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Consistent-handed individuals are more authoritarian

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Individuals differ in the consistency with which they use one hand over the other to perform everyday activities. Some individuals are very consistent, habitually using a single hand to perform most tasks. Others are relatively inconsistent, and hence make greater use of both hands. More- versus less-consistent individuals have been shown to differ in numerous aspects of personality and cognition. In several respects consistent-handed individuals resemble authoritarian individuals. For example, both consistent-handedness and authoritarianism have been linked to cognitive inflexibility. Therefore we hypothesised that consistent-handedness is an external marker for authoritarianism. Confirming our hypothesis, we found that consistent-handers scored higher than inconsistent-handers on a measure of submission to authority, were more likely to identify with a conservative political party (Republican), and expressed less-positive attitudes towards out-groups. We propose that authoritarianism may be influenced by the degree of interaction between the left and right brain hemispheres, which has been found to differ between consistent- and inconsistent-handed individuals.

Keywords: Authoritarianism; Handedness; Interhemispheric interaction.

People differ in how they use their hands. Specifically, some people habitually use the same hand (whether left or right) to perform most everyday tasks, while other people make greater use of both hands, at least for some tasks. We have described the former type of individual as consistent-handed and the latter type as inconsistent-handed (Lyle, Hanaver-Torrez, Hackländer, & Edlin, 2012; Lyle & Orsborn, 2011). Questionnaire research using handedness inventories has repeatedly revealed substantial individual

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variation in consistency, from very consistent to very inconsistent (e.g., Annett, 1970; Oldfield, 1971; Peters & Murphy, 1992; Williams, 1986).

While consistent and inconsistent individuals obviously differ in how they use their hands, they also differ, on average, in many aspects of personality and cognition, some of which will be reviewed below. In this paper we ask whether people who are consistent-handed may be more authoritarian than people who are inconsistent-handed. This relationship is not obvious but we predicted that it may exist because, as we will describe, consistent-handed individuals have been found to resemble authoritarian individuals in numerous respects. Before detailing these resemblances we briefly review how authoritarianism has historically been conceptualised.

In a seminal work, Adorno, Frenkel-Brunswik, Levinson, and Sanford (1950) coined the term authoritarian personality and stated that it was characterised by strong adherence to externally imposed conventional norms, as well as submission or obedience to the authorities that promote those norms. According to Adorno and colleagues, these behaviours are attempts to deal with various personal insecurities. Specifically, authoritarian individuals displace their own anxieties onto weak minority groups in their culture (e.g., ethnic and/or religious minorities) or onto people who deviate from social norms (e.g., homosexuals). Displacement is often accompanied by associated beliefs that are highly evaluative and rigid. Other characteristics of the authoritarian personality include a cynical view of mankind, cognitive and emotional inflexibility, a belief in the need for power and toughness, the tendency to act harshly towards nonconformists, opposition to subjective or imaginative tendencies, and an exaggerated concern with promiscuity. Adler (1965) re-examined the personality characteristics described by Adorno and colleagues and noted that the central trait of the authoritarian personality is the “will to power over others”, which results in aggressive overcompensation for feelings of inferiority and insignificance. Contemporary research continues to rely on many of the conceptualisations and measures originated by Adorno and colleagues (Martin, 2001; Stone, Lederer, & Christie, 1993).

Altemeyer (1988, 1996, 1998) replicated Adorno et al.’s (1950) study and examined whether the components of authoritarianism correlated with right-wing political views. Although not all of the components of authoritarianism correlated significantly with right-wing political views, three did: conventionalism, submission to authority, and aggression towards targeted out-groups. These findings set the stage for current research on authoritarianism, which focuses on right-wing authoritarianism. This research is concerned with how political preferences are influenced by the aforementioned personality traits such as conventionalism, submission, and aggression (Butler, 2000; Ekehammar, Akrami, Gylje, & Zakrisson, 2004; Whitley, 1999). Jost, Glaser, Kruglanski, and Sulloway (2003) posited that right-leaning political

conservatism is a type of authoritarianism and that authoritarianism shares with political conservatism certain core components, including resistance to change and justification for inequality.

