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## **Categorization and intergroup anxiety in contact between British and Japanese nationals**

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### *Abstract*

*Two studies examined the relationship between categorization, intergroup anxiety and intergroup attitudes (intergroup bias and negative affect). Study 1 consisted of a survey of 236 British and Japanese nationals. Study 2 was a longitudinal study of 54 Japanese students studying in the UK. Of the three categorization variables (interpersonal, superordinate and intergroup), only intergroup categorization was shown to have a relationship to generalized intergroup attitudes. In addition, intergroup anxiety and quality of contact were associated with ingroup bias and negative affect to the outgroup. Study 2 revealed an interaction between intergroup categorization and quality of contact in predicting negative affect. Intergroup anxiety was also associated with increased intergroup categorization. It is concluded that the effects of categorization during contact are still poorly understood, and that intergroup anxiety is a far more powerful variable in contact than the current literature acknowledges. Copyright © 1999 John Wiley & Sons, Ltd.*

Despite more than forty years' intensive research, there is still no clear consensus on how to improve intergroup relations through intergroup contact. In recent years, social identity theory (Tajfel, 1978; Tajfel & Turner, 1979) has led to an emphasis on the role of categorization. Opposing models have each argued that specific levels of categorization (interpersonal, intergroup or superordinate) are necessary if contact is to have a positive effect on intergroup relations as a whole (Brewer & Miller, 1984; Gaertner, Mann, Murrell & Dovidio, 1989; Hewstone & Brown, 1986). A separate line of research has concentrated on the affective experience of contact and, in particular, on the role of intergroup anxiety (Stephan & Stephan, 1985). In this perspective, intergroup anxiety is viewed as both a determinant and a consequence of intergroup contact. With a few notable exceptions (e.g. Islam & Hewstone, 1993),

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little research has attempted to trace the link between categorization and intergroup anxiety.

The research to be presented will examine the effects of both categorization and intergroup anxiety on contact between British and Japanese nationals. In contrast to much of the current categorization literature, it will employ real groups and contact outside the laboratory. Further, the relationship between categorization and intergroup anxiety will be explored, and the implications for this relationship on contact will be examined.

### CATEGORIZATION AND INTERGROUP CONTACT

The decategorization model of Brewer and Miller (1984) emphasizes the role of interpersonal perception during contact. It suggests that by discouraging the use of category-based perception, participants are less likely to display the range of ingroup favouring biases that are associated with psychologically salient categories (Brewer, 1979). Further, according to this model, if participants are successful in viewing outgroup members in individuated, personalized terms, the psychological utility of the category should be reduced. Participants should not only develop more positive attitudes to specific outgroup members, but may also be less likely to utilize the category in the future or in different contexts. A number of experimental studies have provided empirical support for the decategorization model (Bettencourt, Brewer, Croak & Miller, 1992; Markus-Newhall, Miller, Holtz & Brewer, 1993; Miller, Brewer & Edwards, 1985).

The recategorization model of Gaertner and his colleagues also involves attempting to reduce the salience of the group boundary (Gaertner *et al.*, 1989, Gaertner, Mann, Dovidio, Murrell & Pomare, 1990). However, instead of deconstructing respective group categorizations, Gaertner *et al.* suggest that participants should be encouraged to recategorize both in- and out-group members into a larger superordinate category. By subsuming both groups into a single, larger group (e.g. being students), distinctions between erstwhile in- and outgroup members should be reduced. In this way, ingroup favouritism is again less likely to occur, and the probability of the original category being utilized in future may be reduced. Some field and experimental evidence supports this model (e.g. Dovidio, Gaertner, Validzic, Matoka, Johnson & Frazier, 1997; Gaertner *et al.*, 1989, Gaertner, Rust, Dovidio, Bachman & Anastasio, 1994; Gaertner, Dovidio & Bachman, 1996).

The categorization model of Hewstone and Brown (1986) contrasts sharply with these two models. Hewstone and Brown argue that the effects of contact will not generalize unless the categories maintain some minimal psychological salience. In this way the interaction can be regarded as 'intergroup' rather than interpersonal\* (Brown & Turner, 1981). Hewstone and Brown argue that intergroup categorization does not inevitably lead to ingroup favouritism, as long as opportunities exist for mutually positive intergroup comparisons along reciprocal dimensions (Mummendey &

\*The use of the term 'intergroup' in this formal, technical sense requires that social categories are psychologically salient and that there is some evidence of perceived group homogeneity and behavioural intergroup uniformity (Brown & Turner, 1981). Thus, it goes beyond the looser and more generic use of 'intergroup', which simply denotes an interaction involving members of different groups.

Schreiber, 1984; van Knippenberg & van Oers, 1984). In support of this model there is evidence which suggests that non-typical group members may be subtyped as exceptions to the rule: stereotype disconfirming information associated with them is therefore ignored (Johnston & Hewstone, 1992; Rothbart & John, 1985; Weber & Crocker, 1983). More directly, some evidence suggests that contact with a typical outgroup member is associated with attitude change to the outgroup as a whole (Desforges, Lord, Ramsey, Mason, van Leeuwen, West & Lepper, 1991; Desforges, Lord & Pugh, 1997; van Oudenhoven, Groenewoud & Hewstone, 1996; Vivian, Brown & Hewstone, 1995; Wilder, 1984), while contact that contains only personalized information is not (Scarberry, Ratcliffe, Lord, Lanicek & Desforges, 1997).

