REPLICATING AND EXTENDING EVIDENCE FOR THE UNILATERALITY OF GROUP LOYALTY

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ABSTRACT

Intergroup competition was a powerful selection force shaping human coalitional psychology. Individuals presenting multiple loyalties among competing groups represent a threat for defection. Thus, there is likely to be a social norm that loyalty should be unilateral among competing groups. Four studies provided evidence supporting this notion, however some of the results have been challenged and suggested to be products of methodological confounds. Also, some participants reported being confused by some of the experimental content, thus providing inaccurate responses. The current study is a modified replication of the survey project (Study 3), controlling for the suggested methodological confounds and revising instructions to clarify participant tasks. The original effects were reproduced, increasing the confidence in the interpretation of results. In addition, data were gathered in an additional set of items that were original to this study. These items directly tested the relative mutual exclusivity of loyalties based on the relationships among teams. Results from these items provide further evidence for a social norm of unilateral group loyalty.

Keywords: *Group loyality, inter-group competition, sports team, rivalries.*

INTRODUCTION

Behaviors related to inter-group competition and in-group loyalty are common in social species (van der Dennen, 2002). For example, male chimpanzees conduct territorial boundary patrols and sometimes lethal raids of neighboring groups' territories (Goodall, 1990). Inter-group and intra-group competition were strong selection forces for our hominid ancestors, especially after they achieved ecological dominance over other species (Alexander, 1979). Mass graves have been found of human bodies exhibiting violent injuries from as early as 200,000 years ago (Keeley, 1996). Forming group coalitions promoted reproductive success through the acquisition of resources, territories, and mates (Kenrick, Li, & Butner, 2003).

Humans differentiate groups quite readily, even from superficial criteria (Sherif, 1966; Wetherell, 1982). Group differentiation can quickly lead to deep emotional attachments to one's in-group (Brewer, 1979; Ostrom & Sedikides, 1992; Tajfel & Turner, 1979). Coalitional favoritism of in-groups and rejection of out-groups are extensively documented (see Ruffle and Sosis, 2006). The importance of group loyalty as one of the most important aspects of social relations has been recognized for nearly a century (Bogardus, 1924).

An observational study of team loyalty displays found that no one in over 4000 individuals simultaneously wore apparel from more than one college or university, whether or not the university teams were athletic competitors (Kruger & Kruger, 2015). Individuals presenting multiple loyalties among competing groups may be considered a potential defector in competitive situations. They may be especially dangerous due to their familiarity with group characteristics, knowledge of privileged information, and access to protected areas. Thus, there may be a social norm that a person cannot simultaneously support two competing groups or teams. The results of four pre-registered studies provided supportive evidence for beliefs that group loyalty should be unilateral among competitors (Kruger, Day, Duan, Heyblom, Juhasz, Misevich, Phaneuf, Saunders, Sonnega, & Sreenivasa, 2019).

Critics have suggested that some of the results demonstrated in these studies are a product of methodological confounds. Several of these studies utilized individuals or pictures of individuals wearing clothing featuring the names, logos, and color schemes of two rival universities. Critics proposed that individuals were not reacting to the apparent display of mixed loyalties for these rival schools, but rather a more basic reaction to the fashion faux-pas of combining attire with such a high contrast in colors (deep blue and bright red). Another challenge was an argument that the study did not really demonstrate that loyalties were expected to be mutually exclusive within a set of competitors, as only two rival teams were included in the stimuli of the original study. Critics proposed that people may have been reacting to seeing any two teams being displayed together, regardless of whether or not they were rivals or competitors.

Also, some of the survey items used in one of the studies included images with the one-letter logos of the rival schools. These items were based on Aron et al.'s (1992) Inclusion of Other in Self (IOS) scale where a circle representing the self exhibits increasing levels of overlap with a circle representing the other, in this case the universities. The item instructions read "Please select the picture that best describes your relationship," consistent with the design of the original IOS items. In an open-ended

comment field at the end of the study, several participants reported that they did not understand the initial IOS question(s) and responded incorrectly to these items. This issue was most prevalent when participants first saw the IOS items with the logo of the rival university without any other context. This item was at the beginning of the section and participants reported not recognizing the logo until seeing the other images and questions. Only about half (53%) of the participants at the authors' university were from in-state, and 5% were international students. Those who were less familiar with the athletic fan culture and sports rivalry may have been less likely to recognize the rival team's logo.

Current Study

The current study was a modified replication of the survey project (Study 3) in the original publication, controlling for the proposed methodological confound of clashing color schemes and revising the instructions for the IOS items to clarify participant tasks. Additional items addressed critics' arguments regarding loyalties being mutually exclusive within a set of competitors, rather than a general aversion to combining loyalty displays for any two groups or teams. The study repeats tests of the five original hypotheses that were pre-registered prior to data collection for the original study with the Open Science Framework [https://osf.io/39pcu/]. H1: Participants who indicate a high degree of self-other overlap with one university team will indicate a high degree of separation from the other university team. H2: Participants' ratings of their reactions to the mixed loyalty images will differ from their ratings of their reactions to the matching loyalty images for both their favored team and the rival team. Ratings for anger, confusion, disgust, and surprise will be highest for the mixed images. Ratings for enjoyment and pride will be highest for the matching loyalty image featuring their favored team. H3: Participants' conceptualizations of the university teams will tend to demonstrate a high degree of separation from each other. H4: Participants' ratings of the social norm proposed by the central project hypothesis, that one can be loyal to only one team among two competing groups or teams, will be significantly biased towards agreement. H5: Participants' open-ended responses will provide evidence for agreement with the central project hypothesis regarding unilateral loyalty. Some participants may explicitly express that it is inappropriate to simultaneously wear clothing featuring two competing teams, that one cannot simultaneously be a fan of or loyal to both teams, or that one has to choose sides in a competition. There were expected to be at least four times as many participant comments agreeing with the proposed social norm as those disagreeing with the proposed social norm.

