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SUPPLEMENTARY INFORMATION

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A registered replication study on oxytocin and trust

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Supplementary Information

Supplementary Methods

In this section we documents our effort to develop an experimental design that implements a trust game with and without a minimal social contact condition but which avoids introducing a ceiling effect for a potential impact of OT. To this effect we assessed the mean investments of trust games conducted across 11 pilot studies which varied slightly in their experimental conditions. The results are reported in the table below. For example, in experimental sessions 2, 5 and 7 below (which implemented the Social 1 condition or the Social 1* condition, for a detailed explanation of these conditions see text after Table S3) the average behavioral trust level was 8.875, 10.875 and 9.437, respectively. These trust levels are very high and leave little space for OT to have an effect in these conditions. Therefore, we conducted further pilots with a Social 2 and a Social 3 condition (see pilot sessions 9 – 11) which tried to mitigate these potential ceiling effects while still allowing for minimal social contact among the participants.

#	DATE	Place	N	Condition	Stakes	Show-up fee	Gender	Invest options	Mean investment
1	15-Dec 2017	Antwerp	14	No contact	1pt = 33 c	5 €	mixed	all integers (0 – 12)	8.786
2	15-Dec 2017	Antwerp	16	Social 1	1pt = 33 c	5 €	mixed	all integers (0 – 12)	8.875
3	16-Jan 2018	Magdeburg	16	No contact	1pt = 1€	5 €	mixed	all integers (0 – 12)	7.313
4	17-Jan 2018	Magdeburg	16	No contact	1pt = 33 c	5 €	mixed	all integers (0 – 12)	8.813
5	17-Jan 2018	Magdeburg	16	Social 1*	1pt = 33 c	5 €	mixed*	all integers (0 – 12)	10.875
6	1-Feb 2018	Magdeburg	16	No contact	1pt = 1€	none	mixed	all integers (0 – 12)	6.936
7	1-Feb 2018	Magdeburg	16	Social 1	1pt = 1€	none	mixed	all integers (0 -12)	9.437
8	3-Mar 2018	Magdeburg	16	No contact	1pt = 1€	none	males	0, 4, 8, 12	8.250
9	3-Mar 2018	Magdeburg	16	Social 2	1pt = 1€	none	males	0, 4, 8, 12	7.500
10	16 Mar 2018	Magdeburg	16	Social 3	1pt = 1€	none	males	all integers (0 – 12)	8.100
11	16 Mar 2018	Magdeburg	16	Social 3	1pt = 1€	none	males	0, 4, 8, 12	8.000

The social conditions are defined as follows:

In **Social 1**, after being seated and having signed the informed consent form in the experimental room, eight participants were called to meet each other briefly (5 minutes) in a smaller room (different from the experimental room where the trust game would be played). They were seated at the same table and then asked to formally introduce themselves by name, mention their hobby, and shake hands with each other, following the Prior Contact condition described in Declerck et al. (2010)[1]. In **Social 1*** (pilot session 5), the experimental rooms were separated by gender (i.e., men and women were not seated in the same room when they arrived or when they were performing the trust game). During the social contact moment, four males from one room met four females from another room and introduced themselves following the same procedures as in Social 1. This led to very high trust levels.

In **Social 2** (pilot session 9), eight male participants met in the smaller room without introducing themselves. They were seated at the same table and waited together for 5 minutes during which they did not speak with each other. This complete lack of verbal interaction caused a strange and akward situation that was associated with reduced investments.

In **Social 3** (pilot session 10 and 11), we combined the procedures of Declerck et al (2010)[1] and Kosfeld et al. (2005)[2]: eight male participants, coming from 2 separate experimental rooms where the trust game was to be played, met in a smaller room. They were not asked to formally introduce themselves, but were told that they were permitted to talk, should they wish to do so. During the 8 minutes that they waited together, they were sitting at the same table and filled out questionnaires (see main text). These procedures were examined once with a "continuous" action space for the investor (i.e., investments from 0 – 12 were possible; in session 10) and once with a restricted investment space (only investments 0, 4, 8 and 12 were possible; session 11). Pilot session 8, which implements the no-contact condition, otherwise matches the procedures of session 11.

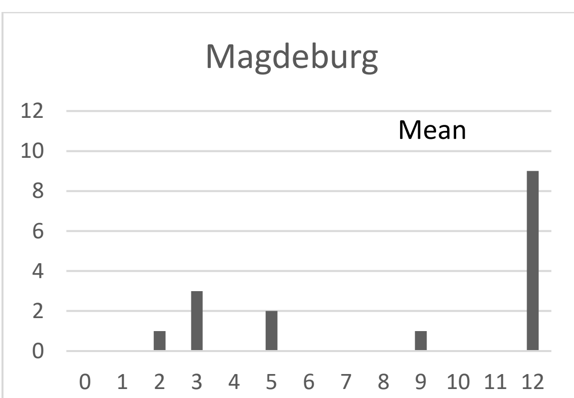
There were also the **following procedural differences** between the various pilot sessions. In **session 1 and 2** participants sat in computer rooms without cubicles; in all other session, participants sat in cubicles the entire time, except during the social contact manipulation in the non-experimental ("smaller") room. In **sessions 1-5** participants arrived at an agreed upon place where they waited together until the beginning of the experiment. In **sessions 6-11**, participants were guided immediately to their cubicles upon arrival. This minimizes the contact with other participants before the experiment and increases our control over participants' social contacts. The show up fee was removed in **sessions 6-11** for the following reason. We hypothesized that if participants receive a show-up fee of €5 they are more willing to take social risks in the trust game, i.e., more willing to send their whole endowment of €12 in the trust game, which exacerbates the ceiling problem discussed above. Instead of giving them a show-up fee of €5 before the trust game we remunerated them ex-post with €5 for filling out questionnaires.

