second between-subjects replication, categorization by political party occurred (same-party errors $M = 7.16$, $SD = 2.34$; different-party errors $M = 2.12$, $SD = 2.07$; $t(57) = 9.63$, $p < .001$, $r = .79$) and categorization by sex again did not differ from the level found in the non-partisan baseline condition ($t(93) = -.62$, $p = .539$, $r = .06$), occurring at the same high level (same-sex errors $M = 6.85$, $SD = 1.92$; different-sex errors $M = 2.43$, $SD = 1.26$; $t(57) = 12.87$, $p < .001$, $r = .86$).

4.2.4 Summary

Unlike categorization by race, categorization by sex was not lowered in either of the two different partisan conditions compared to baseline levels. Moreover, the difference between the race and sex conditions were restricted to race and sex categorization—categorization by political party did not significantly differ between the sex and race conditions (buttons present at recall: $t(102) = .55$, $p = .584$, $r = .05$; partisan statements at recall: $t(109) = 1.72$, $p = .088$, $r = .16$). As in the race conditions, categorization by political party occurred in each partisan condition, and no categorization by button occurred in the non-partisan baseline.

4.3 Age Conditions

4.3.1 Non-partisan baseline condition

Same-button errors ($M = 4.62$, $SD = 2.13$) and different-button errors ($M = 4.54$, $SD = 1.69$) did not significantly differ, $t(52) = .21$, $p = .834$, $r = .03$, indicating that participants did not categorize targets according to the buttons they were wearing, replicating the pattern found in both

the race and sex conditions. Same-age errors ($M = 6.98$, $SD = 2.07$) far exceeded different-age errors ($M = 2.18$, $SD = 1.46$); $t(52) = 13.56$, $p < .001$, $r = .88$, indicating strong categorization by age.

4.3.2 *Partisan condition I (buttons present at recall)*

Participants categorized targets by political party (same-party errors $M = 6.05$, $SD = 2.14$; different-party errors ($M = 4.66$, $SD = 1.63$; $t(48) = 2.94$, $p = .005$, $r = .39$). Categorization by age did not differ from the level found in the non-partisan baseline condition, ($t(100) = 1.54$, $p = .126$, $r = .15$), occurring at the same high level (same-age errors $M = 7.33$, $SD = 1.97$; different-age errors $M = 3.38$, $SD = 1.49$; $t(48) = 9.43$, $p < .001$, $r = .81$).

4.3.3 *Partisan condition II (partisan statements at recall)*

Categorization by political party again occurred (same-party errors $M = 6.76$, $SD = 2.48$; different-party errors $M = 2.70$, $SD = 1.94$; $t(48) = 7.56$, $p < .001$, $r = .74$). And again, categorization by age did not differ from the level found in the non-partisan baseline condition ($t(100) = .84$, $p = .403$, $r = .08$), occurring at the same high level (same-age errors $M = 6.90$, $SD = 2.30$; different-age errors $M = 2.56$, $SD = 1.46$; $t(48) = 10.07$, $p < .001$, $r = .82$).

4.3.4 *Summary*

Categorization by age was not lowered in either of the two different partisan conditions compared to baseline levels, following the same pattern found for sex, and in contrast with the pattern found for race. As in both the race and sex conditions, categorization by political party occurred in each partisan condition and no categorization by button occurred in the non-partisan baseline. The magnitude of categorization by political party in the age conditions did not significantly differ from either the race or sex conditions (buttons present at recall, age vs. race: $t(99) = .51$, $p = .609$, $r = .05$; age vs. sex: $t(99) = .03$, $p = .980$, $r = .00$; partisan statements at recall, age vs. race: $t(100) = .42$, $p = .675$, $r = .04$; age vs. sex: $t(105) = 1.31$, $p = .194$, $r = .13$)⁹.

⁹ In the age conditions participants were shown either male or female targets. An exploratory analysis revealed there were no differences between the all-male and all-female target versions, save one: party categorization was significantly lower in the all-female than in the all-male version, but only in the buttons present at recall partisan condition ($t(47) = 2.78$, $p = .008$ (uncorrected), $r = .38$).