In sum, authoritarian individuals can be described as conventional, deferential to authority, politically conservative, and aggressive towards groups they perceive as challenging conventional values and beliefs. Do consistent-handed individuals possess any of these central characteristics of authoritarians? Prior to the present study, most of these characteristics have not been examined in consistent versus inconsistent individuals. However, there has been some work that relates to conventionality. Studies (e.g., Badzakova-Trajkov, Häberling, & Corballis, 2011; Barnett & Corballis, 2002; Nicholls, Orr, & Lindell, 2005) have repeatedly found that consistent individuals are less likely than inconsistent individuals to endorse unconventional beliefs on the Magical Ideation Scale (Eckblad & Chapman, 1983). This scale assesses belief in experiences such as mind-reading, reincarnation, and seeing the future. Also, Christman (2013) found that consistently right-handed individuals were less likely than inconsistently left- or right-handed individuals to prefer relatively unpopular, and hence unconventional, musical genres (e.g., bluegrass, reggae), as opposed to more popular genres (e.g., hip-hop, pop); there were few consistently left-handed individuals in this sample and they were excluded from statistical analyses. These findings suggest that consistent-handers resemble authoritarians in terms of being more conventional, with the caveat that only two very specific domains (magical ideation and musical preferences) have been examined to date.

More similarities between consistent-handers and authoritarians have become apparent from examination of characteristics beyond those already discussed. First, studies of preschool, high school, and college students have found a negative relationship between authoritarianism and creativity (Bayard-de-Volo & Fiebert, 1977; Calvani & Cesaretti, 1974; Rubinstein, 2003), and other research has found negative correlations between creativity and the related construct of conservatism (Dollinger, 2007). This fits well with Adorno et al.'s (1950) description of authoritarians as being opposed to imaginative tendencies. Consistent-handers tend to share this trait. Consistent-handers have been found to be less creative than inconsistent-handers, whether creativity is assessed on laboratory tasks (e.g., Shobe, Ross, & Fleck, 2009) or measures of realworld creative achievement (Badzakova-Trajkov et al., 2011). Second, recall that Adorno et al. (1950) posited that authoritarianism is a response to anxiety. Not surprisingly, then, studies have documented greater anxiety in more authoritarian individuals (Adorno et al., 1950; Butler, 2000; Davids, 1955; Endler & Shedletsky, 1973). A relationship between consistent-handedness and anxiety may also exist. Multiple studies have reported that more-consistent individuals score higher than less-consistent individuals on various self-report measures of anxiety

(Lyle, Chapman, & Hatton, 2013; Merckelbach, de Ruiter, & Olf, 1989; Wienrich, Wells, & McManus, 1982). Two caveats are necessary. One, some studies have failed to find this relationship (Beaton & Moseley, 1984; French & Richards, 1990), and one paper actually found the reverse (Hicks & Pellegrini, 1978). Two, the study by Lyle et al. showed that consistent-handers are more anxious compared only to inconsistent right-handers. Inconsistent left-handers were no less anxious than consistent-handed individuals.

Third, authoritarianism is associated with greater perception of risk and greater risk aversion. Altemeyer (1988) conducted several studies showing a significant positive correlation between right-wing authoritarianism and risk perception, while Baron (1968) reported a significant correlation between authoritarianism and the tendency to be conservative in risk-taking situations (i.e., risk aversion). Only one study has examined the relationship between handedness consistency and both risk perception and risk aversion, but its findings are intriguing. Christman, Jasper, Sontam, and Coolil (2007) had participants rate the riskiness of certain social activities (e.g., “Defending an unpopular issue that you believe in at a social occasion”, “Wearing provocative or unconventional clothes on occasion”) and their willingness to engage in those activities. Consistently right-handed participants perceived the activities to be riskier and were less willing to engage in them than inconsistently left- or right-handed individuals; no participants were classified as consistently left-handed in this sample. Consistent-handers’ greater risk perception and aversion did not extend to behaviours in nonsocial domains (financial, health/safety, recreational, or ethical), but the finding is nonetheless interesting as it relates to authoritarianism. Given authoritarians’ concern with conventionality, conformity, and promiscuity, they might be expected to be especially sensitive to the potential risk in social activities.

