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UNCOVERING THE MULTIDIMENSIONAL NATURE OF STEREOTYPE INFERENCES: A WITHIN-PARTICIPANTS STUDY OF GENDER, AGE, AND PHYSICAL ATTRACTIVENESS

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ABSTRACT

Eighty undergraduates guessed the attitudes of several people whose pictures they were shown. Within-participant regression analyses were conducted to assess, at the individual level, the influence of targets' gender, age, and physical attractiveness. Participants expected men to adopt conservative positions on child discipline, feminism, immigration, and homosexuality while women were expected to be conservative on religion. Older people were expected to be more conservative on most issues while attractive persons, independent of age, were expected to be more liberal. In addition, examination of interaction effects revealed several instances where gender stereotypes were moderated by either the age or attractiveness of the targets. We conclude that stereotypes frequently combine in an interactive fashion and that future investigations of these interactions would benefit from the within-participant, multiple-target procedure used here.

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In many studies of stereotypes (e.g., Bassili & Reil, 1981; Kite, Deaux, & Miele, 1991; Signori, Butt, & Kozak, 1982), participants have been asked to attribute characteristics to targets who have been categorized or labeled by the researchers. The results of these studies leave little doubt that people possess a variety of consensual beliefs about characteristics associated with categories of persons and that stereotypic associations can be reliably and easily triggered. Encountering a person who belongs to the category (Word, Zanna, & Cooper, 1974), viewing a picture of such a person (Bargh, Chen, & Burrows, 1996), or even being presented subliminally with words related to a stereotype (Devine, 1989) can evoke associations that may then influence a wide range of behaviors and judgments.

In everyday life the stimuli that trigger stereotypic associations are rarely unidimensional. People do not encounter "a male," "an old person," or "an Arab." Rather, they are confronted by a myriad of social information, some of which is physically prominent (e.g., gender, age, ethnicity, attractiveness, etc.) and some of which is more subtle (e.g., occupation, education level, social class). Thus, it is quite likely that the perceiver uses more than a single target attribute to make a stereotypic judgment. Although previous research tells us quite a bit about what people *can* do in making judgments about others using single bits of information, it does not tell us what people actually do when they encounter others in stimulus-rich social situations. The challenge for researchers interested in the process of stereotyping is to capture the rich complex of information available to the perceiver. The question then becomes how do these various target attributes, available in everyday interactions, *simultaneously* influence the perceiver's judgment?

One possibility is that stereotypes combine in some additive fashion to affect people's judgments. People may take account of several of the target's category memberships and arrive at an overall judgment based on the characteristics that are thought to be most typical of each category. Additive or averaging models of this sort, often including weighting factors for the information being combined, have a long history in social psychology (see Eagly and Chaiken, 1993, for a review) and have frequently been shown to account for significant portions of the variability in people's judgments (e.g., Himmelfarb & Anderson, 1975).

A second possibility is that when several stereotypes are evoked simultaneously, they combine in an interactive fashion. Bassili and Reil (1981), for example, found that the influence of gender, occupation, and ethnic stereotypes was greater for younger targets than older ones. Similarly, Macrae, Bodenhausen, and Milne (1995) have argued that in many circumstances, the activation of one stereotype actually inhibits the activation of other less salient ones.

Examining the simultaneous influence of several stereotypic dimensions can be difficult because the number of possible combinations of characteristics quickly becomes very large. This is particularly true when one or more of the stereotypic dimensions of interest are continuous in nature (e.g., age) rather than categorical (e.g., gender). In a between-participants design, where each participant is exposed to only one target, the number of participants needed to assess higher-order interaction effects can be prohibitive. An alternative is to expose each participant to several targets and carry out preliminary analyses on the resulting data at the individual level. The preliminary analyses in these within-participant designs may take the form of simple comparisons among within-participant treatment conditions or more complex correlational and regression analyses carried out on each participant's matrix of data. Judd, Kenny, and McClelland (2001), for example, have described procedures that allow testing for complex, within-participant, treatment mediation and moderation effects. Once summary indices have been calculated for each participant, one can then look for regularities in the indices across participants. Thus, idiographic and nomothetic approaches can be combined within a single study (Michela, 1990).

