The colour of gender stereotyping

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Despite legislative attempts to eliminate gender stereotyping from society, the propensity to evaluate people on the basis of their sex remains a pernicious social problem. Noting the critical interplay between cultural and cognitive factors in the establishment of stereotypical beliefs, the current investigation explored the extent to which culturally transmitted colour–gender associations (i.e., pink is for girls, blue is for boys) set the stage for the automatic activation and expression of gender stereotypes. Across six experiments, the results demonstrated that (1) consumer choice for children's goods is dominated by gender-stereotyped colours (Experiment 1); (2) colour-based stereotypic associations guide young children's behaviour (Experiment 2); (3) colour–gender associations automatically activate associated stereotypes in adulthood (Experiments 3–5); and (4) colour-based stereotypic associations bias impressions of male and female targets (Experiment 6). These findings indicate that, despite prohibitions against stereotyping, seemingly innocuous societal practices may continue to promote this mode of thought.

‘Let us resolve and work toward achieving very simple propositions. There are no acceptable limits, and there are no acceptable prejudices in the 21st century in our country’

Hillary Clinton, Washington, DC, June 7, 2008

A well-worn sentiment in both political and personal declarations is that allowing cultural stereotypes to influence thoughts and behaviour is completely unacceptable. Whether the beliefs in question pertain to gender, race, religion, or sexuality, the practice of judging people on the basis of the groups to which they belong attracts universal condemnation (see Inglehart & Norris, 2003). It is somewhat perplexing therefore that stereotyping continues to persist, even in the most visible of arenas. As a case in point, consider the experiences of Hillary Clinton and Sarah Palin during the 2008 US presidential campaign. Rather than media commentary focusing on the quality of their policies and ideas, attention repeatedly fell instead on their choice of outfit, hairstyle, and cosmetic product. Despite widespread endorsement of egalitarian values (Devine, 1989; Monteith, Devine, & Zuwerink, 1993) and the constant threat of legal sanctions (e.g., UK’s Sex Discrimination Act, 1975), stereotypic beliefs about the sexes continue to wield considerable impact in contemporary life (Benokraitis & Feagin, 1995; Glick & Fiske, 1996; Inglehart & Norris, 2003). But why is this the case? In the current investigation,

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we consider how the interplay of cultural and cognitive factors may ultimately serve to perpetuate this undesirable mode of thought.

**Gender stereotyping in society**

While stereotyping remains an insidious societal problem, it is clear that efforts to promote gender equality have been rewarded with a reduction in people’s tolerance of sexism (Glick & Fiske, 1996). It is no longer acceptable, for example, to deny a woman promotion or access to education on the basis of her gender. These advances aside, however, gender stereotyping continues to pervade public life, albeit in a less explicit form. Characterized by Glick and Fiske (1996) as *benevolent sexism*, this more contemporary form of stereotyping arises from the expectation that men and women should adhere to conventional sex roles (e.g., Glick & Fiske, 1996; Gowen & Britt, 2006; Rudman & Glick, 1999; Rudman & Kilian, 2000). For example, although it is illegal to deny a woman employment on the basis of her gender, a female job candidate who displays counter-stereotypic qualities (e.g., *arrogance* or *competitiveness*) may be viewed less favourably than a male who exhibits identical characteristics (Branscombe & Smith, 1990; Eagly & Karau, 2002; Eagly, Makhijani, & Klonsky, 1992; Rudman & Glick, 1999). Operating in this way, benevolent sexism blocks women from reaching the upper echelons of government, education, and industry (Equal Opportunities Commission, 2004).

At the level of the individual perceiver, the persistence of gender stereotyping can be traced to the cognitive operations that support core components of the person perception process (Brewer, 1988; Bodenhausen & Macrae, 1998; Fiske & Neuberg, 1990). Decades of social psychological research have established that people tend to think about others categorically (i.e., based on their social group memberships), a social-cognitive tactic that dominates both information processing and response generation (Allport, 1954; Bodenhausen & Macrae, 1998; Brewer, 1988; Fiske & Neuberg, 1990; Kunda & Spencer, 2003; Macrae & Bodenhausen, 2000). Following the perceptual registration of triggering categorical cues (e.g., *hairstyle*, *item of clothing*, *sex-typed object*), associated knowledge structures in memory give rise to stereotype-based responses that are notoriously difficult to control (Banaji & Hardin, 1996; Brewer, 1988; Devine, 1989; Fiske & Neuberg, 1990; Macrae & Martin, 2007; Martin & Macrae, 2007; Oakhill, Garnham, & Reynolds, 2005). Only when armed with sufficient attentional resources, awareness that stereotype activation has occurred and a motivation to avoid discriminatory thinking can stereotyping seemingly be avoided (Bargh, 1999; Bodenhausen & Macrae, 1998; Fiske & Neuberg, 1990; Macrae & Bodenhausen, 2000). This then raises a potentially troublesome possibility. If the immediate environment is littered with stereotype-related cues, it may be difficult for perceivers to ameliorate the impact of discriminatory thinking. As Bargh (1999) has suggested, ‘Once a stereotype is so entrenched that it becomes activated automatically, there is relatively little that can be done to control its influence’ (p. 378).

