Supplementary Information

Saliva-based assay for Toxoplasma gondii

We used an indirect competition immunoenzymatic ELISA to detect anti-*Toxoplasma gondii* IgG antibodies following a modified version of the methods outlined by Voller et al. [1]. We obtained optimum dilutions of antigen and saliva samples using the checkerboard titration method, which were adjusted to room temperature prior to beginning ELISA. Each well of a Corning™ clear polystyrene 96-well microplate (Fisher 07-200-642) was coated overnight at 4 degrees C with *T. gondii* antigen (Meridian Life Science EV8131) vortexed with carbonate buffer (Fisher Scientific PI-28382) at a 1:50 ratio. After washing each well three times with phosphate-buffered saline Tween (PBS-T; Fisher 50-674-79) and rocking at 24 rpm on a plate rocker (Fisher Scientific 05-450-213) for three minutes, plates were blocked with 300 µl of 2% bovine serum albumin and incubated at 37 degrees C for one hour. The washing and rocking was repeated three times for each plate. Undiluted saliva from each subject was added to two wells (100 µl per well) alongside five positive manufactured sera controls (Accurun® 135; 1:100), five positive saliva controls, and five negative saliva controls. Plates were incubated for one hour at 37 degrees C.

After one hour, plates were washed in PBS-T and rocked (three times) before adding 200 µl (1:50000) of horseradish peroxidase-labelled antihuman IgG (Jackson ImmunoResearch Laboratories™, INC 109-035-098) was added to each well. After another one hour incubation, plates were again washed in PBS-T and rocked three times before the addition of 200 µl of Tetramethylbenzidine (TMB) membrane peroxidase substrate (Rockland™ TMBM-100) to each well. Plates were kept at room temperature for 15 minutes and the reaction was stopped using 50 µl of 1 mol/L sulfuric acid. Plates were then read within 5 minutes after adding stop solution using an automated ELISA reader (Biotech Synergy HT) at 450 nm to measure optical density. Serum positive and negative saliva controls were verified using a quantitative indirect competitive immunoenzymatic assay (Immuno-Biological Laboratory; Hamburg, Germany) and through a reference laboratory (Quest Diagnostics™) using a sandwich competitive ELISA.

We explored two different methods for classifying ELISA samples as positive or negative for *T. gondii* exposure. The first involved classifying any samples as positive if both of the duplicate optical density (OD) values were at least two standard deviations greater than the average of the five known-negative saliva samples run on the corresponding plate. Thus, we calculated the average OD of the five negative samples within a given plate, added two standard deviations, and treated this value as the threshold above which any OD readings from unknown samples were classified as positive. This process was repeated for each plate, and we tested its efficacy by using it to classify the known positive and negative samples included on each plate (n=5 of each). Sensitivity is the true positive classification rate (number of samples correctly classified as positive divided by the sum of samples correctly classified as positive or incorrectly classified as negative); specificity is the number of correctly classified negative samples divided by the sum of the number of true negatives and false positives [2]. The false positive rate is thus 1 – specificity.

For the second approach, we used Receiver Operating Characteristics (ROC) curves to iteratively optimize the tradeoff between sensitivity and specificity across all samples [3]. This method required that we combine data from different plates; because optical density values can vary among plates, we corrected each OD reading by subtracting the average blank value (i.e., the mean OD reading of five empty or "blank" wells run on each plate). We then used the 387 control samples (201 known positive samples and 186 known negative samples) to construct an

ROC curve; the area under the curve represents accuracy, for which values greater than 0.9 are considered ‘excellent’. From this curve we selected the optimal cutoff value of the blank-corrected OD score to use as a threshold for differentiating negative samples (below this threshold) and positive samples (above this threshold). Analyses were implemented using the package ROCR [4] in the R computing environment [5].

