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Perceptions of Mixed-Race: A Study Using an Implicit Index

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8 July, 2014

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Abstract

The psychology of race is in its infancy, particularly in the UK and especially regarding mixed-race. Most use untimed explicit indexes and qualitative/self-report measures. Here, we used explicit responses (participants' choice of response categories), but also implicit data (participants' response-times, *RT*). In a Stroop task, 92 black, white and mixed-race participants classified photographs of mixed-race persons. Photos were accompanied by a word, such as /black/ or /white/. Participants ignored the word, simply deciding whether to categorize photos as white or black. Averaged across 3 different instructional sets, white participants categorized mixed-race slightly to the white side of the centre point, with black participants doing the converse. Intriguingly, mixed-race participants placed mixed-race photos further towards black than did the black group. But for *RT*, they now indicated midway between white and black participants. We conclude that at the conscious (key-press) level, mixed-race persons see being mixed-race as black, but at the unconscious (*RT*) level their perception is a perfect balance between black and white. Findings are discussed in terms of 2 recent theories of racial identity.

Keywords: Explicit Perception; Implicit Perception; Mixed-Race; Social Cognition; Stroop Task

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We may define race as biological endowment, as an historically barbaric and subjugating social construct or as anything in between (Crawford & Alaggia, 2008; Hurd, Sellers, Cogburn, Butler-Barnes & Zimmerman, 2013; Jorde et al., 2000; Phillips, Odunlami & Bonham, 2007; Song, 2010; Tishkoff & Verrelli, 2003). But however we define it, a considerable amount of research has focused either on the ways that belonging to a race causes one to define oneself or causes one race to stereotype or exclude another race (Reed & Gaines, 1997; Sellers, Smith, Shelton, Rowley & Chavous, 1998; Yip, Seaton & Sellers, 2010). However, far less research has been directed to the study of offspring of different races, perhaps in particular individuals who are of one black parent and one white parent (Lusk, Taylor, Nanney & Austin, 2010; Sellers, Copeland-Linder, Martin & Lewis, 2006). Throughout their lives, such persons might be variously referred to by terms such as biracial, dual heritage, mixed-parentage or multiracial (Crawford & Alaggia, 2008; Rockquemore, 1999; Tizard & Phoenix, 2002). Here we will use the term mixed-race, partly because it is the usual label in the society from where the present research paper emanates (the UK), partly because it implies the bringing together (uniting) of the parental races (black v white, respectively – Lusk et al., 2010), and partly because it simultaneously intimates the potential to marginalize such persons (e.g., as being outcast or even mixed-up - Caballero, Haynes & Tikly, 2007; cf. Tizard & Phoenix, 2002).

Mixed-race is often considered in the realm of sociology (e.g., Campbell & Eggerling-Boeck, 2006; Song, 2010). Indeed, in the UK, there is no psychology of mixed-race one can speak of. Here, we aimed to investigate the experience of being black-white mixed-race in the UK and how it compares to the conception of mixed-race held by black and by white persons, respectively. To achieve this we investigated perceived racial identity, as it is ascribed to persons of mixed-race, using a well-known experimental psychological task of attentional selection explained below (a

modified Stroop task). Before outlining this task, we first briefly explore the phenomenon of racial identity with particular reference to mixed-race.

Racial Identity

Racial identity is the subjective understanding of oneself as a racialized person, and the recognition of how or when one will be assumed both similar to some people and different from other people (Byrd, 2012). It is one aspect of the self-concept, alongside myriad other social identities that can define an individual's sense of self (Sellers et al., 1998; Yip, Douglass & Sellers, 2014). Racial identity can even represent a protective factor against certain detrimental aspects of self-concept, such as being a buffer against low self-esteem (Azibo, 1989; Lusk et al., 2010; Rowley, Sellers, Chavous & Smith, 1998; Sellers et al., 2006). Rowley et al. (1998) defines it simply as that part of the person's self-concept that is related to her or his membership within a race. An important implication here is that racial identity has at its core a subjective experience but is simultaneously objectively perceivable.

A potential issue with the above definition is the question of what race mixed-race persons ascribe to. Therefore, a slightly amended definition is that racial identity is "the significance and meaning that one places on race in defining oneself" (e.g., for this wording specifically regarding African American racial identity see Sellers et al., 1998, p.19). As well as circumventing the issue of whether mixed-race persons are defined as belonging to a specific race, this definition gives greater prominence to the subjective lived experience of being associated with a particular race. Importantly, Sellers et al. then break their definition down into two parts: The importance that race holds in one's perception of self; and the subjective meaning attached to being a member of the racial group in question (note this does not logically preclude membership of more than one race). Thus, it would seem that regardless of whether we define racial identity as more objective or as more of a phenomenological entity, it involves a person's subjective perceptions of his or her self. These

perceptions, however, will at least partly be a function of how that person internalizes the ways in which people in the social environments (both contemporary and historic) seem to perceive and treat the individual in question, which are in turn at least partly a function of the individual's skin color (Lusk et al., 2010; Rockquemore,1999).

Before continuing, it is important to stress that we accept that the perceptions in question may to some extent be towards one's ethnic identity as opposed to one's racial identity (ethnic identity takes into account factors such as one's nationalism, religion and culture as well as one's race). However, as there is considerable overlap between ethnic identity and racial identity (e.g., both involve one's appearance and ethnic identity can be said to involve pride in one's racial identity - Suzuki-Crumly & Hyers, 2004), we adopt the notion of using racial identity even though we accept that this might relate to some extent also to ethnic identity (Gaither, Sommers & Ambady, 2013; Yip et al., 2014).

Racial Identity and Mixed-Race Persons

Doyle and Kao (2007) ask the question, in a society where traditional racial identities such as black and white are well established, where do persons with one black and one white parent fit in? Specifically, can they maintain a distinct multiracial identity that bridges their racial ancestries, or are they forced to choose a particular identity? Some research suggests that they can be temporarily persuaded towards a white identity or a black identity, by the use of priming (Gaither et al., 2013). But either of these identities can be barred if the individual reacts negatively to the absence of the black parent or white parent (Crawford & Alaggia, 2008).