**Culture and gender stereotyping**

Important parallels can be drawn between the manifestation of categorical thinking at an individual level and the persistence of gender stereotyping in wider society (Bargh, 1999; Glick & Fiske, 1996). Indeed, there are notable links between people’s stereotype-related behaviour and cultural practices that disseminate gender-related beliefs about men and women (Bigler & Liben, 2007; Diekman & Eagly, 2000; Diekman, Eagly, Mladinic, & Ferreira, 2005; Guimond et al., 2007). While cognitive processing strategies clearly
underpin people’s propensity to apply gender stereotypes in their dealings with others (Bodenhausen & Macrae, 1998; Macrae & Bodenhausen, 2000), the stereotypes themselves originate in specific beliefs about the sexes that are culturally specified.

The form these beliefs commonly take is that of an association between a particular object (e.g., truck, doll), role (e.g., homemaker, financial provider), or behaviour (e.g., preparing food, repairing the car) and the concepts of masculinity and femininity. What is potentially problematic is that cultural practices that propagate links between category-specifying cues and the sexes may serve to precipitate gender stereotyping by forging associative pathways through which automatic category (hence stereotype) activation can influence the process and products of person construal (Bargh, 1999; Macrae & Bodenhausen, 2000). In this way, category-associated cues may trigger stereotypical thinking even when the cues in question are seemingly inoffensive (Brebner, Martin, & Macrae, 2009; Martin & Macrae, 2007).

A notable example of an innocuous gender-related cue is colour. Pink and blue tones are commonly associated with the sexes, a colour–gender linkage that has been operating since the middle of the last century (Frassanito & Pettorini, 2008; Huun & Kaiser, 2001; Paoletti & Kreglof, 1989) and is ubiquitous from infancy (Picariello, Greenberg, & Pillemer, 1990). Young children’s environments are saturated with gender-typed hues, with blue items essential for boys and pink items obligatory for girls (Bridges, 1993; Picariello et al., 1990; Pomerleau, Bolduc, Malcuit, & Cossette, 1990; Shakin, Shakin, & Sternglanz, 1985). Indeed, such is the potency of these associations, it has been suggested that ‘young children may identify clothing colour as one of several defining attributes of sex even before they are knowledgeable about the biological differences between the sexes’ (Picariello et al., 1990, p. 1459).

Early childhood is a time when developing gender stereotypes are prominent (Albert & Porter, 1983; Kohlberg, 1966; Slaby & Frey, 1975) as gender awareness is high (Kohlberg, 1966; Levy, 1999; Warin, 2000) and category-based processing dominates cognition (Aboud, 1988; Dunham, Baron, & Banaji, 2008; Grace, David, & Ryan, 2008; Martin & Halverson, 1981). If young children’s emerging stereotypes encompass strong colour–sex associations then these otherwise innocuous linkages may serve to precipitate gender stereotyping by creating a direct associative pathway through which stereotypic beliefs can be triggered and expressed (Bargh, 2006; Bodenhausen & Macrae, 1998; Srull & Wyer, 1979, 1989). As a result, cultural practices in childhood may set the stage for the automatic activation and application of gender stereotypes later in life. We explored this possibility in the current inquiry.