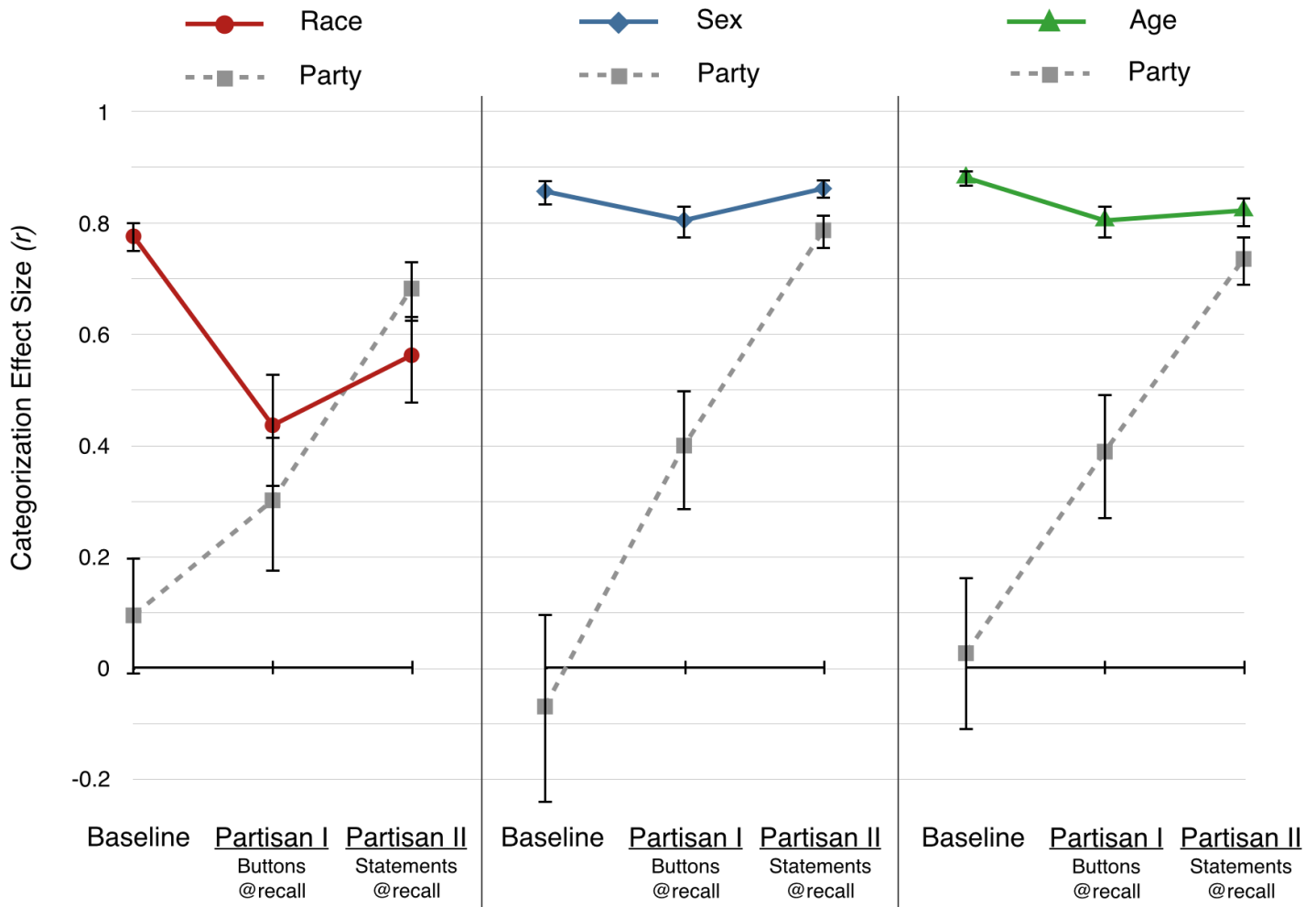


Figure 2. Categorization by Race, Sex, and Age when crossed with non-meaningful button differences (Baseline) and cues of political party support (Partisan I & II, which are two different variants of the presentation and recall task). All three social categories were presented in identical experimental contexts, yet only categorization by race was reduced. Party categorization did not differ between the race, sex, or age conditions, and no categorization by non-meaningful button differences was found. Error bars: ± 1 S.E..

5. Discussion

Support for and agreement with modern political parties was sufficient to induce the spontaneous encoding and retrieval of relevant alliance categories and the inhibition of non-relevant alliance categories—the same effects that have previously been found with explicit antagonism (Kurzban et al., 2001) and cooperation (Pietraszewski et al., 2014). When political party affiliations were presented, participants spontaneously categorized targets by their affiliation. And when race, sex, and age were crossed with political party affiliation, only categorization by race was reduced. There was no change in categorization by either sex or age. These results provide a direct empirical demonstration that the alliance detection system is part of the cognitive machinery that underwrites human political cognition and in particular that this system is activated in response to cues of support for and agreement with political parties. Two new features of the alliance detection system were also discovered: (1) explicit cooperation and antagonism are not necessary to activate the alliance

detection system; instead, cues of support and agreement are sufficient, and (2) categorization by age is, like categorization by sex, unaffected by the same manipulations that strongly reduce categorization by race, supporting the idea that neither age nor sex categorization is a consequence of the alliance detection system's operation.

