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Exposure to Anger and Performance

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Exposure to Anger and Performance

Alberto Chong¹

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Abstract

I study the link between exposure to anger in others and one's performance. To my knowledge, there are no formal empirical studies that focus on how anger in others may be associated to one's performance. I exploit the US version of the nationally syndicated television cooking competition MasterChef and collect data on every instance in which judges objectively demonstrate anger to individual participants in each of the episodes in ten years, from 2010 to 2020, of this competition. Contestants exposed to anger from judges end up higher in the final rankings, increase their probability of success in cooking challenges, as well as their probability of reaching the top three and even winning the competition.

Keywords: exposure to anger, performance, competition, emotions

JEL Codes: D91, Z13, Z18

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Introduction

Anger is a complex emotion characterized by antagonism toward someone or something arising from frustration, real or imagined injury by another, or perceived injustice and where typical common visible characteristics include a scowling facial expression, raised voice, and verbal aggression including using harsh language, insults, or threats in communication (American Psychological Association, 2024; Kazdin, 2000). Several studies on anger have focused on the impact of one's anger on mental health and have shown that it is linked to headaches, insomnia, anxiety as well as major depressive disorders (e.g., Barrett, et al., 2013; Fava and Guidi, 2018). In addition, research has also focused on the link between anger and one's physical health and in particular, physical performance. In fact, anger can have a complex relationship with performance, and, depending on the specific context, researchers have shown that anger may increase or decrease performance.

On the one hand, anger is a high-arousal emotion that may lead to increased energy levels, which may be particularly important in situations where physical performance matters including sports, as it may boost endurance and strength temporarily (e.g., Weiner, 1985; Kelsey and Sweeney, 2011; Giles, et al., 2020). Similarly, being angry may help narrow one's focus, allowing the individual to better concentrate on tasks. This may be useful in competitive settings where distractions may otherwise hinder performance (e.g., Goleman, 1998; Chajut and Algom, 2003; Ruiz and Hanin, 2011; Lench, et al., 2023). In addition, being angry may serve as a motivation to overcome obstacles, engage more deeply with tasks, or strive for improvement in such a way that the desire to channel anger into productive outcomes may lead to increased effort and persistence (e.g., Van Dijk and Kluger, 2011). Also, anger in individuals may be viewed as an adaptive response, prompting people to act decisively, which may be useful in environments when quick and assertive action may be necessary (e.g., Van Kleef, 2009; Forgas, 1998). Finally, in team settings, a shared sense of anger towards a common opponent or challenge may enhance team cohesion and performance driving collective effort (Suls and Martin, 2005). On the other hand, several studies also show that one's anger may have detrimental effects on performance, as stress-related hormones may impair decision-making leading to actions that may disrupt concentration and goals (e.g., Beedie, et al., 2005; Woodman and Hardy, 2003). Being angry may increase one's willingness to take unnecessary risks and in some contexts, for instance, in competitive sports or business, may lead to mistakes and as a consequence, a decrease in performance (e.g., Lajunen and Parker, 2001; Weber and Chapman, 2005). In addition, experiencing anger may prompt individuals to address underlying issues or conflicts, leading to blur thinking and decision-making (e.g., Stone and Cooper, 2001). Similarly, anger may take away the focus from tasks and attention may wander, which may reduce on-task attention, and consequently impair performance (Yechiam, et al., 2016). Finally, being angry may paralyze the individual and negatively impact his or her decision making, which may reflect in a significant drop in performance (e.g., Bandura, 1977; Carver and Scheier, 1990).

Interestingly, whereas the vast majority of research on anger has focused on the impact and consequences of one's own anger on the individual's mental, social, and economic outcomes, more recent research has begun focusing on how anger in one individual may impact those who are directly exposed to it, in particular in relation to mental health. For instance, it has been shown that exposure to anger in others, especially from people in a position of power or seniority, may lead to

increased stress, anxiety, a diminished outlook in life, feelings of frustration or helplessness, erosion of self-esteem, loss of confidence, and depression (e.g., Totterdell, et al, 1998; Lerner et al., 2003; Zlatev, et al., 2014).