Although the advantages of the within-participant designs just described have been known for some time, their application to the study of stereotypes has been relatively infrequent, possibly because of concern over demand characteristics. When the same participant is asked to judge a small number of targets (e.g., male versus female or old versus young), the researcher's purpose may be obvious and the resulting judgments may be different from those made under more natural circumstances. In the present paper, we show how the problem of demand characteristics can be reduced by asking each participant to make judgments about a relatively large number of targets, shown in pictures. In the study we describe, participants were asked to judge the social attitudes of the targets and the pictures that each person saw were randomly selected from a large pool. Although the targets varied in gender, age, and physical attractiveness, nothing in the procedure specifically alerted participants to these dimensions.

There is evidence that people's judgments about a target person's attitudes are strongly influenced by the target's age, gender, and attractiveness. Old people are expected to have more conservative attitudes than young people on a variety of social and political issues (Grant, Ross, Button, Hannah, and Hoskins, 2001; Griffitt, Nelson, and Littlepage, 1972). Women are expected to be more conservative than men on issues of sexuality but more liberal than men on minority and environmental issues (Grant, Button, Ross, and Hannah, 1997; Grant et al., 2001). Finally, in the case of physical attractiveness, people exhibit what may be considered a type of self-serving bias. They expect attractive targets, more than less attractive ones, to share their own views (Marks and Miller, 1982; Mashman, 1978; Schoedel, Frederickson, & Knight, 1975). Although each of these influences on people's judgments has been demonstrated in isolation, little is known about how they operate together.

Undergraduates were asked to guess the attitudes of 10 men and 10 women, whose pictures they were shown. The age and attractiveness of the people in the pictures had been rated by participants in an earlier study (Grant, Button, Hannah, & Ross, 2000). The matrix of data produced by each participant in the present study was subjected to regression analyses designed to determine the separate and combined influence of the targets' age, gender, and attractiveness. Of particular interest was the possibility that the inclusion of interaction terms in the regression model might increase the predictability of participants' judgments about target persons' attitudes.

METHOD

Participants

We tested 40 male and 40 female undergraduates at Memorial University. Participants ranged in age from 18 to 45 ($M = 20.41$, $Mdn = 19.00$, $SD = 3.62$). The procedure took about 20 - 30 minutes. Upon completion, each participant was paid \$2.75.

Materials

Target Pictures

Digitized pictures of adult men and women (showing head and shoulders) were drawn from a variety of sources. Some came from internet websites, some were taken from television, and others were scanned from pictures in magazines and family pictures contributed by colleagues. Half the pictures were of women and half were of men. Within each gender, an attempt was made to include pictures of people who, in the judgment of the researchers, ranged in age from late teens to late seventies. All pictures were digitally cropped to a width of 172 pixels and a height of 203 pixels and saved as 256-colour, bit-mapped images. When displayed on a participant's computer screen, the images were approximately 4.7 cm. wide and 5.4 cm. high.

In an earlier study (Grant et al., 2000), 91 participants (39 men and 52 women) between the ages of 19 and 58 rated either the attractiveness (1 = very unattractive, 10 = very attractive) or the apparent age (in years) of the person in each of the pictures. A mean attractiveness and mean age rating were calculated for each picture. The 100 pictures used in the present study were chosen so that the average age and attractiveness of the men and women were matched as closely as possible (see Table 1). An indication of the reliability of the picture ratings was obtained by correlating, across pictures, the mean rating by male participants with the mean rating by female participants. The correlations ($df = 98$) for age and attractiveness were .99 and .94, respectively. Finally, and not unexpectedly, the correlation across pictures between the mean age and mean attractiveness ratings was significantly negative, $r(98) = -.58, p < .001$.