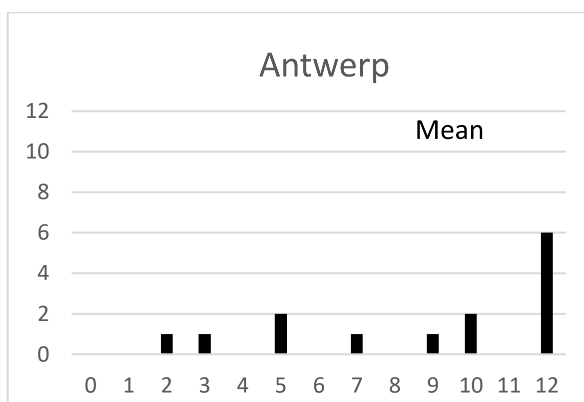
The pilot studies allowed us to assess if investment levels varied according to gender in the mixed gender sessions 1-6

#	Condition	Mean all	Males	Females
1	No contact	8.786	10.6 (n=5)	7.8 (n=9)
2	Social 1	8.875	7.0 (n=10)	12.0 (n=6)
3	No contact	7.313	6.5 (n=8)	8.125 (n=8)
4	No contact	8.813	10.5 (n=8)	7.13 (n=8)
5	Social 1*	10.875	10.75 (n=8)	11 (n=8)
6	No contact	6.936	8.75 (n=8)	5.125 (n=8)
7	Social 1	9.437	9 (n=8)	9.875 (n=8)

The above table shows that in several of the first 6 sessions there were substantial gender differences in trust. To avoid this source of variation we decided to conduct the experiment with only male participants.

Finally, the pilot sessions allowed us to make sure that investments did not differ significantly due to their locations. Below we compare the distributions of investment decisions in the pilot studies conducted in Antwerp (N = 14, session 1) and Magdeburg (N = 16, session 4). Experimental conditions are kept the same: no contact, mixed genders, low stakes (1 point = 33 cent) but with a show-up fee.





Supplementary Table 1. Results of Bayesian regression analysis.

Each cell reports the Bayes Factor representing the ratio of the likelihood of the hypothesized model (defined by the regressors in the corresponding left column) over the null model. In parentheses are the Bayes factors representing the inverse, i.e., the likelihood of the null model over the hypothesized model. The regressions are performed for different values of the JZS/Cauchy prior which have different assumptions on the distribution of the dependent variable.

Hypothesis 1 corresponds to the model with factors OT x MSC (β_3); Hypothesis 2 corresponds to the model with factors OT (β_1) + OT x MSC (β_3). Hypothesis 3 corresponds to the model with factor MSC (β_2).

	Bayes Factors		
	JZS prior		
	0.354	**0.5**	**0.707**
Null model	1.000	1.000	1.000
OT (β_1)	0.099 (10.102)	0.071 (14.166)	0.050 (19.956)
MSC (β_2)	0.201 (4.980)	0.144 (6.929)	0.103 (9.722)
OT x MSC (β_3)	0.094 (10.690)	0.067 (15.000)	0.047 (21.138)
OT (β_1) + OT x MSC (β_3)	0.013 (75.313)	0.007 (147.402)	0.003 (291.808)

In all cases the likelihood of the null model is greater than the likelihood of the hypothesized model. For all models except of the one which only considers MSC as explanatory variable, the Bayes factors exceed 10 showing that the null model is the best predictor of the data.

Supplementary Table 2. OLS regressions testing the effect of oxytocin (OT) and minimal social contact (MSC) on investment decisions, controlling for location (Antwerp coded 1, N = 307, Magdeburg coded 0, N = 370). 95% confidence intervals of the regression coefficients are given in parentheses.

	Controlling for location			Model 1 reported in manuscript	
	β (95% CI)	p		β (95% CI)	P
OT	0.517 (-0.272, 1.306)	0.198		0.517 (-0.272, 1.306)	0.198
MSC	0.690 (-0.111, 1.491)	0.091		0.691 (-0.109, 1.490)	0.091
OT*MSC	-0.652 (-1.789, 0.484)	0.260		-0.653 (-1.788, 0.483)	0.259
GenTrust_z	1.212 (0.926, 1.498)	<0.001		1.212 (0.928, 1.497)	< 0.001
Risk_z	0.029 (-0.259, 0.316)	0.845		0.029 (-0.257, 0.315)	0.842
Location	0.010 (0.562, 0.583)	0.971			
Constant	8.334 (7.727, 8.946)	< 0.001		8.341 (7.786, 8.896)	< 0.001
R-squared	0.100			0.100	

The results show that adding the location as a dummy variable to the regression shown in model 1 of the main manuscript hardly changes the coefficients or the p-values.

Supplementary Table 3. General Estimating Equations (on panel data, population- averaged) testing for mood changes during the course of the experiment. N = 1344 observations clustered on 677 individuals. 95% confidence intervals of the regression coefficients are given in parentheses.

The 30 items of the mood scale (which were administered before and after oxytocin administration) were categorized in 3 dimensions according to valence (good/bad, 10 items), alertness (awake/tired, 10 items), and calmness (calm/nervous, 10 items).

The Good/Bad dimension (first dependent variable) consists of the following items of the MDMS questionnaire[3] (r = reversed item): 1 (content), 4r (bad), 8 (great), 11r (uncomfortable), 14 (superb), 17 (good), 19r (unhappy), 21 (discontent), 24 (happy), 29 (wonderful).

The Awake/Tired dimension (second dependent variable) consists of the following items: 2 (rested), 5r (worn out), 7r (tired), 10 (energetic), 13 (activated), 16r (sleepy), 20 (alert), 23 (fresh), 26r (exhausted), 28 (wide awake).

The Calm/Nervous dimension (third dependent variable) consists of the following items: 3r (restless), 6 (composed), 9r (uneasy), 12 (relaxed), 15 (absolutely calm), 18 (at ease), 22r (tense), 25r (nervous), 27 (calm), 30 (deeply relaxed).

OT = oxytocin, MSC = minimal social contact. The variable Time takes on the value 0 if the items were assessed prior to oxytocin administration, and 1 after oxytocin administration.