In this research, I offer the first empirical study that links exposure to anger in others and performance. I believe that this is a rather relevant question. Not only are people exposed to anger in frequent and countless situations, but many times these situations are ones of high-pressure requiring clarity of mind, high focus, and precision. Furthermore, frequent times these high-pressure situations may be compounded by the fact that the interactions among individuals may not be horizontal, and seniority and power may be involved. A typical example is the case of employees at the workplace facing a tight deadline with a supervisor facing pressure. Another example is the case of sports teams playing an important game and dealing with a not-too-happy coach. Yet other examples are medical doctors and nurses performing at an operating table, government officials facing large protests, protesters facing situations of political conflict, and many others. To my knowledge, there are no studies on exposure to anger in others, including those in more senior positions on one's physical performance. Based on the literature described above, being exposed to anger in others may provide a burst of energy and increase focus and determination, which may be translated into increased performance (e.g., Weiner, 1985; Giles, et al., 2020; Chajut and Algom, 2003). However, the opposite may also be true. Exposure to anger in others may cloud judgment, impair decision-making, and may end up decreasing performance (e.g., Beedie, et al., 2005; Woodman and Hardy, 2003; Carver and Scheier, 1990). In short, understanding whether the link between these two variables is positive or negative needs to be better understood in light of the conflicting theories and limited evidence.

To pursue my research, I take advantage of a well-known, nationally syndicated television show, "MasterChef", a high-pressure cooking competition reflected on the fact that the winner receives 250,000 US dollars as well as additional prizes. I use individual-level data from the US version between 2010 and 2020 and identify situations in which the judges display anger towards any of the contestants and empirically test whether there is a statistically significant link between anger exposure and placement in the competition when controlling for a host of individual and city characteristics. On average, I find that people who are exposed to anger appear to react positively to anger by improving their final placement in the competition likely as a result of increased focus and determination. In particular, I find that it is associated with contestants improving around 1.5 placement positions or higher in the final standings. I also find that the probability of winning the competition increases by around 2.2 percent. Finally, my results are empirically very robust.

Data and Methodology

The data employed come from the first ten seasons, from 2010 to 2020, of the US version of the cooking competition MasterChef. The mechanics of the competition are simple. The contestants face several cooking challenges, each being assessed by three judges who are world-class chefs and restaurateurs who rank the best and worst performers for each cooking challenge. The stakes of the competition are high, as the winner receives a monetary prize of one-quarter-of-a-million US dollars, a guaranteed recipe cookbook publication as well as access to world-renowned chefs.¹ This

¹ Please refer to: masterchef.fandom.com/wiki/MasterChef_Wiki

cooking competition is broadcast in weekly episodes. Challenge after challenge and episode after episode the judges proceed to eliminate one, and sometimes two contestants from the competition until in the final episode of each season they converge on a winner. In general, the number of contestants and episodes varies depending on the broadcast season. The average number of episodes during my period of study is 22 and the average number of contestants also varies from season to season although the number of contestants is typically around 18 to 20 per season. Overall, the total number of contestants during my study period is 197.

Whereas a fair amount of my data come from Chong and Chong (2023) and a MasterChef-related website (see footnote 1), my dataset was significantly enhanced and complemented with information that was manually collected directly from each episode broadcast during my period of study, including my key variable of interest, exposure to anger. In particular, I define this variable as the number of times that any of the contestants have been exposed to anger by any of the judges.