The current research
To investigate the impact that colour associations exert on gender stereotyping, we first examined the extent to which contemporary society continues to promote the belief that pink is for girls and blue is for boys (Experiment 1). Our next experiment then considered whether children’s actual behaviour is driven by colour stereotypes (Experiment 2). Shifting the emphasis to adult social cognition, Experiments 3–5 investigated whether colour cues automatically trigger the activation of associated gender representations. Finally, Experiment 6 explored the application of colour–gender associations in an impression formation task. Collectively, these experiments sought to establish how the interplay of cultural and cognitive forces shapes the emergence, activation, and application of gender stereotypes.
EXPERIMENT 1: PINK DOLLS AND BLUE TRUCKS

Method
Examination of the contemporary cultural association between colour and sex was undertaken by exploring the colours in which children’s products are available. Leading UK mail order catalogues for clothing (‘Kays’, produced by Littlewoods Shop Direct Group) and toys (‘Argos’, produced by the Home Retail Group) were selected for analysis. Both catalogues included a section designated for young (0–5 years) children and the toy catalogue was further divided into sections depicting Girls’ Toys and Boys’ Toys. The catalogues were coded by assigning every unicoloured item a label denoting colour category. For items that were available in a variety of colours, each colour option was coded as a separate item.

Results and discussion
The clothing catalogue listed a total of 258 individual items, of which 203 were unicoloured (including white). Sex-typed colours were found to be prevalent, with 53.2% of the unicoloured clothing items being either pink or blue (55 pink, 53 blue) and the remaining items split among nine other colours. Chi-square analysis confirmed that this distribution was significantly biased towards pink and blue (\( \chi^2(10) = 211.0, p < .001 \)).

In the toy catalogue, a total of 321 unicoloured toys were listed, of which 138 were classified as boys’ toys and 183 as girls’ toys. Chi-square analysis of the colour distribution revealed significant gender biases for both male and female items. Boys were offered more blue toys (23.2%) than any other colour (\( \chi^2(7) = 70.5, p < .001 \)) whereas girls’ toys included more pink toys (54.1%) than any other colour (\( \chi^2(9) = 424.6, p < .001 \)). Notably, 97.0% of the pink toys were listed in the ‘Girls’ toys’ section.

These results confirm that young children’s clothing and toys are dominated by gender-stereotyped colours (i.e., pink and blue). In this respect, the data are consistent with previous research (e.g., Pomerleau et al., 1990; Shakin et al., 1985) and serve to validate anecdotal reports that colour stereotypes continue to pervade contemporary life. Having established the existence of colour–gender associations in the childhood environment, our next experiment examined the extent to which these stereotypes impact young children’s behaviour.

EXPERIMENT 2: CHOOSING BEDROOM FURNITURE
To explore the impact of colour–gender associations on behaviour, young children were asked to choose items that they thought a young male and female target would like to have in their bedroom. It was expected that children’s exposure to colour stereotypes would lead them to choose predominantly blue items for the boy and pink items for the girl.

Method
Participants and design
Ten children aged between the ages of three and five (5 males, mean age 4.0 years) were tested individually. Each child participated with the written consent of a parent or guardian in accordance with the guidelines and approval of the University of Aberdeen Psychology Ethics Committee. The experiment had a single factor (target: boy or girl) repeated-measures design.
Stimulus materials and procedure

The experiment was described to children as a game in which they could choose the furniture and toys that would go into two bedrooms, one for a little boy and one for a little girl. The child was seated at a table alongside the experimenter. On the table was placed a laminated, A4-sized photographic image of an empty room with white walls and flooring. Half of the children were first told that the room was for a boy, while the other half began with a girl’s room. The experimenter presented the child with four laminated photographic images of an object to go in the room (e.g., bed, chair, teddy bear). The objects were depicted in different colours (i.e., blue, pink, green, or orange) and the child was asked to pick the colour the owner of the room would prefer and to place the picture in the room. The colours orange and green were chosen as additional options because they are visually distinct from pink and blue, and not strongly associated with either sex. The experimenter noted the colour option that the child selected. This procedure was repeated for a total of eight objects (each of which was offered in the same four colour options). Once all eight objects had been selected, they were removed from the room and the child repeated the task, this time choosing items for a child of the opposite sex. Once the child had completed the task for both a girl’s and boy’s room, he or she was debriefed, thanked, and returned to a parent.

Results and discussion

The proportions of coloured items selected for the boy’s and girl’s room are shown in Figure 1. The results revealed that there was a clear tendency for children to make gender-typed colour choices, with 90.0% of the items chosen for the girl’s room being pink and 48.7% of items in the boy’s room being blue. Paired-samples t-tests confirmed that if a participant chose a pink item then it was significantly more likely to be for the girl’s room than the boy’s (t(9) = 16.61, p < .001), while blue items were more likely to be chosen for the boy’s room than the girl’s (t(9) = 6.64, p < 0.001). One-sample t-tests showed that, of the eight colour–gender combinations, only ‘pink for girl’ and ‘blue for boy’ choices occurred significantly more often than the 25% proportion that would be expected by chance (t(9) = 12.65, p < 0.001 and t(9) = 3.50, p < 0.01, respectively).