Using the 2SD classification method, 195 of 201 known positive samples (97% sensitivity) and 186 of 186 known negative samples (100% specificity) were classified correctly. Based on the ROC curve combining across plates (after correcting for among-plate variation using average blank values), 191 of 201 known positive (95% sensitivity) and 179 of 186 known negative samples (96.2% specificity) were classified correctly. While both of these classification approaches were therefore highly sensitive and specific, we used to the 2SD method owing to its higher accuracy.

Description of GEM variables and national T. gondii seroprevalence

In each of the three resulting models, our independent variable was the prevalence of *T. gondii* in a given country (the proportion of people who tested positive for *T. gondii* exposure) – indicated by published seroprevalence data. Our data on infection prevalence were based on four major studies examining *T. gondii* across countries [6–9] and complemented by additional studies in individual countries [10–14], which included more than 100 surveys of *T. gondii* from more than 60 countries all conducted after 1990 [see 6 for a summary of the data and assembly methods]. These surveys focus on women tested in association with potential pregnancy. When more than one study was available per country, results were averaged. Because prevalence results may vary by age group, with more opportunities for exposure among older subjects, we used age-adjusted results standardized to an age of 22 years old [6, 8].

The Global Entrepreneurship Monitor (GEM) is based on two parts: (1) the Adult Population Survey (APS), which tracks the entrepreneurial attitudes, activity and aspirations of individuals in each surveyed country, and (2) the National Expert Survey (NES), which surveys experts in each country to create measurements of country conditions (the Entrepreneurial Framework Conditions) believed to have a significant impact on national entrepreneurship activities and attitudes towards entrepreneurship.

Response variables: The first dependent variable used in this analysis was the GEM *Futsupno* variable: “Proportion of the 18-64-year-old population (individuals involved in any stage of entrepreneurial activity excluded) who intend to start a business within three years”. We treated this variable as indicative of entrepreneurial intentions. The second dependent variable was *teayy*, which is “the proportion of people (18-64 years old) currently engaged in entrepreneurial activity (people who started a business or are owner/managers of a business). The final dependent variable was the GEM *Frfailop* variable: the “Proportion of the 18-64-year-old population with positive perceived opportunities who indicate that fear of failure would prevent them from setting up a business.”

Overlaying available GEM and *T. gondii* sources yielded a database for 42 countries (Argentina, Australia, Austria, Belgium, Brazil, China, Colombia, Croatia, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, India, Indonesia, Ireland, Israel, Italy, Jamaica, Japan, Jordan, Malaysia, Mexico, Netherlands, New Zealand, Norway, Peru, Poland, Portugal, Romania, Singapore, Slovenia, Spain, Sweden, Switzerland, Taiwan, Thailand, Turkey, the United Kingdom, and the United States).

Control variables: The GEM survey contains a variety of questions to investigate people's entrepreneurial intent and their general attitude towards entrepreneurship. The proportion of people who plan to start a new business actually start a new business or are inhibited from doing so by fear of failure, in part, will depend on how people in a country perceive the opportunities in their environment as well as their overall attitudes toward entrepreneurship. Our control variables to test the link between infection prevalence and entrepreneurial intentions or fear of failure, therefore, derived from the GEM survey section about entrepreneurial attitudes and opportunity perception. In each country surveyed by GEM, a set of questions is asked to evaluate the general attitude of people towards entrepreneurship. These constitute the following GEM items: *Nbgoodyy*, or the proportion of the population 18-64 years in age who agree with the statement that, in their country, most people consider starting a business as a desirable career choice; *Nbstatyy*, the proportion of the 18-64 year-old population who agree with the statement that, in their country, successful entrepreneurs receive high status; *Knoentyy,* the proportion of the 18-64 yr-old population who personally know someone who started a business in the past two years; *Nbmediyy,* the proportion of the 18-64 year-old population who agree with the statement that, in their country, you often see stories in the public media about successful new businesses; *Suskilyy*, the proportion of the 18-64 year-old population who believe to have the required skills and knowledge to start a business; and *Opportyy*, the proportion of the 18-64 year-old population who see good opportunities to start a firm in the area where they live.