To collect information that captures this emotion in the most objective manner possible, I recruited two independent evaluators who along with me watched and assessed all the episodes of MasterChef during my period of study. These two evaluators were Research Assistants (RAs) who were both pursuing PhD in Economics in the United States at the time of doing this research, had never watched this television competition in the past, did not know what my research was about and did not receive any kind of monetary incentive beyond their standard RA university stipend. The three of us followed a standardized protocol, as follows. First, each of us watched all the MasterChef episodes between 2010 and 2020 and recorded any instance of anger between any of the competition judges and each of the participants by following the definition of anger according to the American Psychological Association (2024) namely. In particular, we focused on instances of (i) raised voice between a judge and a participant or (ii) verbal aggression including using harsh language, insults, or threats in communication or (iii) any kind of anger-related physical action, such as throwing objects to the floor and the like. Notice that not all the above characteristics had to be observed at the same time for a judge to be classified as being angry by the evaluators. In general, when the situation was not obvious and when in doubt, the evaluators were instructed not to classify the situation as one of anger. Thus, we took a conservative approach when classifying the anger variable. Having said this, each of us watched every competition episode independently and had full independence to assess and decide whether any specific interaction between any given judge and contestant provoked anger in a judge.² At the end of the evaluation process of each MasterChef episode between 2010 and 2020, the three evaluators compared their corresponding assessments. Remarkably, the three of us unanimously coincided in 94.5 percent of the cases deemed to be of anger by a competition judge. In the 5.5 percent of cases when all the three evaluators did not coincide unanimously, the majority voting was taken into consideration.³

² A scowling face, expressions of displeasure, disappointment, saying that a dish is “disgusting”, or similar strong adjectives are not enough for the interaction between the judge and the contestant to be classified as one of anger. Examples of situations of angry interactions between judges and contestants can be found here: youtu.be/Phl6UsW8zXE?feature=shared.

³ My results show no change when excluding the observations when the assessments of all three evaluators did not fully coincide. Also, it should be mentioned that as an additional robustness test, I recruited a fourth evaluator who was asked to assess a random sample of the competition episodes and give corresponding anger-related assessments. This evaluator coincided in all cases with the assessments provided by the three original evaluators. As before, this fourth

The exposure to anger variable is constructed in a simple, straightforward manner. We simply counted the number of instances in which a particular judge demonstrated anger to a particular contestant. In this context, a value of zero means that a particular individual was not exposed to anger by a judge. Similarly, a value of one means that the contestant faced a judge's anger one time during his or her participation in the competition and so on.

My key dependent variable is the final position of the contestant in the competition in a particular season. Table I provides the definitions of all the variables employed in this research, which include individual characteristics such as age, gender, and college status as well as city-related characteristics including poverty rate and household income of the city of origin of each contestant. My data collection process results in a total of 197 observations at the individual level, which cover the full universe of participants of the competition during the ten seasons for which I collected data.

Table I. Definitions of Variables, MasterChef USA

Exposure to Anger	Number of times when a judge expresses clear anger toward a contestant. This includes extreme raised voice, verbal aggression including using harsh language, insults, or threats in communication, and physical action.
Age	Age of the contestant
College	Dummy that equals one if the individual attended college, zero otherwise.
Female	Dummy that equals one if the contestant is female, zero otherwise
Race	Set of dummies that equal to one if the contestant is African American, Asian American or Latino, and zero otherwise.
Top Three	Dummy that equals one if the contestant ended up among the top three of the competition, zero otherwise
Rounds	Number of television episodes in which each contestant participated
Final Placement	Final position in the competition in a particular season. The higher the final placement, the worse that the contestant did.
Winner	Dummy that equals one if the contestant wins the competition, zero otherwise
Top	Number of cooking challenges throughout the competition in which a contestant placed among the top three.
Judge _i	Dummy that equals to one if Judge=1,2,3 and zero otherwise (1= Ramsay, 2= Bastianich; 3=Elliot)
Poverty Rate	Poverty Rate in city where the contestant is from.
Household Income	Household income in city where the contestant is from.

evaluator had no knowledge of the research conducted, had never watched MasterChef ever, and did not receive any kind of monetary or non-monetary incentive.