Table 1: Age and Attractiveness Ratings for the Pictures of Male and Female Targets

	Age ratings			Attractiveness ratings		
	Male targets	Female targets	t ($df = 98$)	Male targets	Female targets	t ($df = 98$)
<i>Mean</i>	43.20	43.48	0.11(ns)	4.66	4.86	0.89 (ns)
<i>SD</i>	10.51	15.40		0.84	1.31	
<i>N(targets)</i>	50	50		50	50	

Attitude Statements

Two statements on each of five issues (discipline of children, homosexuality, feminism, immigration, and religion) were used. For each issue, one of the statements expressed an attitude in favor of the concept and one expressed an attitude opposed to the concept. The complete set of attitude statements is shown in Appendix A. Each statement was followed by a scale ranging from 1 (disagree strongly) to 7 (agree strongly).

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To simplify presentation of the results we created a single score for each issue by adding the response to the positively worded statement to the reverse-scored response to the negatively

worded statement. [1] The result was a set of scores that could range from 2 to 14 with higher scores reflecting more favorable attitudes toward the issue.

Procedure

Participants were tested up to three at a time. Each person sat in a separate cubicle equipped with a personal computer running a *Visual Basic* program. All instructions and experimental materials were presented by the computer and participants responded by pointing and clicking the mouse.

For each participant, 20 pictures (10 of men and 10 of women) were randomly selected from the pool of 100 pictures. Pictures of these target persons were displayed one at a time in a random order on the participant's computer screen. While each picture remained on the screen, the ten attitude statements were presented one at a time in a random order. The participant was asked to estimate, using a 7-point scale that ranged from (1) strongly disagree to (7) strongly agree, how the person in the picture would respond to the attitude statement. When all ten statements had been presented for a particular photograph, a new picture appeared and the procedure was repeated. The procedure ended when participants had made ten attitude inferences for each of the different target persons.[2]

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RESULTS

The mean attitudes assigned to male and female targets on each of the five attitude issues are shown in Table 2. As can be seen, participants expected significant gender differences on each of the five issues.

Table 2: Mean Attitudes Attributed to Male and Female Targets on Five Attitude Issues

Issue	Male targets	Female targets	<i>t</i> (79)	<i>p</i> (two-tailed)
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Discipline				
<i>Mean</i>	8.15	7.41	6.04	< .001
<i>SD</i>	1.15	1.21		
Homosexuality				
<i>Mean</i>	7.75	8.61	-5.74	< .001
<i>SD</i>	1.50	1.54		
Feminism				
<i>Mean</i>	7.99	10.81	-17.71	< .001
<i>SD</i>	1.26	1.21		
Immigration				
<i>Mean</i>	8.17	9.07	-6.88	< .001
<i>SD</i>	1.18	1.19		
Religion				
<i>Mean</i>	8.96	10.12	-7.23	< .001
<i>SD</i>	1.18	1.27		

Note. All means are based on the data of the same 80 participants.

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For each participant, a 20 x 8 data matrix was constructed. Each of the rows of this matrix corresponded to a different target. The first three columns contained information about the target's gender (males were coded 1, females 2), age, and attractiveness while the last five columns contained the participant's inferences about the target's attitudes on the five issues. A correlation matrix was computed for each participant's data and these matrices formed the basis for the regression analyses described below. An aggregated correlation matrix, averaged across participants, is shown in Table 3.

Table 3: Correlations among Target Predictor Variables and Attitude Inferences on Five Attitude Issues.