The current study also includes novel items designed to examine the relative exclusivity of loyalties to rival teams in comparison to teams with other relationships. Critics of the original study argued that the previous design did not really indicate whether loyalties to rival teams were mutually exclusive or proposed that a similar pattern of results would be found given any display combining affiliation with two different teams. The new items examined the relative exclusivity between the two rival teams and a set of other teams, including that team's rival and teams with other relationships. Participants were expected to indicate that someone who was a fan of one

of the rival teams was least likely to be a fan of the other rival team, in comparison with being fans of teams that would rarely or never compete with the two rival teams.

METHODS

Participants

Undergraduates (N = 460, M age = 19, SD age = 2, 67% female) enrolled in large public universities in Michigan (87%) and Ohio (13%) completed anonymous on-line surveys at their convenience. This sample size was 42% larger than the original sample, with similar demographic and geographic characteristics. Michigan participants were recruited from the Introductory Psychology Subject Pool in Winter 2018 and Fall 2018, these participants received credit towards their course requirements. Ohio participants were recruited from Psychology courses in Fall 2017 and were not compensated. The novel items were added in the Fall 2018 wave of data collection, the participants completing these items (N = 174, M age = 19, SD age = 6, 63% female) were demographically similar in composition to the overall sample, although they were all students at the university in Michigan.

Materials and Procedure

The survey content was adapted from the original study (Kruger et al., 2019). Responses to items based on the Inclusion of Other in Self (IOS) scale (Aron et al., 1992) were used to test H1. Item instructions read "Please select the picture that best describes your relationship with the University of Michigan" and participants selected one of eleven images with a circle labeled "You" and a circular image of the university's "Block M" logo. Response options ranged from one diameter (100%) separation between images to complete (100%) overlap of images, approaching each other and eventually merging in 20% image diameter intervals. Alternate item instructions read "Please select the picture that best describes your relationship with the Ohio State University" and participants selected one of eleven images with a circle labeled "You" and a circular image of the university's "Buckeye O" logo. Participants completed both of these items in randomized order. Responses to these items were analyzed after data collection to categorize team preferences for tests of H2.

Predictions in H2 were tested based on participants' responses to images of a traditional age college undergraduate male confederate wearing combinations of apparel displaying university names and logos. The confederate wore a t-shirt with the university name "Michigan" or "Ohio State" in traditional block letter font and a hat with either the University of Michigan Wolverines "Block M" logo or Ohio State University Buckeyes "O" logo. The images used in the original study were converted to greyscale, removing all color. The survey randomly presented one of four images (matching OSU, matching UM, UM hat and OSU t-shirt, OSU hat and UM t-shirt) for the first set of items. For the second set of items, the survey program randomly selected one of the matching loyalty images if the first image was a mixed loyalty image and one of the mixed loyalty images if

the first image was a matching loyalty image. Thus, based on responses to the initial IOS-based items, each participant rated one mixed loyalty image and a matching loyalty image of either their favored team in the rivalry or the rival team.

Participants indicated their reactions to these images with items representing basic emotional reactions (Ekman, 1992) as well as the cognitive reaction of "confusion." After each set of emotional and cognitive items, participants responded to an open-ended item "Why do you feel this way?," which generated feedback to test H5. The IOS-based item originally used to test H3 was modified to specify the names of the universities in the instructions, "Please imagine that these diagrams represent relationships and select the picture that best describes the relationship between the University of Michigan and Ohio State University." Logo images for both teams (modified to 50% transparency) were used as stimuli. Response options ranged from one diameter (100%) separation between images to complete (100%) overlap of images, approaching each other and eventually merging in 20% image diameter intervals. This section was followed by an item testing H4, assessing agreement or disagreement with the social norm proposed in the central project hypothesis regarding unilateral loyalty, "Please indicate how strongly you agree or disagree with the following statement: When there are two competing groups or teams, you can be loyal to only one of the teams."

Novel items were added to the end of the survey section. The first new item assessing the relative exclusivity of team loyalties read, "Please imagine you meet someone your age who is a University of Michigan football team fan. Which statement about him is most likely to be FALSE?" Participants selected one of five options presented in randomized order, "He is a Ohio State University fan," "He is a Eastern Michigan University fan," "He is a University of Toledo fan." "He is a Detroit Lions fan," and "He is a Cleveland Browns fan," Participants were expected to predominantly select the option for the rival team (Ohio State University). The rival schools are in the National Collegiate Athletic Association (NCAA) Division I Big Ten Conference ("B1G"), the oldest Division I collegiate athletic conference in the United States. Eastern Michigan University and University of Toledo are in the NCAA Division I Mid-American Conference and would not ordinarily play either the University of Michigan or Ohio State. Eastern Michigan University is located in Michigan, the University of Toledo is located in Ohio. The Detroit Lions and Cleveland Browns are professional teams in the National Football League and would not play any of the collegiate teams. The Detroit Lions are based in Michigan, the Cleveland Browns are based in Ohio. The second item was similar to the first item, "Please imagine you meet someone your age who is an Ohio State University football team fan. Which statement about him is most likely to be FALSE?" with the same response options as the first item except "He is a Ohio State University fan," was replaced with "He is a University of Michigan fan."

Analyses

H1 was tested by examining the matrix of responses for the initial IOS-based items. For those indicating a high degree of identification with one team (60-100% diameter overlap), the number of participants indicating high (60-100% diameter) separation and the number of participants indicating moderate (20% diameter) separation from the other team to 100% overlap with the other team were calculated. These proportions

were compared with a Chi-Square test. A one-sample t-test with the middle response (option 6, adjacent images with 0% separation and 0% overlap) as the test value also examined these responses.