Table 2 presents summary statistics of all the variables employed. As it can be observed, my key variable of interest, exposure to anger, ranges from zero to four, which as described above simply means that whereas some contestants were never exposed to anger by the judges during the competition, others were exposed up to four instances of anger by the judges. In my ten-year sample, 57.8 percent of the contestants were never directly exposed to the judges' anger, 24.3 percent of the participants were exposed the anger of the judges one time, 5 percent of the contestants were exposed to anger three times and only one contestant was exposed to the anger of the judges four times.

Table 2. Summary Statistics, MasterChef USA

Variables	Mean	Std. Error	Min	Max
Age	31.23	8.450	18	63
Exposure to Anger	0.659	0.915	0	4
College	0.462	0.500	0	1
Female	0.467	0.500	0	1
Caucasian	0.584	0.494	0	1
Asian American	0.122	0.328	0	1
African American	0.178	0.383	0	1
Hispanic	0.122	0.328	0	1
Top Three Placement	0.152	0.360	0	1
Final Placement	10.49	5.937	1	23
Rounds	12.411	2.523	1	24
Top	0.909	1.065	0	5
Poverty Rate	16.528	6.675	0	35.19
Household Income	91304	29384	40916	271666

Source: Data collected by authors from MasterChef USA episodes between 2010 and 2020 along with complementary information from MasterChef Wiki. The number of observations for all the variables is 197.

There are typically three judges in every episode. While the specific judges have varied somewhat as years passed, I focus my analysis on the three main judges who have participated in most episodes and seasons during my period of study.⁴ The three main judges are Gordon Ramsay, Joe Bastianich, and Graham Elliott. Gordon Ramsay is the main character of the MasterChef Competition and while in theory he has equal say to the other judges, he is clearly the star of the show. Ramsay is British chef whose restaurants have been awarded 17 Michelin stars overall.⁵ He is considered one of the best-known and most influential chefs in the world, which is reflected on the fact that only two chefs in the world have more Michelin stars than him.⁶ In television, he typically displays fiery and aggressive behavior that includes the use of profanity, while making harsh, blunt,

⁴ My findings do not change in any meaningful way if I include other guest judges who participated in different episodes or seasons of the competition.

⁵ www.gordonramsay.com/

⁶ www.statista.com/statistics/1358531/chefs-with-most-michelin-starred-restaurants-worldwide/

even insulting comments to contestants. He is shown to be a strict and short-tempered mentor who holds high standards and would get frustrated with a cook who performs poorly.

Another judge, Graham Elliot is an American chef and restaurateur.⁷ He first gained recognition in the business as a three-time nominee for the James Beard Award.⁸ He is a highly regarded chef who has earned numerous accolades including the prestigious Food & Wine's "Best New Chefs" list, reflected by the fact that his namesake restaurant is one of just two restaurants in Chicago to hold two Michelin stars. As a judge he has been considered as the gentler of the three judges always trying to be constructive in his criticisms. Finally, the third judge, Joe Bastianich is an American restaurateur who co-owns thirty restaurants in four countries including Singapore, Hong Kong, the United States and Sweden.⁹ Some of his restaurants have received great acclaim including one in New York that received a Michelin star as well as four stars from The New York Times, only one of four restaurants that have received such an accolade and the first time an Italian restaurant was given such a rating in forty years by the Times. In terms of his judging, he has been described as strict, harsh, and intimidating. He can be considered to be rude and arrogant.¹⁰

Empirically, I apply simple ordinary least squares to the following basic specification:

$$Placement_{ij} = \alpha + \mathbf{\Lambda}Ind_{ij} + \mathbf{\Pi}City_{ij} + \Gamma Anger_{ij} + \varepsilon_{ij} \quad (1)$$

where the key dependent variable *Placement* is the final placement obtained by contestant *i* in season *j*. The vector $\mathbf{\Lambda}$ corresponds to variables that capture the individual characteristics mentioned above and the vector $\mathbf{\Pi}$ captures variables that correspond to the city characteristics described above. The variable Γ reflects the coefficient of my key variable of interest, exposure to anger from the judges. Finally, α is a constant and ε_{ij} is an error term. As explained above, the a priori signs of the corresponding exposure to anger coefficients are unclear. On the one hand, I expect a negative sign in the coefficient if exposure to anger is a positive incentive to individuals. On the other hand, the sign of the coefficient may be positive when if anger erodes confuses decision-making, or makes the individual lose focus.¹¹

