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The chair of excellence project that will host Professor Colin Tredoux is structured around both the issue of facial recognition/identification and intergroup relationships, two domains in which Colin Tredoux is a specialist. Those research topics are of particular societal importance worldwide, especially regarding their relevance to the law. Indeed, the foundation of the Innocence Project in the United States in 1992, and then in Canada, UK, Australia, New Zealand, Ireland, South Africa as well as its recent introduction in France in 2013, has helped highlight flaws in the criminal justice system worldwide, and the way that mistaken eyewitness identifications have lead to judicial errors. The analysis of cases of judicial error shows that in over half of these cases the error was due to an erroneous identification produced by a truthful witness. These biases are particularly present when the suspect belongs to a different ethnic group than the witness, both because the line-up is then difficult to build, and because the witness experience difficulties distinguishing the members of the line-up.

One explanatory hypothesis of this bias concerns the notion of intergroup contact. A lack of contact with members of another ethnic group, as well as prejudice against them, and/or devaluation of interactions with them, may explain the difficulty of identifying members of a given group. In the current French context, a country facing difficulties of integration of its ethnic minorities, the project of this Chair is to provide new light on inter-ethnic relations related to identification, as well as find ways to reduce this inter-group deficit.

Research on identification as well as research on values and attitudes of social groups is a key component of the CLLE Laboratory, recognized especially for its work on situated social cognition. Several researchers from the lab have developed substantial lines of inquiry in this area, over some time. This is the case for the project leader, Jacques Py, full Professor in the laboratory since 2007, whose work concerns person identification,

especially in the case of inter-ethnic recognition. This is also the case for Maja Becker, assistant professor in the laboratory since 2011, who focuses on the motivations and dynamics of identity in the context of intercultural relationships, and for Valérie Le Floch, research director in the laboratory since 1999, working for several years on the mechanisms of value allocation deficit attributed to members of minority groups (women, North African people, etc.), particularly in the context of hiring.

One of the many interests of the present project also concerns the dual skills of Colin Tredoux in Psychological Sciences and Computer Sciences. This dual expertise has allowed him to develop specialised software to create faces that opens up new possibilities in experimentation on face recognition. It also allows him to develop original experimental situations which are based on games in which it will be possible to manipulate the harm or reward, pending contact with members of other ethnic groups, e.g. through confrontational or cooperative games, etc. We have within CLLE a particular resource in the person of Virginie Ferraud, an engineer in computer studies, who will dedicate 33% of his working time to the project. In addition, Pierre Vincent Paubel, research engineer in management platforms, will dedicate 15% of his working time of the project, as well as a third research engineer to be recruited by CLLE on the 1st of September 2015.

Colin Tredoux will therefore find in Toulouse a set of skills to ensure the feasibility of the project. Also, the fact that the project leader and the candidate have been working jointly for 3 years (thanks to a grant from the Ministries of Foreign Affairs of France and South Africa) in a fruitful manner on the issue of identification, is also a project feasibility pledge. In return, there is no doubt that the arrival of Colin Tredoux in Toulouse, as part of a chair of excellence awarded by the Federal University of Toulouse, would have structuring effects on the work of the team. Beyond the researchers mentioned earlier, several researchers who work on face recognition (CLLE members, but also members of the cognitive science laboratories from the University Paul Sabatier (UT3), and even experimental economics laboratory from the University Toulouse 1 - Capitole) will find the arrival of Colin Tredoux at Toulouse a significant opportunity to enrich scientific collaboration.

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Application for Chaire d'attractivité

To whom it may concern,

I confirm the application for the Chaire d'attractivité, in collaboration with Professeur Jacques Py and the Laboratoire CNRS CLLE (team LTC) of Université Toulouse Jean Jaurès.

We propose to extend our existing collaboration, which has examined methods of lineup construction and the prediction of witness choices in lineups through a specialized interview process. The collaboration has been very fruitful, and has engaged many doctoral students and postdoctoral fellows in both Toulouse, and Cape Town, my home university.

We now propose to examine two questions of central importance to the lives of societies and the people in them, all over the world, and especially perhaps in contemporary Europe. We further propose to explore the connections between these questions.

The first question is of central importance to the criminal justice system, and has become more clearly so with the application of DNA testing of biological evidence. As you will see in our proposal, several hundred people have been false convicted, imprisoned, and then exonerated after many years, on the basis of mistaken eyewitness identifications. Most troubling is that fully half of these mistaken identifications have involved cross-group eyewitness identifications. Psychological researchers have explored this so-called own-group bias over some years, but it is fair to say that there is no commonly accepted explanation for it. It is also not well understood from what might be called an ecological perspective.