	1 Good/Bad		2 Awake/Tired		3 Calm/nervous	
	β (95% CI)	p	β (95% CI)	p	β (95% CI)	P
OT	-0.035 (-0.244, 0.173)	0.739	-0.207 (-1.672, 1.259)	0.782	0.035 (-1.346, 1.417)	0.960
MSC	-0.103 (-0.315, 0.109)	0.340	-1.130 (-2.620, 0.359)	0.137	-0.170 (-1.573, 1.232)	0.812
OT*MSC	-0.077 (-0.378, 0.225)	0.618	-0.486 (-2.603, 1.631)	0.653	-1.415 (-3.409, 0.579)	0.164
Time	-0.128 (-0.227, 0.029)	0.012	-0.844 (-1.591, 0.098)	0.027	0.443 (-0.345, 1.231)	0.270
OT*Time	0.073 (-0.068, 0.214)	0.312	-0.469 (-1.529, 0.592)	0.386	-0.520 (-1.639, 0.599)	0.362
MSC*Time	0.068 (-0.075, 0.211)	0.351	1.020 (-0.057, 2.096)	0.063	0.959 (-2.095, 0.178)	0.098
OT*MSC*Time	-0.034 (-0.238, 0.170)	0.743	0.766 (-0.766, 2.299)	0.327	0.289 (-1.239, 1.908)	0.726
Constant	0.116 (-0.031, 0.264)	0.121	40.98 (39.947, 42.012)	< 0.001	42.881 (41.907, 43.854)	< 0.001
Wald chi^2 (Prob > chi^2)	12.35 (0.090)		20.89 (0.004)		18.71 (0.0092)	

For the dimensions good/bad and awake/tired, mood changed during the course of the experiment: participants reported feeling worse and less alert the second time they filled in the questionnaire. However, these ratings were neither affected by oxytocin nor by MSC.

Supplementary Table 4a. Distribution of participants' beliefs regarding their treatments (oxytocin/placebo). More participants believed they received the placebo, but this proportion did not differ between conditions (Pearson $chi^2_{1,560} = 1.284$, $p = 0.257$). N = 561; these are the participants who responded to an open question with a belief that they had taken either a hormone or a placebo. The remaining 116 participants responded with "I don't know" or left the answer blank.

	Beliefs		
Treatment	Assumed placebo	Assumed hormone	Total
Placebo	185 (47.44 %)	90 (52.63%)	275 (49.02%)
Oxytocin	205 (52.56 %)	81 (47.37 %)	286 (50.98 %)
Total	390 (100 %)	171 (100 %)	561 (100 %)

Supplementary Table 4b. Results of OLS regression showing that the beliefs of participants regarding their treatment did not affect investment decisions (dependent variable). Hence the results reported in the main text cannot be explained by a placebo effect. N = 561. 95% confidence intervals of the regression coefficients are given in parentheses.

	Model controlling for beliefs		Model 1 reported in manuscript	
	β (95% CI)	P	β (95% CI)	P
OT	0.601 (-0.285, 1.487)	0.183	0.517 (-0.271, 1.306)	0.198
MSC	0.875 (-0.031, 1.782)	0.058	0.691 (-0.109, 1.490)	0.091
OT*MSC	-0.728 (-1.999, 0.544)	0.261	-0.653 (-1.788, 0.483)	0.259
GenTrust_z	1.187 (0.863, 1.509)	<0.001	1.212 (0.928, 1.497)	< 0.001
Risk_z	0.044 (-0.278, 0.366)	0.789	0.029 (-0.257, 0.315)	0.842
Beliefs	0.081 (-0.611, 0.771)	0.820		
Constant	8.171 (7.501, 8.841)	< 0.001	8.341 (7.786, 8.896)	< 0.001
R-squared	0.084		0.100	

Supplementary Table 5a. OLS regression showing the moderating effect of oxytocin (OT) on investment decisions depending on symptomatic symptoms, having had nose surgery, or experienced spray discomfort. 95 % confidence intervals of the regression coefficients are given in parentheses. N = 677.

MSC = minimal social contact, GenTrust = dispositional trust, Risk = risk seeking attitude, NOSE_z = standardized score on 4 item Nose questionnaire assessing generalized nasal obstruction[4], VAS_z = standardized score on 10-item visual analogue scale[5] assessing momentary nasal congestion, SURG = dummy with 1 meaning having had surgery on the nose; DISCOMF_z = standardized score of the participants' self-rating of any discomfort they experienced from the spray.

	NOSE		VAS		Nose surgery		Spray discomfort	
	β (95% CI)	P	β (95% CI)	P	β (95% CI)	p	β (95% CI)	p
OT	0.515 (-0.275, 1.306)	0.201	0.513 (-0.276, 1.302)	0.202	0.449 (-0.353, 1.252)	0.272	0.521 (-0.268, 0.402)	0.195
MSC	0.684 (-0.118, 1.486)	0.094	0.684 (-0.116, 1.484)	0.094	0.652 (-0.150, 1.454)	0.111	0.728 (-0.077, 1.533)	0.076
OT_MSC	-0.649 (-1.787, 0.488)	0.263	-0.668 (-1.804, 0.468)	0.248	-0.609 (-1.746, 0.528)	0.294	-0.677 -1.817, 0.461)	0.243
GenTrust_z	1.211 (0.924, 1.497)	<0.001	1.216 (0.930, 1.501)	<0.001	1.199 (0.912, 1.486)	<0.001	1.240 (0.954, 1.523)	< 0.001
Risk_z	0.032 (-0.254, 0.319)	0.824	0.017 (-0.270, 0.304)	0.908	0.031 (-0.255, 0.317)	0.831	0.018 (-0.268, 0.304)	0.903
NOSE_z	-0.073 (-0.481, 0.335)	0.725						
NOSE*OT	0.137 (-0.432, 0.707)	0.637						
VAS_z			-0.214 (-0.600, 0.172)	0.278				
VAS*OT			-0.014 (-0.586, 0.559)	0.962				
SURG					-1.238 (-3.031, 1.252)	0.176		
SURG*OT					0.924 (-3.031, 0.555)	0.463		