In addition to these perceptions and attitude towards entrepreneurial activity, we also controlled for the general motivation underlying entrepreneurial activity. GEM assesses the percentage of entrepreneurs in a given country that started a business because they saw an opportunity to improve their income instead of starting it out of economic necessity. Even when the general attitudes towards entrepreneurship are not favorable in a given country, if the entrepreneurial activity is driven by individual necessity, it is not a choice. We therefore also controlled for the percentage of those involved in entrepreneurial activities who did so not because they saw a general opportunity for improvement but because they had no other option for work.

Finally, we accounted for a country's conditions for entrepreneurship. The rate of entrepreneurial activity in a country as well as the desire of people to start businesses also depends on many institutional and economic aspects beyond personal attitudes. GEM operationalizes these factors by developing a set of Entrepreneurial Framework Conditions (EFCs) for each country. The EFCs are based on expert surveys GEM conducts in each country of interest. They capture a variety of items: *(1) Entrepreneurial Finance*: the availability of financial resources-equity and debt-for small and medium enterprises (SMEs) (including grants and subsidies). *(2) Government Policy:* the extent to which public policies give support to entrepreneurship. This EFC has two components: entrepreneurship as a relevant economic issue, and taxes or regulations that are either size-neutral or encourage new and SMEs. *(3) Government Entrepreneurship Programs:* the presence and quality of programs directly assisting SMEs at all levels of government (national, regional, municipal). *(4) Entrepreneurship Education:* the extent to which training in creating or managing SMEs is incorporated within the education and training system at all levels. This EFC also has two components: entrepreneurship education at basic school (primary and secondary) and entrepreneurship education at post-secondary levels (higher education such as vocational, college, business schools, etc.). *(5) R&D Transfer:* the extent to which national research and development will lead to new commercial opportunities and is available to SMEs. *(6) Commercial and Legal Infrastructure:* the presence of property rights, commercial, accounting and other legal and assessment services and institutions that support or promote SMEs. *(7) Entry Regulation:* contains two components, market dynamics: the level of change in markets from year to year, and market openness: the extent to which new firms are free to enter existing markets. *(8) Physical Infrastructure:* ease of access to physical resources, including communication, utilities, transportation, land or space, at a price that does not discriminate against SMEs. *(9) Cultural and Social Norms:* the extent to which social and cultural norms encourage or allow actions leading to new business methods or activities that can potentially increase personal wealth and income.

Supplemental statistical tests

To examine the stability of obtained results, we followed recent suggestions [15,16] to run additional regressions testing *T. gondii* as a predictor without the selected control variables. These supplemental models provide an additional indication of the stability of *T. gondii* parameter estimates and significance (see Tables S3, S4).

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Table S1. Descriptive statistics and correlations for the study of university students. [1]Sex is coded as 0=male, 1= female. Only students 18 years or older were included in the analysis (*n*=1,293). [2]Business major is coded as 0=non-business major, 1=business major. [3]Among business majors, students identifying within the management and entrepreneurship emphasis were coded as 0=non-management and entrepreneurship emphasis, 1=management and entrepreneurship emphasis (*n*=274). [4]*Toxoplasma gondii* infection status is coded as 0=non-seropositive, 1=seropositive. The significance of the Pearson *r* correlation estimates is indicated with asterisks (*P < 0.05, **P < 0.01, ***P < 0.001).

	Mean	*SD*	1	2	3	4	5
1. Sex[1]	0.55	0.5	--				
2. Age	20	2.8	-0.08**	--			
3. GPA	3.3	0.42	0.11***	0.035	--		
4. Business major[2]	0.37	0.48	-0.16***	-0.042	-0.02	--	
5. “Management and entrepreneurship” emphasis[3]	0.21	0.41	0.033	-0.078	-0.13*	--	
6. *T. gondii* infection status[4]	0.25	0.43	-0.047	-0.019	0.018	0.10***	0.108

Table S2. *Toxoplasma gondii* seroprevalence by country (%) age-adjusted to 22 years old. Data from Maseland [6].