Some investigators consider that mixed-race individuals are barred from a white identity but also from a black identity (Kennedy, 2003; Khanna & Johnson, 2010). However, against this view, Brunsma and Rockquemore (2001) found that, mixed-race persons may well be barred only from a white identity. Based on 177 adults, over 73% of mixed-race persons felt they were perceived to be

black, although in 3/4 of those cases this identity differed from their own identity which was mixed-race. The question of whether such perceptions are attributable to black others to the same extent as to white others, has received little attention (Crawford & Alaggia, 2008). This was one goal of the present study.

If mixed-race persons internalize being perceived as black but simultaneously identify as mixed-race (Brunsma & Rockquemore, 2001), how is it that they keep these two aspects of their identity separate? An easy answer is to argue that they do not keep these aspects separate, but rather the two aspects blend together and this often results in mixed-race individuals having a somewhat confused or mixed-up identity (Tizard & Phoenix, 2002).

However, it might be a mistake to claim that mixed-race individuals often have a mixed-up identity. For example, Fatimilehin (1999) and Morrison (2004) independently conclude that the contrast between seeing oneself in terms of both black and white (or mixed) parentage and tending to see oneself increasingly as black, simply indicates an harmonious multi-componential or dynamic sense of identity. For example, one's mixed-race identity may move towards a black identity when the individual has a larger number of black friends than white friends (Yip et al., 2010), or even simply when the social context makes a black identity more beneficial (and likewise for a white identity - Crawford & Alaggia, 2008; Doyle & Kao, 2007; Song, 2010). When mixed-race persons readily and deliberately alter their racial identity depending on the environment or social context, they can be said to demonstrate a protean racial identity (Rockquemore, 1999). Rockquemore contrasts this identity with three other types - single racial identity (e.g., black v white), border racial identity (identifying as bordering on the boundary between black and white - i.e., exclusively mixed-race), and transcendent identity (seeing no need to adopt any of the previously mentioned identities).

Drawing on the above studies, the present study therefore investigated the thesis that by early adulthood, mixed-race persons are not at all mixed-up, but have an outwardly (i.e., explicit) racial

identity that is more black than white (a single identity), whilst inwardly (i.e., implicitly) holding an identity that is mixed-race (a border identity).

Towards a Psychology of Perceptions of Mixed-Race

One implication from Brunsma and Rockquemore's (2001) findings is that one's racial identity is partly a function of the biases one does or does not face in society. Social identity theory speaks to this issue. Basically, social identity theory (Tajfel & Turner, 1979) states that we are biologically programmed to favor our own racial group (e.g., black) over our out-group (e.g., white). The available evidence suggests that black persons do not show negative racial bias as much as do white persons (Lawrence, 1995; Monteith & Spicer, 2000; Reed & Gaines, 1997; Worrell, 2008). But more relevant for our purposes, mixed-race persons are biologically/genetically as white as they are black and hence logically race is not a ready means of rendering them to be an out-group relative either to white persons or to black persons (Sellers et al., 2006).

As an alternative, Reed and Gaines (1997) argue that racial attitudes do not simply follow biological endowment. Following Du Bois (1935) they proposed that a more adequate way of conceiving of inter-group attitudes is in terms of consciousness versus double-consciousness of the majority versus minority group respectively. Basically, minority group double-consciousness begins by suggesting people see themselves as society claims to see them (i.e., as of mixed-race); but simultaneously as being treated as though they are black. The former is taken to be more positive (i.e., meritocratic and a non-derogatory balance between black and white) and the latter more negative (i.e., carrying connotations of negative stereotypes and social inequalities - see Dovidio & Gaertner, 1998). As Jones (1988) intimates, one consciousness espouses the myth of social equality with the other consciousness embodying the reality of social inequality.

Sellers et al. (1998) managed to constructively merge the revised notion of double consciousness plus a number of other underground theories, with more mainstream theories (e.g.,

social identity theory). This gave a new theory called the Multidimensional Model of Racial Identity (MMRI) that can explain black racial identity (specifically African American identity) whilst being far more testable than previous theories attempting to explain black identity. Three assertions made by this theory are - 1, Identity is situation dependent over and above being person-specific. 2, Individuals therefore will have a number of identities rather than just one. 3, Although society plays a role in shaping identity, the individual's own perception of his or her identity is the most valid indicator of identity.

The MMRI promises much to the area of racial identity, particularly in aiding a better understanding of black racial identity and generating predictions that can be falsifiable (one indicator of a good theory). However, thus far, it has not ventured much into the realm of explaining mixed-race identity (although see Sellers et al., 2006). This said, we took on board its emphasis on perception in the present study.

The Need for Implicit Measures of Mixed-Race Perceptions

One issue in this area is that much of the research into racial identity has been based on interviews or questionnaires. These either have tended to be explicit and qualitative (e.g., Caballero et al., 2007; Monteith & Spicer, 2000), or explicit and quantitative (e.g., Rockquemore & Arend, 2002). Relying on such explicit measures is of course vital. However, explicit indexes should ideally be triangulated with implicit indexes, to guard against the possibility that participant groups sometimes withheld true attitudes or reported simply what they thought the researcher wanted to hear. For example, Towles-Schwen and Fazio (2006) found that when explicitly asked about their attitudes towards black room-shares, white university students reported that they were not at all prejudiced (based on self-report measures). But then an implicit index was generated by obtaining records of instances where these same students requested a change of room-mate. Now, an implicit bias was evident where white students were 108 times (43% v 0.4% respectively) more likely to

request a change of room share away from a black student rather than away from a white student (see also Greenwald, McGhee & Schwartz, 1998; Lewis, 2011).

In investigating race-perception, some studies have circumvented the above issues by employing implicit measures such as the dolls task, the draw a person task or social distance picture tasks (see Byrd, 2012 for review). Tasks such as these can prove very valuable for accessing implicit knowledge of a person's racial identity, but they are less useful for adult studies than for child studies. The most widely used single test of implicit perception with adults is the Implicit Association Test (IAT), as introduced by Greenwald and colleagues (e.g., Greenwald et al., 1998; Greenwald, Nosek & Banaji, 2003). In the IAT, participants are asked to respond by pressing one key (say "X") for either of one pair of words versus a different key (say "Y") for either of a second pair of words. The crucial manipulation is that one word of each pair is a racial word and the other is indicative of a quality. For example, the racial words might be black versus white, and the qualities might be good versus bad. This task operates on the assumption that the more strongly a participant associates two concepts, the faster his or her responses to the pair-wise mappings (Brunel, Tietje & Greenwald, 2004; Fazio, 2001).