Leaving to one side the contrasting predictions (and evidence) based on these models, it is worth identifying some limitations shared by all three approaches. First, they have relied primarily on laboratory methodologies and *ad hoc* groups. In this context, participants may have less of an investment in the group and their categorization processes may be more malleable. In real groups, individuals may actively resist the (de)emphasis on certain levels of categorization and reject interventions that attempt to achieve this. Real category memberships may also remain salient when the differences between the groups involved reinforce stereotypes (Lee & Duenas, 1995).

The current categorization literature has therefore largely failed to address the reality and inflexibility of categorization in the real world. The same literature has also concentrated on examining the one-shot effects of different levels of categorization, rather than investigating the use of categorization over time (Pettigrew, 1986; Stephenson, 1981; van Oudenhoven *et al.*, 1996). Most importantly for the research to be presented, however, it can be argued that all three models are strongly cognitive in emphasis and have neglected more affective processes. Different kinds of categorization may have different affective consequences, and these in turn may influence categorization processes.

## INTERGROUP ANXIETY AND INTERGROUP CONTACT

Stephen and Stephan (1985) suggested the term 'intergroup anxiety' to denote the anxiety that an individual may feel when anticipating or experiencing contact with someone from another group.\* Stephan and Stephan suggested a number of antecedents of such anxiety, many of which are embedded in the history of intergroup relations and the social context. For example, an individual may fear that they will be discriminated against, that the group may reject them, or that their identity or self-esteem may be threatened. Individuals may experience more intergroup anxiety where there has been a history of discrimination, where the perceived differences between groups are large, or where the individual has had minimal previous contact. There are presumably other, more idiosyncratic, reasons why a person may experience anxiety in such group settings, which may have little to do with specifically intergroup variables.

There is a sizeable literature examining the consequences of affect and mood on cognition and judgement, and a number of competing models to account for how some

\*Note that 'intergroup' is used here in its generic sense simply to indicate that a member of the other group may be present. This does not imply that the contact is necessarily construed psychologically at an intergroup level in the Brown and Turner (1981) sense, although this is also possible.

of the observed effects might come about. It is beyond the scope of the current paper to review these effects and competing models in depth. Instead we will focus on one specific aspect of this research: the relationship between generic anxiety and stereotyping. We will then go on to review the (very limited) evidence concerning the relationship between intergroup anxiety (in Stephan and Stephan's sense) and stereotyping.

There is strong evidence to suggest that generic anxiety is associated with increased stereotyping. Baron, Inman, Kao & Logan (1992) examined illusory correlation (which Hamilton argues can be regarded as an index of stereotyping) among dental patients and observed that those patients who reported high anxiety were more likely to exhibit the illusory correlation effect. Wilder and Shapiro (1989b) conducted a series of studies in which participants were made anxious before watching a videotape of a target group. They reported that participants in the high anxiety condition assimilated individual group members into the group. Wilder and Shapiro's account for this effect was that participants in the high anxiety condition experienced elevated physiological arousal: this distracted participants such that they were unable to concentrate on individuating information. The suggestion that the effects of anxiety is mediated by arousal is further supported by evidence of the effects of arousal on stereotyping (Kim & Baron, 1988; Bodenhausen, 1993).

Although most of the research in the field appears to have concentrated on the arousal–distraction hypothesis, there are a number of other theoretical accounts that may be of interest. For example, it has been suggested that a negative mood renders negative cognitions more accessible, such that individuals who are in a negative mood are likely to interpret ambiguous information in a negative way (e.g. Esses & Zanna, 1995). Alternatively, Mackie, Hamilton, Schroth, Carlisle, Gersho, Meneses, Nedler and Reichel (1989) have suggested that incongruency between mood and target (e.g. a negative mood but a positive target) requires greater processing, and may therefore lead to increasing reliance on heuristics.

However, the theory that contrasts most sharply with the distraction model is the 'feelings as information' model (Schwarz, 1990; Schwarz & Clore, 1988). Schwarz and his colleagues argue that affect is used to signal well-being (or the lack of it). A negative affective state, according to Schwarz, signals a lack of well-being. The adaptive response to this is to engage in problem solving, which ultimately involves processing affect-related information more systematically. This model contrasts with the distraction model in two important ways. First, it predicts that the consequences of affect on information processing will interact with the perceived relevance of the information to the affective state (see the distinction between integral and incidental affect below). Second, and most importantly, the 'feelings as information' model predicts that anxiety should be associated with *reduced* stereotyping. Clearly, this prediction is inconsistent with the empirical evidence already described. Although this may be partly attributable to empirical problems with the current evidence (and explored in more depth shortly), it has also been suggested that the 'feelings as information' model fails to incorporate arousal sufficiently (Bodenhausen, 1993; Bodenhausen, Sheppard & Kramer, 1994).\*

\*More recently, Wilder and Simon (1996) have suggested that there is a tension between individuating problem-solving processes, and heuristic processes generated by physiological arousal. This model has yet to be tested empirically.