	Target Age	Target Attractiveness	Discipline	Homosexuality	Feminism	Immigration	Religion
Target Gender	-.01	.08	-.16	.14	.47	.19	.22
Target Age		-.57	.39	-.34	-.32	-.14	.36
Target Attract.			-.31	.32	.35	.21	-.21
Discipline				-.43	-.44	-.32	.14
Homosex.					.54	.47	-.08
Feminism						.39	-.02
Immig.							.16

Note. Correlation coefficients are averaged across participants. All but two of the mean correlations, gender-age and feminism-religion, differ significantly ($p < .05$) from zero by two-tailed t -test.

Five regression analyses were conducted for each of the five issues. The first analysis for each issue assessed the influence of target gender. The second analysis assessed the influence of target age and target attractiveness. Finally, the third, fourth, and fifth analyses for each issue assessed each of the three possible two-way interactions among the target variables.[3]

The regression coefficients from the analyses described above were averaged across participants and tested against a null-hypothesis mean of zero using single-sample t-tests. Summary statistics for these data are shown in Table 4.

Table 4: Means and Standard Deviations for Regression Coefficients on Five Attitude Issues

Issue	Regression Coefficients for Target Variables and Interaction Terms in Equation					
	Target Gender (G)	Target Age (Age)	Target Attractiveness (Att)	G x Age	G x Att	Age x Att
Discipline (<i>n</i> = 69)						
<i>Mean</i>	-.78	.06	-.28	-.00	.49	.01
<i>SD</i>	1.13	.06	.66	.10	1.41	.05
Homosexuality (<i>n</i> = 68)						
<i>Mean</i>	1.11	-.05	.48	-.01	.13	.00
<i>SD</i>	1.15	.08	.81	.16	1.84	.05
Feminism (<i>n</i> = 65)						
<i>Mean</i>	2.91	-.03	.78	-.05	-.14	-.01
<i>SD</i>	1.41	.08	.77	.11	1.51	.06
Immigration (<i>n</i> = 64)						

<i>Mean</i>	1.10	-.00	.48	.01	-.41	-.00
<i>SD</i>	1.12	.07	.74	.11	1.47	.05
Religion (<i>n</i> = 66)						
<i>Mean</i>	1.22	.08	.12	.03	-.64	-.01
<i>SD</i>	1.46	.07	.82	.11	1.88	.05

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Gender Stereotypes

Each participant's inferences about target attitudes on each of the five issues were regressed on target gender. The regression coefficient was taken as an index of the participant's gender stereotype. Mean regression coefficients (*Mb*'s) for gender differed significantly from zero for all five issues. Participants expected male targets compared to female targets, to be more favorable toward strict discipline, $Mb = -.78$, $t(68) = -5.71$, $p < .001$, but less favorable toward homosexuality, $Mb = 1.11$, $t(67) = 7.95$, $p < .001$, feminism, $Mb = 2.91$, $t(64) = -16.61$, $p < .001$, immigration, $Mb = 1.10$, $t(63) = 7.86$, $p < .001$, and religion, $Mb = 1.22$, $t(65) = 6.78$, $p < .001$.

Age and Attractiveness Stereotypes

Attitude inferences were regressed on target age and target attractiveness. The regression coefficients were taken as indices of the participant's age and attractiveness stereotypes. With both regressors in the equation, each regression coefficient reflects the influence of that regressor with the influence of the other removed. Mean regression coefficients for target age (with attractiveness controlled) differed significantly from zero for four of the five issues. Participants expected older targets compared to younger ones, to be more favorable toward strict discipline, $Mb = 0.06$, $t(68) = 8.02$, $p < .001$, and religion, $Mb = 0.08$, $t(65) = 10.01$, $p < .001$, but less favorable toward homosexuality, $Mb = -0.05$, $t(67) = -5.31$, $p < .001$, and feminism, $Mb = -0.03$, $t(64) = -3.02$, $p < .001$.