The standard finding is that the key response is speeded when the participant associates the racial word relatively strongly with the quality (e.g., white might be associated with good), but slowed if they are not so strongly associated (e.g., black with good). The IAT has been shown to be an effective test for quantifying how biased one group might be regarding another group. For example, using the IAT, van den Bergh, Denessen, Hornstra, Voeten and Holland (2010) showed that teachers' implicit prejudicial attitudes regarding their ethnic minority students, was associated with the students' predicted grades and also their actual achievements in class. These findings contrasted with their self-report measure of teachers' prejudice, which did not reliably relate to students' predicted grades or their achievements.

Introducing the Stroop Task to Race Perception

The Stroop task (cf., Stroop, 1935) is the most popular task of its kind, but to our knowledge has never been used directly to investigate perception of racial identity. In the most well known variant, we present one attribute of a stimulus (e.g., its color) in the same vicinity as a second attribute of that same stimulus (e.g., a word we wrote using that color). The participant's task is to ignore the spelt word and just report the color it was written in. If the word itself spells out a color, this typically affects our ability to report the color it was written in (e.g., the word YELLOW might be written in blue ink; the correct response is "blue"): When the two stimulus attributes are congruent with each other (e.g., the word RED written in red ink), we find that participants can name the color of the ink faster than any other condition. When the attributes are incongruent with respect to each other (e.g., the word RED now written in blue ink), then naming of the ink color is very slow and more error prone (participants are drawn to reading the word). When the two attributes can be considered neutral with respect to each other (e.g., the word SHEEP written in green ink), then errors and speed of responding fall somewhere between the two previous conditions (MacLeod & MacDonald, 2000).

In Stroop tasks we do not simply assess unconscious processing (the *RT* differences between conditions over which the participant has little conscious control). Unlike the IAT, we can give equal credence to error analyses. These errors are an index of conscious control (i.e., the participant's ability to remain focused on the task - MacLeod, 1991). Furthermore, erroneous responses are prevented from distorting the unconscious data, by avoiding the taking of *RT*s from erroneous responses. These controls, however, do not tend to be used in the IAT, making the Stroop task potentially a useful alternative index of unconscious processing.

A few investigators have sought to apply Stroop tasks to issues of racial bias. For example, Trawalter and Richeson (2006) found that white individuals exposed to conflicting views regarding

race subsequently showed greater interference on a standard color-word Stroop task. This was the case even though the task had nothing itself to do with race. However, this study may not represent a direct test of race-related processing, because it did not employ a task where the potential for racial bias occurs at the same time (rather than well before) the Stroop task. In essence, the task needs to use a Stroop task that showed persons rather than simply patches of color. We offer the first such task. Also, to date, there have been no published articles applying Stroop tasks to perceptions of mixed-race by mixed-race persons themselves.

Aims of the Study

As well as using a Stroop task variant to investigate the racial identity of black-white mixed-race individuals about being mixed-race, we looked into how the parental races (i.e., persons with the same racial background as the parents of our mixed-race participants) automatically and implicitly perceive of people who are of mixed-race. This design allowed us to assess how mixed-race persons identify mixed-race, and to place their categorization in the context of the parental races' categorizations. From our above review of the mixed-race literature, we predicted that mixed-race persons implicitly would have a border racial identity but their explicit identity would tend towards a single identity (black). We further predicted that white persons would tend to see mixed-race as more black than do either mixed-race or black persons. Finally, we expected that black persons would tend to see mixed-race as more black than do mixed-race persons.

Method

Participants

Participants were 92 students from two university cohorts in London, England (M=23.1 years, SD=3.7), of whom 46 were female. Both universities are culturally diverse and together they represented a cross-section of working class and middle class students. Participants responded to a recruitment advert and were accepted on the basis of their self-reported racial group being one of

those of interest to the present research, English being their first or only language, and them being

born in the UK. They were then divided into three groups according to self-reported racial category.

There were 30 participants in the white/Caucasian group, 16 female and 14 male (M=23.1, SD=3.3).

The 31 participants in the black/African/Caribbean group comprised 17 females and 14 males

(M=23.7, SD=3.6). There were 31 participants in the mixed-race/dual-parentage/biracial group, 13

females and 18 males (M=21.8, SD=4.5). MacLeod (1991) conducted the most comprehensive

review of Stroop research carried out to date, concluding that gender differences are never an issue in

Stroop research. This, plus our relatively small group numbers by gender, meant that we did not

analyze for gender differences.

Materials

The experiment was run on computer, with stimuli shown on screen and responses collected

using button presses (Trawalter & Richeson, 2006). Our target stimuli were head and shoulders color

photographs of individuals who had self-reported as mixed-race (Na & Kitayama, 2011).

Photographs were of three males and three females, and were cropped to be of on-screen size 4cm

wide x 3cm high. They had been selected through piloting from a larger set of 80 candidate

photographs (following Lewis, 2011). This was done via a panel of four persons of diverse racial and

gender background, who viewed each photo and discussed the best ones to use. Each panel member

had previously been involved in Stroop research. As well as needing to be good exemplars of mixed-

race, photos were selected on the basis of the quality of the picture, and any potential distractions

(e.g., an unusual line of gaze).

Once on computer, pictures were presented on a light-grey background of fairly low intensity

(Anes & Kruer, 2004). For each picture, the word "White" or "Black" was printed in light-yellow

immediately below the picture and centered relative to it. The word was in a font equivalent to Times

New Roman 32 point, and the distance between word and color-patch was half the print-height. Two

pictures of black persons (one male the other female) and two pictures of white persons were created as distracters.