Fourth, and finally, authoritarianism is associated with emotional and cognitive inflexibility (Adorno et al., 1950) and resistance to change (Jost et al., 2003). The personality trait of openness to experience is negatively correlated with right-wing authoritarianism (Butler, 2000; Ekehammar et al., 2004; McCrae & Costa, 1997). In line with this, Oesterreich (2005) reported that authoritarians tend to reject the new and the unfamiliar, have rigid adherence to norms and value systems, and have anxious and inflexible responses to new situations. Furthermore, authoritarians are less likely to exhibit attitude change. One study testing the contact hypothesis in Israel found that people scoring high on authoritarianism did not exhibit attitude change (Amir & Garti, 1977). Another study found that, when confronted with persuasive messages, non-authoritarians were, not surprisingly, more likely to change their attitudes when the message came from a more- versus a less-credible source, while authoritarians were less influenced by source

credibility (Johnson, Torcivia, & Poprick, 1968). Similarly, consistent-handers have been characterised as generally less cognitively flexible than inconsistent-handers (Sontam & Christman, 2012). This characterisation is based on several specific findings that converge on a similar idea. Like authoritarians, consistent right-handers, exhibited less attitude change in response to a persuasive message than did inconsistent left- or right-handers (Christman, Henning, Geers, Propper, & Niebauer, 2008), and they were also more rigid in their perception of ambiguous figures (Christman, Sontam, & Jasper, 2009) and poorer at counterfactual thinking (Jasper, Barry, & Christman, 2008); in these three studies there were few, if any, consistent left-handers in the samples and they were excluded from statistical analyses. Finally consistency, regardless of left or right direction, was positively correlated with tendency to fixate (or ruminate) on current worries (Niebauer, 2004).

In summary, prior research has shown that consistent-handers resemble authoritarians in terms of being relatively more conventional, more anxious, more risk averse, less creative, and less cognitively flexible. However, it would be premature to suppose that consistent-handers are actually more authoritarian than inconsistent-handers, because there have been no studies of consistency-based differences in three central dimensions of authoritarianism: submission to authority, political conservatism, and aggression towards targeted out-groups.

What would be the significance of a link between consistent-handedness and authoritarianism? We are primarily interested in the potential implications for theorising about the origins of authoritarianism. Scholars have traditionally emphasised the contribution of socialisation and/or situational factors to the development of authoritarianism (Gabennesch, 1972; Greenstein, 1965; Hopf, 1993; Triandis & Suh, 2002). For example, regarding socialisation, Adorno and colleagues (1950) held that parents who dominate their children and demand conformity to conventional behaviours via threats tend to foster the authoritarian personality in their children. The argument has also been made that, later in life, authoritarianism is contingent upon an individual's understanding of politics (e.g., knowing the leaders of other countries and which individuals hold leadership positions in the House and Senate), with people who have acquired extensive knowledge of politics being more likely to exhibit authoritarian tendencies (Federico, Fisher, & Deason, 2011). Regarding situational factors, research on reaction to threat has found that non-authoritarians can become more susceptible to authoritarian thinking when they perceive a threat to their safety (Duckitt & Fisher, 2003; Hetherington & Suhay, 2011).

While such accounts might partially explain the development of authoritarianism, a link between consistent-handedness and authoritarianism would raise the possibility of underlying neurocognitive factors in

authoritarianism. This is because the most prominent explanation for consistency-based differences in personality and cognition is neurocognitive in nature. Specifically, according to the interhemispheric interaction hypothesis (Christman, Propper, & Dion, 2004; Propper, Christman, & Phaneuf, 2005), differences in handedness consistency reflect underlying differences in brain structure and function. The hypothesis holds that consistent handedness, compared to inconsistent handedness, reflects either lesser functional coordination of the left and right brain hemispheres (i.e., interhemispheric interaction) or lesser access to brain processes for which the right hemisphere is relatively more specialised than the left. The former possibility has been more extensively investigated than the latter and will receive most of our attention (but for recent data supporting the latter possibility, see Propper, Pierce, Geisler, Christman, & Bellorado, 2012). The general idea is that many aspects of personality and cognition are influenced by degree of interhemispheric interaction. Therefore differences in interaction could produce the differences observed between consistent and inconsistent individuals.