Although there are a number of different accounts for the relationship between (negative) stereotyping and anxiety *per se*, there is little argument about the effect, at least within the laboratory. The aims of the current research is to establish how intergroup anxiety may influence intergroup contact and categorization. There are a number of issues which must be addressed here. First, much of the research on anxiety has been conducted with *ad hoc*, experimentally generated groups (e.g. Wilder & Shapiro, 1989a, b). In such contexts, it has not always been demonstrated that reduced information processing is associated with increasing access and utilization of outgroup stereotypes: stereotypes may not be activated, or may not be functionally relevant to the situation (Gilbert & Hixon, 1991; Oakes, Haslam & Turner, 1994). Second, the majority of the work has used incidental rather than integral manipulations of anxiety (Bodenhausen, 1993). This means that the source of the anxiety has been unrelated to the task on which participants' performance was being measured. This is an important distinction, since an integral manipulation of anxiety could theoretically facilitate information processing (see Schwarz, 1990, outlined above). This is a hypothesis that has not yet been successfully examined in the literature and is unfortunately beyond the scope of the current paper (see Greenland & Brown, in press). On this basis, we can not assume that the effects of incidental manipulations of anxiety will be similar to the effects of integral, intergroup anxiety.

Compared to the literature on anxiety in general, very little research has been conducted specifically on intergroup anxiety. The main evidence comes from two surveys, and is largely consistent with the generic anxiety literature. Stephan and Stephan's (1985) survey of Anglo and Hispanic Americans suggested that intergroup anxiety is correlated with outgroup stereotyping. Islam and Hewstone (1993) obtained a similar correlation between intergroup anxiety and perceived group variability in a survey of Muslims and Hindus. Combined, these results suggest that the relationship between generic anxiety and stereotyping does extend to intergroup anxiety. They also suggest that there may be a relationship between intergroup anxiety and intergroup categorization.\* The surveys outlined above were correlational, and it is not possible to draw any strong conclusions about the causal relationship between the variables. Most of the experimental literature already reviewed suggests that it is intergroup anxiety that increases category use.† However, there is an alternative argument: intergroup categorization could increase intergroup anxiety. Insko and his colleagues (Insko, Pinkley, Harring, Holton, Hong, Krams, Hoyle & Thibaut, 1987; Insko, Schopler, Hoyle, Dardis & Graetz, 1990; McCallum, Harring, Gilmore, Drenan, Chase, Insko & Thibaut, 1985; Schopler, Insko, Graetz, Drigotas, Smith & Dahl, 1993) provide evidence to suggest this effect. Insko *et al.* argue that participants who experience intergroup (as opposed to interindividual) contact may assume that this will be competitive. Since it has also been demonstrated that competition is associated with increased anxiety (Wilder and Shapiro, 1989a), it is conceivable that participants who use intergroup categorization may also experience more intergroup anxiety.

The relationship between intergroup anxiety and categorization is of both theoretical and practical relevance, both to draw intergroup anxiety into the contact

\*This is not to suggest that intergroup categorization inevitably implies stereotype use. However, for a stereotype to be accessible, it is reasonable to suppose that the category must also be accessible.

†It might also be suggested that there would be a curvilinear relationship between anxiety and performance, with maximal performance (i.e. most systematic processing) at moderate levels of anxiety. We found no evidence to support this hypothesis.

literature, and to explore the viability of the intergroup categorization model. To date, however, we know of only one attempt to outline this relationship in any depth. The contact model of Vivian, Hewstone and Brown (1997) explicitly includes a link between intergroup anxiety and intergroup categorization. Vivian *et al.* argue that (1) intergroup categorization requires outgroup members to be typical and that (2) where there is a history of conflict, the typical outgroup member may be seen as negative. Vivian *et al.* therefore predict that intergroup categorization may increase intergroup anxiety, but as yet there is no empirical evidence to support this argument.

### THE CURRENT RESEARCH

The research to be presented examined the effects of categorization and intergroup anxiety in naturally occurring contact between members of real groups. The groups used were British and Japanese nationals.\* The main independent variables were quality of intergroup contact; interpersonal, intergroup and superordinate group categorization; and intergroup anxiety. The dependent variables were ingroup bias and negative affect towards the outgroup.

There were three main predictions from the contact and intergroup anxiety literature. First, we predicted that there would be a significant negative relationship between quality of contact and both ingroup bias and negative affect towards the outgroup. Second, we predicted that there would be a significant positive relationship between intergroup anxiety and bias and affect. Finally, there were rival predictions for a relationship between interpersonal, intergroup and superordinate categorization and ingroup bias and affect. No specific predictions were made in favour of any one of these models.