Each photo was shown a total of 8 times within a given block, twice each for each of 4 Stroop conditions; making 48 mixed-race stimuli amongst 16 black stimuli and 16 white stimuli per block. One of the 4 Stroop conditions presented photographs in isolation - the Neutral-None condition. The other 3 conditions presented each picture accompanied by a word. One of the conditions involving a word used a word unrelated to the picture following arguments set out by MacLeod (1991). The neutral word selected here was arbitrary and we settled on "Crane" (Neutral-Word condition). The two remaining conditions utilized a word representing one of the parental racial categories (White and Black).

The stimuli and conditions were re-presented in randomized order in each of three blocks. Each block primarily differed from the other two in terms of instructions given to participants (open choice categorizations, categorize mixed-race using a key reserved for the categorization of White stimuli, and categorize mixed-race using a key reserved for Black stimuli).

Design

A mixed factorial design was used, with dependent measures of Key-Press and Response Time (*RT*). One independent measure was between-subjects and was the group to which a given participant belonged (White, Mixed-Race or Black). The remaining independent measures were within-subjects and were Instructions Set and Stroop Condition.

Procedure

After being given initial instructions, participants sat approximately 60cm in front of the computer screen. They were shown stimuli one at a time on screen. Each stimulus was preceded by a fixation cross for 500ms, to indicate where the centre of the photo would be. The stimulus was presented 1000ms later and it remained on screen until a categorization response was given. Once the

participant responded, the stimulus was removed, followed by a delay of between 1000ms and

1500ms (delays were varied randomly within these limits).

The black photos/words and white photos/words were provided simply to give racial

reference points for the mixed-race photos. Participants responded to each stimulus by pressing a key

according to the instructions given. In the first of the three blocks, they were asked to categorize

photos as either black or white as they wished (open choice format). Participants pressed the same

key as used for black photos (key 4) to indicate categorization of mixed-race photos as black and key

6 to indicate white. In this and the remaining blocks, they were instructed to categorize just the

photos, and to ignore any word shown with it. They were additionally instructed to try not to make

errors (i.e., avoid pressing a key they had not intended to press) but at the same time they should not

delay a response. This latter instruction is common in Stroop research (MacLeod & MacDonald,

2000; Wright & Wanley, 2003). Thus, participants responded as soon as they could give an answer

but were not under significant cognitive load (e.g., they were not told to respond fast at all costs or

under dual task instructions).

At the end of each 80 trial block, the computer paused in order to give the participant a rest.

The participant then pressed a key to continue the procedure when s/he was ready. In block 2,

participants were asked to categorize mixed-race using the key for white. Then, in block 3, they were

asked to categorize mixed-race as black. For blocks 2 and 3, a response was marked as correct if it

was consistent with the categorization instructions. In preparing for data analyses, we ensured that

our block 1 data were in line with block 3, by marking a response correct if the black key was

pressed and incorrect otherwise. This convention assumes participants would generally openly

categorize mixed-race photos as black more often than white (Brunsma & Rockquemore, 2001). The

means would then tell us if our presumption had been justified or not (see top row of Table 1).

After sitting the three blocks, participants were debriefed. The entire procedure (all three blocks) took around 40 minutes, including briefing, debriefing, breaks, and inter-trial intervals. For Stroop response-accuracy, we awarded a 1 if the response was judged correct (i.e., in line with instructions). We then averaged across the two repetitions of each stimulus, to give a maximum mark of 1 per stimulus. Marks for the 6 stimuli of each condition were then summed, giving a maximum total mark of 6 for each condition. Only the mixed-race photos were analyzed - the two black photos and white photos were discarded. For ease of comparison, each total was additionally converted to a percentage. We did likewise for *RT*, apart from finding the median *RT* of each picture, instead of sums and percentages.

Results

We summarize key-press data in Tables 1 and 2. The response accuracy percentages for the "respond as white" block (i.e., block 2) were reversed, to bring them in line with the direction of key-presses for blocks 3 and 1 (i.e., higher percentages = categorized as black and lower percentages = white). Thus, the overall placement of mixed-race as midway between black and white is represented by the value of 50%. Table 1 presents values relevant to main effects and two-way interactions. The final two-way interaction between Condition and Instructions, plus the three-way interaction between Participant Group, Condition and Instructions are summarized in Table 2. The key-press data were analyzed using a three-way mixed model Analysis of Variance (ANOVA) with factors of Participant-Group, Instruction-Set and Stroop-Condition.

Table 1 shows a tendency for white participants to view mixed-race pictures as slightly more white than black overall and for black participants to view mixed-race pictures as more black than white (see final row of Table 1). Intriguingly, mixed-race participants viewed mixed-race pictures as even more black than did black participants. These group differences were statistically significant (F (2, 74) = 5.590, p = 0.005).

When instructions were to press the white key for mixed-race pictures, on the whole participants did do this (percentages less than 50% for each group). When asked to categorize as black they also tended to respond correctly (percentages greater than 50%). In the block where they were instructed to categorize mixed-race pictures as they wished and so could press either key depending on their own criteria, all three groups pressed the key for black more than the key for white. The overall difference between key-presses for the different instruction-sets was statistically significant ($F(2, 148) = 202.945$, $p < 0.001$).

Turning to the conditions, Table 1 shows key-presses were similar in the neutral condition having no word and in the incongruent condition (with the word white). It was as though the word white beneath the photograph, rendered essentially no meaning (i.e., the same as no word at all), or was automatically dismissed or ignored. But key-presses were almost evenly split between black and white keys in the neutral condition having a word. Even more curiously, in the congruent condition with the word black, on the whole participants actually pressed the white key slightly more than they pressed the black key. It was as though they were reacting against the word black. The difference between these four conditions was statistically significant ($F(3, 222) = 88.318$, $p < 0.001$).

For the first of our two-way interactions, the key-presses for white versus black differed for our participant groups, as the instructions changed. Specifically, as we moved from block 1 (Instructions Open) to block 3 (Instructions Black), the difference between key-presses for white versus black got progressively bigger. These differences were smallest for the white group, followed by the mixed-race group, with this difference biggest for the black group. This interaction between Instructions and Group was statistically significant ($F(4, 148) = 5.324$, $p < 0.001$).