Both anatomical and behavioural evidence exists to support the contention that consistent and inconsistent individuals differ in interhemispheric interaction. Anatomically, the major pathway for interhemispheric interaction is the corpus callosum. Although the finding is not universal (Welcome et al., 2009), multiple studies (e.g., Cowell, Kertesz, & Denenberg, 1993; Habib et al., 1991; Luders et al., 2010; Witelson, 1985) have found that particular sub-regions of the corpus callosum are smaller, or less thick, in consistent than in inconsistent individuals, which indicates the presence of fewer or less-thickly myelinated neurons transmitting signals between the hemispheres. Behaviourally, consistent individuals exhibit less transfer of information between the hemispheres (Chase & Seidler, 2008; Potter & Graves, 1988) and poorer performance on cognitive tasks when the hemispheres must work together (Lyle & Martin, 2010; Lyle, McCabe, & Roediger, 2008).

Given the interhemispheric interaction hypothesis, finding a link between authoritarianism and consistent-handedness would raise the possibility that reduced interhemispheric interaction is a factor in the development of authoritarianism. This is in line with emerging research which suggests there are neurofunctional and neuroanatomical correlates of political attitudes (Amodio, Jost, Master, & Yee, 2007; Kanai, Feilden, Firth, & Rees, 2011). This would challenge the prevailing tendency to conceptualise authoritarianism as purely the result of socialisation and/or situational factors.

In the current study we assessed consistency using a handedness inventory, as has been the method in most of the previous studies we have cited. Handedness inventories yield numeric scores with the lower and upper bounds indicating exclusive left and right hand usage, respectively.

The midpoint indicates equal usage of both hands. Consistency may be treated as continuous or categorical (i.e., consistent or inconsistent). If treated as continuous, greater distance from the midpoint in either the leftward or rightward direction reflects greater consistency. If treated as categorical, scores within a stated distance of the midpoint indicate inconsistency, while scores beyond that distance in either direction indicate consistency. Both continuous and categorical analyses have been reported in prior research, and we conducted both here.

When conducting categorical analyses we ignored directional differences between participants, because our focus was on consistency. That is, we combined inconsistent left- and right-handers into one single group and combined consistent left- and right-handers into another group. In combining consistent left- and right-handers we were motivated by prior studies showing that the two types of individuals do not differ on memory (Lyle et al., 2012) or anxiety (Lyle et al., 2013). Combining inconsistent left- and right-handers is more precarious because they have been found to be similar in memory but to differ in anxiety. Although we ignored directional differences in our primary analyses, we acknowledge that some aspects of personality and cognition may differ between left- and right-handers (e.g., Wright, Hardie, & Wilson, 2009) and we acknowledge that many studies of consistency-based differences (including the present one) have not been designed to definitively reveal whether the same consistency-based differences exist among left-handers as exist among right-handers. Because we believe the field of consistency research must ultimately grapple with the possibility of interactive effects of consistency and direction (Lyle et al., 2013) we address, for exploratory purposes, the issue of direction in ancillary analyses below.

We focused on assessing three central components of authoritarianism: submission to authority, political conservatism, and aggression towards out-groups. To measure submission to authority we used the four-item instrument from the American National Election Studies, which has also been used in numerous prior studies (Buckler, Davila, & Salinas, 2008; Federico et al., 2011; Henry, 2011; Hetherington & Suhay, 2011; Huddy, 2011; Huddy & Khatib, 2007). Although the instrument has sometimes been considered a measure of the global construct of authoritarianism, we saw it as primarily tapping the submission to authority component. To measure political conservatism we had participants report their political ideology and the political party with which they most identified. To index aggression we queried attitudes towards various individuals, institutions, and groups, on the assumption that aggression would manifest as less-positive attitudes. For use as covariates, we also collected information about sex, age, race, and religiosity.