In addition to the main predictions, there was an additional prediction over the relationship between intergroup anxiety and intergroup categorization. We predicted that there would be a significant positive relationship between intergroup anxiety and intergroup categorization. The causal relationship between these two variables was speculative, and no specific predictions over causality were made.

Data from two studies will be presented. The first consisted of a survey reporting contact between Japanese and British people. The second was a longitudinal study, examining the effects of intergroup anxiety and categorization over time.

### STUDY 1

#### Outline

The first study was a survey of British and Japanese students, each conducted in their nation states. A total of 125 British and 111 Japanese participants were recruited through psychology lectures. Of the British sample, 30 were male and 94 were female (one missing). Of the Japanese sample, 39 were male and 72 were female.

\*British and Japanese nationals were originally chosen for two reasons. First, we had some evidence to suggest that intergroup attitudes, at least on the British side, may still be affected by the legacy of the Second World War and might reveal some residual negativity (Mori poll, 1995; *Guardian*, 19 August 1995). Second, we expected that cultural differences in social interaction styles, especially in more formal settings, might lead Japanese nationals to have higher levels of intergroup anxiety (McCroskey, Gudykunst & Nishida, 1985). This turned out to be the case.

## **Method**

### *Materials*

All the materials were in questionnaire format and were initially written in English. This was translated by a Japanese bilingual and back-translated into English using the method recommended by Brislin (1976).

The first measures were a number of contact scales (partly derived from Islam & Hewstone, 1993). Participants were asked to describe the contact that they have had with an identified member of the other group on closed 7-point scales. These scales included quantity and quality of contact, and three levels of categorization (interpersonal, intergroup and superordinate).

Quantity of contact (Cronbach's  $\alpha = 0.84$ ) consisted of three items measuring the amount of contact at university, contact outside university and number of informal talks. Quality of contact ( $\alpha = 0.85$ ) consisted of eight items, and included elements of volition ('Do you choose to meet—i.e. is it voluntary or involuntary?'), cooperation ('Does the contact take place on a cooperative or competitive basis?'), and acquaintance potential ('Do you consider them to be close personal friends or just acquaintances?') during contact (partly derived from Allport, 1954; Islam & Hewstone, 1993). Categorization involved asking participants to report the extent to which they were aware of 'individual personalities' (interpersonal categorization, three items:  $\alpha = 0.59$ ), 'nationalities and culture' (intergroup categorization, 5 items:  $\alpha = 0.72$ ) or 'wider categories' (e.g. both being students) (superordinate group categorization, three items:  $\alpha = 0.64$ ). Participants were also asked five questions on the extent to which they felt competent at the outgroup language, although this variable had little predictive power and was not used in the final analysis.

The next set of items consisted of an intergroup anxiety scale (derived from Stephan & Stephan, 1985). Participants were asked to imagine contact with an outgroup member and to rate how they would feel on a series of fifteen anxiety related adjectives (e.g. 'awkward', 'confident', 'nervous':  $\alpha = 0.88$ ).

Participants were then asked to complete a series of seven semantic differentials on both the in- and outgroup (British and Japanese nationals). Differences between these two scales were then calculated, and adjusted for valence such that a high score indicated ingroup favouritism. This constituted a measure of intergroup bias ( $\alpha=0.65$ ).

The final two scales were an outgroup negative affect scale and an ingroup identification scale. The affect scale measured to what extent participants disliked members of the outgroup. Participants rated their agreement with seven closed statements such as 'I get bored talking to Japanese nationals' ( $\alpha = 0.88$ ). The identification scale was derived from Brown, Condor, Matthews, Wade & Williams, (1986). Participants were asked to report how they felt about their nationality (e.g. 'I am glad I am British', 'I make excuses for being British') on six 7-point scales ( $\alpha = 0.81$ ).

## Results

### *Preliminary Analysis*

There were a number of significant differences between the two samples. The Japanese sample reported significantly less contact (British mean = 8.35, Japanese mean = 4.72;  $F(1,230) = 52.0$ ,  $p < 0.01$ ) and poorer quality contact (British mean = 38.9, Japanese mean = 29.7;  $F(1,225) = 72.5$ ,  $p < 0.01$ ). This contact was also significantly more intergroup than the British sample (British mean = 15.4, Japanese mean = 18.6;  $F(1,226) = 20.4$ ,  $p < 0.01$ ). The Japanese sample reported more intergroup anxiety (British mean = 24.0, Japanese mean = 35.6;  $F(1,234) = 138$ ,  $p < 0.01$ ) and more negative affect (British mean = 20.4, Japanese mean = 24.8;  $F(1, 231) = 25.7$ ,  $p < 0.01$ ). Preliminary multivariate analysis, however, provided no evidence to suggest that these differences had any systematic effects on the results. The analysis to be presented therefore consists of data collapsed across nationality to provide a final total sample of 236.

### *Path Analysis*

Initial regression analysis identified a number of basic relations between the variables. Path analysis with EQS was then used to provide a more structured analysis.