These findings suggest that young children’s understanding of male and female preferences is already under the influence of gender stereotypic notions. Whether
the children were projecting their personal preferences to hypothetical targets (see Ames, 2004) or applying explicit, internalized stereotypic beliefs about gender, they displayed a clear conviction that girls prefer pink and boys prefer blue. Worrisome though these findings may be, it is conceivable that the influence of colour stereotypes may be restricted to childhood. After all, surely sophisticated adults must be free from associations that link colours with the sexes – or are they? Influential accounts of social-cognitive functioning would tend to suggest otherwise (Bargh, 1999; Devine, 1989; Macrae & Bodenhausen, 2000). Indeed, among unsuspecting adults, the mere detection of category-specifying colour cues may be sufficient to trigger the automatic activation of associated representations (i.e., category automaticity, see Bargh, 1999). We explored this possibility in our next three experiments.

**EXPERIMENT 3: PINK AND BLUE FORENAMES**

Once stereotypic associations are formed in memory, perceptions of category-specifying cues, such as a person’s hairstyle, are sufficient to trigger stereotype activation (e.g., Bargh, 1999; Brebner *et al.*, 2009; Devine, 1989; Macrae & Bodenhausen, 2000; Macrae & Martin, 2007). But is this also case for colour cues and gender stereotypes? In our next experiment, we explored the extent to which colour cues (i.e., pink and blue) automatically activate conceptions of gender during a forename-classification task (Brebner & Macrae, 2008; Macrae & Martin, 2007). Male and female forenames were selected as the to-be-categorized stimuli because of their strong and unambiguous association with the sexes (Macrae, Mitchell, & Pendry, 2002). Of interest was the impact that the colour of the forenames (i.e., pink or blue) would exert on task performance. If pink and blue trigger the activation of associated gender-based representations, it was expected that participants would respond more quickly on trials in which forenames were presented in gender-matching (e.g., male forenames presented in blue) than gender-mismatching (e.g., female forenames presented in blue) colours, thereby demonstrating the automaticity of category activation from colour cues.

**Method**

**Participants and design**

Twenty undergraduates (11 females, mean age 20.9 years) participated in the experiment in return for course credits. The study had a 2 (Forename: male or female) × 2 (Trial Type: matching or mismatching) repeated-measures design.

**Stimulus materials and procedure**

Participants were asked to complete a simple colour-naming test to ensure that they were not colour blind, and were then seated at an Apple Macintosh computer and keyboard. They were informed that forenames (e.g., *John*, *Angela*) would appear on the screen and their task was simply to classify the items as male or female (indicating their judgement using keys on the keyboard) as quickly and accurately as possible. The task was presented using PsyScope experimental software (Cohen, MacWhinney, Flatt, & Provost, 1993). Forty gender-specific forenames (20 males and 20 females) were presented individually in Helvetica font (size 48) in the centre of a black background, in pink or blue lettering. The names were the 20 most popular forenames for boys and girls in the United Kingdom from the year that a typical 18-year-old participant would
have been born, after excluding those names associated with both sexes. Each name remained on the screen until a response was made, then a 1,000-ms interval preceded the presentation of the next stimulus. Each forename was presented in both pink and blue font (i.e., 80 trials) and stimulus presentation was randomized for each participant. On completion of the task, participants were thanked, debriefed, and dismissed.

Results and discussion

The dependent measure of interest was the time taken by participants to sex the forenames. Trials on which errors were committed (4.3%) were excluded from the analysis. Median reaction times were submitted to a 2 (Forename: male or female) × 2 (Trial Type: matching or mismatching) repeated-measures analysis of variance (ANOVA). The analysis yielded a main effect of Forename, such that responses were faster to female than male items \( F(1,19) = 11.16, p < .005, M_s: 608 \text{ ms vs. } 640 \text{ ms} \). More importantly, however, a main effect of Trial Type was also observed, with faster responses returned on gender-matching than gender-mismatching trials, \( F(1,19) = 7.79, p < .05, M_s: 616 \text{ ms vs. } 632 \text{ ms} \).1

These results confirm that colour cues prompted the automatic activation of gender-related categorical representations during the forename-classification task. When, for example, participants responded to male forenames in pink (or female forenames in blue), competing categorical representations triggered response competition and impaired task performance (Brebner et al., 2009; Macrae & Martin, 2007). That pink and blue colour cues influenced performance on the forename-classification task demonstrates that colour–gender associations are not limited to childhood, but continue to impact on adult cognition. To examine the generalizability of this effect beyond lexical stimuli (Macrae & Bodenhausen, 2000), in our next experiment we examined the influence of colour cues on the classification of gender-stereotyped objects.