One respect in which it is not well understood is in its connection to the processes that unite, and separate members of different groups. This is our second key question, and one I have been involved in intensive study for over 12 years. Although contact between different groups is clearly associated with improvement of attitudes of the groups towards each other (more so for the majority group than the minority), our research in a variety of contexts (schools, universities, public spaces, nightclubs, playgrounds) shows that the dominant behavioural form when groups encounter each other is not positive contact, but rather contact avoidance and separation. We have

developed specialized methods for researching patterns of contact and separation, and have published our results in a variety of leading journals.

What is the connection between contact avoidance, indifferent or hostile attitudes, and the failure to individually differentiate and recognize members of other groups? This is a key, and largely unasked question in the psychological literature. We propose in our project to provide some answers to this question. We outline how we intend to do this in more detail in our proposal, and we also suggest that one important outcome of our work may be to develop a training program for improving cross-group identification.

I am personally delighted to be making this application. I have found the joint work with Professeur Py and his colleagues at Université de Toulouse to be very rewarding, and very much look forward to continuing the association. The environment in Toulouse, and in France, is a good one for this project, precisely because of a combination of the relevance of the material for France, and the joint expertise of the hosting laboratory, and the applicant.

I thank you for the opportunity to apply for this honour.

COLIN G TREDOUX

Grant title and overall details

Chaire d'attractivité

Affiliated laboratory	Laboratoire CNRS CLLE (team LTC) (UMR 5263)
Project leader	Jacques Py
Name of the proposed scholar	Colin Tredoux, Professor of Psychology, University of Cape Town, South Africa

Scientific Program

The connection between mistaken identifications, attitudes, and behaviours towards members of other groups: the complex interplay between social separation, intergroup contact, and witness memory

Introduction

Relations between groups are of longstanding concern in both public and academic life. These relations may be peaceful, but are often not, and can take the extreme form of civil wars, genocide, and acts of terror, all of which have occurred in several locations in Europe in the last twenty years (Beconyté et al., 2010). But there are lesser forms, too, which may become worse or in their own right can be considered out of line with what we believe fair societies to be. Our concern in this program of research is two such instances, at two different levels of analysis, and our ambition is to connect them.

1 Recognition deficits for members of other groups

In the first of these, an event occurs at an individual or inter-individual level, but has profound consequences for the fate of individuals. We mean the mistaken identification of a member of an ethnic group in a criminal legal case. This happens on a frequent basis in criminal cases, as illustrated by the work of the Innocence Project (www.innocenceproject.org), and its chapters in over 50 countries (including France). Since 1992 this project has researched and assisted in the exoneration of people falsely imprisoned, usually through negative DNA matching. As of April 2015, 329 people have been exonerated in the United States through this project, and analysis of the cases shows that approximately 70% of the people exonerated have been from ethnic minorities, and in about 65% of those cases, the convictions were based on eyewitness identifications by people from a different ethnic group. Although this data is from the United States, the problem of mistaken cross-group identifications afflicts many other countries, although whether it occurs on a similar scale is unknown.

One of the sources of mistaken cross-group eyewitness identifications is in the recognition deficit that humans often have for faces of different group morphology to their own. This was established in measurable terms with a memory test by Malpass and Kravitz (1969). Malpass & Kravitz showed that Americans of European descent and Americans of African descent were more accurate at recognizing individual faces of their own ethnicity than the other, and this result has been replicated many times, in many countries (the present applicant, Colin Tredoux, has co-authored six of these studies). A meta-analysis by Meissner and Brigham (2001) showed that the own-race recognition advantage is a factor of approximately 1.4, and the cross-race recognition deficit is a factor of approximately 1.5. In some locations the pattern is indeed one of a cross-over interaction, but in others it is asymmetric: in contexts where political power has historically been skewed, members of the dominant group typically show the recognition deficit, but the dominated group does not (e.g. Wright, Boyd et al. (2003)).

