*General Method & Procedure*

*i. Participants*

A total of 336 healthy male participants, aged between 18 and 90 were randomly recruited from the local population in Edinburgh, Scotland, UK (N = 136; age: M = 38.54 ± 18.72 years ) and from Barcelona, Catalonia, Spain (N = 200; age: M = 22.43 ± 5.22 years). All were pre-screened to exclude a number of significant behavioural and physiological traits that could produce confounding physiological effects in the analysis of T and sAA (see Supplementary Materials below for a detailed description).[[1]](#footnote-1) Participants were also pre-screened to allow groups to be created on the basis of the participants’ self-declared primary identity while avoiding drawing attention to the identity focus of the research during the experimental intervention.[[2]](#footnote-2) Amongst other questions, participants were asked 'when forced' which one, and only one, identity group they belonged to: European Union, British/Spanish, or Scottish/Catalonian. The final sample included: ‘Scottish’ (n = 74), ‘British’ (n = 58), and ‘European’ (n = 5) in the British sample and ‘Catalonian’ (n = 133), ‘Spanish’ (n = 42), and ‘European’ (n = 25) in the Spanish sample.

*ii. Materials*

Participants played the Ultimatum Game by writing their offers on a laminated game card, which the confederate then indicating whether they accepted or rejected. The confederate had a similar card, on which they wrote their offers, and on which the participants indicated their acceptance or rejection. Cards had the flag indicating identity of the player at the top. No text or other indication of purpose or identity was present.

Surveys included demographic questions, self-identification of territorial identity, the Moral Foundations Questionnaire (MFQ; Graham et al., 2011), and the abbreviated Five Factor Inventory (NEO-FFI; Costa & McCrae, 1992).

*iii. Procedure*

*Pre-screening*

Participants were not allowed to smoke, eat, drink anything except water, engage in heavy physical activity or brush their teeth for at least one hour before providing saliva samples.[[3]](#footnote-3) Participants who had recently engaged in heavy physical activity or the consumption of alcohol (within 12 hours) were not allowed to participate to mitigate abnormal hormonal ranges. Participants were pre-screened twice – using an online questionnaire days before participation (see pre-screening questionnaire) and also upon arrival to participate in the study – so those that did not meet the sampling requirements online would not be scheduled to participate and those who did not meet the behavioural restrictions before the study would be turned away or rescheduled for another study session. The entire study took place between 3 March and 21 May 2014, and all sessions were held between 12:00 and 8:00 pm to control for diurnal rhythms in Testosterone (Nater et al., 2007).

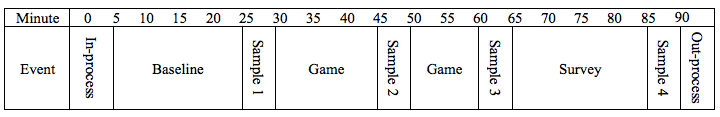
*Hormone sample protocol*

Four saliva samples were collected into a 3.5mL sterile polypropylene cryovials using standard salivary-hormone collection procedures (Dickerson & Kemeny 2004; Schultheiss & Stanton 2009) and via ‘passive drool’ (Navazesh, 1993). The first sample was collected to establish a ‘baseline’, after twenty minutes of participant isolation in a quiet room without any stimuli. The second sample was collected after participants had played ten iterations of the ‘ultimatum game’ against a confederate posing as another participant. The third sample was collected after participants had played another ten iterations of the Ultimatum Game against the same confederate participant. The fourth sample was collected to assess ‘recovery’, twenty minutes after completion of the game[[4]](#footnote-4).