Considering the two-way interaction between Group and Condition, each group showed a similar profile to the other groups regarding the four conditions, leading to no statistically significant two-way interaction between group and condition ($F(6, 222) < 1$, *NS*).

In our final two-way interaction here which is between Instructions and Condition, for the neutral-none, neutral-word and incongruent conditions, participants responded with the key-press for black more in the block with Instructions-Black than in the block with Instructions-Open. Also, the difference between these two instructions increased with condition, from Neutral-None, to Neutral-Word and finally to the Incongruent condition (Table 2). Yet in each of these three conditions, Instructions-Open versus Instructions-Black key-presses each tended to be for the word black. However, for the Congruent condition, where the mixed-race picture was accompanied by a word and the word was black, the participants actually responded with the key-press for white more than the key-press for black. The tendency for the Instructions-Open versus Instructions-Black difference to alter with condition, together with the tendency for this difference to be completely reversed for the Congruent condition only, led to a statistically significant two-way interaction between Instructions and Condition (F (6, 444) = 89.555, $p < 0.001$). There was no significant three-way interaction (F (12, 444) <1, NS).

A summary of the RT data is given in Tables 3 and 4. As before these data were analyzed using a three-way mixed-model ANOVA. Table 3 shows that the black group generally responded fastest, with the mixed-race group responding midway between the other two groups and the white group taking the longest time to give their response. However, this trend was not statistically significant (F (2, 74) <1, NS).

RTs generally sped up from Instructions-Open to Instructions-White to Instructions-Black (Table 3). This led to a main effect that was statistically significant (F (2, 148) = 32.224, $p < 0.001$).

Regarding the conditions, on the standard Stroop effect, we would expect RTs to get larger (slower) from the Neutral-None condition, through the Congruent, Neutral-Word and finally Incongruent condition. This was generally what was found and the overall main effect of Condition was statistically significant (F (3, 222) = 19.511, $p < 0.001$). However, there had nevertheless been

one deviation from expectation. That was, the incongruent condition was responded to much faster than the neutral-word condition and indeed it was identical to the congruent condition.

For the two-way interactions, we first consider the interaction between Instructions and Group, as was done for the key-press data. From Table 3, the white group showed a 257ms spread (range between all *RT*s) from Instructions-Open to Instructions-Black, which contrasts starkly with the black group who showed a spread of only 111ms between these Instruction sets. The mixed-race group fell mid-way but were around 20ms closer to the profile shown by the black group than by the white group (difference = 173ms). The two-way interaction between Instructions and Group was statistically significant (F (4, 148) = 4.443, p = 0.002).

For the two-way interaction between Group and Condition, each group evidenced a subtly different profile to the other groups regarding the four conditions. These differences, however, were not sufficient to result in a statistically significant two-way interaction between Group and Condition (F (6, 222) = 1.059, p = 0.388).

For the final two-way interaction between Instructions and Condition, Table 4 shows that the difference between the *RT*s of a given Instruction Set altered depending on which condition we consider. To put it simply, the spread (for mean of Instructions sets) for the Neutral-Word condition was smallest (63ms), followed by the Neutral-None condition (135ms), with the Congruent condition much larger at 183ms and the spread for the Incongruent condition largest of all at 341ms. This reduces to an increasing overall difference between our three instruction sets as the type of trial got more demanding (i.e., more relevant to black or white race). This two-way interaction effect was statistically significant (F (6, 444) = 15.197, p < 0.001). As with the key-press data, the three-way interaction for *RT* as summarized in Table 4, was not statistically significant (F (12, 444) = 1.228, p = 0.261).

Discussion

In terms of the Stroop condition data, our findings generally supported expectations from theories of the Stroop Effect, in that participants' speed of categorizing the photos varied with the relationship between photo and word, and was fastest when there was no word accompanying the photo (MacLeod, 1991; MacLeod & MacDonald, 2000). The main departure was that overall *RT*s here were around 27% slower than in the color word Stroop task and over 15% slower than a picture-Stroop task which did not involve race (868ms v 638ms & 754ms, respectively - see Wright & Wanley, 2003). This suggests that race requires some additional cognitive processing, over and above the processing of facial stimuli more generally. But as the main purpose of employing a Stroop task here was to illuminate the similarities and differences between what participants consciously report when they are asked to indicate how they perceive mixed-race photos (explicit data) and any delays or speeding of their individual responses (implicit data), we here confine our discussion to this social-cognitive aspect.

Interpreting the Key-Press Data

Our basic key-press data (explicitly choosing one category or the other), suggested that overall, black and white individuals to some extent respond to mixed-race in contrasting ways (Aspinall, 2003; Cunningham et al., 2004; Song, 2010). Overall, each parental race indicated seeing being of mixed-race as slightly more like its own race than like the other parental race. This potentially indicates an acceptance of mixed-race both by white and by black persons (contrast Morrison, 2004; Song, 2010).

However, considering the data in more detail, our analyses then broke down the overall categorizations into their three constituent instructional sets - considering responses from open responding, to categorizing mixed-race as white, to categorizing mixed-race as black. When asked to categorize mixed-race as white, all groups did this equally (approximately 15% towards the white end of the continuum). But when asked to categorize as black or given an open-choice, the white

group only achieved 5% into the black end of the continuum, with the black group and mixed-race group exhibiting less difficulty complying. An interpretation here is that the white group found it more difficult to categorize mixed-race as black, perhaps because, for them, there is a conflict between being mixed-race and being black (Crawford & Alaggia, 2008). Such a difficulty is at least possible, for example, it is an analogue of what lays at the heart of the traditional color-word Stroop task (MacLeod & MacDonald, 2000).

We feel that both the above interpretations of our key-press findings rather unlikely, given that previous studies typically report that white persons see mixed-race as black (Doyle & Kao, 2007; Fatimilehin, 1999; Morrison 2004). Another issue here is that other studies have shown that, if mixed-race persons are categorized as black, this is readily done by black persons as well as white persons (e.g., Brunsma & Rockquemore, 2001); and yet black participants in our study did not exhibit the same profile as white participants. We therefore suggest an interpretation of our finding regarding the white group, whereby this group was simply more conscious about managing its overt responses (Lewis, 2011; Towles-Schwen & Fazio, 2006; van den Bergh et al., 2010).