METHOD

Participants

Participants were 224 students at the University of Louisville aged 18–39 ($M = 21.3$ years) who received credit in psychology or political science courses for participating. Participants were classified (see below) as inconsistent-handed ($n = 86$, 61 females) or consistent-handed ($n = 138$, 109 females). Most participants were right-handed, but 10 of the inconsistent-handers and 9 of the consistent-handers were left-handed. Regarding racial background, most participants self-identified as white (77.7%), but 14.3% self-identified as black or African-American and a small number (8%) self-identified as American Indian or Alaskan Native, Asian, Native Hawaiian or Pacific Islander, or identified with multiple groups.

Materials

The survey we administered consisted of demographic questions (sex, age, and race) followed by the four sections described below.

Religiosity. In this section participants reported their religious affiliation and their frequency of attending religious services, praying, and reading the major religious text(s) of their faith. Frequency of attending religious services was indicated on a scale from 1 (*not religious/spiritual*) to 5 (*as often as I can*). Frequency of prayer and reading religious texts was indicated on separate scales from 1 (*not religious/spiritual*) to 7 (*daily*). We summed these three frequencies to create a single measure of religiosity (Cronbach's $\alpha = .84$).

Consistency of handedness. We administered a modified version of the Edinburgh Handedness Inventory (Oldfield, 1971), which we and others have used in numerous studies (Christman et al., 2004; Lyle & Jacobs, 2010; Lyle, Logan, & Roediger, 2008; Lyle & Martin, 2010; Lyle, McCabe, et al., 2008; Lyle & Orsborn, 2011; Propper et al., 2005). The inventory queries direction and consistency of hand use for 10 activities (writing, drawing, using a spoon, opening jars, using a toothbrush, throwing, combing hair, using scissors, using a knife without a fork, and striking a match). For each activity, the response options (and the corresponding point values for the purpose of scoring) are Always Right (+10), Usually Right (+5), No Preference (0), Usually Left (-5), and Always Left (-10). Scores range from -100 (exclusive left-hand use) to +100 (exclusive right-hand use) in increments of 5.

Political views. Participants indicated the political party with which they most identified (Democrat, Green, Libertarian, Republican, or Other) and reported their political ideology on a 7-point scale ranging from -3

(*Extremely Liberal*) to 3 (*Extremely Conservative*) with the midpoint of 0 labelled *Moderate*. Participants also reported their feelings about various individuals (Barack Obama, Sarah Palin), groups (Liberals, Conservatives, Immigrants, Muslims, Homosexuals, Mexicans, Atheists, Christian Fundamentalists), and institutions (Congress) on a “feeling thermometer” ranging from 0 to 100. Participants were informed that “Ratings between 50 and 100 degrees mean that you feel favourable and warm towards the group. Ratings between 0 and 50 degrees mean that you don’t feel favourable towards the group and that you don’t care too much for that group.”

Submission to authority. The American National Election Studies measure consists of four pairs of attributes: independence versus respect for others, self-reliance versus obedience, curiosity versus good manners, and being considerate versus being well-behaved. For each pair, participants are instructed to select the attribute they think is “most important for a child to have”. Scores ranging from 0 to 4 are calculated by summing the number of times a participant selects one of these four attributes: respect for others, obedience, good manners, and being well-behaved.

Procedure

In samples of college students the median raw score on the handedness inventory we used is usually close to +80. Consequently we have adopted the practice of using the absolute value of 80 as the a priori cut-off for consistent-handedness (Lyle et al., 2012). Hence in the current study we classified participants as consistent-handed if they scored greater than or equal to +80 *or* less than or equal to -80. Participants scoring less than +80 but greater than -80 were classified as inconsistent-handed. This resulted in 62% of participants being classified as consistent, which is similar to other studies (Lyle & Jacobs, 2010; Lyle, Logan, et al., 2008; Lyle & Martin, 2010). The survey was administered online. For 171 participants (64 inconsistent and 107 consistent), the sections of the survey were administered in the order in which they were described under Materials. For the other 53 participants (22 inconsistent and 31 consistent), section order was the same except that consistency of handedness was assessed after submission to authority, at the conclusion of the survey.