Confederate image conditions (matching favored team, matching rival team, and mixed loyalty) were classified based on fan preferences expressed in the initial IOS-based items. Participants with equivalent scores on these items were excluded from analyses testing H2. H2 was tested with ANOVAs for each of the reaction ratings. Between-subjects comparisons were conducted for both sets of images, including the Tukey-b multiple comparison procedure. The data were restructured to enable within-subjects comparisons of matching favored team vs. mixed loyalty and matching rival team vs. mixed loyalty. H3 was tested by a one-sample t-test with the middle response (adjacent images with 0% separation and 0% overlap) as the test value for the IOS-based university logos item. H4 was tested with a one-sample t-test with the middle (neutral) response as the test value for responses to the central project hypothesis item.

Participants' open-ended comments following the emotional and cognitive ratings for the mixed outfit images were coded into agreement, disagreement, neutral, and ambiguous categories regarding the central hypothesis to test H5. Agreement responses explicitly expressed that it is inappropriate to simultaneously wear clothing featuring two competing teams, that one cannot simultaneously be a fan of or loyal to both teams, or that one has to choose sides in a competition (e.g., "The kid is wearing the clothing items of two of the biggest rivals in college in the country." ; "He is wearing the shirt from the best school in the world but has the audacity to wear the one thing that should never be worn with that shirt." Disagreement responses supported the confederate's choice of attire and/or disagreed with the proposed social norm (e.g., "I don't have an opinion about that person. They able to wear whatever they choose as long as it does not directly harm others in my eyes." ; "It's kind of weird that someone likes Ohio State and U-M but its their choice"). Neutral statements expressed neutrality towards the proposed social norm or a lack of interest (e.g., "I do not care about the rivalry between the two schools at all. This picture does not affect me." ; "Who cares?"). Statements that were not directly addressing the central project hypothesis ("Because I hate Ohio State" ; "I am a wolverine through and through") and statements outside of the context of the research topic (e.g., "He looks calm but not very happy") were classified as ambiguous. Statements expressing confusion or being suggestive without specifically mentioning the rivalry (e.g., "He has a certain shirt on," ; "It is confusing," ; "I think it's just weird for people to wear like this.") were noted and were ultimately classified as ambiguous to increase confidence in the conclusions regarding these items.

RESULTS

The replication study reproduced the results supporting H1, $\chi^2_{(1)}$ = 183.33, p < .001, of 314 participants who highly identified (indicated a high degree of self-other overlap) with one team, 242 (77%) had high separation from the rival team and 22 (7.0%) highly identified with the rival team. Ratings for the rival team were significantly biased towards separation, $t_{(313)}$ = 22.52, p < .001, d = 1.27, 95% CI difference: 3.18 – 3.79, observed power $(1 - \beta)$ = 0.99.

The replication study reproduced all of the results supporting H2 in the between-subject comparisons of the first confederate image presented (see Tables 1 and 2 and Figures 1 and 2). Reactions of Confusion and Surprise were again higher for the mixed image than for the rival image and favored image. In addition, ratings of Confusion were higher for the rival image than the favored image. Reactions of Anger and Disgust were again higher for the mixed image than for the favored image, but also did not differ between the mixed image and rival image. Participants' Enjoyment and Pride reactions were higher for the matching favored image than the matching rival image and the mixed image.

The replication study reproduced all of the results supporting H2 in the between-subject comparisons of the second confederate image presented. Reactions of Confusion and Surprise were again higher for the mixed image than for the rival image and favored image. Reactions of Anger and Disgust were again higher for the mixed image than for the favored image and did not differ between the mixed image and rival image. In the original study, disgust was higher for the rival image than for the mixed image, contrary to the predicted direction. Participants' Enjoyment and Pride reactions were higher for the matching favored image than the matching rival image and the mixed image. The within-subject comparisons of responses to the first and second images again replicated this pattern of results (See Table 2).
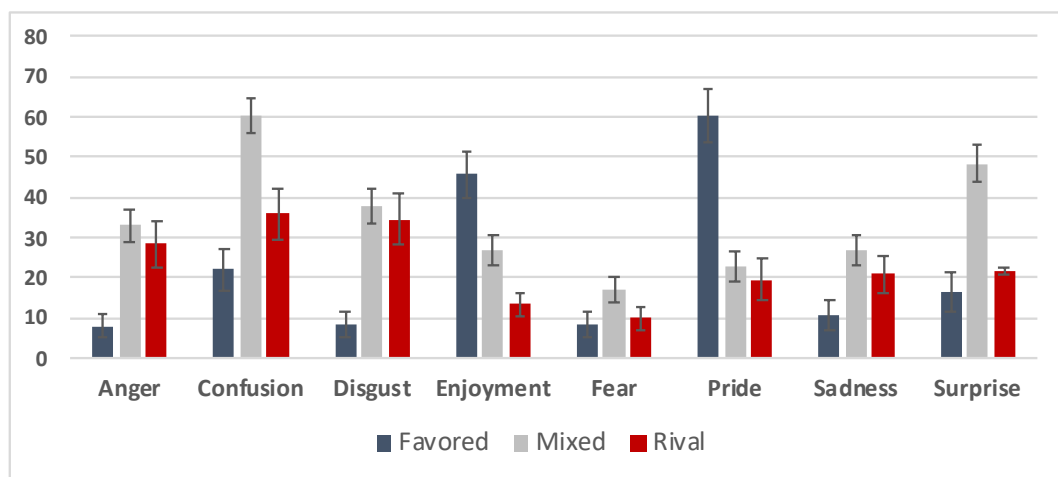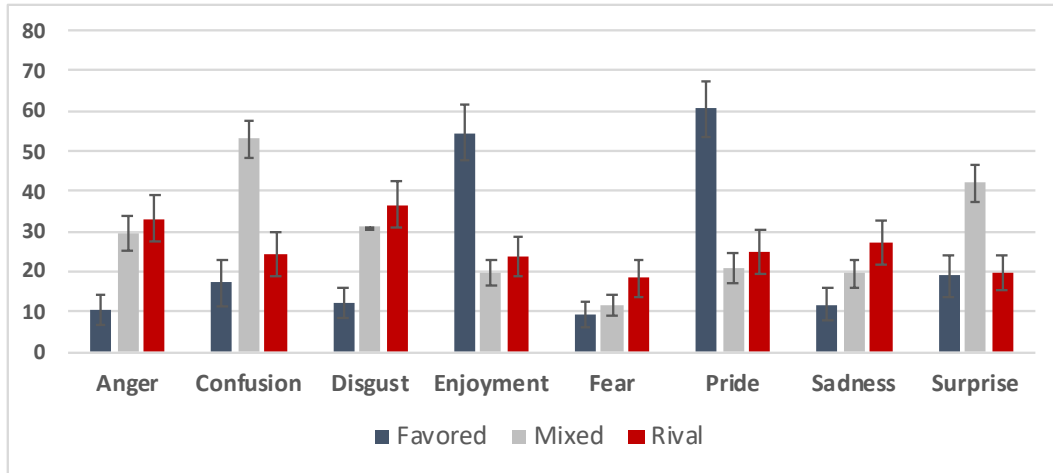