Turning to mixed-race participants, interestingly, in the relevant blocks, this group was better able to categorize mixed-race as white when instructed to do so, and as black when instructed to do so. This might be an indication that the mixed-race individual overtly embraces both of his or her parental races, or experiences less conflict between how s/he sees mixed-race and the two parental races (Gaither et al., 2013; Kennedy, 2003; Khanna & Johnson, 2010). However, when given an open choice, the mixed-race group categorized mixed-race as more black than white. The black parent is more likely to teach the child about race-related biases than the white parent (Barr & Neville, 2008). This parent may support this teaching with accounts from his or her direct experience (Lawrence, 1995), some of which the mixed-race individual may have already begun to experience for his or her self (Barr & Neville, 2008). The implication is that as adults, mixed-race persons will

already realize that in some social contexts, they may not be as accepted as some racial groups (Campbell & Eggerling-Boeck, 2006; Katz & Treacher, 2005; Kennedy, 2003; Khanna & Johnson, 2010).

The above notwithstanding, an intriguing finding was that when the instruction was to categorize mixed-race as black, the mixed-race group indicated mixed-race as being even more black than was indicated by the black group (see also Morrison, 2004 and contrast Rockquemore & Arend 2002; Tizard & Phoenix, 2002). This finding deserves some attention. Of relevance, Khanna and Johnson (2010) suggest that we should not focus solely on mixed-race participants' greater choice of a black identity but also on their corresponding lack of choice of a white identity, as compared to the ascriptions of, say, black participants. According to Brunsma and Rockquemore (2001), this may derive from the extent to which mixed-race persons might tend to feel barred from a white identity more than they feel barred from a black identity. Here, the white identity is assumed to some extent to be default, privileged etc. (Aspinall, 2003; Lusk et al., 2010). By contrast, black persons might tend to see mixed-race as further towards white, because they must first experience barring from their own perspective, and from that perspective mixed-race is less barred from white (Hurd et al., 2013; Khanna & Johnson, 2010; Lawrence, 1995; sellers et al., 2006). Conversely, white persons might see mixed-race as less barred from white, because of their lesser direct knowledge about the myriad ways in which being black might be socially limiting in a white dominant world (Lewis, 2011; Towles-Schwen & Fazio, 2006).

Our findings are in line with the above conceptions. They suggest that such perceived barring away from a white identity, is more attributable from black others than from white others, but most attributable from mixed-race persons themselves (Campbell & Eggerling-Boeck, 2006; Crawford & Alaggia, 2008; Lusk et al., 2010). On Rockquemore's (1999) conception, their greater adoption of

being black implies that, explicitly, mixed-race persons more often tend towards a single racial

identity than is afforded them by other groups.

Interpreting the *RT* Data

For *RT*, the change of instructions led to large variation for how fast white participants

responded from one instructional set to the next, but had a much smaller impact on how black

participants responded. Just as the smaller range in white participants' key-press data here suggests

they were thinking about how far to comply with the instruction sets (e.g., respond to mixed-race as

black), the wider *RT*s range for white participants here (almost 2.5 times the magnitude of the range

of black participants) shows they experienced greater difficulty before responding (note, these

contrasts in ranges were at the level of group differences rather than individual differences that

would be required for bivariate correlations - see limitations below). This can be explained in terms

of white participants being more mindful of the potential for one's responses to be taken in a certain

way, and so does not lead us necessarily to conclude that our white participants showed an actual

racial bias regarding mixed-race persons (Trawalter & Richeson, 2006; although see also Dotsch,

Wigboldus, Langner & van Knippenberg, 2008).

Turning to mixed-race participants, their *RT*s as a function of instructional set fell midway

between those of black participants and white participants. However, unlike their key-press data, *RT*s

were no closer to the black group than the white group. Rather, the *RT* data indicated a near-perfect

balance between black and white perceptions of mixed-race. At this point, it is important to

reemphasize that *RT* data should capture participants' implicit perceptions, unlike the key-press data

which were more attuned to their explicit perceptions (Greenwald et al., 1998).

The *RT* data may indicate that at the unconscious level mixed-race persons perceive of

mixed-race as constituting a distinct race category (a border identity - Rockquemore, 1999).

However, they could just as easily be interpreted as mixed-race persons perceiving race either as a

perfect balance between being black and white (Caballero et al., 2007), or even as irrelevant altogether at the implicit level (Rockquemore's, 1999 transcendent identity).

Interpreting the Key-Press and *RT* Data Combined

For our mixed-race participants, our explicit key-press data suggested that at the conscious level, they see mixed-race as moving towards a single identity (Rockquemore, 1999). By contrast, our *RT* (i.e., more implicit) data suggested that at the unconscious level, mixed-race persons see it as a balanced blend between their two parental identities. So there may be two simultaneous realities: The *RT* data reflecting what mixed-race really is or ought to be, versus our key-press data reflecting the lived experience of mixed-race (Barr & Neville, 2008; Jones, 1988). This duality can be captured by Sellers et al.'s (1998) Multidimensional Model of Racial Identity (MMRI). Recall, the MMRI stipulates that African Americans (and we extend this to mixed-race persons) have a number of different identities, which can be expressed depending on factors such as the social situation (Department for Education & Skills, 2005; Lawrence, 1995; Monteith & Spicer, 2000; Towles-Schwen & Fazio, 2006).

Regarding our black participants, their conscious responses suggested they perceive mixed-race as more black than white (Brunsma & Rockquemore, 2001), and these responses were fastest of all three groups. Our interpretation is that they were most at ease with their categorization.

By contrast, white participants' conscious responses placed mixed-race as slightly more white than black overall (see last row of Table 1), specifically because they were less willing to categorize mixed-race as black in the open-choice and respond-as-black conditions. Additionally, because this was accompanied by this group giving much slower responses, this suggests they were more mindful of their responses compared to the other two groups. We noted a large spread of *RT*s for the white group from open responding to responding to mixed-race as white and to responding to mixed-race as black. According to the theory behind the IAT (Brunel et al., 2004), this suggests that, at least

relative to their own performance, white participants experienced least difficulty when mixed-race was categorized as black; although they were not as at ease in doing this as were the other two groups.