DISCOMF_z							0.138 (-0.240, 0.515)	0.474
DISCOMF*OT							-0.629 (-1.207, -0.053)	0.033
Constant	8.345 (7.789, 8.901)	<0.001	8.350 (7.795, 8.905)	<0.001	8.425 (7.857, 8.991)	<0.001	8.320 (7.764, 8.877)	< 0.001
R-squared	0.100		0.100		0.102		0.098	

The results of the regression show that neither the score on the Nose- nor VAS questionnaire interacted significantly with oxytocin to affect investment decisions. There was also no interaction effect between oxytocin and having had nose surgery. However, spray discomfort significantly decreased investments in the oxytocin- compared to the placebo-treated group Because this finding might suggest that the discomfort interfered with proper oxytocin administration (which could also explain the results reported in the main manuscript), we repeat the analyses for Equation 1 only for those participants that reported no, or negligible, spray discomfort (scoring 1 or 2 on a 5-point scale) in Supplementary Table 5b.

Supplementary Table 5b. OLS regressions to re-assess the effect of OT (oxytocin) and MSC (minimal social contact) on investment decisions (as specified in Equation 1 of Manuscript) only for those participants who experienced no, or negligible, spray discomfort (score 1 or 2 on the 5-point self-report scale, where 1 = no discomfort at all, 2 = negligible discomfort, 3 = some discomfort, 4 = much discomfort, 5 = painful). This leaves N = 640. The coefficients and p-values are not substantially different from those reported in Table 1 and Table 2 of the main manuscript.

	All participants with scores < 3 N = 640		High trustors with scores < 3 N = 304		Low trustors with scores < 3 N = 336	
	β (95% CI)	P	β (95% CI)	p	β (95% CI)	P
OT	0.600 (-0.215, 1.414)	0.149	-0.272 -1.363, 0.818)	0.623	1.377 (0.142, 2.613)	0.029
MSC	0.802 (-0.027, 1.632)	0.058	0.376 (-0.714, 1.466)	0.498	1.218 (-0.061, 2.497)	0.062
OT*MSC	-0.833 (-2.004, 0.337)	0.162	0.320 (-1.236, 1.877)	0.686	-1.950 (-3.737, -0.165)	0.032
GenTrust_z	1.200 (0.904, 1.494)	<0.001				
Risk_z	-0.005 (-0.303, 0.293)	0.973	0.253 (-0.170, 0.676)	0.241	-0.156 (-0.589, 076)	0.477
Constant	8.287 (7.705, 8.868)	<0.001	9.635 (8.884, 10.386)	<0.001	7.044 (6.136, 7.952)	<0.001
R-squared	0.097		0.011		0.019	

Supplementary Table 6. OLS regression showing that the effect of oxytocin (OT) and minimal social contact (MSC) on investment decisions does not depend on socializing traits. These traits are assessed prior to the experiment with the 10 item AQ scale[6] (assessing the autism spectrum quotient) and the 4 item sociability dimension (SOC) of the HEXACO scale[7]. The _z indicate that the scores are standardized to have mean=0 and s.d.= 1. N = 677. 95% confidence intervals of the regression coefficients are given in parentheses.

	Controlling for autism spectrum		Controlling for sociability	
	B (95% CI)	p	β (95% CI)	P
OT	0.532 (-0.259, 1.322)	0.187	0.528 (-0.261, 1.317)	0.189
MSC	0.741 (-0.063, 1.546)	0.071	0.684 (-0.116, 1.485)	0.094
OT*MSC	-0.690 (-1.829, 0.450)	0.235	-0.628 (-1.764, 0.509)	0.278
GenTrust_z	1.218 (0.932, 1.504)	< 0.001	1.207 (0.919, 1.494)	<0.0001
Risk_z	0.078 (-0.215, 0.370)	0.601	0.031 (-0.261, 0.322)	0.836
AQ_z	0.455 (-0.092, 1.002)	0.103		
OT*AQ	-0.314 (-1.829, 0.450)	0.418		
MSC*AQ	-0.269 (-1.075, 0.537)	0.513		
OT*MSC*AQ	0.251 -0.900, 1.402)	0.669		
SOC			0.243 (-0.344, 0.831)	0.416
OT*SOC			-0.203 (-0.993, 0.587)	0.614
MSC*SOC			-0.754 (-1.567, 0.058)	0.069
OT*MSC*SOC			0.981 (-0.158, 2.121)	0.091
Constant	8.314 (7.758, 8.870)	< 0.001	8.329 (7.773, 8.884)	<0.001
R-squared	0.092		0.106	

Supplementary Table 7a. Exploratory analysis (OLS regressions) of behavioral trust (investments) for individuals with a low disposition to trust and individuals with a high disposition to trust. Both models repeat the analyses reported in Table 2 of the main text, but the 29 participants who are exactly at the median disposition to trust are here excluded.

OT = oxytocin, MSC = minimum social contact. The constant measures the mean investment in the placebo/No contact condition (which is the omitted category). 95% confidence intervals of the regression coefficients are given in parentheses.