Although the presence of the cross-group recognition deficit has been well established, it has no widely accepted theoretical explanation. A popular account known as the 'perceptual contact hypothesis' posits, without further elaboration, that the deficit arises from a lack of exposure to the group (especially visual exposure to facial morphology), and that this results in an underdeveloped ability to individuate members of the other group. Alternate explanations posit mechanisms akin to 'categorical gates' when processing other-group faces (e.g. Levin (2000); MacLin and Malpass (2001)), or a combination of such mechanisms, along with additional socio-cognitive factors (e.g. Hugenberg, Young et al. (2010)). Recent models such as the categorization individuation model of Hugenberg and colleagues recognize the importance of socio-cognitive processes, but there has been little systematic attention to the role of intergroup attitudes and relations in the provenance of the cross-group recognition deficit. Meissner and

Brigham (2001) find an absence of such a relationship in their meta-analysis of a limited corpus of studies, but they do find evidence of a contact-recognition deficit relationship of small size, and a more substantial relation between contact and attitudes, which they argue implies that people with more negative attitudes avoid people of other groups, thus implicating attitudes indirectly in the recognition deficit. Colin Tredoux, the candidate for the Chaire d'attractivité, has done considerable original research on the manifestation of prejudice in intergroup relations (viz. Aboud, Tredoux et al. (2012), Dixon, Durrheim et al. (2005), Finchilescul, Tredoux et al. (2007), Tredoux, Dixon et al. (2005), Tredoux and Dixon (2009)), and is well placed therefore to address the absence of such a program in work on recognition performance.

In addition to a dearth of research on the role of intergroup attitudes and prejudice in the development and manifestation of the cross group recognition deficit, there is also dearth of research on the situatedness, or ecology of the effect. By this we mean the possible dependence of the effect on local demography, or on the nature of the power relations between groups. Some preliminary research by Tredoux, Vredeveldt and their student, Seutloali (Seutloali, 2013), shows that there may be a direct relation between demography and the cross group recognition defect: they found a significant correlation between degree of ethnic heterogeneity of participants' home towns and the size of the recognition defect in a group of South African students. What is also unexplored in the literature, though, and which may be more important, is the degree to which inequality of the groups manifests in the nature and size of the recognition deficit: to this extent, Tredoux has already identified structural inequality as one possible moderator of the effect, and wishes to extend this through examination of the role of residential and educational segregation on the recognition deficit.

2 The nature and role of contact in intergroup relations

The second instance of ethnic relations that we wish to address is that of contact between ethnic groups in a broader sense, and its ramifications for attitudes, discrimination, and prejudice. This level of analysis is classically considered to be that of the group, or inter-group, but we will want to show the 'articulation' of this level of analysis with the individual, perceptual level outlined in section 1 above, following the epistemological metatheory outlined by the Swiss psychologist Willem Doise (1976).

The central quest of this tradition has been partly political in nature, namely to promote intergroup contact, on the premise that it will improve intergroup relations, and over 500 studies in this research tradition do support this premise (Pettigrew and Tropp 2006). Work on this so-called 'contact hypothesis' has intensified in the last 20 years, and a number of efforts have been made to establish it on surer theoretical footing. However, the study of intergroup contact has stood accused on several occasions of a particular utopianism, and of ignoring the ecology of contact (Dixon, Durrheim et al. (2005). One important line of work has been to explore the natural occurrence of contact in everyday settings. Tredoux has played a significant role in this group, and their publications have demonstrated quite clearly that in the natural unfolding of group relations in everyday spaces, contact between groups is not guaranteed by spatial and temporal contiguity. The picture that has emerged from their study of university cafeterias, open spaces, nightclubs, school playgrounds, and classrooms, inter alia, is one of spontaneous avoidance of contact. They have also demonstrated that in these groups participants recognize and report the beneficial effects of contact – contact works, but it is avoided. Additional work by Tredoux and his student Kim has demonstrated that socially sanctioned contact, engineered in university dining rooms, can have positive effects on intergroup contact and attitudes, but even in such contexts well over two thirds of student resist intergroup encounters of this kinds (Kim & Tredoux, in preparation).

Work on intergroup contact is important, but it is also important to understand the high levels of spontaneous avoidance of contact, and especially to understand the spatial and temporal dimensions of contact. Much of the original research reported by Tredoux and his colleagues can be found online at www.contactecology.com, as well as general statement of the research paradigm they have founded with their work on contact and its vagaries.

3 Connecting the individual recognition deficit with group level processes

The discipline of Psychology has addressed both of the questions outlined in sections 1 and 2. The candidate for the Chaire d'attractivité, Colin Tredoux, is uniquely positioned as having addressed both in

his extant research, and as having published original research in both areas in leading journals, with recognized leaders in the field. It is the central intention of the project to articulate these two traditions of work (in the sense of the French word, "l'articulation" (see Doise (1976)). The recognition deficit that majority group members have for minority group members is not presently formulated in the psychological literature as an ecological phenomenon, that is as emerging from a joint lived history, but we believe that it should be formulated in these terms, and we propose a program that commences work on such an alternate formulation.