RESULTS

We administered two versions of the survey that differed in whether consistency of handedness was assessed before or after submission to authority. Since initial analyses revealed that this factor had no effect on the dependent variable, it was not included in the analyses reported below.

Treating consistency as a categorical variable, all independent variables were submitted to a one-way ANCOVA with the single between-participants factor of handedness consistency (consistent versus inconsistent). The covariates were sex, age, race, and religiosity. Sex was dummy coded as 0 for male and 1 for female. Because the number of participants claiming a racial identity other than white was small, we dummy coded race as 0 for exclusive white identification and 1 for any nonwhite identification.

As predicted, analysis of the measure of submission to authority yielded a significant effect of handedness consistency, $F(1, 218) = 6.59$, $p = .011$, $\eta_p^2 = .029$, with consistent participants scoring higher ($M = 2.3$) than inconsistent participants ($M = 1.9$).

Based on responses to the question about party identification in the political views section of the survey, we classified participants as either Republican (1) or not (0), combining all responses other than Republican. As predicted, analysis yielded a significant effect of handedness consistency, $F(1, 218) = 5.01$, $p = .026$, $\eta_p^2 = .022$. A total of 37% of consistent participants identified with the Republican Party compared to only 24.4% of inconsistent participants.

Analysis of self-described political ideology did not yield a significant effect of handedness consistency, $F < 1$. Average ratings were near 0 (meaning *moderate*) and this was true for consistent ($M = -.33$) and inconsistent ($M = -.34$) participants alike.

Participants reported their attitudes towards 11 different individuals, groups, and institutions. As a data reduction strategy we conducted a principal components analysis with varimax rotation (oblique rotation indicated that the factors were not highly correlated). Three factors were extracted but simple structure was not achieved. Nonetheless, the factor that explained the largest percentage of variance (37.6%) was of theoretical interest, insofar as it seemed to represent attitudes towards what an authoritarian individual would view as out-groups. The items that loaded highly ($\geq .43$) on this factor were liberals, immigrants, Muslims, homosexuals, Mexicans, and atheists. We averaged ratings for these six groups into one measure that had high internal consistency (Cronbach's alpha = .86). Analysis of this measure did not yield a significant effect of handedness consistency, $F(1, 218) = 1.64$, $p = .201$, although consistent participants gave slightly lower ratings ($M = 59.4$) than inconsistent participants ($M = 62.9$).

We also ran the above analyses with consistency treated as a continuous variable, examining the partial correlation between each measure and the absolute value of the handedness inventory score. These analyses yielded results similar to the categorical ones, with the exception of a significant negative correlation between consistency and attitudes towards out-groups, $r = -.13$, $p = .05$.

Direction of handedness

The number of left-handers in our sample was insufficient to formally test whether direction of handedness (left or right) had a main or interactive effect on any of the dependent variables. However we felt it was important to explore, at least via descriptive statistics, whether the consistency-based differences reported above were present among left-handers and right-handers alike. Therefore we isolated left-handers and compared consistent individuals to inconsistent ones. Then we repeated this process with right-handers. In both comparisons (left-handers only or right-handers only), consistent individuals were more likely to affiliate with the Republican Party and scored higher on the measure of submission to authority than their inconsistent (but same direction) counterparts. Furthermore, the correlation between consistency and attitudes towards out-groups was negative whether looking only at left-handers or only at right-handers.

DISCUSSION

As predicted, consistent-handed individuals scored higher than inconsistent-handed individuals on a measure of submission to authority and were more likely to identify with a conservative political party (Republican). Both of these relationships were apparent regardless of whether consistency was treated as categorical or continuous. Also as predicted, consistency was associated with less-positive attitudes towards out-groups, but this relationship was statistically significant only when treating consistency as continuous. We obtained all of these relationships when controlling for other important variables including sex, age, race, and religiosity. Submission to authority, political conservatism, and aggression or negativity towards out-groups are central components of authoritarianism (Adorno et al., 1950; Altemeyer, 1998; Gabennesch, 1972; Stone et al., 1993; Whitley, 1999). Therefore we believe our findings, taken together, are compelling evidence that consistent-handed individuals are, on average, more authoritarian than inconsistent-handed individuals. We believe the case is particularly compelling given that numerous previous studies, reviewed in the Introduction, have shown that consistent-handedness is associated with other characteristics of authoritarianism.