5.1 Categorization by political party support

Targets supporting the same political party were assigned to the same implicit category. In six of out six between-subjects conditions, when asked to recall who said each statement, participants were much more likely to confuse targets belonging to the same political party with one another, and much less likely to confuse targets belonging to different political parties with one another, demonstrating they had categorized the targets and their statements according to political party affiliation. This was found both when participants were provided with partisan statement portions at recall, but saw no political buttons on the targets (*partisan statements at recall*), and also when participants were only shown the political buttons on targets, but were provided with no partisan content in the statements (*buttons present at recall*). In both cases, the only way to have produced these non-random error patterns was to have implicitly tagged the target and the statement, respectively, to the category of party. There was no information at recall that would allow participants to simply match statements and photos by their political party. In the *partisan statements at recall* conditions, there was nothing in the photos to indicate which party each individual was a member of during the attribution task (the buttons seen during the initial presentation phase were removed). Therefore the only way to have confused targets belonging to the same category was to have assigned them to the same category during the initial presentation phase and to have retained and activated that information during the attribution task. In the *buttons present at recall* conditions there was nothing in the statements to indicate which political party that statement would have come from¹⁰. Therefore the only way to have confused statements belonging to the same category was to have assigned them to the same category during the initial presentation phase and to have retained and activated that information during the attribution task. Therefore—and converging with the findings of Pietraszewski et al. (2014)—we find direct evidence that both the target photos and the statements presented during the initial presentation phase were tagged with category information, such that both categorization of photos by party, and categorization of statements by party, was found. This shows that cues of political party support for modern political parties spontaneously activated categorization.

¹⁰ There are two sources of evidence for this: (1) there was no categorization by the same non-partisan statements in the non-partisan baseline conditions. If the non-partisan statement portions afforded strategic guessing of any kind (such that party membership could be inferred), this would have shown up as categorization by button in these non-partisan baseline conditions. There was none. (2) A separate set of participants (N = 79) sampled from the same subject population were given the explicit task of trying to infer which political party would have been more likely to have said each of the non-partisan statement portions for each of the twelve issues discussed. Participants were slightly more wrong (M = 6.9, SD = 1.39) than right (M = 5.1, SD = 1.39) in this task ($t(78) = -5.83, p < .001$), confirming that there was no partisan-diagnostic information present in the statements, and that if anything the non-diagnostic statement portions were biased against producing categorization by political party, should strategic guessing have been attempted.

5.2 Lack of categorization by button in the non-partisan conditions

In each of the three non-partisan baseline conditions there was no categorization by non-meaningful button differences—replicating previous findings with the “Who Said What?” memory confusion paradigm which show that participants do not always categorize targets along any easily-perceivable and systematic difference between targets (such as differences in their shirt color; Brewer, Weber, & Carini, 1995; Pietraszewski et al, 2014, or in obvious sound differences in the background of their statements; Pietraszewski & Schwartz, 2014a). This shows that categorization by political party support (and categorization in general) is not an epiphenomenon or byproduct of the perception of systematic differences and similarities (Cosmides et al., 2003; Pietraszewski et al, 2014).

5.3 Baseline measurements of categorization by race, sex, and age in the non-partisan conditions

The non-partisan conditions provided baseline measurements of categorization by race, sex, and age without any cues of cross-cutting party affiliation, to which the effect of inserting opposing partisan positions (in the partisan conditions) could be compared, all the while holding constant the images of the target individuals and the topics that the targets were discussing (e.g., health care, teaching evolution, etc.). That is, the non-partisan baseline conditions provided an experimental control for idiosyncrasies of the target photos and also any general topic-by-social-category interactions (i.e., demonstrating that we were not differentially priming either race, sex, or age when presenting these particular political issues; previous research furthermore suggests that chronically-activated social categories such as these are insensitive to contextual primes; e.g. Stangor et al, 1992; Hewstone et al., 1991). Consistent with previous results, very strong categorization by all three categories occurred (e.g., Lieberman et al., 2008; Taylor et al., 1978).

5.4 Categorization by race, sex, and age in the partisan conditions

When race, sex, and age were crossed with cues of political party affiliation, only categorization by race was reduced compared to its non-partisan baseline. The reduction was substantial: halving or quartering the .78 effect size ($\Delta r = .20, .32$). There was no significant change in either sex or age categorization, even though, like race, these started out at similarly high baseline levels (r 's of .88, .86, respectively). This occurred in each of the two different between-subjects partisan conditions (i.e., in both the *partisan statements at recall* and *buttons present at recall* conditions) and occurred despite the fact that race, sex, and age were always present in the photos during both presentation and recall phases of each experimental procedure, and despite the fact that the experimental procedures were identical across each of the race, sex, and age conditions.