EXPERIMENT 4: FOOTBALL BOOTS AND BRAS

Numerous objects are associated with one sex more than the other (e.g., hairdryer, cigar), such that presentation of the item can trigger activation of the associated gender-based representation in memory (Brebner & Macrae, 2008; Crawford, Leynes, Mayhorn, & Bink, 2004). Exploiting this finding, in Experiment 4 participants were required to classify (i.e., masculine or feminine) line drawings of sex-typed objects that were depicted in either pink or blue. As was the case for forenames (i.e., Experiment 3), it was anticipated that responses would be furnished more rapidly when gender-typed objects were presented in a matching than mismatching colour.

Method

Participants and design

Twenty undergraduates (12 females, mean age 22.8 years) participated in the experiment in return for course credit. The experiment had a 2 (Object: masculine or feminine) × 2 (Trial Type: matching or mismatching) repeated-measures design.

1 An additional analysis revealed that these effects were not moderated by the sex of participants.
Stimulus materials and procedure
The current study was a replication of Experiment 3, but on this occasion the to-be-classified stimuli comprised line drawings of gender-typed objects. Following an initial colour-vision test, participants were seated at an Apple Macintosh computer and keyboard and asked to indicate (via a key press) whether a series of objects were stereotypically masculine or feminine. PsyScope experimental software (Cohen et al., 1993) was used to present line drawings of 20 stereotypically male (e.g., gun, hammer, jeep) and 20 stereotypically female (e.g., lipstick, pram, cocktail glass) objects (Brebner & Macrae, 2008; Crawford et al., 2004). A pink and a blue line drawing of each object was presented as a 250 × 250 pixel image and appeared in the centre of a black background. Stimulus presentation was randomized for each participant. Each picture remained on the screen until a response was made, then a 1,000-ms interval preceded the presentation of the next stimulus. On completion of the task, participants were thanked, debriefed, and dismissed.

Results and discussion
Trials on which errors were committed (3.4%) were excluded from the analysis. Median reaction times were then submitted to a 2 (Object: masculine or feminine) × 2 (Trial Type: matching or mismatching) repeated-measures ANOVA. The only effect to emerge in this analysis was a main effect of Trial Type \( F(1,19) = 4.40, p < .05 \), such that response latencies were faster on gender-matching than gender-mismatching trials (respective Ms: 665 ms vs. 708 ms). These findings confirm the automaticity of category activation following the presentation of sex-typed objects in associated colours.

EXPERIMENT 5: BACKGROUND COLOUR CUES
Thus far (i.e., Experiments 3 and 4), the results have demonstrated the automaticity of category activation when to-be-classified stimuli (i.e., words or objects) are depicted in gender-related colours (i.e., pink or blue). This then raises an interesting question. Must colour cues be an inherent part of the target item (i.e., bound to the item – Treisman & Gelade, 1980) to trigger category activation or would similar effects emerge when the critical colours comprise irrelevant aspects of a stimulus display? That is, is the mere presence of gender-typed colours sufficient to trigger category activation? We explored this issue in our next experiment in a task in which participants had to sex faces (Brown & Perrett, 1993; Cloutier, Mason, & Macrae, 2005; Ganel & Goshen-Gottstein, 2002) that appeared on either a pink or blue background. It was anticipated that trials in which faces were presented on a gender-matching background (e.g., a male face on a blue background) would elicit faster responses than trials in which the background was gender mismatching (e.g., a male face on a pink background).

Method
Participants and design
Twenty undergraduates (15 females, mean age 21.3 years) participated in the experiment in return for course credits. The experiment had a 2 (Face: male or female) × 2 (Trial Type: matching or mismatching) repeated-measures design.

2 An additional analysis revealed no effect of participant sex on reaction times.
Stimulus materials and procedure
Following a colour-vision test, participants were seated at an Apple Macintosh computer and keyboard and asked to indicate (via a key press) the sex of a series of faces (Macrae & Martin, 2007). PsyScope experimental software (Cohen et al., 1993) was used to present black and white photographic images of 20 male and 20 female Caucasian faces. The hair was cropped from the stimuli and each face was depicted in a frontal pose displaying a neutral expression. The faces were presented on a 250 × 250 pixel pink or blue background in the centre of a black screen. Each face appeared on both backgrounds giving a total of 80 trials. The experimental software randomized the order of stimulus presentation. Each face remained on screen until participants made a response, then a 1,000-ms interval preceded the presentation of the next stimulus. On completion of the task, participants were thanked, debriefed, and dismissed.