	Model 2 High disposition to trust (N = 316)		Model 3 Low disposition to trust (N = 332)	
	β (95% CI)	p	β (95% CI)	P
Oxytocin (OT)	-0.447 (-1.515, 0.621)	0.411	1.312 (-0.680, 2.556)	0.039
Minimal social contact (MSC)	0.256 (-0.809, 1.321)	0.636	1.1240 (-0.043, 2.522)	0.058
OT*MSC	0.524 (-0.995, 2.044)	0.498	-2.012 (-3.815, 0.209)	0.029
Risk attitude (z-scored)	0.259 (-0.157, 0.676)	0.221	-0.085 (-0.509, 0.340)	0.695
Constant	9.712 (8.984, 10.452)	< 0.001	7.041 (6.146, 7.937)	< 0.001
R-squared	0.012		0.017	

Supplementary Table 7b. Exploratory analysis (OLS regressions) of behavioral trust (investments) for individuals with a low disposition to trust and individuals with a high disposition to trust. Both models repeat the analyses reported in Table 2 of the main text, but the 29 participants who are exactly at the median disposition to trust are here moved to the category of high dispositional trustors

OT = oxytocin, MSC = minimum social contact. The constant measures the mean investment in the placebo/No contact condition (which is the omitted category). 95% confidence intervals of the regression coefficients are given in parentheses.

	Model 2 High disposition to trust (N = 345)		Model 3 Low disposition to trust (N = 332)	
	β (95% CI)	p	β (95% CI)	P
Oxytocin (OT)	-0.231 (-1.263, 0.802)	0.661	1.312 (-0.680, 2.556)	0.039
Minimal social contact (MSC)	0.226 (-0.809, 1.262)	0.667	1.240 (-0.043, 2.522)	0.058
OT*MSC	0.543 (-0.936, 2.022)	0.471	-2.012 (-3.815, -0.209)	0.029
Risk attitude (z-scored)	0.279 (-0.122, 0.680)	0.172	-0.085 (-0.509, 0.340)	0.695
Constant	9.526 (8.816, 10.235)	< 0.001	7.041 (6.146, 7.937)	< 0.001
R-squared	0.012		0.017	

Supplementary Table 8a. Exploratory analysis (OLS regressions) testing the effect of oxytocin (OT) and minimal social contact (MSC) on investment decisions for individuals with a risk score below the median value (N = 392). 95% confidence intervals of the regression coefficients are given in parentheses.

	Low risk score	
	β (95% CI)	p
Oxytocin (OT)	0.840 (-0.253, 1.932)	0.132
Minimal social contact (MSC)	1.753 (0.653, 2.853)	0.002
OT*MSC	-2.056 (-3.624, -0.489)	0.010
Constant	7.820 (-3.623, -0.486)	0.001
R-squared	0.026	

Supplementary Table 8b. Exploratory analysis (OLS regressions) testing the effect of oxytocin (OT) and minimal social contact (MSC) on investment decisions for individuals with a proself value orientation (N = 350). 95% confidence intervals are given in parentheses.

	Proself SVO	
	β (95% CI)	p
Oxytocin (OT)	0.696 (-0.533, 1.925)	0.266
Minimal social contact (MSC)	1.210 (-0.060, 2.480)	0.062
OT*MSC	-0.894 (-2.680, 0.891)	0.325
Constant	7.258 (6.413, 8.102)	0.001
R-squared	0.012	

Supplementary Table 9. A priori sample size computation using the G*Power 3.1.9.2 28 software[8]

t-tests: Difference between two independent means (two groups)		
Analysis	A priori: compute required sample size	
Input	Tail(s)	**One**
	Effect size d	**0.514**
	α error prob	**0.05**
	Power (1-β error prob)	**0.95**
	Allocation ration N2/N1	**1**
Output	Noncentrality parameter δ	**3.311**
	Critical t	**1.654**
	DF	**164**
	Sample size group 1	**83**
	Sample size group 2	**83**
	Total sample size	**166**
	Actual power	**0.951**

Supplementary Table 10. Simonsohn's small telescopes approach[9] to assess the adequacy of the sample size of a replication study. This method assesses whether the replication study has 80% power to detect an effect size the original study had 33% power to detect.

t-tests: Difference between two independent means (two groups)		
Analysis – Step 1	Compute required effect size for the Kosfeld et al.[3] study with 33 % power	
Input	Tail(s)	One
	α error prob	0.05
	Power (1-β error prob)	0.33
	Sample size group 1	29
	Sample size group 2	29
Output	Noncentrality parameter δ	1.220
	Critical t	1.672
	DF	56
	Effect size d	0.320
Analysis – Step 2	Compute required sample size using d = 0.32	
Input	Tail(s)	One
	Effect size d	0.320
	α error prob	0.05
	Power (1-β error prob)	0.80
	Allocation ration N2/N1	1
Output	Noncentrality parameter	2.502
	Critical t	1.651
	Sample size group 1	122
	Sample size group 2	122
	Total sample size	244
	Actual Power	0.802

Supplementary Table 11 OLS regressions of investment decisions in the trust game (behavioral trust) testing the effects of oxytocin (OT), the minimal social contact (MSC) condition and their interaction. These regressions are similar to Table 1 reported in the main text, but they exclude the data from all participants who indicated in the pre-experimental questionnaire that they had surgery on the nose, or scored above score 10 (out of 20) on the NOSE questionnaire, a scale that measures chronic nasal obstruction. (N = 564). Model 0 contains only the treatment dummy variables (OT, MSC) and their interaction. The constant measures the mean investment in the placebo/no contact condition (which is the omitted category). Model 1 controls, in addition, for participants' general disposition to trust their partner and risk attitude. High scores indicate a stronger disposition to trust and a higher willingness to accept risks. Coefficients for these variables are standardized to have a mean of zero and a standard deviation equal to one. 95% confidence intervals given in parentheses.

	Model 0		Model 1	
	β (95% CI)	P	β (95% CI)	P
Oxytocin (OT) (β_1)	0.511 (-0.380, 1.402)	0.260	0.568 (-0.288, 1.424)	0.193
Minimal social contact (MSC) (β_2)	0.816 (-0.086, 1.717)	0.076	0.852 (-0.015, 1.718)	0.054
OT*MSC (β_3)	-0.798 (-2.081, 0.484)	0.222	-0.864 (-2.096, 0.369)	0.169
General dis-position to trust (z-scored)			1.102 (0.792, 1.412)	< 0.001
Risk attitude (z-scored)			0.040 (-0.350, 0.271)	0.801
Constant (β_0)	8.441 (7.809, 9.073)	< 0.001	8.411 (7.804, 9.018)	< 0.001
R-squared	0.006		0.086	

Supplementary Table 12 OLS regressions of investments in the trust game (behavioral trust) testing the effect of oxytocin (OT), the minimal social contact (MSC) condition and their interaction. These regressions are similar to Table 1, model 0, reported in the main text, but they include the data from two participants we had excluded because they did not fill in the pre-experimental questionnaire. (N = 679). 95% confidence intervals are given in parentheses.