Figure 1: Participants' ratings of the first confederate image with 95% Confidence Intervals.

Table 1: Between-subject differences in ratings of emotional reactions by comparison

First Image								
Reaction	Favored		Rival		Mixed		$F_{(2,441)}$	p
	M	SD	M	SD	M	SD		
Anger	7.97[a]	15.50	28.40[b]	30.64	33.01[b]	31.10	28.98	.001
Confusion	22.09[a]	27.11	35.85[b]	34.24	60.43[c]	33.30	56.76	.001
Disgust	8.30[a]	15.45	34.56[b]	33.61	37.83[b]	33.49	35.78	.001
Enjoyment	45.61[c]	31.11	13.27[a]	16.70	26.86[b]	28.19	41.57	.001
Fear	8.49[a]	16.10	9.90[a]	15.72	17.05[b]	23.06	8.78	.001
Pride	60.24[b]	33.53	19.44[a]	28.82	22.89[a]	27.64	69.22	.001
Sadness	10.60[a]	20.16	20.78[b]	26.42	26.78[b]	29.58	13.04	.001
Surprise	16.67[a]	25.16	21.50[a]	27.15	48.46[b]	34.00	52.13	.001

Second Image								
Reaction	Favored		Rival		Mixed		$F_{(2,442)}$	p
	M	SD	M	SD	M	SD		
Anger	10.57[a]	18.10	33.07[b]	31.86	29.48[b]	31.69	18.59	.001
Confusion	17.12[a]	28.30	24.34[a]	28.82	53.01[b]	36.14	54.31	.001
Disgust	11.97[a]	19.27	36.63[b]	34.12	30.93[b]	33.21	18.70	.001
Enjoyment	54.38[b]	34.22	23.54[a]	26.86	19.41[a]	24.90	56.96	.001
Fear	9.21[a]	15.46	18.24[b]	24.84	11.44[a]	20.56	5.94	.003
Pride	60.40[b]	35.24	24.71[a]	29.14	20.69[a]	27.57	63.91	.001
Sadness	11.59[a]	20.14	27.16[c]	30.60	19.37[b]	28.78	8.50	.001
Surprise	18.84[a]	26.93	19.58[a]	24.65	41.96[b]	36.00	28.98	.001

Note: Means with different superscripts indicate significant differences.

Figure 2: Participants' ratings of the second confederate image with 95% Confidence Intervals.

**Table 2:** Within-subject differences in ratings of emotional reactions by comparison

Favored team vs. Mixed loyalty								
Reaction	**Paired Differences**		**95% CI**		$t_{(202)}$	**p**	**d**	**1-β**
	M	**SD**	**Lower**	**Upper**				
Anger	-21.64	-21.64	-25.91	-17.37	-10.00	.001	-0.70	1.00
Confusion	-37.85	39.69	-43.34	-32.36	-13.59	.001	-0.95	1.00
Disgust	-24.65	33.41	-29.27	-20.03	-10.51	.001	-0.74	1.00
Enjoyment	29.43	37.51	24.24	34.62	11.18	.001	0.78	1.00
Fear	-3.72	17.22	-6.10	-1.34	-3.08	.002	-0.22	0.88
Pride	41.16	37.23	36.01	46.31	15.75	.001	1.11	1.00
Sadness	-11.74	27.89	-15.60	-7.88	-6.00	.001	-0.42	1.00
Surprise	-30.19	37.08	-35.87	-24.51	-10.49	.001	-0.81	1.00
Rival team vs. Mixed loyalty								
Reaction	**Paired Differences**		**95% CI**		$t_{(226)}$	**p**	**d**	**1-β**
	M	**SD**	**Lower**	**Upper**				
Anger	0.61	24.84	-3.21	4.42	0.31	.648	-0.03	0.07
Confusion	-23.64	43.57	-30.34	-16.95	-6.97	.001	-0.61	1.00
Disgust	6.95	23.98	3.26	10.63	3.72	.328	0.07	0.18
Enjoyment	-9.29	29.70	-13.85	-4.72	-4.02	.001	-0.29	1.00
Fear	-5.12	23.04	-8.66	-1.58	-2.86	.304	-0.07	0.18
Pride	-8.72	32.59	-13.72	-3.71	-3.44	.055	-0.13	0.50
Sadness	-2.86	30.57	-7.55	1.84	-1.20	.435	0.05	0.12
Surprise	-22.21	44.80	-29.10	-15.33	-6.37	.001	-0.54	1.00

The effect sizes in the original and replication studies were quite similar (See Figures 3-7). The similarity in effects across ratings of emotional and cognitive reactions and across image presented is striking. Note that the effect sizes in these figures are given as absolute values.