This selectivity eliminates many possible alternative accounts of the race reduction. (For instance, that it is due to a more general process of competitive category activation in which processing or attention is shifted away from a crossed category that is not contextually relevant). And it is exactly what is predicted if the category [race] is treated as a probabilistic alliance cue and cues of support and agreement with political parties engage the alliance detection system.

5.5 *Boundary conditions of the alliance detection system*

Cues of support and agreement with political parties triggered the predicted, distinctive, signature of alliance detection system: the detection and acquisition of new alliance categories and the decreased activation of a previously predictive alliance category, suggesting that explicit cooperation and competition are not necessary to engage the alliance detection system. This validates a view of the alliance system that is probabilistic in its cue structure and continuous in its activation of alliance cues (which is how a well-designed cue-detection system should work). It is not a binary, all-or-none process in which any new cue or category and completely inhibits attention to any and all previous cues. Instead, probabilistic cues that need not involve explicit cooperation or competition, but that diagnose how people are likely to get along, are captured by this system and in turn have computational consequences.

These new results pose new questions that will need to be resolved in future work. First, because party affiliation was marked by multiple cues—the broadcasting of shared opinions, wearing shared visual markers, and sharing a verbally-labeled identity—we do not know which set of cues were necessary and sufficient to elicit categorization. Future research will need to determine which cues or set of cues are. Second, because we were specifically interested in cues of political party support, we do not know if shared opinions and beliefs in an entirely novel domain will be treated as markers of social affiliation in the same way political opinions and beliefs are. One possibility is that only certain beliefs and opinions come to be marked as coalitional within a culture, and that in order to be viewed in this way, beliefs and opinions must co-occur with additional alliance cues in the social environment (political beliefs and opinions certainly conform to this, as political parties also engage in explicit competition with one another, cultivate verbal and psychophysical cues of alliance strength, and so on¹¹). It is also possible that these additional alliance cues are not necessary. Future research will be needed to determine if and when shared beliefs and opinions come to be treated as alliance markers.

5.6 *Political attitudes as social signals*

The present results seem to suggest that supporting a political party is not viewed only as a stance on policy or beliefs, but is also, at least implicitly, viewed as predictive of the quality and nature of the relationships people will have with one another. Whether or not this is objectively true, the mind seems to view political affiliations in this way. In line with this, recent research shows that political attitudes are the second most important factor in assortative mating in contemporary United States (Alford et al., 2012), that about 40 percent of contemporary Americans would be upset if their child to married a person supporting another party than the parent (Iyengar et al., 2012), and that people try to avoid revealing their political affiliations when establishing new relationships (Klofstadt et al., 2012).

¹¹ Politics as a formal domain separated from daily life may also be a modern (or WIERD; Henrich, Heine, & Norenzayan, 2010) manifestation of an evolutionarily-reccurent set of strategies for broadcasting attitudes which function to negotiate local norms and customs in a way that is self-beneficial (Weeden & Kurzban, 2014), and so may be implicitly understood to have coalitional functions in the mind (Ellemers, & van den Bos 2012).

The result that the mind treats support for particular sets of ideas as a social—and not just epistemic—commitment, may also help explain why political preferences do not always maximize economic well-being (Fiorina, 1981, c.f. Weeden & Kurzban, 2014) and why people often attend more to whether a policy or candidate is sponsored by their party than to the contents of the policy or positions of the candidate (called *party cue* effects; Cohen, 2003; Rahn, 1993). Instead of heuristics for minimizing effort (Kam, 2005; Lau & Redlawsk, 2001), these may reflect (often implicit) considerations of another kind: how the policy or candidate affords broadcasting a social identity consistent with one's social roles, affiliations, and aspirations within the local context of peers and rivals, all of which depends on who else agrees and disagrees within the local social environment. Thus, the social identity implications of beliefs will be important to include in models of belief-fixation and decision-making whenever factual and normative claims are debated, particularly when information about others' beliefs are present (Asch, 1951; Tetlock, 2003), such as in science or religion.

5.7 Race and politics

The current results also seem to suggest that when people of different races share similar political beliefs and opinions, and people of the same race hold opposing political beliefs and opinions, they will be less likely to be viewed in terms of their race. The same is not true of their sex or age. This may be true for both party supporters and also political candidates.

This conclusion supports Social Dominance Theory (SDT; Sidanius & Pratto, 1999; 2012), in which sex and age are considered universal dimensions of person perception and bases of status differentiation, whereas race is an arbitrary, culturally-idiosyncratic social construct, like nationality, religion, and—relevant to the current studies—political affiliation (these are called *arbitrary sets*). The present results can be understood as showing that the mind treats both race and cues of political party affiliation as arbitrary set dimensions, and dynamically updates which arbitrary set is most relevant and predictive within an ongoing situation, whereas sex and age are not treated as arbitrary sets. In this way, the computational claim that both race and politics are underwritten in part by the alliance detection system converges with the sociological claim that race and politics are arbitrary set dimensions.