Argentina	46.2	Japan	12.3
Australia	23.0	Jordan	37.4
Austria	35.3	Malaysia	38.5
Belgium	38.6	Mexico	26.3
Brazil	60.4	Netherlands	29.9
China	16.5	New Zealand	27.2
Colombia	48.6	Norway	8.6
Croatia	34.2	Peru	32.9
Czech Republic	27.2	Poland	36.3
Denmark	21.7	Portugal	17.0
Finland	16.2	Romania	57.6
France	44.1	Singapore	12.8
Germany	41.9	Slovenia	29.9
Greece	23.4	Spain	23.4
Hungary	56.1	Sweden	13.0
India	30.0	Switzerland	26.8
Indonesia	53.5	Taiwan	26.0
Ireland	21.6	Thailand	11.0
Israel	16.7	Turkey	42.6
Italy	21.7	UK	8.7
Jamaica	52.1	USA	15.9

Table S3. Parameter estimates and standard errors of linear models to test the influence of a country's *T. gondii* seroprevalence on patterns of entrepreneurial intent and fear of failure, as determined from the GEM database. Presented is the model including standard control variables only (1a and 2a), a model with control variables and *T. gondii* infection (1b and 2b), and a model with *T. gondii* only (1c and 2c). Model coefficients are listed in the table with the standard error in parentheses. The significance of the coefficient estimate is indicated with asterisks (*P<0.05, **P<0.001, ***P<0.0001).

	Entrepreneurial intent			Fear of failure inhibits		
	Model 1a, controls only	Model 1b controls & *T. gondii*	Model 1c *T. gondii* only	Model 2a, controls only	Model 2b controls & *T. gondii*	Model 2c *T. gondii* only
T. gondii prevalence		1.16* (0.49)	2.49*** (0.30)		-0.74* (0.35)	-0.71** (0.24)
Prop. of pop. that perceives: Ent. is a desirable career choice	2.90*** (0.75)	3.22*** (0.78)		0.54 (0.43)	0.42 (0.44)	
Proportion of population that perceives: Successful entrepreneurs have high status	0.50 (0.75)	0.07 (0.77)		-0.76 (0.47)	-0.46 (0.49)	
Proportion of population that personally knows an entrepreneur	2.01** (0.73)	2.14** (0.74)		0.38 (0.48)	0.44 (0.48)	
Proportion of population that perceives: The media covers entrepreneurship	0.78 (0.52)	0.92 (0.52)		0.22 (0.33)	0.08 (0.33)	
Prop. of population that perceives: I have the right capabilities to start a business	0 (0.73)	-0.25 (0.74)		-1.63** (0.55)	-1.6** (0.55)	
Prop. of pop. that perceives: There exists good opportunities in their environment	-0.08 (0.71)	-0.15 (0.71)		0.20 (0.46)	0.24 (0.47)	
Proportion of entrepreneurial activity undertaken because no other choice	1.67** (0.51)	1.21* (0.55)		0.21 (0.37)	0.51 (0.4)	
Entrepreneurial Finance	-0.17 (0.23)	-0.2 (0.23)		0.14 (0.15)	0.17 (0.15)	
Government Policy: Entrepreneurship as a relevant economic issue	0.64* (0.25)	0.82** (0.26)		0.11 (0.15)	0.01 (0.16)	
Government Policy: Taxes or regulations encourage new firms	-0.58* (0.24)	-0.57* (0.24)		0.28 (0.15)	0.28 (0.15)	
Government Entrepreneurship Programs	-0.12 (0.33)	-0.36 (0.35)		-0.05 (0.19)	0.04 (0.19)	
Entrepreneurship Education at basic school (primary and secondary)	0.09 (0.31)	0.22 (0.32)		-0.63*** (0.17)	-0.68*** (0.18)	
Entrepreneurship Education at post-secondary levels	0.93*** (0.28)	0.7* (0.29)		-0.15 (0.17)	0.01 (0.19)	
R&D Transfer	-0.44 (0.44)	-0.13 (0.46)		-0.43 (0.26)	-0.6* (0.27)	
Commercial and Legal Infrastructure	-0.25 (0.27)	-0.3 (0.26)		0.51** (0.18)	0.51** (0.18)	
Entry Regulation: Market Dynamics	0.1 (0.16)	-0.05 (0.17)		-0.05 (0.09)	0.02 (0.1)	
Entry Regulation: Market Openness	0.18 (0.34)	0.08 (0.34)		-0.28 (0.21)	-0.23 (0.21)	
Physical Infrastructure	0.3 (0.21)	0.29 (0.21)		-0.18 (0.14)	-0.16 (0.14)	
Cultural and Social Norms	0.65*** (0.16)	0.71*** (0.16)		0.39*** (0.1)	0.34** (0.11)	
Pseudo R^2	0.66	0.67	0.10	0.22	0.23	0.03