Mean regression coefficients for target attractiveness (with age controlled) differed significantly from zero for four of the five issues. Participants expected attractive targets compared to less attractive ones, to be less favorable toward strict discipline, $Mb = -0.28$, $t(68) = -3.50$, $p < .001$, but more favorable toward homosexuality, $Mb = 0.48$, $t(67) = 4.84$, $p < .001$, feminism, $Mb = 0.78$, $t(64) = 8.18$, $p < .001$, and immigration, $Mb = 0.48$, $t(65) = 5.18$, $p < .001$.

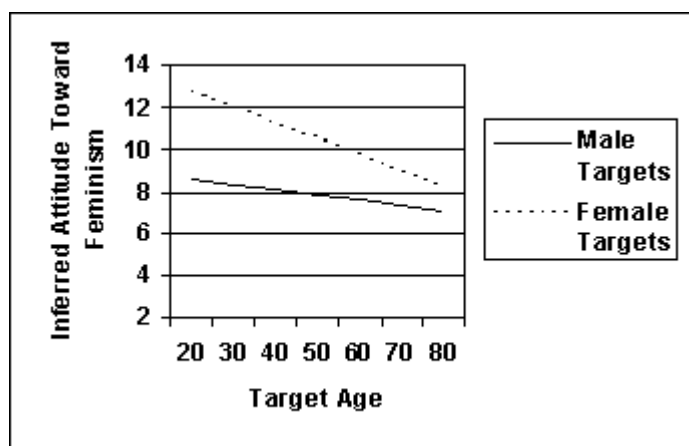
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Gender x Age Interactions

Attitude inferences were regressed on target gender, target age, and the interaction cross-product of these two factors. The regression coefficient for the interaction term was taken as an indication of the extent to which the participant's age stereotype was different for male and female targets. The mean regression coefficient for the gender x age interaction was significant only for the feminism issue, $Mb = -0.05$, $t(64) = -3.57$, $p < .001$. As already noted, people expected support for feminism to decline with age. The negative value for the interaction coefficient indicates that this decline was expected to be steeper (i.e., more negative) for female targets (coded 2) than for male targets (coded 1). Best-fitting regression lines, aggregated across participants, are shown in Figure 1.

Figure 1: Aggregated Regression Lines Showing Attitudes Toward Feminism Attributed to Male and Female Targets of Different Ages



Gender x Attractiveness Interactions

Attitude inferences were regressed on target gender, target attractiveness, and the interaction cross-product of these two factors. The regression coefficient for the interaction term indicates the extent to which the participant's attractiveness stereotype was different for male and female targets. The mean regression coefficient for the gender x attractiveness interaction was significant for the issues of discipline, $Mb = .49$, $t(68) = 2.92$, $p = .005$, immigration, $Mb = -0.41$, $t(63) = -2.26$, $p = .027$, and religion, $Mb = -0.64$, $t(65) = -2.75$, $p = .008$. People expected attractive persons to be less favorable toward strict discipline and this was especially true for male targets. They expected attractive persons to be more favorable toward immigration and this was especially true for male targets. Finally, the relationship between attractiveness and attitudes toward religion was expected to be more negative for female targets than for male targets. Best-fitting regression lines, aggregated across participants, are shown in Figures 2, 3, and 4.

Figure 2: Aggregated Regression Lines Showing Attitudes Toward Discipline Attributed to Male and Female Targets of Different Levels of Attractiveness

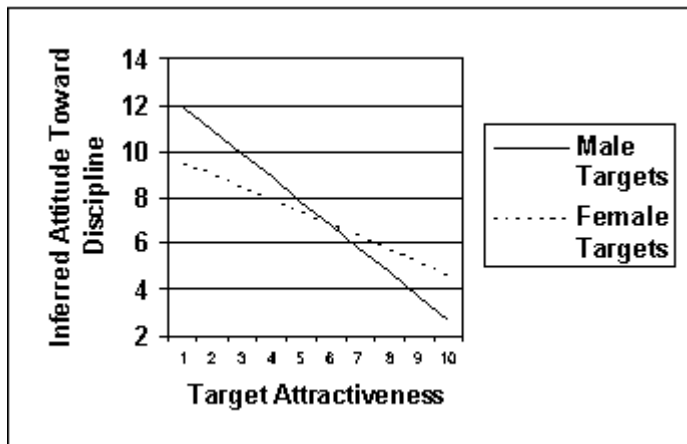


Figure 3: Aggregated Regression Lines Showing Attitudes Toward Immigration Attributed to Male and Female Targets of Different Levels of Attractiveness