One plausible implication of this is that changes to cues of racial demographics in political contexts may change racial perceptions. That is, when physical or cultural features are perceived as being correlated with political affiliations, those features will then become to be seen as more corresponding to 'race', and when previously 'racialized' features come to be seen as less predictive of political affiliations (or other cues of affiliation), those features will become seen as less corresponding to 'race'. Historical and sociological trends seem to in fact support the notion that the perception of racial differences and political differences tend to track each other over time. For instance, during the late 1800's and early 1900's—a time in which Irish Catholics were considered a racial group in the United States—there was a strong correlation between being Irish Catholic and one's political party affiliation. And although the order of causation is likely bi-directional (such that

being treated as a race will cause people to have political and economic interests in common), as the perception of being a racial group has all but vanished for Irish Catholics—from the 1960's onward—so too has the correlation with the political affiliation (Dolan, 2008; Prendergast, 1999). Other examples (e.g., the Hutu and Tutsi of Central Africa) lend some weight to this possibility. Future research can better clarify what, if any, relationships exist between political affiliation trends and race perception and categorization.

These results also inform a larger class of theories about the evolutionary psychological origins of large-scale social identities, such as ethnic groups (e.g., McElreath, Boyd, & Richerson, 2003; Moya & Boyd, 2015). These theories argue that there is selection on cognitive systems for not only representing transient and dynamic alliances and coalitions, but also for representing larger-scale clines of cultural transmission, shared norms, and patterns of coordination, and picking up on locally-contingent markers of these clines (that is, there is selection to pick up on *ethnic* markers). We do not disagree with these claims—in fact, some of our own research shows that accent categories, unlike racial categories, do not behave like dynamic alliance cues, but are better understood as marking clines of social and cultural transmission and residence history (Pietraszewski & Schwartz, 2014a;b). So what do these (and our past) results suggest about race (or political parties) as ethnic markers?

At a first pass, these results are not predicted by theories that treat race as an ethnic marker. In both current and past studies (Kurzban et al., 2001; Pietraszewski et al., 2014; Pietraszewski & Schwartz, 2014b) we have found that transient, small-scale, and volatile patterns of antagonism, cooperation, and shared opinions change racial categorization. In contrast to coalitions, ethnicities are stable social units. Therefore, the kinds of transient social changes that have been found to change race categorization should not serve as inputs to systems that represent ethnic categories, and so should not modify ethnic category representations and inferences (e.g. Gil-White, 2001, see Cosmides et al., 2003 for extended discussion). That they do suggests that the simple hypothesis that race is only an ethnic category, and not a coalitional alliance category, cannot be correct (at least in the cultures sampled by these studies). This means that any model of the evolutionary psychology of racial or other arbitrary set perceptions, categorizations, and inferences will not be complete without including coalitional alliance adaptations.

Our current and past results do not exclude the possibility that race, in addition to being represented as a coalitional alliance cue, is *also* represented as an ethnic cue¹². That is, although these results are not predicted by ethnic marker theories, they do not preclude these theories either. Given that racial perceptions are a byproduct, several different sets of adaptations may underlie racial perceptions, and the makeup of this constellation of adaptations may vary depending on the particular social inputs present in a particular social ecology (Cosmides et al., 2003). Future research

¹² This requires what we think is a reasonable additional assumption: that locally-contingent ethnic markers are not prioritized in the presence of unfolding coalitional interactions, as the immediacy of coalitional behavioral inferences—who is on who's side; who will attack who?—supersedes, or even conflicts with, ethnic behavioral inferences, such as who shares common norms and customs. If future research suggests this isn't true, then these reduction-in-racial-categorization results *would* argue against the ethnic hypothesis.

and theory on the relationships between coalitional alliances and ethnic representations can more fully address the causal relationship between ethnic and coalitional dynamics, their underlying cognitive adaptations, and their different predictions (Moya & Boyd, 2015). However—and importantly—theories that argue that race is only an ethnic category are not sufficient to explain either past or current categorization results.

5.8 Conclusion

Biologists and social scientists alike have previously theorized that the cognitive abilities to form and mobilize alliances are an important feature of political cognition. For the first time, we have provided direct empirical evidence that this is the case: the mind implicitly treats cues of support for and agreement with modern political parties as an alliance category. In the process, more evidence has been collected in support of the claim that categorization by race is a reducible byproduct of the mind's attention to alliances. Race and politics, despite their superficial differences, appear to both be treated as coalitional alliances (or arbitrary sets) by the mind, unlike sex and age.