We do not know why the negative relationship between consistency and attitudes towards out-groups was significant only when consistency was analysed as a continuous variable. One potentially important factor is that the relationship was rather weak ($r = -.13$). It would not be surprising if a weak relationship failed to reach conventional significance in all analyses. It is possible that the relationship was weak because consistent participants were reluctant to express the full extent of their negativity on an explicit attitudinal measure. Self-presentation concerns (e.g., about appearing bigoted) are thought to affect responses on explicit attitudinal measures

(McConahay, Hardee, & Batts, 1981; Nosek, 2007). Another possibility is that consistent-handedness is more strongly related to some components of authoritarianism than others. Future studies might test these possibilities.

Surprisingly, given that they were more likely to identify with the Republican Party, consistent individuals did not self-describe as more ideologically conservative than inconsistent individuals. This may be because the meaning of the labels *liberal*, *moderate*, and *conservative*, which we asked participants to apply to themselves, is inherently subjective. It is possible that consistent individuals do not perceive themselves to be more conservative than other individuals, despite actually holding values that are more conservative. Another possible explanation for the discrepancy between the party identification and self-reported ideology measures is that consistent individuals are more conservative than inconsistent ones on only some issues and that, by asking participants to give a global characterisation of their ideology, we failed to detect issue-specific relationships. Support for this possibility comes from political science research. For example, one study found that the belief systems of the mass public are multidimensional, with large numbers of voters in the American electorate holding liberal preferences on some dimensions and conservative preferences on others. When asked to provide a global assessment of their ideology, these individuals tend to self-identify as moderate or answer “don’t know” (Treier & Hillygus, 2009). Correspondingly, studies have suggested that party identification is a more stable and reliable predictor of political attitudes than many of the other measures employed by political scientists and national polling firms (Green & Palmquist 1984; Smith, 1980). Future research could employ multi-item measures to determine if there are issue-specific differences between consistent and inconsistent individuals.

As outlined in the Introduction, converging lines of research suggest that interhemispheric connectivity (e.g., Cowell et al., 1993; Habib et al., 1991; Luders et al., 2010; Witelson, 1985), transfer of information (Chase & Seidler, 2008; Potter & Graves, 1988), and functional coordination (Lyle, Logan, et al., 2008; Lyle & Martin, 2010) are all reduced in consistent-handers relative to inconsistent-handers. Could lesser interhemispheric interaction in consistent-handed individuals cause those individuals to be more authoritarian? We suggest so. Authoritarianism is characterised by a lack of tolerance and flexibility. Relatedly, interhemispheric interaction has been theoretically linked to various facets of cognitive flexibility, including updating beliefs in the face of new information (Christman et al., 2004, 2008; Niebauer, 2004), perceiving ambiguity in sensory stimuli (Christman et al., 2009), generating counterfactual ideas (Jasper et al., 2008), and imagining novel uses for objects (Shobe et al., 2009).

Helpful for understanding a relationship between interhemispheric interaction and cognitive flexibility is Ramachandran’s (1995) framework

of hemispheric specialisation, according to which the left hemisphere imposes and maintains stable beliefs (see also Gazzaniga, 2000), while the right hemisphere evaluates whether beliefs are consistent with other beliefs and with new incoming information. If warranted, the right hemisphere initiates belief updating. In this framework belief evaluation and updating may be dependent on interhemispheric interaction, which suggests that individuals who experience lesser interaction, such as consistent-handers, might be less likely to update their beliefs. Constrained belief updating could contribute to emergence of authoritarianism by causing rigid adherence to prevailing views espoused by leadership, and lack of understanding and frustration with countervailing views held by members of minority groups.