So, the implicit (unconscious) and explicit (conscious) indexes combined tell us different things about mixed-race persons, black persons and white persons. In line with MMRI theory (Sellers et al., 1998, 2006) and Brunsma and Rockquemore's (2001) self-report findings, our results suggest that mixed-race persons conscious experience of the world is as black, but unconsciously they have internalized mixed-race as midway between black and white. Regarding black persons, both our implicit and explicit data suggest that they view mixed-race as more black than white. However, regarding white persons our findings were mixed. Extending Trawalter and Richeson (2006) we found that they consciously report mixed-race as midway between black and white but the unconscious data over which they had little control, suggested that they are far more comfortable when asked to categorize mixed-race as black (i.e., faster) than when they must decide for themselves how to categorize.

Finally here, returning to the question we posed earlier, of how mixed-race individuals are aware they are perceived as black but simultaneously have internalized being as white as they are black, and manage to keep these two things separate: Perhaps they maintain their racial identity implicitly (i.e., mixed-race) but their perception that others see them as black guides their behaviors (i.e., their explicit identity). Thus, we would argue that mixed-race individuals do not become mixed-up (Tizard & Phoenix, 2002) but simply rely on one identity when the environmental context is a neutral one and another identity when the context is non-neutral (Doyle & Kao, 2007; Lusk et al., 2010; Rockquemore, 1999; Sellers et al., 1998, 2006).

Limitations and Conceptual Issues

As with any psychological research, there are potential limitations of the present study. Firstly, previous Stroop research has not considered whether socio-economic, educational or cultural identity factors might contribute to Stroop effects and neither did the present study. In order to achieve any of these, a replication with a much larger sample of white, mixed-race and black participants would be required. Next, because of our sample size, we could not consider our data on an individual photograph basis, nor how differences in the skin tone or facial features of each person in our photos might have related to the categorization of that particular photo against the other photos (Crawford & Alaggia, 2008; Lewis, 2011).

On a more conceptual level, our claim that the key-press data represent an explicit index and the *RT* effects represent an implicit index is not above challenge. Concerning explicit indexes, self-report and interview data are perhaps the most well known examples of these (Doyle & Kao, 2007; Brunsma & Rockquemore, 2001; Sellers et al., 1998). However, more broadly speaking, explicit indexes are typically taken to be related to intentional actions or actions under conscious control and behaviors that the participant is aware of (Blommaert, van Tubergen & Coenders, 2012; van den Bergh et al., 2010). All these apply to our Stroop key-press data. Each participant was in total control of whether or not to press any particular key, and was aware of the key being pressed. Note, Stroop tasks can accept verbal responses as well as key-press responses (MacLeod & MacDonald, 2000; Wright & Wanley, 2003). A replication of the present study in the verbal domain would therefore add to our conviction that what we measured in the present study was explicit rather than implicit.

Broadly speaking, implicit indexes concern behaviors that are automatic in so far as they can be activated unintentionally and without conscious awareness (Nosek, 2007). The Stroop task (more specifically Stroop as an *RT* measure) is the most longstanding and well known index of automatic processing in psychology (MacLeod, 1991; MacLeod & MacDonald, 2000). That said, implicit behaviors can lead to subsequent phenomenological experience. For example, in the standard color-

word task, a large number of incongruent trials can be given in a list of say 100 words and verbal

responses can be ascertained (i.e., say each color aloud). Under these conditions (Stroop, 1935),

participants may well become aware of having difficulty saying the colors (and avoiding saying the

words). What is important here is that they can do nothing to eradicate response slowing. This is a

hallmark of automatic processing (Brunel et al., 2004; Gaither et al., 2013), and this is what our

Stroop task measured.

If *RT* differences are ones to which the participant does not have introspective access, they

can be considered implicit. It is also entirely possible that the participant has access to them but

prefers not to report them, in which case the test measured explicit processes which the participant

attempted to consciously suppress (for this argument regarding the IAT see Brunel et al., 2004). This

illustrates how implicit indexes can (in the first above case) be completely uncorrelated or only

weakly correlated with explicit processes (Blommaert et al. 2012; van den Bergh et al., 2010); and

yet (in the second case) implicit and explicit indexes might well be strongly correlated (Lane, Banaji,

Nosek & Greenwald, 2007). Our point here is that correlations per se cannot be used on their own as

a definitive means of deciding whether a particular index is implicit or explicit (Brunel, et al., 2004;

Lane et al., 2007).

Finally, one could ask what a Stroop task of race perception can offer over and above the

IAT. We focus here on just one of the potential advantages. Namely, the IAT requires participants to

press a designated key for one pair of words and a different key for a second pair (Brunel et al.,

2004; van den Bergh et al., 2010). However, as well as doing similarly (blocks 2 and 3), the present

study additionally permitted participants to have a free choice about whether to categorize our

stimuli as black or as white (block 1). In our study, it was the open-choice instruction (i.e., the

manipulation not present in the IAT) which led to the biggest key-press differences. This advantage

noted, the IAT is arguably the most important development in implicit indexes of the past 2 decades.

It is therefore now important to establish whether our Stroop implicit index relates to the IAT (recall both derive from *RT*), in order to further validate our own index.

Conclusions

We do not claim to be the first to use experimental tasks to investigate issues relating to race. Nor are we the first to specifically employ a Stroop task in this pursuit (e.g., see Richeson & Shelton, 2003). However, we may be the first to use actual racial stimuli in a genuine Stroop paradigm to investigate issues of race perception of mixed-race by black, white and mixed-race persons themselves. This, we would argue, is a potentially useful tool, alongside the IAT, that is long overdue.