Results and discussion
Trials on which errors were committed (8.8%) were excluded from the analysis. Median reaction times were then submitted to a 2 (Face: male or female) × 2 (Trial Type: matching or mismatching) repeated-measures ANOVA. The only effect to emerge in this analysis was a main effect of Trial Type \[F(1,19) = 4.64, p < .05\], such that response latencies were faster on gender-matching than gender-mismatching trials (respective Means: 682 ms vs. 702 ms). These findings confirm that even when comprising an irrelevant aspect of a stimulus array, gender-typed colour cues trigger the activation of associated categorical knowledge.

EXPERIMENT 6: APPLYING GENDER STEREOTYPES
The results of Experiments 3–5 confirm that innocuous colour cues are sufficient to trigger the automatic activation of associated gender-related representations (Bargh, 1999; Macrae & Bodenhausen, 2000). What has yet to be demonstrated, however, is whether this category activation turns into explicit stereotype application (see Bodenhausen & Macrae, 1998; Gilbert & Hixon, 1991). To explore this issue, our final experiment considered the extent to which pink and blue items of clothing impact people’s impressions of hypothetical targets.

Method
Participants and design
Sixty undergraduates (51 females, mean age 21.4 years) participated in the experiment in return for course credits. The experiment had a 2 (Target: male or female) × 2 (Shirt: pink of blue) between-subjects design.

Stimulus materials and procedure
Participants were shown a photographic image of either a male or female target of whom they were to form an impression. The photographic images comprised morphed

3 An additional analysis revealed no effect of participant sex on reaction times.
Gender stereotyping

Table 1. Ratings for applicability of masculine and feminine items to targets dressed in pink and blue shirts

<table>
<thead>
<tr>
<th>T-shirt colour</th>
<th>Masculine items</th>
<th>Feminine items</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Independent</td>
<td>Contact sports</td>
</tr>
<tr>
<td>Blue</td>
<td>3.8 (0.7)</td>
<td>3.7 (0.9)</td>
</tr>
<tr>
<td>Pink</td>
<td>3.3 (0.9)*</td>
<td>3.1 (1.2)*</td>
</tr>
</tbody>
</table>

*Difference between blue and pink: $p < .05$; **Difference between blue and pink: $p < .01$.

composites of 64 female faces and 32 male faces (Braun, Gruendl, Marberger, & Scherber, 2001, used with permission). These images showed an average face displaying a neutral expression, along with the visible neckline and top portion of a t-shirt. The hair was shown in an ambiguous style that could be perceived as very short hair, or long hair tied back to avoid giving potentially conflicting cues of masculine or feminine preferences. However, the targets were designed to represent a male and female individual, rather than looking androgynous. Participants’ impressions of the target were assessed using a questionnaire that probed (using a 5-point Likert scale) how likely 24 descriptors were to apply to the target. Embedded in the questionnaire were four items that assessed gender stereotyping (Bem, 1974; Crawford et al., 2004), notably items pertaining to personality characteristics (i.e., independent, affectionate) and lifestyle choices (i.e., enjoys contact sports, enjoys watching romantic movies). On completion of the task, participants were thanked, debriefed, and dismissed.

Results and discussion

Participants’ responses to the critical questions revealed a clear pattern of gender stereotyping. Targets depicted in a pink t-shirt elicited higher ratings on the feminine than the masculine items, while those depicted in blue produced the opposite pattern of effects (see Table 1). Participants’ ratings were submitted to a 2 (Target: male or female) $\times$ 2 (Shirt: pink of blue) between-subjects ANOVA. This yielded a main effect of Shirt on each measure (affectionate, $F(3,56) = 5.81, p < .05$; dominant, $F(3,56) = 4.58, p < .05$; enjoys romantic films, $F(3,56) = 7.35, p < .01$; enjoys contact sports, $F(3,56) = 4.16, p < .05$). No effect of Target or interaction between the factors emerged on the measures. Thus, regardless of target sex, wearing a blue t-shirt elevated ratings on the masculine items, whereas possession of a pink t-shirt increased ratings on the feminine items.