Participants provided each saliva sample via passive drool through a short straw into the 3.5 mL cryovial for precisely two minutes, as timed and supervised by the same researcher throughout. All samples were labelled with a barcoded participant numbers and put into an insulated cool box with dry ice immediately after collection. Samples were maintained frozen overnight in a freezer at -20 degrees Celsius, with no self-defrost setting, to precipitate mucins but avoid hormone degradation and bacterial growth. Samples were packed in dry ice and shipped overnight for laboratory analysis to Salimetrics Europe Ltd. (Cambridge, UK) biweekly during the conduct of research. Saliva samples were assayed in duplicate for T and singlet for sAA using a highly sensitive enzyme immunoassay (EIA). Detailed description of these procedures can be found in the Supplementary Materials, *Hormone Sample Protocol*.

Figure 1. Protocol Timeline

Figure 1. Protocol Timeline depicting sequence of events from participant arrival to completion of experiment.

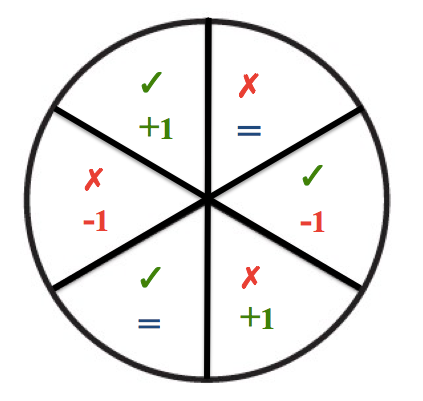


*Ultimatum Game & Questionnaires*

Participants were randomly assigned their ultimatum game opponent, and were told only that their opponent could be from one of a number of places. The term identity was not employed. However, the identities of the participants and their opponents were reinforced during the game by the corresponding flag on the laminated game card. Participants remained in the same study room throughout the ‘baseline’ period, the ‘ultimatum game’, the collection of the saliva samples, and the completion of the survey instruments, while both the confederate and researcher entered and exited the room to play the game and collect the saliva samples.

A large tri-fold divider was used to prevent visual interaction between participants and confederates while entering the room and playing the Ultimatum Game.[[5]](#footnote-5) Participants were told they were not allowed to speak to the other ‘participants’ throughout the experiment, while confederates were trained not to speak to participants and to note if participants tried to speak to them. Participants were taught the Ultimatum Game rules after the baseline saliva sample was collected and were provided with a paper copy of simplified instructions, while confederates were trained ahead of time and their responses were randomised by a clock device.

Figure 2. Ultimatum Game Confederate Behavior Randomizer (to be placed on the face of a clock and used to determine game response based on the location of the seconds hand).



The selection of ‘Player 1’ was also randomised and both the participant and confederate took alternating turns making offers, choosing to accept or deny each offer until both players had done so ten times. A saliva sample was collected from the participant after the first ten iterations and a second sample collected after the second set of ten iterations.

After the end of the game, and having provided the three saliva samples, all participants completed a brief survey questionnaire containing basic demographic, self-identification, the MFQ and the NEO-FFI. All research in Scotland was conducted in English, and all research in Catalonia was conducted in Spanish (???), but all Ultimatum Game cards were free of language. The fourth and final saliva sample was collected twenty minutes after the third sample was collected (see Supplementary Materials, Note 7).

1. Individuals with diagnosed psychiatric disorders (e.g. ADHD, depression, anxiety, etc.), those currently taking hormonal replacements, adrenergic agonists or antagonists (e.g. anti-hypertensive drugs, asthma medication, etc.), and heavy drinkers/smokers (10 or more drinks or cigarettes per week) were excluded from participation. [↑](#footnote-ref-1)
2. In the pre-screening questionnaire, participants were asked to state ‘when forced’ to choose only one, which identity group they would see themselves as belonging to: European Union, British or Scottish. [↑](#footnote-ref-2)
3. Confederates were also held to the same standards, as to not trigger salivation in participants, and were also prohibited from wearing any cosmetic products with a noticeable scent. [↑](#footnote-ref-3)
4. See supplementary materials, Note 7. [↑](#footnote-ref-4)
5. See Supplementary Materials, Note 8. [↑](#footnote-ref-5)