Table S4. Parameter estimates and standard errors of linear models to test the influence of a country's *T. gondii* seroprevalence on patterns of current entrepreneurial activity, as determined from the GEM database. Presented is the model including standard control variables only (3a), a model with control variables and *T. gondii* infection (3b), and a model with *T. gondii* only (3c). Model coefficients are listed in the table. Standard errors are in parentheses. The significance of the coefficient estimate is indicated with asterisks (* P<0.01, ** P<0.001, *** P<0.0001).

	Entrepreneurial activity		
	Model 3a, controls only	Model 3b controls & *T. gondii*	Model 3c *T. gondii* only
T. gondii prevalence		1.17* (0.59)	1.39*** (0.38)
Proportion of population that perceives: Entrepreneurship is a desirable career choice	1.71* (0.83)	1.98* (0.85)	
Proportion of population that perceives: Successful entrepreneurs have high status	-0.3 (0.85)	-0.64 (0.87)	
Proportion of population that personally knows an entrepreneur	1.11 (0.87)	1.25 (0.89)	
Proportion of population that perceives: The media covers entrepreneurship	1.56** (0.6)	1.68** (0.6)	
Proportion of population that perceives: I Have the right capabilities to start a business	2.88** (0.92)	2.66** (0.93)	
Proportion of population that perceives: There exists good opportunities in their environment	-1.97* (0.8)	-2.14** (0.81)	
Proportion of entrepreneurial activity undertaken because no other choice	-1.54* (0.62)	-1.96** (0.66)	
Entrepreneurial Finance	-0.39 (0.27)	-0.4 (0.27)	
Government Policy: Entrepreneurship as a relevant economic issue	0.31 (0.29)	0.45 (0.29)	
Government Policy: Taxes or regulations encourage new firms	0.12 (0.28)	0.16 (0.28)	
Government Entrepreneurship Programs	-0.15 (0.39)	-0.37 (0.41)	
Entrepreneurship Education at basic school (primary and secondary)	0.31 (0.34)	0.4 (0.35)	
Entrepreneurship Education at post-secondary levels	-0.11 (0.33)	-0.3 (0.34)	
R&D Transfer	-0.2 (0.52)	0.06 (0.54)	
Commercial and Legal Infrastructure	-0.13 (0.32)	-0.2 (0.32)	
Entry Regulation: Market Dynamics	-0.12 (0.18)	-0.27 (0.2)	
Entry Regulation: Market Openness	-0.1 (0.4)	-0.14 (0.4)	
Physical Infrastructure	0.04 (0.25)	0.04 (0.25)	
Cultural and Social Norms	0.54** (0.2)	0.58** (0.2)	
Pseudo R^2	0.44	0.45	0.04