The reason for controlling for individual characteristics mainly gender, age, race, and college education is that some previous research between anger and these variables have resulted in corresponding statistically significant links. For instance, Boylan and Ryff (2013) show that more anger appears to be linked less education, something particularly more salient in the case of males. They argue that those who are educationally disadvantaged are not psychologically equivalent and bring different profiles to their experiences, which appear to be meaningful in terms of anger. Similarly, Boylan, et al., (2015) argue that there may be important racial differences in how anger experience and expression affect inflammatory physiology including links to educational attainment.

⁷ www.grahamelliot.com/about

⁸ The James Beard Foundation Awards were established in 1990 and are annual awards presented by the James Beard Foundation to recognize chefs, restaurateurs, authors and journalists in the United States. They are the most prestigious food-related awards in the country.

⁹ joebastianich.com/en/

¹⁰ www.youtube.com/watch?v=rjXz IXMNo

¹¹ The signs of the coefficients are interpreted in such a way that a negative sign implies a higher placement.

In particular, they show that African Americans tend to display more anger, which appears to be mediated by education. In fact, they show that those with low education show higher physiological anger markers.

Other studies that further show a link between individual characteristics and anger are Shivpuri, et al., (2011); Elovainio, et al., (2011); Graham, et al., (2006) and Haukkala (2000) among several others. In addition, I also control for proxies of socio-economic status, in particular the poverty rate and household income of the city of origin of the contestant, as research shows that some effects of anger may be greater among low socio-economic status individuals. For instance, Merjonen, et al., (2008) shows that the link between anger and atherosclerosis was significant only in young adults from poorer backgrounds and Beatty and Matthews (2009) demonstrates that anger is associated with ambulatory blood pressure most strongly in African American adolescents of poor socio-economic backgrounds. As Boylan and Ryff (2013) argue these results appear to suggest that the risk for detrimental health effects associated with disadvantaged socio-economic backgrounds may be exacerbated by an emotional profile marked by high anger. Finally, it should be emphasized that, unless noted, all the regressions include city-fixed effects, season-fixed effects as well as clustered standard errors at the season level and robust standard errors.¹²

Findings

My main results are shown in Table 3. My main variable of interest is “Exposure to Anger”, which, as described above, captures every instance when any of the three judges expressed anger to an individual contestant. As shown in Column 1, I find that exposure to demonstrations of anger by the judges to contestants is negatively linked to their final placement in the MasterChef competition. The coefficient of my variable of interest is negative and statistically significant at one percent, as shown in columns 1 and 2. An increase in one unit in my exposure to anger measure is linked to an increase of around 1.47 to 1.78 positions in the final placement ranking on average. It appears that anger functions as a catalyst for motivation and focus. As described above and consistent with some previous literature, exposure to anger may generate a surge of energy, which may be channeled toward focusing on specific tasks or goals, giving a clearer sense of what is important and helping eliminate distractions. Anger may help concentrate on the task at hand increasing determination to overcome obstacles to help achieve goals (e.g., Chajut and Algom, 2003; Van Dijk and Kluger, 2011; Kelsey and Sweeney, 2011; Van Kleef, 2009).¹³

¹² I also tested many variations of specifications that exclude all or some individual and/or city-level controls. My results do not change, as the corresponding coefficient of my variable of interest, exposure to anger, is always negative and statistically significant at five percent or higher even in the bivariate case. The results when using anger of specific Judges (in particular Judge 1) do not change either. These additional results are available upon request.

¹³ Also, consistent with previous literature age and having some college education also appear to be relevant in explaining the contestant’s final placement in the competition. However, these variables appear not to be robust (See Table 4).