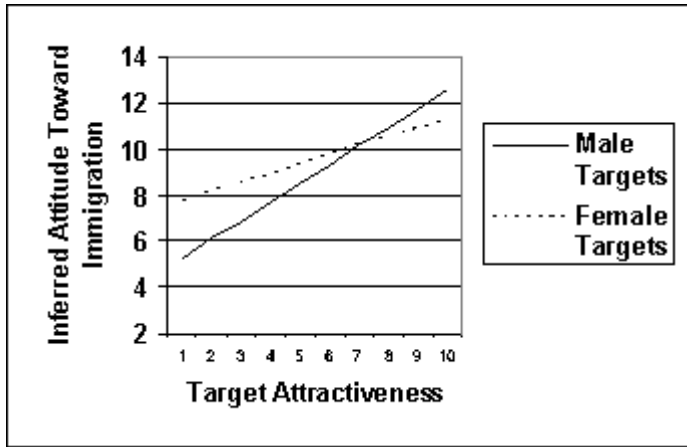
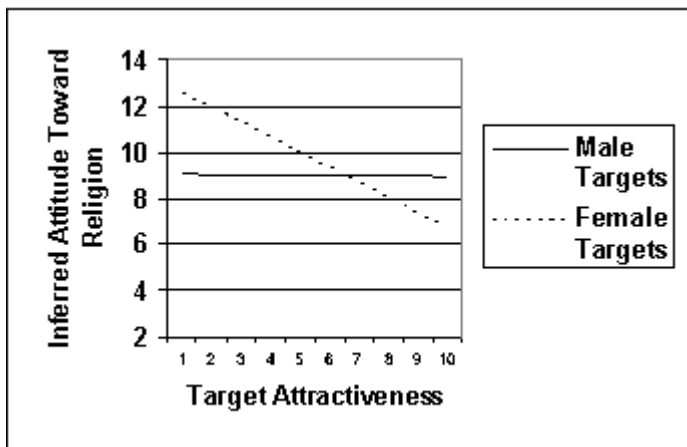


Figure 4: Aggregated Regression Lines Showing Attitudes Toward Religion Attributed to Male and Female Targets of Different Levels of Attractiveness



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Age x Attractiveness Interactions

Attitude inferences were regressed on target age, target attractiveness, and the interaction cross-product of these two factors. The regression coefficient for the interaction term indicates the extent to which the participant's age stereotype was moderated by target attractiveness. On none of the five issues was there a significant interaction between age and attractiveness.

Comparisons Between Male and Female Participants

Male and female participants were compared on each of the regression coefficients described above. No significant differences were found.

DISCUSSION

The results reported here demonstrate pervasive stereotypes in people's inferences about other people's attitudes. The stereotypes are consistent with the perception that women, compared to men, are less disciplinarian, more tolerant and accepting of homosexuals and immigrants, more supportive of feminism, and more religious, that old persons are relatively conservative on these issues, and that attractive people are relatively liberal. Like other stereotypes, these perceptions appear to reflect consensual generalizations about the characteristics of large categories of people. More importantly, however, the results show that people do indeed take advantage of the multiplicity of information available to them in forming their perceptions of others. Perceivers' inferences based on gender, for example, were qualified by age. The gender stereotype that women would be more supportive of feminism than would men weakened as target age increased. People expected relatively little support for feminism among older persons of either gender.