The replication study reproduced the results supporting H3, responses to the dual university logo IOS item were biased towards separation, $t_{(459)} = 20.55$, $p < .001$, $d = 0.96$, 95% CI difference: 2.55 - 3.09, observed power $(1 - \beta) = .99$. The replication study reproduced the results supporting H4, participants ratings of loyalty as unilateral were biased towards agreement, $t_{(459)} = 8.64$, $p < .001$, $d = 0.40$, 95% CI difference: 0.51 – 0.82, observed power $(1 - \beta) = 0.99$. More than twice as many participants (60.4%) agreed than disagreed (27.6%) with the notion that one can be loyal to only one team in a group of competitors, $\chi^2_{(1)} = 56.16$, $p < .001$. The replication study reproduced the results supporting H5, $\chi^2_{(1)} = 209.92$, $p < .001$, open-ended responses to the mixed loyalty image included agreement (241), disagreement (11), neutral (63), and ambiguous (142) statements regarding the proposed social norm. There were 22 times more participant comments consistent with the social norm for unilateral loyalty than disagreeing with the social norm.
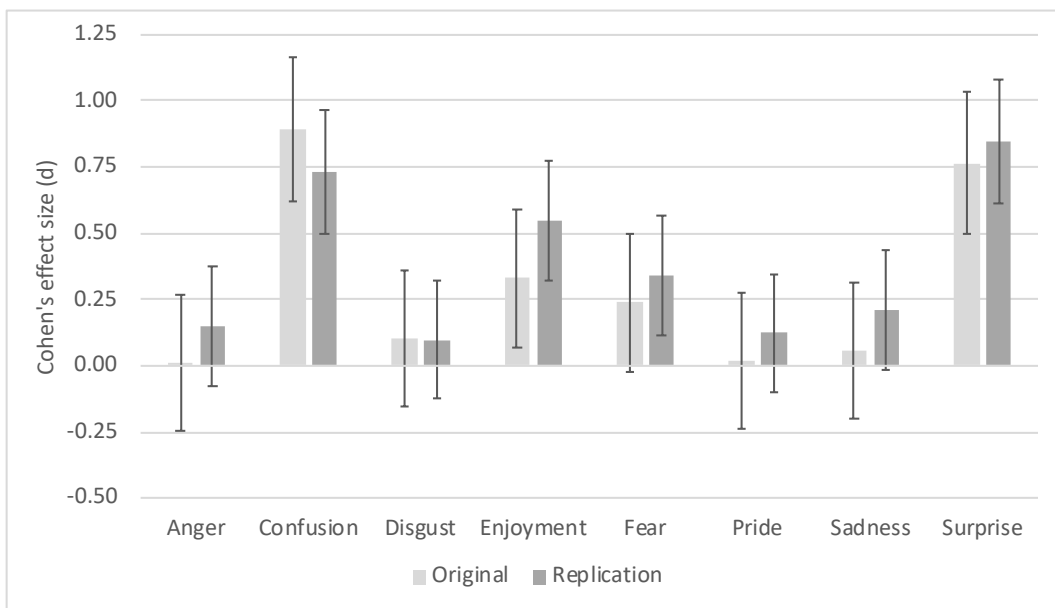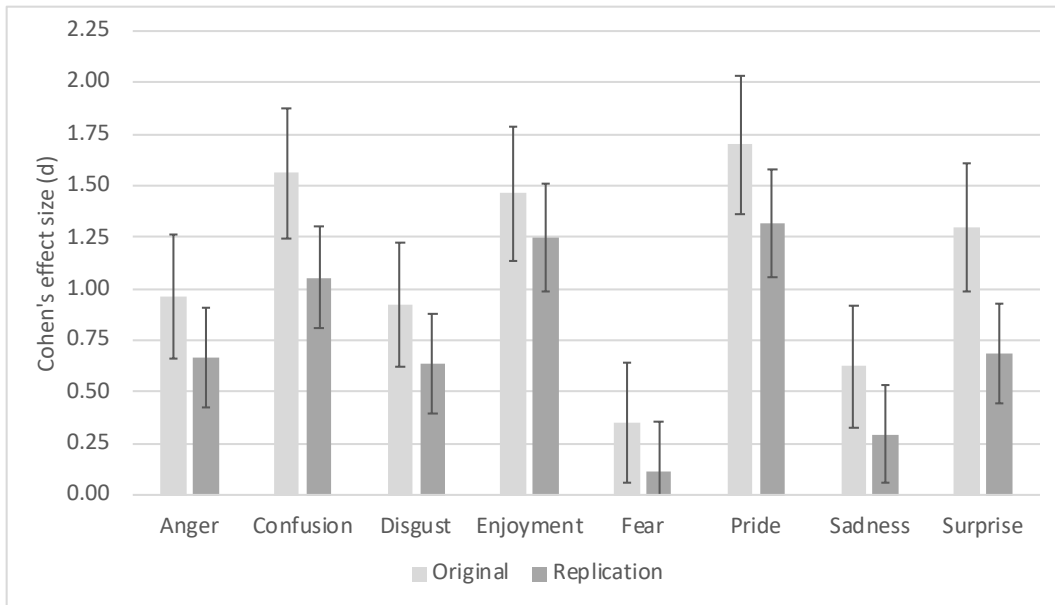