These results confirm that gender-stereotypic beliefs activated by pink and blue colour cues were applied during the impression formation task. If inferences on a ‘slow’ judgement task can be influenced by the colour of t-shirt a target is wearing, then this suggests that the colour associations demonstrated in Experiments 3–5 extend beyond rapid automatic responses to inferential aspects of person construal. While the scope of the current inquiry did not extend to exploring these effects in real-world environments (e.g., interviewing job candidates dressed in pink and blue shirts), the findings certainly suggest that, in such a scenario, colour cues would have the potential to activate gender stereotypic responses and influence person evaluation.
Interestingly, participants appeared to be using colour cues as more of an inferential guide than the target’s actual sex. One reason for this may have been an assumption by participants that the targets’ t-shirt colour was meaningful as it reflected their personal choices and tastes, rather than being an incidental factor (as in Experiments 3–5). An interesting angle for future work might be to explore whether colour cues that are externally determined (e.g., company uniform) have a similar effect. What is clear from the current experiment is that when an individual decides to don pink and blue colours, he or she should do so in the knowledge that the gender-stereotypic associations of these colours can have an impact on the person perception process.

GENERAL DISCUSSION

The six experiments reported herein highlight the cultural proliferation of colour–gender associations and demonstrate the impact that these linkages exert on social cognition. Experiment 1 showed that consumers of children’s goods are offered a predominance of sex-typed colour options. Goods aimed at girls were largely pink, while blue dominated boys’ clothes and playthings. Experiment 2 revealed that these associations impact children’s behaviour. Specifically, while it was believed that a young boy would prefer to have blue items in his bedroom, pink was the preferred colour for a young girl. This pattern suggests that young children quickly acquire colour–gender associations and freely apply them when thinking about other people.

The impact of these early colour–gender associations on adult cognition was examined in four further experiments. The results of Experiments 3–5 revealed that pink and blue colour cues were sufficient to trigger the activation of gender-related knowledge, whether the colours comprised part of the to-be-judged stimuli (i.e., forenames or objects) or were simply an irrelevant part of the stimulus display. In doing so, these findings confirm the automaticity of category activation from colour cues (Bargh, 1999; Macrae & Bodenhausen, 2000). Finally, an impression formation task (Experiment 6) demonstrated the application of gender stereotypes from associated colour cues. Unknown men and women depicted in pink clothing were imbued with more feminine characteristics than those wearing blue, who in turn were ascribed more masculine qualities and preferences. Taken together, this series of experiments suggests that the cultural proliferation of colour–gender associations serves as a foundation for the activation and application of stereotypes in children and adults alike.

What’s in a Cue?

Notwithstanding the inherently benign nature of pink and blue hues, the current findings suggest that the creation of strong associations between colour and the sexes can have undesirable consequences. While pink toys and blue shirts are not in themselves offensive or problematic, the frequent association of a specific colour with each sex is an unhelpful obstruction to the reduction of adult gender biases. It seems deeply ironic that a society that does not condone the enforcement of traditional sex roles and applauds attempts to crack workplace glass ceilings should endorse colour stereotyping. The cultural acceptability of this practice presumably arises from the apparent unimportance of colour cues in everyday life. Belying this innocuous assumption, however, the current inquiry clearly demonstrates the unwanted consequences of perpetuating such unnecessarily dichotomous gender-based associations.
It has been suggested that there may be an underlying biological basis for colour–gender associations, with red and blue tones having specific evolutionary advantages for women and men, respectively (Alexander, 2003; Hulbert & Ling, 2007). However, cross-cultural experiments and temporal changes in colour–gender associations argue against such a viewpoint. For instance, a century ago pink was promoted as the colour of masculinity (see Frassanito & Pettorini, 2008; Huun & Kaiser, 2001; Paoletti & Kregloh, 1989) and, as recently as two generations ago, Eysenck (1941) found no significant difference between male and female colour preferences (also see Garth, 1922). Only recent experiments, ensuing from the contemporary stream of colour stereotypes (i.e., pink for girls, blue for boys), reveal sex differences that tie in with the proposed evolutionary advantages. It therefore seems unlikely that there is anything special about the relation between pink and blue colours and the sexes, other than the association proliferated by contemporary society.