The present study was not designed to examine whether direction of hand dominance affects the manifestation of consistency-based differences in authoritarian characteristics. Our sample overwhelming comprised individuals who were right hand dominant (91.5%). Nonetheless, our ancillary analyses revealed that consistent left-handers appeared to be more authoritarian than inconsistent left-handers, and consistent right-handers appeared to be more authoritarian than inconsistent right-handers. Thus this study provides preliminary evidence that direction of hand dominance does not mediate consistency-based differences in authoritarian characteristics. Similar analyses with small numbers of left-handers have been conducted in the past to provide preliminary evidence that direction does not mediate consistency-based differences in memory (Kempe, Brooks, & Christman, 2009; Propper et al., 2005) and rumination (Niebauer, 2004). In the domain of memory, subsequent research with a larger sample of left-handers confirmed the preliminary conclusion (Lyle et al., 2012). Similar follow-up research would be useful in the domain of authoritarian characteristics. Given that direction *has* been found to mediate consistency-based differences in one domain already (i.e., anxiety; Lyle et al., 2013), it would be premature to assume that it could not do so in other domains.

Although we have chosen to explain our findings in terms of consistency-based differences in interhemispheric interaction, there are reasons to remain open to alternative accounts. Most obviously, our findings are correlational in nature and cannot establish a causal link between limited interhemispheric interaction and authoritarianism. In addition, the notion that all consistency-based differences in cognition and personality can be explained by differences in interhemispheric interaction has been questioned. Indeed, we ourselves (Lyle & Orsborn, 2011) reported a study in which consistent-handers had poorer face recognition than inconsistent-handers and yet did not exhibit less bilateral gain, which is a behavioural measure of interhemispheric interaction. Also, Badzakova-Trajkov et al. (2011), whom we previously cited as having found that consistent individuals score lower on the Magical Ideation Scale and report fewer creative achievements, argued

that their own findings might not be explicable in terms of consistency-based differences in cerebral asymmetry, a concept which is related to, but not necessarily equivalent to, interhemispheric interaction.

In the spirit of entertaining a variety of accounts, we consider an alternative here. One could reason from the perspective of embodied cognition (Anderson, 2003; Barsalou, 2008; Wilson, 2002), which is, in part, the idea that physical activity influences cognition. An embodied cognition account might emphasise that consistent-handed individuals repeatedly interact with the physical world in the same way (i.e., with the same hand). Their approach to “solving” physical problems that require manual manipulation is largely invariant. This experience with the physical world could lead them to habitually entertain only one viewpoint or possible solution in relation to more cognitive issues or problems. Supporting the feasibility of this idea, Leung et al. (2011) had participants generate novel uses for a university building complex on two distinct but consecutive trials. Participants in one condition held their right arm outstretched and kept their left hand behind their back during both trials. Participants in another condition held their right arm outstretched and their left hand behind their back during the first trial but did the reverse during the second trial. Participants who consistently kept their right arm outstretched generated fewer ideas during the second trial compared to those who switched to the left hand. Furthermore, when participants consistently used their right hand, the ideas they generated in the second trial were less original and fell into a more restricted number of categories than the ideas generated by participants who used both hands.¹

In closing, our findings suggest that the connection between handedness consistency and authoritarianism warrants further investigation, as does the possibility of neurocognitive or embodied influences on authoritarianism. In the future it may be important to consider factors in addition to socialisation and situational pressures to fully understand the origin of authoritarianism.

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¹ Although we present Leung et al.'s (2011) findings in support of an embodied cognition account of our results, it bears noting that the findings could themselves be explained in terms of hemispheric activation or interhemispheric interaction. Physical movement can result in lateralised cortical activity. Extending the left arm during the second trial of Leung et al.'s procedure presumably would have induced greater right hemisphere activation than extending the right arm. Moreover, because participants who extended their left arm during the second trial had extended their right arm (with accompanying left hemisphere activation) during the first trial, interhemispheric interaction might have been affected in some way that it was not in the right-arm only condition. We thank Steve Christman for suggesting this possibility.

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