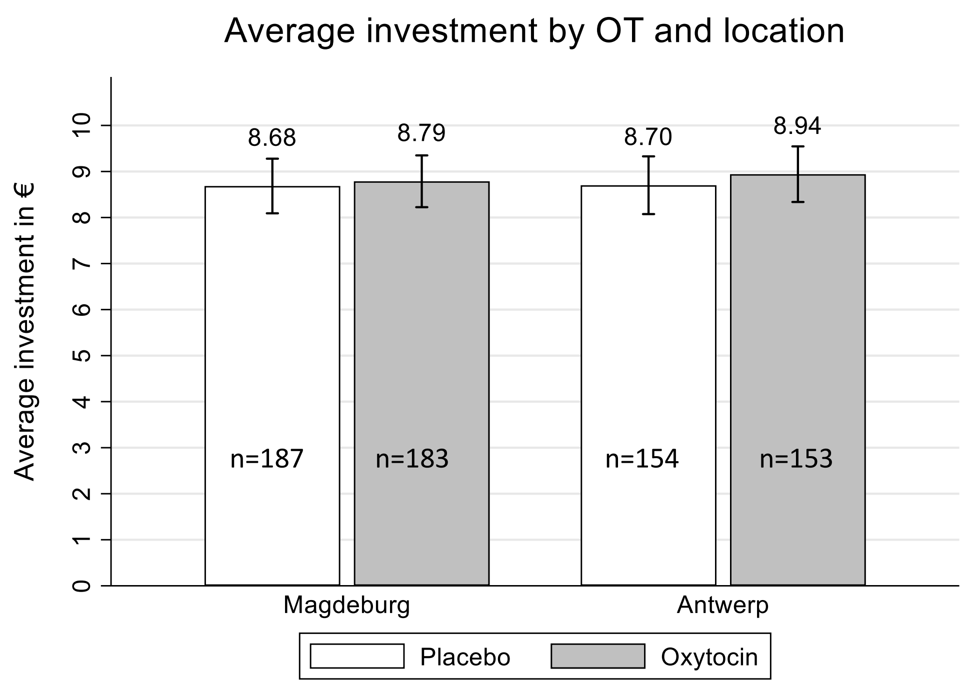
	Model 0	
	β (95% CI)	P
Oxytocin (OT) (β_1)	0.480 (-0.357, 1.293)	0.266
Minimal social contact (MSC) (β_2)	0.731 (-0.105, 1.568)	0.087
OT*MSC (β_3)	-0.670 (-1.859, 0.519)	0.269
Constant (β_0)	8.360 (7.779, 8.940)	< 0.001
R-squared	0.0047	

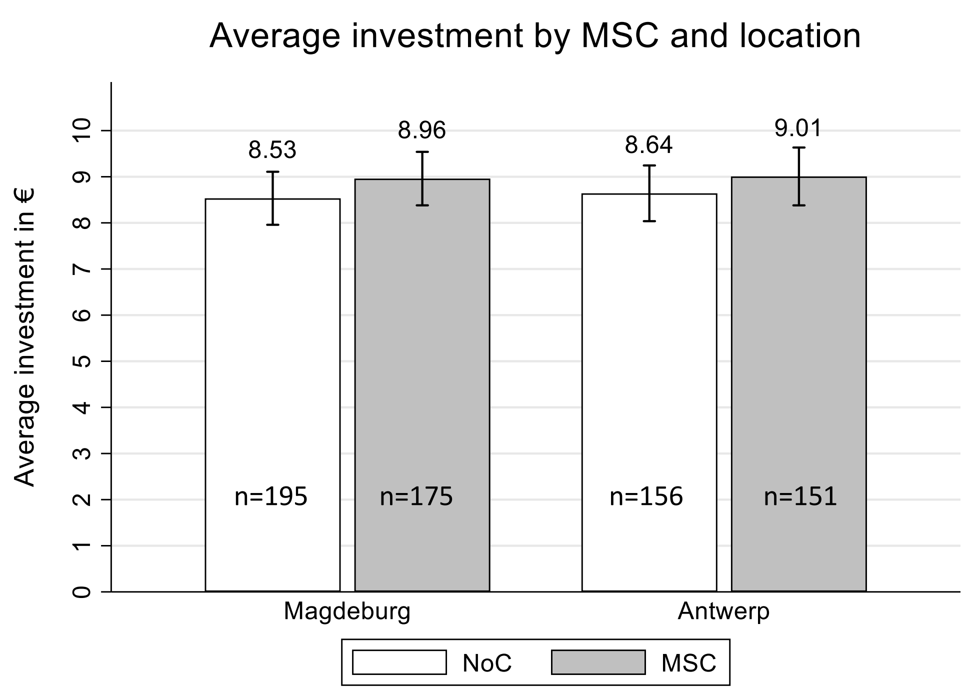
Supplementary Table 13. Guidelines for OT administration, based on recommendations by Guastella et al., 2013[10].

1	If necessary, clear your nose from any obstruction (box of tissues provided).
2	Prime the bottle and complete a test spray in the air.
3	Sit comfortably and keep the head in an upright position.
4	Close one nostril with one finger while administering the spray to the other nostril.
5	Insert bottle 1 cm into the nostril and keep the tip of the bottle at a 45 degree angle into the nose. Aim towards the upper lateral part of the nose (and not towards the middle of the nose).
6	Upon delivery, inhale and breathe in lightly. Do not sniff exaggeratedly.
7	Alternate administrations between nostrils. Allow time between each re-administration to the same nostril of at least 15 seconds.