If there are no adaptive advantages of colour–gender associations, then the activation of gender stereotypes is surely undesirable. But to what extent can this social-cognitive outcome be avoided? There are clearly a multitude of cues associated with male and female categories that can trigger gender stereotyping (see Oakhill et al., 2005); indeed even labelling targets as male or female or viewing male and female hairstyles can have this effect (e.g., Branscombe & Smith, 1990; Macrae & Martin, 2007). The social brain is required to deal with a vast array of complex information, hence relies on categorical knowledge to function effectively (Bodenhausen & Lichtenstein, 1987; Bodenhausen & Wyer, 1985; Cloutier et al., 2005; Gilbert & Hixon, 1991; Macrae, Hewstone, & Griffiths, 1993; Macrae, Milne, & Bodenhausen, 1994; Pendry & Macrae, 1994). It is therefore inconceivable that gender-based categorical processing could be circumvented completely. However, if there is a societal motivation to reduce levels of gender stereotyping in adults (see Inglehart & Norris, 2003), then it is logical to minimize environmental triggers of gender-related processing, rather than promoting such cues to children. The juxtaposition between society’s abhorrence of adult gender inequality and endorsement of childhood gender divisions brings into sharp focus the need to consider the impact of cultural factors on social-cognitive functioning.

Reducing gender stereotyping
According to standard social information processing models, categorical cues function by activating associated stored knowledge and beliefs, increasing the likelihood that such information will be applied in subsequent cognition and behaviour (e.g., Brewer, 1988; Bodenhausen & Macrae, 1998; Devine, 1989; Fiske & Neuberg, 1990). The resilience of categorical person perception therefore lies in the strength of category–cue associations. Accordingly, some of the most successful approaches to stereotype reduction have focused on breaking down associations by emphasizing intergroup overlap, blurring the boundaries between categories (see Allport, 1954; Hyde, 2005; Pettigrew, 1998; Pettigrew & Tropp, 2006). This strategy has been specifically applied to gender stereotyping, with some success. For instance, Rosenthal and Crisp (2006) examined the well-established effect of stereotype threat on female math performance (i.e., poorer test performance following gender stereotype priming – Brown & Josephy, 1999; Nosek, Banaji, & Greenwald, 2002; Quinn & Spencer, 2001; Spencer, Steele, & Quinn, 1999). They found that the effect could be eradicated with the simple step of encouraging women to focus on shared male and female characteristics before the test.
Such evidence suggests that if there is a societal goal of reducing gender stereotyping, then there should be a drive to minimize perceptions of male and female differences. However, the current inquiry has made clear that cultural forces run counter to this aim, with children’s environments artificially increasing distance between the sexes (Experiments 1–2). It is noteworthy that such practices are likely to be particularly influential at this early stage, when children are seeking to make sense of the world by compartmentalizing stimuli and experiences into manageable networks of relationships and categories (Aboud, 1988; Dunham et al., 2008; Grace et al., 2008; Martin & Halverson, 1981). Given this aspect of young children’s emerging socio-cognitive abilities, it should be expected that the gender–colour associations flooding their environment at this stage of development will have a pronounced impact on person perception.

What is perhaps more surprising is the continued influence of colour–gender association in adulthood, as demonstrated in Experiments 3–6. If the adult social environment is not coloured by pink and blue gender-related cues, why do they continue to wield a measurable influence? The answer may lie in the initial strength of encoding of these cues, especially as counter-stereotypic examples are rarely encountered to diminish or compete with the established association (see Picariello et al., 1990; Pomerleau et al., 1990; Shakin et al., 1985). Further, there is little motivation for conscious inhibition, as explicit endorsement of colour–gender associations does not evoke hostile reactions (cf. Wyer, Sherman, & Stroessner, 2000). Perhaps as a direct result of their innocuous status, the early and unchallenged encoding of pink and blue colours in association with gender has a persistent effect on gender-categorical processing, which persists into adulthood.

The current inquiry highlights the need to acknowledge the importance of categorical beliefs that are culturally imparted to children, as well as the cognitive processes through which these beliefs impact on cognition and behaviour. Recent emphasis on the cognitive underpinnings of everyday behaviour has obscured the critical influence that socio-cultural forces exert on social cognition (see Bigler & Patterson, 2007). The message that emerges from the current investigation is that gender-dichotomous aspects of children’s environment can have unwanted social consequences that extend into adult life. The practice of saturating young children’s environments with gender-specific colours furnishes categorical knowledge such that the mere presence of these critical colour cues is then sufficient to trigger the activation and application of gender categorical beliefs. If artificially and unnecessarily differentiating children’s environment according to colour produces additional routes to stereotypical thinking, such a practice seems at odds with the egalitarian goals that feature so prominently in contemporary society.

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References


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