Of course, detecting alliances is only one component of a larger suite of cognitive adaptations for navigating alliances and coalitions, and these themselves are not the only adaptations that underwrite political cognition. Others include adaptations for computing which resource distributions to favor, how to achieve the status necessary to enforce these distributions, when to escalate or withdraw from conflicts, and how to navigate hierarchies within and between groups, and so on (e.g., Petersen, 2015; Pietraszewski & Shaw, 2015; Sell, Tooby, & Cosmides, 2009). Sustained research will be needed to continue to map out the set of cognitive adaptations that underwrite our ability to represent and think about politics (for a review of present evidence, see Petersen, 2015).

A deeper understanding of alliances and their representation will be crucial to this enterprise. In contrast to many other animals, power in humans is not primarily a matter of the physical strength and size of a single individual, but is instead gained by forming coalitions and alliances with similarly-minded individuals (Von Rueden et al., 2008). The human political animal is a coalitional animal, able to track who is allied with whom, and on that basis calculate which political projects should be pursued and abandoned, and who will come to whose aid should conflicts of interest arise and loyalties be tested. Although the realities of modern mass politics may be evolutionarily-novel, the psychologies brought to bear on them are not.

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Constituents of political cognition: Race, party politics, and the alliance detection system Supplementary Materials

Contents:

I. Testing against superficial expectations

II. Statement Stimuli

I. Testing against superficial expectations

Although previous results (e.g., van Kippenberg, van Twuyver, & Pepels, 1994) suggest that consistency or inconsistency with superficial expectations does not drive social categorization (meaning that contexts that are either consistent or inconsistent with expectations of race, sex, or age, do not tend to change how strongly they are categorized), we wanted to also directly verify this with our present studies. In particular, the previous Kurzban et al. (2001) studies that had found a decrease in race featured two basketball teams physically-threatening each other. In that scenario, learning that each team had an equal number of white and black male players would be less surprising than learning that each team had an equal number of all white male and female players (given real-world knowledge about the makeup of formal basketball teams). Thus, the experimental context in Kurzban et al. was more consistent with race expectations than sex expectations. (The experimental context of Pietraszewski et al., which also found a race reduction, featured membership in two different charity organizations, which tends not be either strongly consistent or inconsistent with sex or race expectations, and so does not clearly inform this issue).

Because of this clear asymmetry in the race and sex expectations in the Kurzban et al. study, we wanted to conduct another set of studies that would be predicted to yield the same reduction in racial categorization on the coalitional hypothesis, but that would feature the *opposite* pattern of race and sex expectation-consistency. That is, to create a scenario that would more sex consistent than race consistent. Affiliation with US political parties provides precisely this pattern: In the United States, race is much more strongly correlated with party affiliation than is sex. According to polls for the 2008 Presidential Election (the election closest to when these race and sex studies were conducted), 95% of blacks, but only 56% of women voted for the Democratic candidate (Gallup; NY Times; see below). Additional analyses of the 2008 American National Election Survey (presented below) show that race is highly correlated with vote choice ($r=.45$, $p<.001$) while sex is not significantly related to vote choice ($r=.09$, $p=.30$). Moreover, our participant subject pool was aware of these relationships—consistently expecting race to more strongly correlated with political party affiliation than sex (see below). Therefore, in the current studies, when race is shown to be crossed with political party affiliation, this should be more surprising than when sex is shown to be crossed with political party affiliation. If consistency with these kinds of superficial expectations were driving the changes in categorization found previously in Kurzban et al., then the opposite pattern should be found in the present studies: categorization by sex should be reduced more than categorization by race.

To additionally verify that superficial expectations were not driving the prior and current reductions in race (and also as a more stringent test of the coalitional prediction that any reduction should be largely restricted to race), we included a third social category: age. According to polls, 66% of young people (18-29) voted for the Democratic candidate in 2008, making age a moderate predictor of party support, intermediate between race and sex (the American National Election Survey also shows that age and vote choice is only moderately correlated ($r=.23$, $p=.001$)). Because mixed-age groups of political party supporters are moderately expectancy-violating (and verified in our participant pool surveys, see below), categorization by age should be moderately reduced in the

present studies—at some level intermediate between race and sex—if superficial expectations were driving categorization. (Our participant pool furthermore considered age to be closer to race than to sex in terms of political expectations. To the degree this is true, the expectation account would predict that both race and age categorization should be similar to each other, unlike the coalitional hypothesis).

2008 Presidential election polls

<http://elections.nytimes.com/2008/results/president/exit-polls.html>

<http://www.gallup.com/poll/112132/Election-Polls-Vote-Groups-2008.aspx>

Expectations of Sex, Age, & Race on Political Affiliations

The relationship between sex, age, and race on US political party affiliation was assessed through (1) actual voting behavior, and (2) surveys of explicit expectations.

First, the relationship between the precise set of sex, age, and race stimuli featured in the current studies was measured against the candidate voting behavior to the 2008 presidential election:

Effects of Demographics on Party Choice in 2008 US election. Comparisons designed to fit experimental conditions.