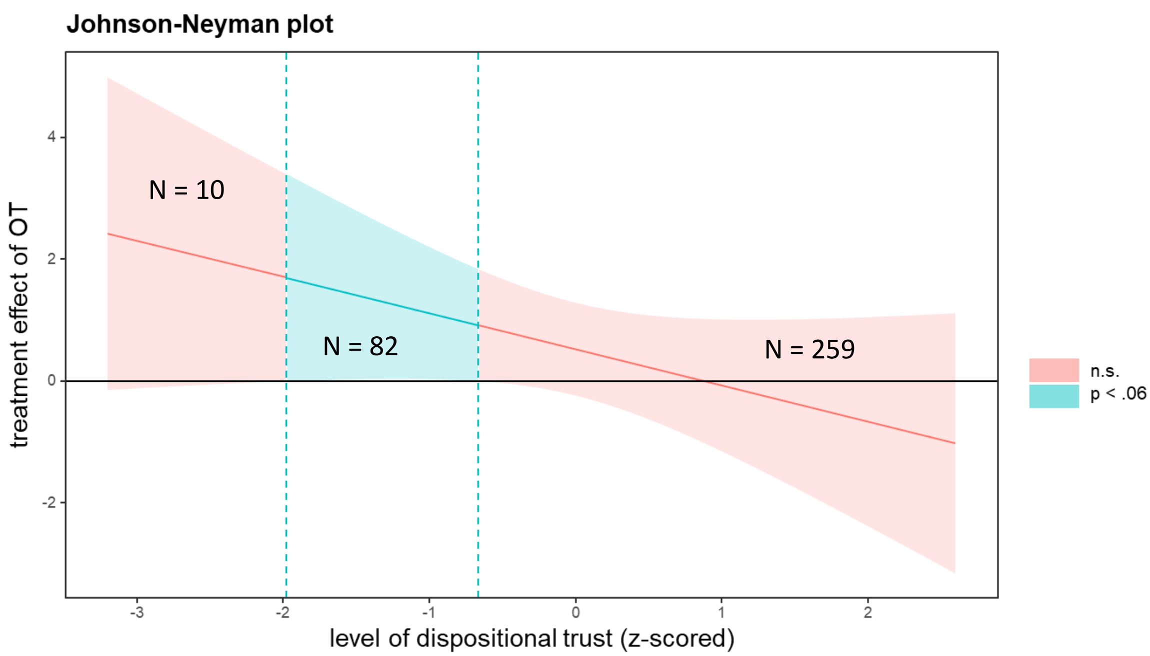
Supplementary Figure 1: Mean investments in the trust game by location.

OT = Oxytocin; P = Placebo; MSC = minimal social contact; NoC = no contact; sample size for each condition printed inside columns. Error bars represent standard error for the mean.