The initial proposed model was based on the consensus in the current literature (e.g. Islam & Hewstone, 1993; Gaertner *et al.*, 1996; Vivian *et al.*, 1997). In these models contact and categorization are assumed to predict intergroup bias and negative affect. Intergroup anxiety, in contrast, has been described as dependent on contact (Islam & Hewstone, 1993; Gaertner *et al.* 1996), and as a predictor of bias and affect. In the event, such a model provided a very poor fit to the data and was subsequently rejected ( $\chi^2(11, N = 218) = 1543$ ; Goodness of Fit Index (GFI) = 0.421; Comparative Fit Index (CFI) = 0.000; Root Mean Square Residual (RMSR) = 306.209). Further analysis was conducted. This involved the use of Wald tests to identify which paths were relatively unsuccessful in accounting for variance within the sample. These paths were then removed from the model.\* Lagrangian tests were also used to identify any paths that could be added to the model to increase the variance accounted for.† It should therefore be stressed that the model to be presented is somewhat investigative and *post hoc*.

The final model provided a satisfactory fit to the data, but contrasted with the current literature in a number of ways. First, in the final model there was no direct relationship between any of the categorization variables and either bias or affect. Intergroup anxiety, in contrast, was reliably associated with both negative affect ( $b = 0.19$ ,  $p > 0.05$ ) and intergroup bias ( $b = 0.27$ ,  $p < 0.05$ ). Both interpersonal and intergroup categorization were significantly associated with intergroup anxiety and quality of contact. Interpersonal categorization was associated with high quality of contact ( $b = 1.38$ ,  $p < 0.05$ ) and low intergroup anxiety ( $b = -0.51$ ,  $p < 0.05$ ).

\*Ultimately this strategy involved removing one variable (superordinate categorization) from the model altogether.

†Paths were added to the model with great caution to ensure that they were theoretically meaningful.

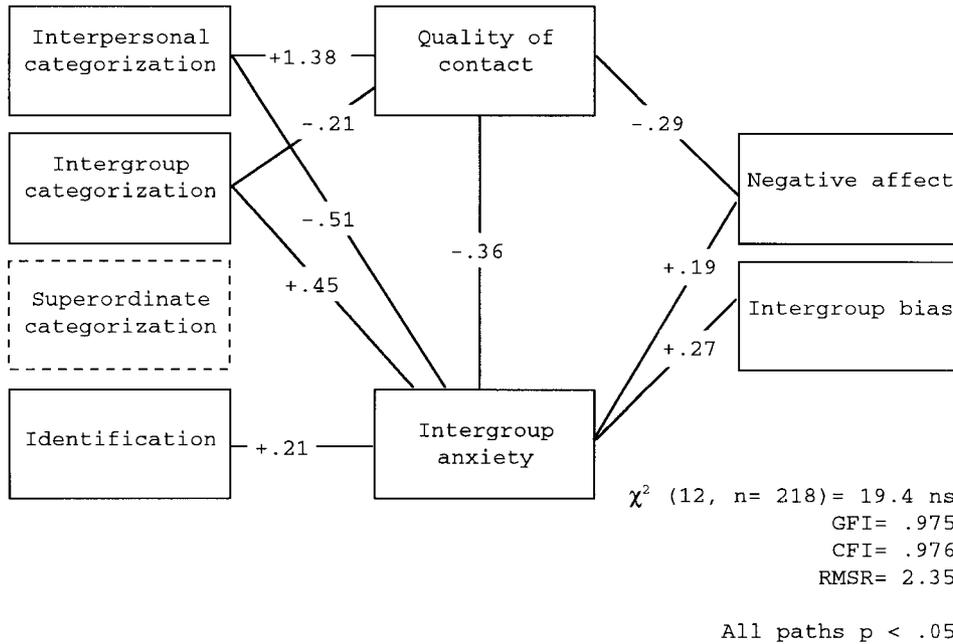


Figure 1. Path analysis

Intergroup categorization in contrast, was associated with lower quality of contact ( $b = -0.21, p < 0.05$ ) and higher intergroup anxiety ( $b = 0.45, p = 0.05$ ). Interpersonal categorization therefore appeared to be relatively benign during contact, while intergroup categorization was rather less so. Superordinate categorization had no clear relationship with either of the dependent measures, or with intergroup anxiety. Finally, there was no significant relationship between identification and the principal dependent variables, but ingroup identification was associated with significantly more intergroup anxiety ( $b = 0.21, p < 0.05$ ).

#### *Interactions between Quality of Contact and Categorization*

From Hewstone and Brown it can be predicted that there would be an interaction between intergroup categorization and quality of contact, such that participants who used intergroup categorization would be more likely to generalize from their contact experiences to their attitudes of the group as a whole. Interactions between the categorization variables and quality of contact was examined using median splits. The correlations between quality of contact and bias or affect were compared at different levels of categorization.\* Among participants who reported low levels of intergroup categorization there was no correlation between quality of contact and bias ( $r = -0.048$ ns). However, participants who reported high intergroup categorization also had a significant correlation between quality of contact and intergroup bias

\*An alternative method would have been to compare across participants who used different levels of categorization. This method resulted in an unacceptable loss of data among participants using different levels of categorization equally.