Figure 3: Effect sizes with 95% confidence intervals for between-subjects comparisons of reactions to the first image: Mixed loyalty image vs. Rival team loyalty image.
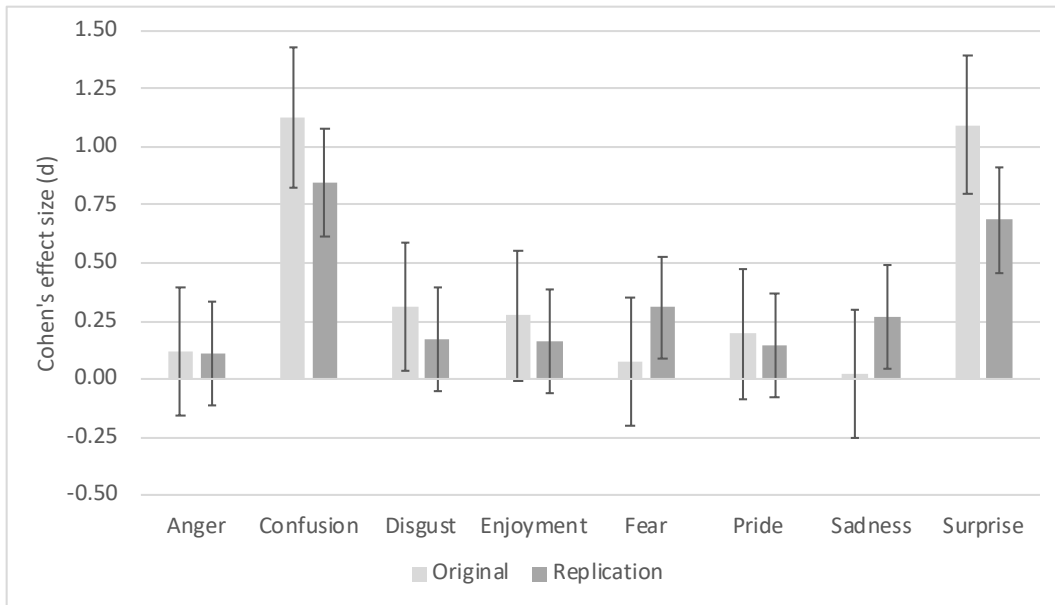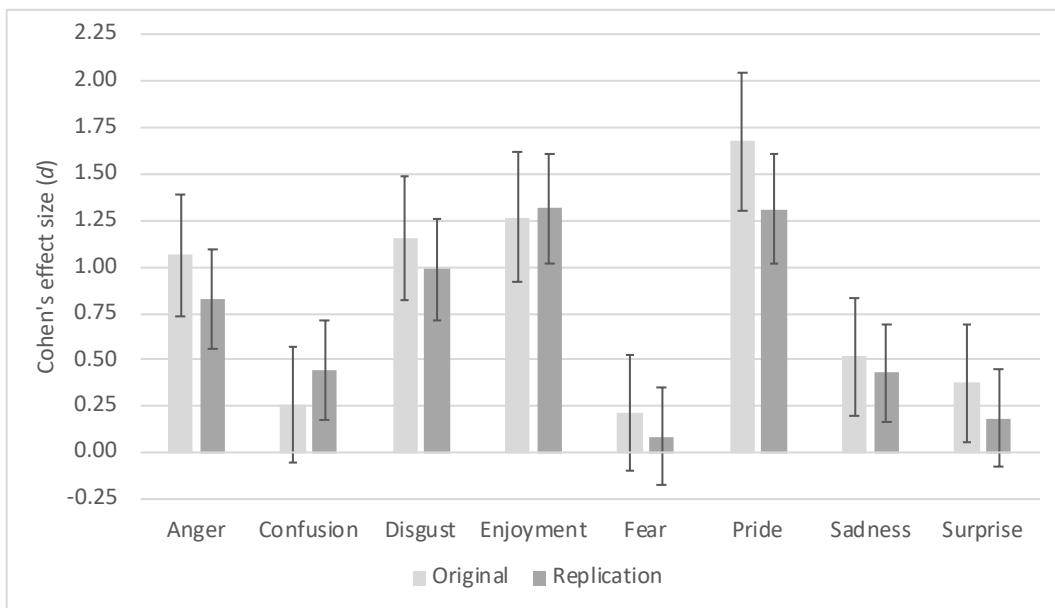
Figure 4: Effect sizes with 95% confidence intervals for between-subjects comparisons of reactions to the second image: Mixed loyalty image vs. Rival team loyalty image.
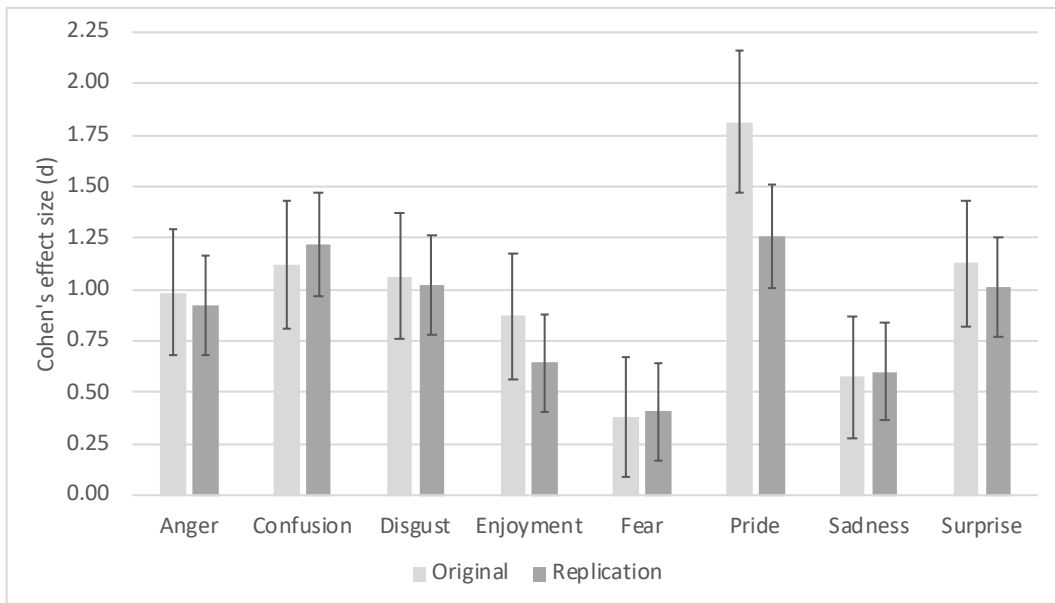
Figure 5: Effect sizes with 95% confidence intervals for between-subjects comparisons of reactions to the first image: Mixed loyalty image vs. Favored team loyalty image.