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Gender stereotypes were also influenced by the attractiveness of the targets. People generally expected women to be more opposed to strict discipline and more supportive of immigration but both these tendencies weakened and eventually reversed with increasing attractiveness of the targets. The stereotype that men are "red necked" in their attitudes was especially influenced by the attractiveness of the target. Attractive men were perceived to have attitudes that were as liberal or more liberal than those of women. In the same way, the stereotype that women are more religious than men was qualified by attractiveness. More attractive females were perceived to be less religious than less attractive ones while attractiveness of males was virtually unrelated to their perceived religious attitudes.

In all the findings just described, perceivers were evidently using multiple trait information to form a judgment that was qualified in comparison to judgments based on single attributes. It is quite likely that perceivers also use other target attributes, such as race, ethnicity and apparent

socio-economic status, and that contextual features will determine which features are more salient. Future research using procedures similar to those used here should pursue such questions.

Two instances where significant interactions were *not* found should also be noted. First, there was no evidence of an interaction between target age and attractiveness. As noted earlier, however, these variables did show a substantial negative correlation and this may well have affected estimates of the interaction terms.[4] Second, there was no evidence that any of the target variables examined in the present study interacted with the gender of the participant. Feingold's (1990) finding, for example, that physical attractiveness was more important in men's perceptions of women than in women's perceptions of men was not replicated here. The present null results are consistent, however, with those of both Eagly, Ashmore, Makhijani, and Longo (1991) and Jackson, Hunter, & Hodge (1995).

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Two aspects of the methods used in this study are worth noting. First, we avoided drawing participants' attention to the particular categories of target person under investigation. Thus, the stereotypes that emerged may be more typical of those that influence people's judgments in everyday life. A second important aspect of the current procedure is that not every participant saw the same set of targets. Each participant saw a set of targets randomly selected from a pool of 100. The use of multiple target sets gives the present results a generalizability they would not otherwise have.

In conclusion, the stereotypes about people's attitudes that were evident here appear to be every bit as pervasive and robust as the well-documented stereotypes concerning people's traits and abilities. Like other stereotypes, those concerning attitudes may help people anticipate, organize, and interpret complex social information. Moreover, it appears that perceivers use more than single attributes to make inferences about others and these attributes interact in the inference process. Research should be directed toward more faithfully simulating the perceiver's rich social environment to uncover the critical aspects of the inference process.

ENDNOTES

[1] Summing responses on oppositely worded pairs of items seemed justified on the basis of data, not presented here, showing that responses to the items within each pair were negatively correlated.

[2] Participants in this study also indicated their own attitudes on the issues, sometimes before the inference process and sometimes after. Analyses of these data, in conjunction with participants' attitude inferences, revealed several instances of the false consensus effect (i.e., people expected targets to share their own attitudes), and a tendency for this effect to be slightly stronger for more attractive targets.

[3] The three-way interaction among gender, age, and attractiveness, although theoretically of interest, could not be reliably assessed in this study because of the relatively small number of targets and the lack of independence, noted earlier, of two of the three regressors, age and attractiveness.

[4] We thank an anonymous reviewer for this suggestion.

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APPENDIX A: ATTITUDE STATEMENTS USED IN THE STUDY

1. A teacher should not be allowed to physically punish children. (Discipline -)
2. School boards should not hire homosexual teachers. (Homosexuality -)
3. It's time to close the door to refugees. (Immigration -)
4. Religious beliefs are important guiding principles in my life. (Religion +)
5. A woman's place is in the home. (Feminism -)
6. Homosexuality should be accepted. (Homosexuality +)
7. What young people need most of all is strict discipline by their parents. (Discipline +)
8. I favor a more open immigration policy for Canada. (Immigration +)
9. The feminist movement deserves strong support. (Feminism +)
10. Religion is mostly superstition. (Religion -)

Note. The issue label and scoring direction are indicated in parentheses.

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AUTHORS' NOTE

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