( $r = -0.287, p < 0.01$ ). There was a significant difference between these two correlations ( $z = 1.82, p = 0.05$ ), suggesting that there was a significant interaction between intergroup categorization and quality of contact on intergroup bias. This observation provides support for Hewstone and Brown's model: participants who reported highly intergroup categorization demonstrated a much stronger association between their experience of contact and their attitudes to the group as a whole. In this group, more positive contact was associated with less intergroup bias. However, those participants who did not report using intergroup categorization had no clear relationship between their contact experience and intergroup bias.

## Discussion

There were three main findings from Study 1. First, intergroup anxiety appeared to be central to processes in intergroup contact. The categorization variables, in contrast, were more strongly associated with intergroup anxiety than with the dependent variables. Intergroup categorization in particular was associated with more intergroup anxiety. This observation replicates Islam and Hewstone (1993). However, the causal nature of this relationship is not yet understood, and the design of the study allowed no firm conclusions to be drawn. What this study does demonstrate is that intergroup anxiety is a much more central and powerful variable than the current literature takes into account.

The study also yielded some results consistent with Hewstone and Brown's intergroup categorization model. Although initial path analysis suggested that intergroup categorization was associated with poor quality contact, later analysis suggested that high intergroup categorization was associated with a stronger relationship between the experience of intergroup contact and intergroup bias. There was no evidence of a similar effect for either interpersonal or superordinate categorization. This result suggests that, as argued by Hewstone and Brown, intergroup categorization is necessary to promote generalization from contact to intergroup attitudes. However, and as already argued, the design of the study does not allow this conclusion to be drawn unambiguously. It is also possible that participants' bias has influenced their perceptions of contact. To demonstrate the effects of intergroup categorization on generalization, and to investigate the possible causal relationship between intergroup anxiety and the dependent variables, it was necessary to use a longitudinal design.

## STUDY 2

### Method

#### *Sample*

The sample was taken from a Japanese College in the UK. A total of 54 Japanese students were recruited at time 1, of which 38 were male and 16 were female. There was a 26 per cent attrition rate such that at time 3 the sample size was 40: 33 men and 7 women. A total of 35 students participated through all three times, although

response rates for individual items will vary due to missing data. Time 1 (*T1*) was taken within two weeks of the participants' arrival in the UK; time 2 (*T2*) was administered after 8 months and time 3 (*T3*) after 12 months.

### *Materials*

Many of the materials used in Study 2 were comparable to those used in Study 1. However, *T1* was run before Study 1 and some changes were made to the materials administered at *T2* and *T3*. All materials were in questionnaire format, and translated into Japanese using the same method as Study 1.

Materials used both in Study 1 and at *T1* were as follows: the intergroup anxiety scale; the English language ability scale; the identification scale and the ingroup bias scale. The contact scales at *T1* were slightly different from those of Study 1. At *T1* the contact scales measured quantity, quality and intergroup categorization only (interpersonal categorization was assumed to be the bipolar opposite of intergroup categorization). At *T2* and *T3* independent measures of interpersonal and intergroup categorization were used, and a scale of superordinate categorization was added. At these later times negative affect was also added as a dependent variable.

Additional measures were devised to examine the effects of the participants' sojourner status in the UK. These materials included perceived attitudes to outgroup contact and attitudes to ingroup identification: Berry (1984) has identified these variables as crucial to acculturation success. Measures of acculturative stress and psychosomatic illness were also taken. Although these variables had some predictive power, they are not relevant to the current research and will not be discussed further.

### **Results**

Due to the limited sample and the high attrition rate, the results to be presented have reduced statistical power and should be interpreted with caution. The strength of the study, however, is that its longitudinal design allows an examination of causal relations in a naturalistic setting. Despite the small sample size, the study therefore provides an unusual insight into the effects of intergroup anxiety and categorization over time. Given the statistical problems inherent in the sample, many of the results obtained are difficult to interpret, and limited space is available to discuss them. On this basis, only two key results will be presented. These are both crucial in interpreting the results already observed in Study 1: specifically, the relationship between intergroup anxiety and intergroup categorization, and the relationship between intergroup categorization and generalized intergroup attitudes.

Two methods of analysis were available to examine temporal effects. The first (and preferable) method was to use multiple regression to examine the relationship between *T1* variable *X* on *T2* variable *Y*, controlling for variable *Y* at *T1*. The second method was to calculate change statistics and to use these as dependent variables in the regression equation. There are a variety of problems involved in the use of change statistics, particularly with the risk of inflated measurement error (Cronbach & Furby, 1970; Willett & Sayer, 1994). However, given the limited sample size and resulting restrictions on degrees of freedom, change statistics provided the most parsimonious

method. Change in the dependent variables was calculated between T1 and T2, and between T2 and T3 by subtracting the former score from the latter.