We propose an empirical program with three key aspects. The first aspect will be to address the dependence of the cross-group recognition deficit on the relative demography of places. The work under this aspect will consist of i) secondary data analysis (and fortification of that data with independent demographic information) of a corpus of studies of the recognition deficit; ii) conduct of a large multi-national hybrid experiment and survey of the recognition deficit, structured so as to sample systematic variations in relative demography of the groups in question. The second aspect will be to explore the role of 'subjective expected utility' (Malpass (1990)), in the formation and evolution of the cross-group recognition deficit. Malpass pointed to the likely (but unestablished) dependence of the cross group recognition deficit on the utility or benefit to individuals from one group of recognizing members of another group. His conjecture was that there will be more benefit to members of a minority group in recognizing members of a majority than the converse, but this has not been tested. We believe that this can now be tested, along the lines outlined by Malpass in an unpublished article (Malpass, 1985), using a custom built computer software game ('FaceGame') developed at the University of Cape Town by Tredoux and colleagues in computer science. The game requires players to learn new populations of faces, under varying conditions of reward and incentive, relative demography of faces in the game, and most importantly, amount of contact. In order to generate new populations of faces, we will use face synthesizing software, developed at the University of Cape Town by Tredoux and colleagues in Mathematics and Engineering ('ID', Tredoux, Rosenthal et al. (1999), Tredoux, Nunez et al. (2006)).

The third aspect of the empirical work will be to explore the complex relations between inter-group attitudes, contact, threat, and prejudice, and their ramifications for recognition of members of another group. This has been rudimentarily tested in previous research, through self-report, and in contexts where it is arguably counter-normative to express prejudice. We will embed this inquiry within the first and second aspects outlined above. This will give us the flexibility of testing hypotheses in an ecologically relevant sample, as well as in an experimental paradigm where it is possible to observe potentially co-varying changes in attitude and recognition to new and unfamiliar face populations.

A final aspect of the empirical work will be to explore the use of the methods developed in the program for possible training: specifically, we may be able to combine use of the ID program to create populations of synthetic faces, and if we are able to identify optimal conditions in the FaceGame program for learning new populations of faces, we could develop and test a program for training recognition of faces of other groups.

Empirical studies

In this section we outline the studies we propose for the program of research over four years. Of course, the program must be recognized as developmental, and it is possible that exigent contingencies will add new questions to the mix, just as it is possible that those we specify here take on a different character.

1) *The cross race recognition deficit and the demography of place*. We see there being two components to this theme.
    a. A secondary data analysis of the extant literature on the cross-group recognition deficit. We will extend the meta-analysis conducted by Meissner & Brigham (2001), by gathering all literature they used, and all studies in the intervening period, and fortifying this database of studies by collecting demographic data about the cities in which those studies were conducted. This should be possible for most of the studies, as good historical demographic data is available for most cities in the USA, which is where the studies were conducted. We aim to collect first level demographic data (relative numbers of members of different ethnic groups used in the study), and second level demographic data (the residential segregation of

the city, and the economic inequality of groups within the city). Our analysis will be to ascertain whether these demographic factors moderate the cross-group recognition deficit.

b. An online experiment, developed to assess the cross-group recognition deficit with a range of stimulus materials, and at least two distinct methods of measuring the deficit (a face recognition paradigm, and an eyewitness recognition paradigm). An important aspect of the experiment will be to sample deliberately for both demographic and economic heterogeneity. We will do this by identifying 20 cities in Europe, the UK, the USA, Canada, and South Africa: the cities will be chosen so as to maximize variation on demographic and economic heterogeneity. The experiment will be supplemented with an attitude survey, with measures drawn from the suite that Tredoux and collaborators have developed over the past 12 years, including a version of the Implicit Associations Test devised by Greenwald, Banaji, and colleagues, which is a measure of implicit prejudice. Our analysis will be multifold: on the one hand, the intention is to ascertain whether the demographic factors moderate the cross group recognition bias, and on the other, the intention is to connect the attitude and prejudice measures to the recognition data. The platform for delivering the experiment is not clear at this stage, and will be one of the tasks for the team to resolve.