	Effect of Sex on Party Choice	Effect of Age on Party Choice	Effect of Race on Party Choice
White individuals in their 20ties	$r=.0940$ ($p=.2970$), $N=216$		
White individuals in their 20ties relative to white individuals in their 70ties		$r=.2307$ ($p=.0008$), $N=333$	
White males in their 20ties relative to white males in their 70ties		$r=.2164$ ($p=.0429$), $N=146$	
White females in their 20ties relative to white females in their 70ties		$r=.2351$ ($p=.0094$), $N=187$	
Males in their 20ties			$r=.4506$ ($p=.0001$), $N=131$

Notes. Coefficients are Pearson's correlations. Data is from ANES 2008. Party choice was operationalized as voting for Obama (0) versus McCain (1) as president. Sex was operationalized as female (0) versus male (1). Age was operationalized as between 20-29 (0) versus between 69-80 (1). Race was operationalized as black (0) versus white (1).

These results demonstrate an ordinal relationship between sex, age, and race: Race was most predictive of party choice, sex least so, and age intermediate.

Next, to establish that our participant pool was aware of this ordinal relationship (Race > Age > Sex), two independent surveys of expectations were conducted with the same undergraduate participant pool used in the current categorization studies:

Survey 1: Perceived relationship between Demographics and Party Affiliation in the US via frequency prediction.

Effect of Sex on Party Affiliation	Effect of Age on Party Affiliation	Effect of Race on Party Affiliation
$r=.61$ ($p<.001$), $N=62$		
	$r=.78$ ($p<.001$), $N=62$	
		$r=.83$ ($p<.001$), $N=62$

Notes. Standardized regression coefficients/Pearson's correlations. Participants were asked to report expected frequencies of party affiliation for six different sets of 100 people: black, white, 20 year-olds, 70 year-olds, men, and women. Frequencies were then regressed on the variables of Sex, Age, and Race. Party choice was coded as Democrat (0), Republican (1); sex as female (0), male (1); age as 20 year-olds (0), 70 year-olds (1); race as black (0) versus white (1).

Survey 2: Explicit report of relationship between Demographics and Party Affiliation in the US via Likert Scale.

Sex & Party Affiliation	Age & Party Affiliation	Race & Party Affiliation
$M= 3.29$ ($SD=1.43$)		
	$M= 4.65$ ($SD=1.39$)	
		$M= 4.71$ ($SD=1.38$)

Notes. Likert scale: (0) not correlated; (1) weakly correlated; (2) somewhat correlated; (3) correlated; (4) pretty strongly correlated; (5) strongly correlated; (6) perfectly correlated. $N=34$.

Both surveys revealed that our participant pool held the same expectations revealed by actual voting behavior—that race is most strongly correlated with party affiliation, sex least so, and that age is intermediate (and for our participants, potentially closer to race than to sex). It should be noted, furthermore, that if we compare the actual effects of age on party choice and subjects' perceptions of this effect, subjects seem to overestimate it. This in fact biases our test between the coalitional and superficial expectancy accounts *against* the coalitional account, as this should lead to more similar categorization effects for race and age on the superficial expectancy account. Yet, consistent with the coalitional account, we found a sharp difference between categorization on the basis of race and age, respectively, in the face of information about party affiliation.

In fact, no superficial expectancy account can explain both the present categorization results and those of Kurzban et al. The first account, that consistency with expectations reduces categorization, would predict that sex would have been reduced in the present studies, followed second by age, and followed last by race. This did not happen. A second possible account is that counter-expectancy decreases, rather than increases, levels of categorization. If this were true, categorization by sex should have been lowered more than race in the Kurzban et al. studies. It was not. A third account can also be excluded: Rather than a linear relationship, there is a U-shaped function between expectations and categorization (van Kippenberg et al., 1994), such that *either* consistent or inconsistent contexts facilitate categorization. This predicts that both race and sex should remain high in both the current studies and also in Kurzban et al.. That did not happen in

either study. A fourth and final account, that there is an inverted-U-shaped function between expectations and categorization, is also falsified, as this predicts both race and sex should have decreased in both studies. Thus, none of the possible relationships between superficial expectations and categorization—including both linear and non-linear—can explain the reduction in categorization by race across these sets of studies.

II. Statement stimuli

Partisan portions are underlined, odd-numbered statements are from Republican targets, even-numbered from Democrats. For the control conditions, the non-partisan portions constituted the entire statement.