#### *Relationship between Intergroup Anxiety and Intergroup Categorization*

From the literature reviewed and the results of Study 1, there was clear evidence of a relationship between intergroup anxiety and intergroup categorization. However, there were conflicting accounts over the causality behind this relationship. The categorization literature has assumed that intergroup anxiety is a consequence of intergroup categorization, while the anxiety literature seems to suggest the reverse.

This issue was examined directly in Study 2. Change in both intergroup categorization and intergroup anxiety over time were calculated, and attempts were made to predict change from the independent measures.

From Table 1 it can be seen that there was no evidence to suggest that intergroup categorization was associated with any change in intergroup anxiety ( $\beta = -0.005$ , ns). In Table 2 the dependent and independent variables were reversed. Here it can be seen that intergroup anxiety *was* associated with increased intergroup categorization over time ( $\beta = 0.51$ ,  $p < 0.05$ ). Ingroup identification and positive attitudes toward identification were also positively associated with increasing intergroup categorization ( $\beta = 0.52$  and  $0.46$  respectively, both  $p < 0.05$ ). This finding therefore clarifies the relationship between intergroup anxiety and intergroup categorization, and replicates the observed effects of anxiety on information processing (e.g. Wilder & Shapiro, 1989a, b).

Table 1. Regression of intergroup categorization on change in intergroup anxiety

Variable	<i>B</i>	Beta
Intergroup categorization	-0.019	-0.005
Quality of contact	0.306	0.089
Ingroup identification	0.469	0.193
Attitude to identification	0.699	0.173
		$R^2 = 0.096$
		Adjusted $R^2 = 0.085$
		Multiple $R = 0.309$
		$F(4,20) = 0.530$ ns

Table 2. Regression of intergroup anxiety on change in intergroup categorization

Variable	<i>B</i>	Beta
Intergroup anxiety	0.307	0.509 ( $p < 0.05$ )
Quality of contact	-0.230	-0.150
Ingroup identification	0.537	0.515 ( $p < 0.05$ )
Attitude to identification	0.887	0.461 ( $p < 0.05$ )
		$R^2 = 0.448$
		Adjusted $R^2 = 0.326$
		Multiple $r = 0.670$
		$F(4,18) = 3.66$ ( $p < 0.05$ )

*Interaction between Intergroup Categorization and Quality of Contact*

In Study 1 it was demonstrated that there was a stronger relationship between quality of contact and intergroup bias under conditions of high intergroup categorization. This observation provided some support for Hewstone and Brown's intergroup categorization model, but could not demonstrate that participants were generalizing from contact to the group as a whole. Study 2 therefore examined whether the relationship could be replicated, and if so, whether quality of contact appeared to influence intergroup bias, or whether bias was influencing quality of contact.

The analysis in Study 2 was again based on comparing correlations between contact and bias/affect for subgroupings split at the median of the categorization variables.\* As in Study 1, there were a number of correlations between quality of contact and change in both intergroup bias and negative affect, but there was no evidence that these correlations were systematically associated with different levels of interpersonal or superordinate categorization. However, there was evidence of a relationship between intergroup categorization and the correlation between quality of contact and change in negative affect. Specifically, at low levels of intergroup categorization there was no significant correlation between quality of contact and change in negative affect ( $r = -0.368$ ). However, at high levels of intergroup categorization there was a significant correlation ( $r = 0.662, p < 0.05$ ). The two correlations were also significantly different from each other ( $z = 2.55, p < 0.05$ ). The latter observation therefore again suggests that intergroup categorization was causally associated with a stronger relationship between quality of contact and outgroup evaluation under conditions of intergroup categorization. Intergroup categorization and quality of contact at  $T1$  were able to predict change in negative affect between  $T2$  and  $T3$ . This suggests that participants were generalizing from contact to the group, rather than using their affect to the group to influence their perceptions of contact.

Superficially, this result is supportive of Hewstone and Brown's model. However, the correlation between quality of contact and negative affect was *positive* rather than negative: participants who reported high-quality contact had significantly more negative affect. This observation is counter-intuitive: there was no evidence of additional variables or changes in the variables over time that might account for the relationship. We will return to this issue shortly.

**Discussion**

The design of Study 2 allowed more causal insight into the processes identified in Study 1. The results of this study both confirmed and confounded the results of Study 1. First, the study confirmed that the relationship observed between intergroup anxiety and intergroup categorization (observed in Study 1) was replicable. Moreover, it demonstrated that it seemed to be intergroup anxiety that was influencing intergroup categorization and not the reverse. This is an important result for both the literature on intergroup anxiety and on categorization. First, this result replicates the

\*Participants at time 1 completed one scale of categorization only. Mean responses to this scale were therefore subject to a median split. Participants who scored below the median were assumed to be reporting relatively interpersonal categorization while participants who scored above the median were assumed to be reporting relatively intergroup categorization.

very limited research on the effects of intergroup anxiety on information processing in a naturalistic context. Second, it suggests that research on the relationship between categorization and intergroup attitudes must take intergroup anxiety into account.