We did anticipate our finding that consciously, mixed-race and black persons might see mixed-race as having an identity more black than white. However, we had not anticipated that mixed-race persons would see mixed-race as more black than did black persons, nor did we anticipate that white persons would resist categorizing mixed-race as black, even when instructed to do so. This notwithstanding, our findings support at least one of the three assertions of Sellers et al.'s MMRI theory that we considered earlier. Mixed-race individuals perceive that being mixed-race involves more than one racial identity (here one was conscious and the other unconscious). This finding is in line with Lusk et al. (2010), who concluded that one of the hallmarks of mixed-race is the need to adapt to apparently-divergent (or even adversarial) worlds. On a further assertion of the MMRI, it is for future experimental psychological studies to corroborate whether the individual's social contexts, more than his or her ethnic background, is what determines which of these identities guides social discourse (Gaither et al., 2013; Suzuki-Crumly, & Hyers, 2004; Yip et al., 2014). Finally, both black and white participants' responses indicate that they see only the explicit identity, although in different ways. However, in agreement with the third assertion of MMRI theory, we

conclude that the mixed-race individual's own perception of his or her identity is the most valid

indicator of mixed-race identity.

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Table 1: Percentage of Mixed-Race Categorized as Black v White by Each Group

Instructions & Conditions	Participants White	Participants Mixed	Participants Black	All Participants
Must Categorize Mixed as:-				
Open Choice	52.17 (1.77)	65.85 (2.47)	62.87 (1.67)	60.30 (1.15)
White	35.90 (1.90)	35.65 (2.65)	35.62 (1.80)	35.72 (1.25)
Black	55.02 (1.75)	62.55 (2.42)	58.80 (1.65)	58.80 (1.12)
Stroop Condition				
Neutral-None	50.15 (1.62)	56.87 (2.25)	54.65 (1.52)	53.90 (1.05)
Congruent-Black	41.75 (1.17)	48.97 (1.62)	46.17 (1.10)	45.65 (0.77)
Neutral-Word	49.27 (1.57)	55.80 (2.17)	53.87 (1.47)	52.97 (1.02)
Incongruent-White	49.60 (1.42)	57.07 (1.97)	55.07 (1.35)	53.92 (0.92)
Overall	47.70 (1.35)	54.67 (1.87)	52.45 (1.25)	51.60 (0.87)

Note: Each percentage is given in terms of the black end of the continuum, such that percentages above 50% indicate how "black" the average responses were and percentages below 50% indicate how "white" the averages were. Numbers in parentheses are standard errors.

Table 2: Key-Press Categorization Data Involving Both Condition and Instructions

	Participants White	Participants Mixed	Participants Black	All Participants
Instruction Open Choice				
Neutral-None	53.50 (2.05)	64.05 (2.85)	63.60 (1.92)	60.37 (1.32)
Congruent-Black	53.52 (1.95)	68.05 (2.70)	61.50 (1.82)	61.02 (1.27)
Neutral-Word	51.32 (2.00)	66.27 (2.80)	62.85 (1.87)	60.15 (1.30)
Incongruent-White	50.35 (1.97)	65.00 (2.72)	63.52 (1.85)	59.62 (1.27)
Instruction Mixed as White				
Neutral-None	35.27 (1.87)	36.80 (2.62)	35.32 (1.77)	35.80 (1.22)
Congruent-Black	35.55 (2.15)	33.32 (2.97)	35.10 (2.00)	34.65 (1.40)
Neutral-Word	35.62 (2.27)	35.55 (3.17)	35.85 (2.12)	35.67 (1.47)
Incongruent-White	37.12 (2.00)	36.90 (2.80)	36.27 (1.87)	36.75 (1.30)
Instruction Mixed as Black				
Neutral-None	61.67 (2.50)	69.75 (3.45)	65.00 (2.32)	65.47 (1.62)
Congruent-Black	36.20 (1.20)	45.55 (1.67)	41.95 (1.12)	41.22 (0.77)
Neutral-Word	60.85 (2.35)	65.55 (3.27)	62.87 (2.20)	63.10 (1.52)
Incongruent-White	61.35 (2.02)	69.32 (2.82)	65.40 (1.90)	65.37 (1.32)

Note: Each percentage is given in terms of the black end of the continuum, such that percentages above 50% indicate how "black" the average responses were and percentages below 50% indicate how "white" the averages were. Numbers in parentheses are standard errors.

Table 3: Response Times for Mixed-Race Categorizations by Each Participant Group

Instructions & Conditions	Participants White	Participants Mixed	Participants Black	All Participants
Must Categorize Mixed as:-				
Open Choice	1053 (57)	943 (80)	871 (54)	956 (37)
White	862 (31)	890 (44)	867 (29)	873 (20)
Black	796 (32)	770 (45)	760 (30)	775 (21)
Stroop Condition				
Neutral-None	854 (36)	853 (50)	804 (34)	837 (23)
Congruent-Black	904 (40)	830 (56)	819 (38)	850 (22)
Neutral-Word	882 (34)	842 (48)	827 (32)	934 (30)
Incongruent-White	974 (47)	946 (65)	883 (44)	851 (26)
Overall	903 (37)	868 (52)	833 (35)	868 (37)

Note: All RTs measured in milliseconds (MS). Numbers in parentheses are standard errors.

Table 4: Response Times for Mixed-Race categorizations Involving Both Condition and Block

	Participants White	Participants Mixed	Participants Black	All Participants
Instruction Open Choice				
Neutral-None	944 (52)	910 (72)	813 (49)	889 (34)
Congruent-Black	1097 (68)	883 (94)	872 (63)	951 (44)
Neutral-Word	953 (50)	878 (69)	789 (47)	873 (32)
Incongruent-White	1217 (81)	1101 (112)	1012 (76)	1110 (27)
Instruction Mixed as White				
Neutral-None	843 (38)	917 (53)	846 (36)	868 (25)
Congruent-Black	838 (35)	808 (48)	853 (32)	833 (22)
Neutral-Word	854 (33)	878 (46)	869 (31)	867 (21)
Incongruent-White	913 (41)	955 (58)	902 (39)	923 (27)
Instruction Mixed as Black				
Neutral-None	776 (35)	732 (49)	753 (34)	754 (23)
Congruent-Black	777 (37)	797 (51)	732 (34)	768 (24)
Neutral-Word	838 (38)	769 (54)	822 (36)	810 (25)
Incongruent-White	792 (35)	781 (49)	734 (33)	769 (23)

Note: All RTs measured in milliseconds (MS). Numbers in parentheses are standard errors.