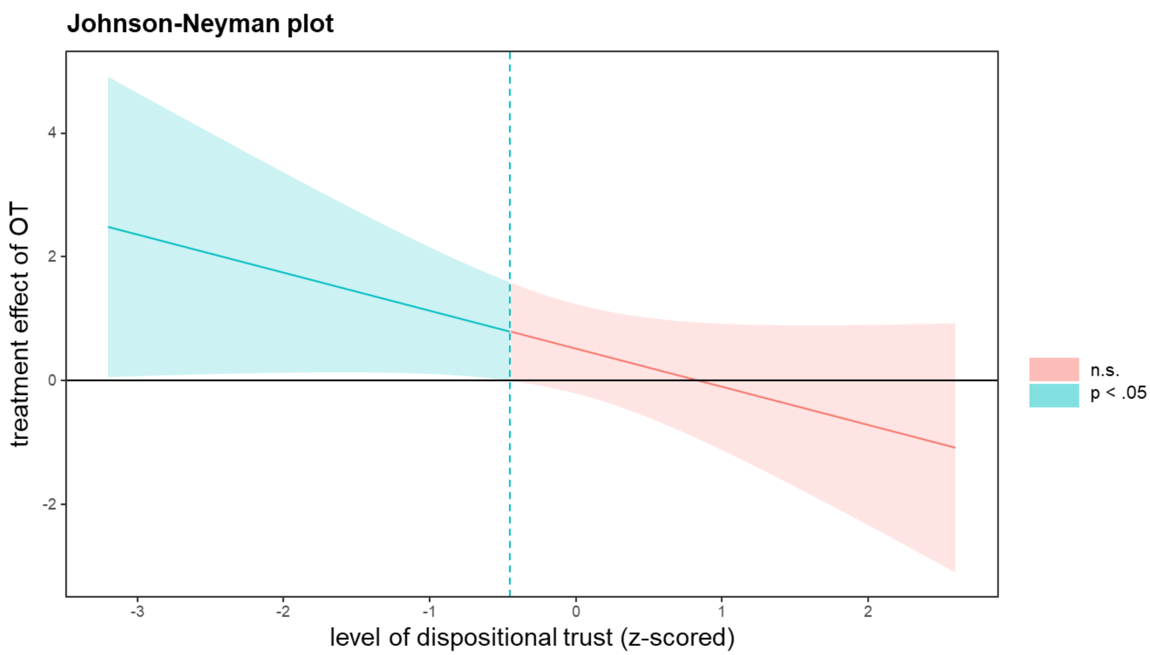




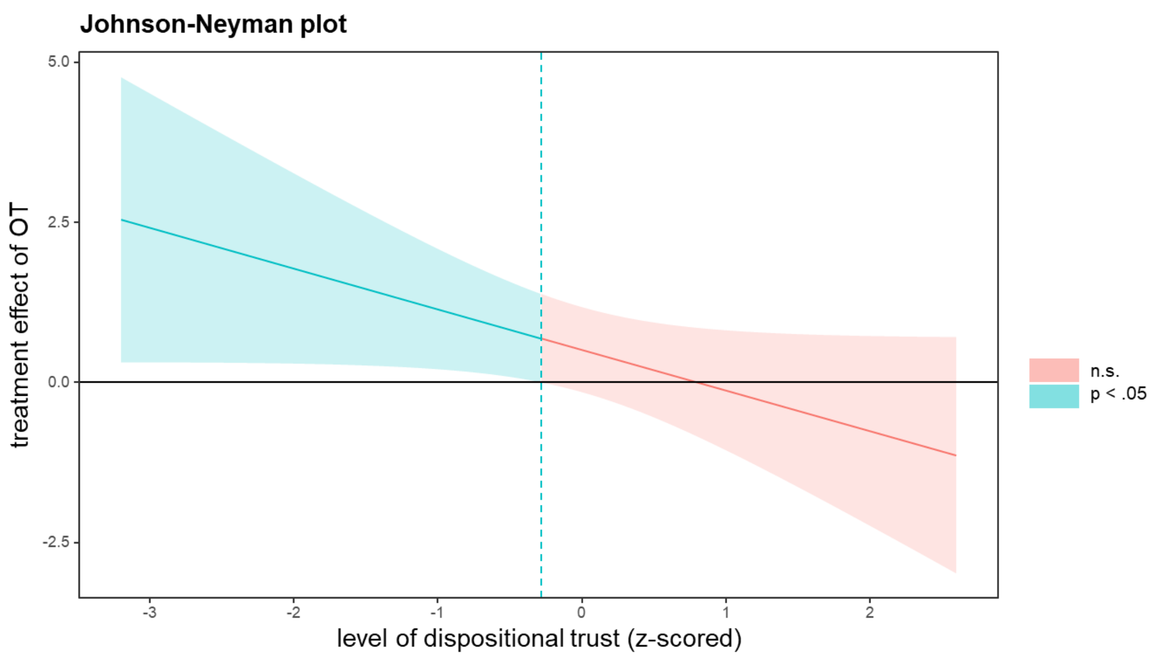
Supplementary Figure 2a: The dependence of the investment effect of OT on individuals' dispositional trust levels in the no contact condition (N = 351). The figure is based on the Johnson-Neyman method of computing a treatment effect. The figure shows the OT-effect for the different levels of dispositional trust (negatively sloped straight line) together with the associated confidence intervals. The overall range of the observed standardized (z-scored) dispositional trust levels in the No Contact condition is (-3.16, 2.60). The median value is 0.15. When the standardized dispositional trust score is in the interval (-1.98, -0.66), the treatment effect of OT is significant at $p < 0.06$. For dispositional trust levels below –1.98 the OT effect is higher but due to the small number of observations (N = 10) the confidence interval slightly intersects with the zero line.



Supplementary Figure 2b: The dependence of the investment effect of OT on individuals' dispositional trust levels in the no contact condition under the assumption of 10% more observations. The figure is based on the Johnson-Neyman method of computing a treatment effect but instead of N = 351 we assume 10% more (similar) observations. We ordered the participants according to their level of dispositional trust for the placebo and the treatment group separately. Then we divided both ordered samples into intervals containing 10 participants per interval. Then we added 1 subject per interval with the mean value of dispositional trust and investments in this interval and calculated the Johnson-Neyman statistics. The figure thus illustrates what would happen in terms of the Johnson-Neymann statistic if a sample contains 10 % more observations that are similar to the observations in our sample.



Supplementary Figure 2c: The dependence of the investment effect of OT on individuals' dispositional trust levels in the no contact condition under the assumption of 20% more observations. The figure is based on the Johnson-Neyman method of computing a treatment effect but instead of N = 351 we assume 10% more (similar) observations. We ordered the participants according to their level of dispositional trust for the placebo and the teatment group separately. Then we divided both ordered samples into intervals containing 10 participants per interval. Then we added 2 subjects per interval with the mean value of dispositional trust and investments in this interval and calculated the Johnson-Neyman statistics. The figure thus illustrates what would happen in terms of the Johnson-Neymann statistic if a sample contains 20 % more observations that are similar to the observations in our sample.



Supplementary Figure 3. Technical details of finger sprayer used to deliver OT/placebo. Figure reproduced with permission from Pharma-pack, Wilrijk (Belgium) and Pack Teck, Herlev (Denmark).

PTY-29,1

Finger-Sprayer

TECHNICAL DRAWING AND MATERIAL SPECIFICATION

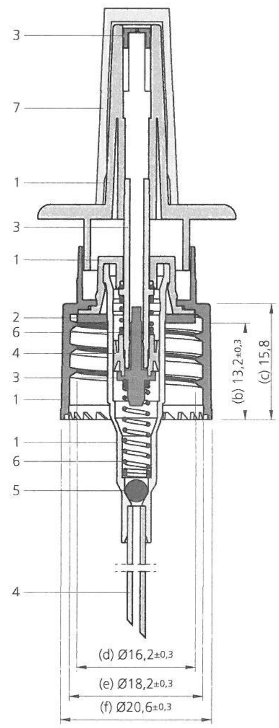
Rev : 03 • Date : 03rd of February 2016

1: Polypropylene (PP)
2: Polyethylene (PE)
3. Polyoxymethylene (POM)
4: Low-density polyethylene (LDPE)
5: Glass
6: Stainless Steel (SUS304)
7: Polystyrene (PS)

Dosage: 0,12 ml. ± 0,01 ml.

Closure: 18 mm. (18/410)

All dimensions are in mm.



18/405	18/410	18/415
a=p=3,175	a= —	a=p=3,175
b= —	b=13,2±0,3	b=15,2
c=12,9	c= 15,8	c= 17,2
d= —	d=Ø 16,2±0,3	d=Ø 16,1±0,2
e=Ø 18,2 ±0,2	e=Ø 18,2 ±0,3	e=Ø 18,2 ±0,2
f =Ø 20,9 ±0,2	f = Ø 20,6 ±0,3	f =Ø 20,6 ±0,2

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