Study 2 also replicated Study 1 in demonstrating an interaction between intergroup categorization and quality of contact on generalised attitudes to the group (in this case, negative affect). This observation lends support to the Hewstone and Brown model of intergroup categorization and generalisation. Unfortunately for the model, however, the association was in the reverse direction predicted.

### GENERAL DISCUSSION

The research presented was designed to investigate the relationship between categorization and intergroup anxiety on intergroup attitudes. Two studies were outlined that investigated actual contact experiences between British and Japanese nationals. This research contrasts with much of the current literature in its use of real groups and contact as reported by participants in real life. The research is also innovative in simultaneously measuring all three levels of categorization, rather than manipulating them individually.

The research examined interpersonal, superordinate and intergroup categorization and the relationship between these variables and intergroup bias and positive outgroup affect. Contrary to the current literature, there was very little evidence of any simple effects of the three categorization variables.

Although there was no evidence of a direct relationship between any of the categorization variables and outgroup bias or affect, there was some evidence in support of the generalization hypothesis of the categorization model. Specifically, in both Study 1 and 2, intergroup categorization was associated with a stronger relationship between quality of contact and intergroup attitudes (bias in Study 1 and negative affect in Study 2). However, while in Study 1 intergroup categorization was associated with a positive correlation between quality of contact and intergroup bias, in Study 2 the correlation with affect was negative. Combined, these results lend strong support to the suggestion that intergroup categorization is central to generalization from intergroup contact. They also suggest, however, that the relationship between intergroup categorization and generalized attitudes is complex, and that intergroup categorization may have paradoxical effects.

There are several possible reasons for the inconsistencies observed between the two studies. First, note that the interactions were observed on different dependent measures (bias in Study 1, negative affect in Study 2). As has been observed elsewhere, these indicators of intergroup attitude are seldom closely related and may have different antecedents (Brewer, 1979; Brown, 1995). Second, there was a minor measurement difference between the two studies: the time 1 measure of categorization involved a single bipolar measure (interpersonal–intergroup). All other categorization measures in Study 1 and 2 employed independent indices. Finally, and potentially most interestingly, the social context of the two studies was different. In Study 1, both Japanese and British samples were responding to questionnaires in their native countries. It is plausible that this contact could be construed as being of approximately equal status. In Study 2, however, the Japanese respondents were all temporary sojourners in the

UK. In this context they were very much a numerical minority and conceivably of lower status *vis-à-vis* the British host culture.\* It is possible that in such a context some of the 'quality of contact' items (e.g. voluntary versus involuntary, competitive versus cooperative) might have taken on a different (and less pleasant) significance for the participants. This could have caused the inversion of the quality  $\times$  intergroup interaction observed in Study 1. Experimental investigations of such interaction effects in different social and numerical status conditions would be invaluable to explore these issues in more depth (see Bettencourt, Charlton & Kernahan, 1997, for a promising start in this direction).

The key results from these two studies, however, are the effects of intergroup anxiety on both intergroup attitudes (intergroup bias and affect) and on categorization. Intergroup anxiety was shown to be directly associated with intergroup bias and negative affect in Study 1, and with increased intergroup categorization in Study 2. These results therefore replicate some of the current evidence of the effects of intergroup anxiety on information processing (Wilder, 1993) and further confirm the effects of a negative affective state on intergroup perception and interpretation (Esses & Zanna, 1995; Forgas & Bower, 1986; Jussim, Manis, Nelson & Soffin, 1995; Stangor & Ford, 1992). The current research should be considered as an extension of the literature in its emphasis on integral, intergroup anxiety in contact between real (as opposed to *ad hoc*) groups. These results are also consistent across two different methodologies, and three very different samples.

There are a number of implications of this research for the categorization literature. First, the results of Study 2 have confirmed the probable existence of the causal relationship between categorization and intergroup anxiety. This extends the current experimental evidence, and places intergroup anxiety at the heart of the categorization debate. If intergroup anxiety does increase the use of intergroup categorization, then attempting to promote either interpersonal or superordinate categorization in anxious participants may be a fruitless task: participants may have neither the will nor the cognitive resources to do so. Further, some of the apparent negative effects of intergroup categorization (Gaertner *et al.*, 1996) may be explicable in terms of intergroup anxiety rather than categorization *per se*: intergroup anxiety and categorization may have been confounded in a number of these studies.

There is a second, and more important, implication from this research, however. Both studies have found strong evidence of the effects of intergroup anxiety during intergroup contact. In both studies intergroup anxiety has appeared to be a more powerful variable than any of the categorization variables. These observations strongly suggest that the current cognitive emphasis in the contact literature may be neglecting the role of more affective processes. While research is increasingly examining the role of affect, this has typically been considered as incidental and secondary to cognition (Islam & Hewstone, 1993; Gaertner *et al.*, 1996). The model of Vivian *et al.* (1997), in particular, included intergroup anxiety, but placed it as secondary to categorization. The current research suggests that intergroup anxiety is central to the perception of intergroup contact and intergroup attitudes as a whole. Further, the relationship between intergroup anxiety and intergroup categorization suggests that the effects of anxiety on information processing may, under some circumstances, drive social cognition.

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