Figure 6: Effect sizes with 95% confidence intervals for between-subjects comparisons of reactions to the second image: Mixed loyalty image vs. Favored team loyalty image.
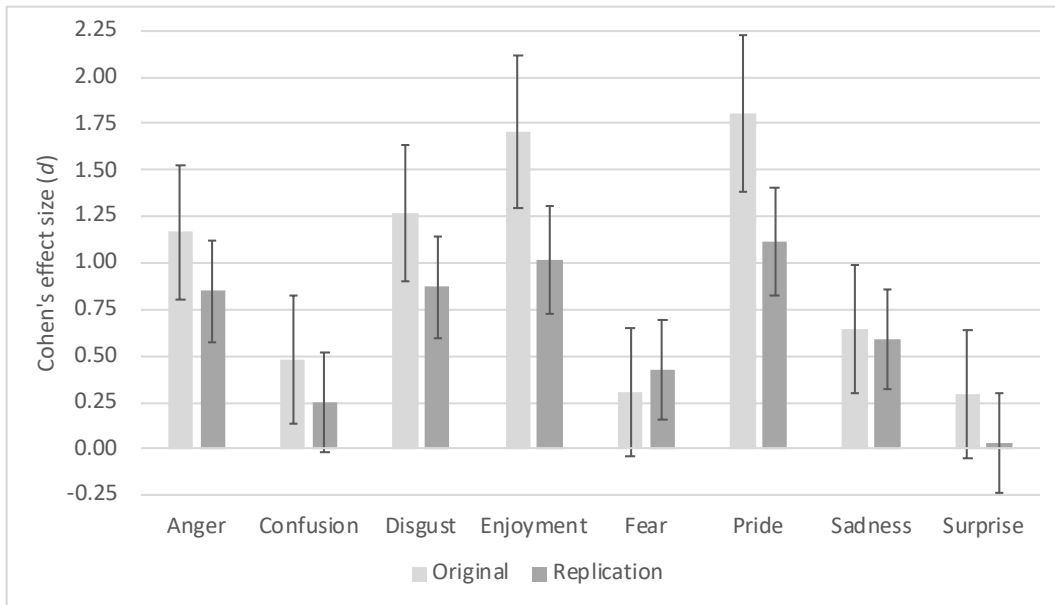

Figure 7: Effect sizes with 95% confidence intervals for between-subjects comparisons of reactions to the first image: Rival team loyalty image vs. Favored team loyalty image.

Figure 8: Effect sizes with 95% confidence intervals for between-subjects comparisons of reactions to the second image: Rival team loyalty image vs. Favored team loyalty image.

Responses to the novel items confirmed predictions. For the character described as a University of Michigan football team fan, 162 (92% of) respondents choose "He is a Ohio State University fan" as the statement most likely to be false, indicating a substantial bias, $\chi^2_{(4)} = 574.71$, $p < .001$. The other response options were selected by few participants, six chose "He is a Detroit Lions fan," five chose "He is a University of Toledo fan," two chose "He is a Cleveland Browns fan," and one chose "He is a Eastern Michigan University fan." For the character described as an Ohio State University football team fan, 163 (93% of) respondents choose "He is a University of Michigan fan" as the statement most likely to be false, indicating a substantial bias, $\chi^2_{(4)} = 583.971$, $p < .001$. The other response options were selected by few participants, six chose "He is a Cleveland Browns fan," five chose "He is a Detroit Lions fan," two chose "He is a University of Toledo fan," and none chose "He is a Eastern Michigan University fan."

DISCUSSION

Overall, this study strengthens confidence in the evidence for beliefs enforcing the unilaterality of loyalty among competing groups or teams. All of the emotional and cognitive reaction effects in the original study were reproduced, with remarkably similar effect strengths despite the control for the potential confound of clashing color schemes. There were no new effects providing support for additional aspects of the original hypotheses, so there is more certainty in identifying the mechanisms involved. Clarifications in the wording of the Inclusion of Other in Self items resulted in an effect that was twice as strong as the one in the original study. The new items regarding the exclusivity of loyalties provided additional support that unilateral loyalty is expected among rivals or frequent competitors, rather than among groups that rarely or never compete with each other.