- 1) I'm worried about healthcare. People are scared they'll get sick and lose all their money. The system just is not working. Getting government out of healthcare is the only way to go. The free market can give people better, more efficient care at a lower price.
- 2) The system is in serious trouble. Most bankruptcies are caused by health bills. People are dying, it's just awful. We need the government to step up, and to create a national healthcare system. Universal coverage is the only way to literally save these lives.
- 3) Iraq is an important front in the war on terror. We have to stay the course. Retreating now would only encourage our enemies to step up attacks on soldiers and civilians. The bloodshed in Iraq is already bad enough. Everyday innocent people are being killed.
- 4) The Iraq war was a mistake. We started a war of choice, instead of hunting Al Qaeda in Afghanistan. We got distracted from our main mission. We blew it. After 9/11, we had a responsibility to the world, to show them how we'd fight terrorism.
- 5) We live in a different world than we used to. We can't ignore the larger international world; the good and the bad. Domestic surveillance is the only way to catch terrorists who operate across borders. It saves American lives. Only terrorists have something to hide.
- 6) This country is founded on basic liberties that cannot and should not be violated. I was brought up believing in the principles of this country. It is unbelievable to me that the government is spying on Americans' communications. It is illegal, unconstitutional, and immoral.
- 7) Evolution is just a theory. Living things are too complex to have gotten here by chance. They must have been designed by some greater intelligence. We should teach Intelligent Design in our classrooms. Science is about making judgments about different ideas based on the facts.
- 8) The evidence for evolution is overwhelming. All scientists agree that Darwin's theory explains the diversity of life on Earth. We shouldn't waste any time with creationism. We need kids who are strong in science. We should be teaching all the good information we have.
- 9) Marriage is a sign of how much two people are devoted to each other. That's what makes it special. It's an ancient tradition that shouldn't be messed around with. That's why I think it's important that marriage be between a man and a woman.
- 10) Marriage has two sides. There's the love and commitment, and there's the special legal rights and responsibilities that come with it. Gay people fall in love. They deserve the same rights as everyone else. So of course they should be allowed to get married.
- 11) Welfare just doesn't work. It encourages people to be lazy, to stay unemployed, and to not take care of themselves or their family. To finally fix poverty we have to really focus on what will have the best long term consequences for our nation's children.
- 12) Providing welfare to the unlucky and disadvantaged is the only moral thing to do. Kids can't help it if they're poor. Right now kids in the United States are going to bed hungry. You have got to ask yourself, what's the right thing to do?

- 13) Researchers are starting to use embryonic stem cells to help in the fight against diseases like cancer. The problem, though, is that they're embryos; they're potentially living, breathing babies. Turning an embryo into something else destroys a potential life. We must stop this. It's immoral.
- 14) The human stem cells are really quite impressive. They have the ability to grow into any type of cell in the body. These cells can grow into replacement organs and save lives. Besides, the embryos come from fertility clinics, and would be thrown out anyway.
- 15) Illegal immigrants are not welcome here, they should go back. They place a huge burden on things like schools and hospitals. They have to go home. Schools and hospitals are full. I am worried about how we can care for immigrants while this situation continues.
- 16) We need to find a quick way to bring immigrants into the system. Immigrants are hard working, valuable contributors to society, they're not criminals. We should welcome them. This country was founded by immigrants. Though, there are security issues with not knowing who is here.
- 17) Handguns kill more people in this country than any other type of gun. But, way more people are protected by owning a handgun legally. We have the constitutional right to bear arms. Take that away, and you take away our liberties, rights, and our protection.
- 18) There's nothing wrong with having a gun for hunting or protecting your home from a burglar. But that doesn't mean you need to own a concealable weapon or armor-piercing bullets. We need to restrict gun sales and ownership. We need fewer guns on the street.
- 19) Religion should not be kept out of our government. Our founding fathers based our government on Christian principles. Even our money says 'In God We Trust'. We are an example to the rest of the world. We cannot afford to lead in a moral vacuum.
- 20) The founders of the country were very clear about the separation of church and state. Religion should stay out of government, and government should stay out of religion. It's really important for maintaining a strong and healthy religion, and maintaining a strong and healthy government.
- 21) The environmental movement has been a very good thing and made our lives a lot better. However, environmentalists have not definitively proven that humans are causing global warming. Anyway, there's not much we can do about it, and restricting oil use definitely hurts the economy.
- 22) We cannot know for certain that global warming is caused by human activity. But by the time we know for sure, it'll be way too late. We must restrict carbon emissions and oil immediately. If we don't, there'll be flooding and chaos across the globe.
- 23) Reducing taxes should always be the government's goal. Businesses shouldn't be taxed so hard; they've worked for their money. Besides, taxes discourage spending. The more money people have, the better off they are. It's good when people can buy the things they want and need.
- 24) Taxes are the price we pay for civilization; for schools, roads, and medicare. It's fair that wealthy people, and especially businesses, put some of their money back into life-saving programs. We have to recognize that there are costs and benefits to our current tax system.