2) Manipulating contact and utility of contact directly in an experimental setting

a. As described earlier, Tredoux and some computer science students have developed 'Face Game', which is a computer game: players have to navigate their way around a series of terrains, in which they encounter avatars, and are asked to search for faces that they are presented with. The relative number of faces of one or other group can be manipulated, as can the amount of contact with the faces. More importantly perhaps, the game has a built-in reward and penalty economy that can be applied to learning and remembering the faces. In addition to this, Tredoux and colleagues at UCT have developed face synthesis software, that allows the creation of high quality synthetic faces. For the experiment, we will produce a new population of faces, that is a hybrid of faces contained in the existing 10 eigenface models maintained at UCT. These faces will be used to populate Face Game, and will allow us to simulate the learning of a new population of faces. The design of the experiment will be a factorial combination of Relative demography of two groups [three levels] X Amount of contact [four levels] X Utility of contact [three levels]. We anticipate that we will need to run a minimum of 360 participants through the experiment to achieve acceptable statistical power.

b. In order to explore the role of attitudes and prejudice in the recognition deficit, we will assess these in Face Game players systematically throughout the experiment. This will allow us, potentially, to chart the development of attitudes and prejudice as a function of contact and contact utility in the simulated environment, and our analysis will be to connect these to the development of the recognition deficit.

3) *Field Study with the South African Police Services, and the French Police/law enforcement*.

a. The issue of eyewitness identification of members of another group and the known problems this creates for the fair administration of criminal justice is of course one that is from a practical point of view mostly under the purview of the criminal justice system, especially the various arms of policing. It is important to know therefore what extant practices the policing services use for witnesses making cross-group identifications.

b. We therefore propose to conduct a field study with the South African Police Services (SAPS) and with French law enforcement; the explicit intention of this would be to gather information about practices within the police regarding the i) construction of face composites, ii) interview methods, iii) lineup construction and administration, when the situation is one of a cross group identification.

c. A plausible extension of the working relation with the police, is to develop and test a training program aimed at improving identification of cross-group faces amongst police officers. This may flow from the work with Face Game, referred to above: if the research on Face Game identifies optimal conditions for reducing the cross-group recognition

deficit it is possible that the game itself could be used for training purposes. Our aims here have to be modest at this stage, as we cannot anticipate what the results will be from the experiment involving Face Game.

Timeline, expected impact, indicators to monitor progress, resources needed

If the Chaire is awarded, the project can commence in January 2016, and will continue for four years. Anticipated residence in Toulouse is at this stage 2 months in 2016, 6 months in 2017, and 2 months each in 2018 and 2019.

Medium-term expected impact on research and training: a central goal will be to report the work of the project in the form of articles in highly rated international journals. We expect this project therefore to enhance the research productivity of Tredoux, Py, and colleagues at Toulouse and Cape Town involved in the project. Since we will be using several specific research methods (computer methods for generating synthetic faces, implementing an experiment inside a computer game etc.), capacity is likely to be increased in students and faculty for these specialized skills. Finally, if we are able to develop a cross-group training program for police officers, that will be an additional impact of the research program.

Indicators to monitor the progress of the project. The project will be succeeding if i) the empirical work is being conducted, ii) students are enrolled in the program, iii) the empirical work is being published in high impact international journals. This means that some benchmarks can be set: after Year 1, a PhD student should be enrolled in the project; after Year 2, a PhD student and a postdoctoral should be enrolled, and the first of the projects should have been completely conducted; after Year 3 the PhD and postdoctoral fellow will be enrolled, one article should have been submitted for publication, and the second of the empirical projects should have been conducted; at the end of Year 4, all the studies should have been completed, two articles submitted for publication, and all the empirical work completed.

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The financial resources needed for the project

In order to run the project, the following financial costs are proposed:

1 *Travel expenses*. The Chaire will travel to Toulouse at least four times in the four years, and there will be other travel incurred during the project, but of a more minor nature. We have budgeted 15,600 € for this cost.
2 *Running costs*. We have budgeted 9,000 € for this item. There will be various items to purchase for the project (stationery, etc.), we do not specify them here in any detail.
3 *Staff related costs*. This is the biggest item in the budget. It comprises salaries for PhD students and post-doctoral fellows, as well as *per diem* for the Chaire when he is in Toulouse, as well as consideration of his salary To make up a total of 303,600 € IDEX funding. The project will depend fundamentally on the presence of the PhD student and the Postdoctoral fellow, as they will be jointly responsible for the empirical work, and it cannot be completed without them.
4 *Investment.* These are small items of equipment: computers, photographic kit (umbrellas, camera, screen, software etc). We have budgeted 3,900 € for this item.