The patterns of emotional and cognitive reactions help clarify the interpretation of beliefs regarding mixed loyalty. Displays that combine affiliations among competitors are most distinguished by the surprise and confusion they produce. They also generate feelings of anger and disgust, understandably higher than for consistent displays of loyalty to one's favored team, but no more so than consistent displays of loyalty to the rival team. Displays of mixed loyalty do not generate the feelings of enjoyment and pride that is seen with allegiance displays to one's favored team. Thus, the reactions to loyalty displays are not additive. A person who displays mixed allegiance amongst rivals produces similar reactions as someone who consistently supports the rival of one's favored team, but also generates shock and bewilderment. One who mixed loyalties appears to be seen as just as much a threat as a rival, but not more of a contaminant who could possibly "infect" allies with duplicitous allegiance.

The decision rules regarding H5 were retained from the original study, despite their limitations, to faithfully reproduce the methodology. This hypothesis was framed in terms of agreement with the notion that loyalty is unilateral within a set of competitors, rather than agreement that this notion exists as a social norm. As in the original study, many of the responses classified as Disagreement or Neutral (see also below) explicitly noted the rivalry and the surprising or unusual nature of the mixed loyalty attire: "It makes me wonder why he's wearing the opposing teams' clothing, however I don't feel close enough to the university to be offended." ; "There's a big rivalry between the two schools, but I have no hatred for the school itself. A few of my best friends go to Ohio State." Many of the statements classified as Ambiguous using the criteria from Study 3 in the original research would have been classified as "Statements regarding inappropriate or confusing behavior," and thus supportive of the hypothesis with the criteria stated in Study 2: "This dude is mad confused" ; "What is the wearer trying to accomplish? To get a rise out of people? Well my jimmies are rustled." ; "This boy is obviously confused and needs psychiatric help."

Many participants reported being amused by the surprising sight someone wearing apparel featuring both of the two rival schools, especially when this was the first image presented(e.g., "I giggled because I assumed this would upset some of the UofM students." ; "This picture is confusing and surprising, but I find the picture somewhat funny because of the uniqueness of the outfit."). Some participants explained that this is why their ratings for enjoyment were so high, which helps to explain the pattern seen in

the ratings for the first image presented where the mixed loyalty image is intermediate between the favored team and the rival. This pattern was not repeated for the second image presented.

As suggested by the reactions above, there was considerable individual variation in responses to displays of mixed loyalty. Many participants whose responses were categorized as Neutral expressed a lack of reaction: "No interest in sports rivalries" ; "I don't really care about the rivalry between U of M and Ohio State so I don't care what he's wearing." ; "just wondering why this is important the rivalry doesn't mean that much to me." On the other hand, some participants expressed strong adverse feelings: "he is a traitor" ; "I hate bandwagon fans and the fact that he is supporting two rival teams at the same time makes me think he is a snake." ; "I hate when people wear two different labels like that." Some of these participants also used profanity regarding the confederate, the rival school, or the apparel representing the rival school. Additional research will be needed to identify factors associated with the strength of beliefs in unilateral loyalty and beliefs regarding the importance of rivalries. In the original observational study assessing naturalistic reactions, men, young adults, and those wearing university merchandise themselves were more likely to react to the confederate, in both mixed and matching loyalty display conditions (Kruger et al., 2017). Life history variation predicts the level of risks taken in between-group competition (Wang et al., 2009), which may be related to beliefs regarding loyalty in inter-group competition.

As found in the original study, many of the responses categorized as Disagreement indicated beliefs that kinship trumps team loyalty: "It doesn't make a lot of sense that someone would wear the clothes to represent one school and also its rival, but I could understand if you had relatives that went to both." ; "It's a little confusing that he is wearing an OSU hat and a UM shirt, but maybe he has family that goes to one or the other, its no big deal." ; "Families with kids going to different colleges can cheer for both."

Participant responses raised additional topics that could be examined with future research. Several participants remarked about "clashing colors," "He's wearing both school's colors" ; "those colors don't even work together pick a side." This was initially alarming, as the replication study was designed to control for the different university color schemes. It was verified that the survey was displaying the greyscale images, so participants could be using "colors" as a colloquial expression for allegiance. It is also possible that participants mentally imputed the universities' traditional colors into the greyscale images. Some participants expressed insights into the intentional creation and maintenance of university sports rivalries as a mechanism to generate public interest, "The reason I put U of M and OSU kind of close in the Venn diagram is because of the shared football history. The football teams need each other to maintain the rivalry." Others noted the rivalry was a natural product of placing teams in a competitive athletic conference (The Big Ten).

Limitations

The use of the greyscale images increased the chance that participants did not recognize the plural allegiance expressed in the mixed loyalty images. It is possible that some participants did not notice or recognize the "O" on the hat as representing Ohio State when the colors were removed, or even the Block M representing Michigan. One participant viewing the mixed loyalty image with the Michigan t-shirt and Ohio State hat remarked "I am a huge Michigan fan so I love this picture!" Another Michigan student remarked, "I'm just now realizing that this dude is wearing a Umich hat" for the Ohio State t-shirt and Michigan hat mixed-loyalty image. Rather than providing an alternative explanation for the results, this issue would have decreased the chance of identifying the predicted effect.

Conclusion

This study provides confirmatory evidence for the conclusions of the original study regarding the unilaterality of loyalty among competing groups or teams. Displaying mixed loyalty among competitors is surprising and confusing, and those who do so may be considered as a rival and not as an ally. It is remarkable that the patterns of effects and effect sizes were consistent when using images devoid of color, in order to control for aesthetically clashing color schemes. The color contrast in itself is likely jarring. Clarifications in item wording increased the strength of predicted effects. Additional items resolved concerns for conceptual issues regarding the boundary conditions for unilaterality, loyalty was considered mutually exclusive among rivals, though individuals could have multiple affiliations with non-competing sports teams.

ETHICAL STATEMENT

These studies were approved by the Institutional Review Board for Health Sciences and Behavioral Sciences at the University of Michigan [HUM00027121].

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