Table 3. Exposure to Anger, MasterChef USA
 Dependent Variable: Final Placement
 Ordinary Least Squares

	(1)	(2)	(3)	(4)
Exposure to Anger	-3.612*** (0.372)	-3.612*** (0.443)		
Exposure Anger Judge1			-4.023*** (0.491)	-4.023*** (0.552)
Exposure Anger Judge2			-1.619 (1.462)	-1.619 (1.376)
Exposure Anger Judge3			-3.266 (2.627)	-3.266 (1.376)
Age	0.071* (0.043)	0.071 (0.052)	0.074* (0.732)	0.074 (0.049)
College	-1.283* (0.732)	-1.283** (0.487)	-1.167 (0.732)	-1.167** (0.525)
Female	0.572 (0.747)	0.572 (0.388)	0.477 (0.746)	0.476 (0.381)
Constant	10.594** (3.322)	10.534*** (3.638)	10.139*** (3.279)	10.139** (3.575)
Observations	197	197	197	197
R-squared	0.358	0.357	0.371	0.370
Clustered S.E. (Season)	No	Yes	No	Yes

*** p < 0.01, ** p < 0.05, *p < 0.1 Standard errors in parentheses. Judge 1 = Ramsay, Judge 2 = Bastianich, Judge 3 = Elliot. All regressions include City-Level Controls (poverty rate, household income), season fixed effects, robust standard errors as well as these additional individual-level controls: Rounds participated, Caucasian, African American, and Hispanic. I also used city-fixed effects instead of city-level controls. None of these variables are statistically significant in any specification. Neither of these variables is statistically significant in any specification. Data collected by the author from MasterChef USA episodes between 2010 and 2020 along with information from Chong and Chong (2023) and MasterChef Wiki.

Interestingly, I also find that not all anger is created the same, as exposure to anger from one specific judge drives my findings. This is also shown in Table 3. As it can be observed, the dummy that captures the episodes of anger of Judge 1, Gordon Ramsay, yields a coefficient that is statistically significant at conventional levels. This is not really surprising when one considers that not only is this judge the most important personality of the cooking competition, but he is also a world-class chef and restaurateur and the face of the MasterChef television competition, as described above. Given his prestige, his comments and suggestions are extremely credible, more so than any comments that the other two Judges might make. For instance, if Ramsay said that a dish prepared by a competitor might easily be “served at my three-starred Michelin restaurant in London”, this would be a very compelling and believable comment to a competitor. On the other hand, if Ramsay said that a competitor’s dish is “absolutely disgusting” and showed anger about the taste of the dish, this opinion would likely be particularly impactful to the participant given the particularly strong credibility that a chef like Gordon Ramsay has.

In addition, I test whether my exposure to anger measure is robust to the inclusion of additional variables to the benchmark specification by augmenting it with a pool of three ancillary variables, which are introduced systematically including all possible combinations in the regressions. I find that anger exposure is robust to systematic changes in specification, as the weighted cumulative distribution function at zero is statistically significant at five percent or higher for both my exposure to anger and to Judge I variables (Sala-i-Martin, 1997).¹⁴

Also, in Table 4, I test three alternative outcome variables instead of final placement. The first one is the total number of cooking challenges in which a contestant placed among the top three throughout the competition. The second is a dummy variable that equals one if the contestant ends among the top three of the competition. The third is a dummy variable that equals one if the contestant wins the competition and zero otherwise. Notice that for the last two variables I apply Probits, as follows¹⁵:

$$Top_{ij} = \alpha + \Lambda Ind_{ij} + \Pi City_{ij} + \Gamma Anger_{ij} + \varepsilon_{ij} \quad (2)$$

where Top reflects these two variables, α is a constant and ε_{ij} is an error term. All the other vectors are equivalent to specification (1). Again, all the regressions include season-fixed effects, clustered standard errors (season), and robust standard errors. Again, I find that exposure to anger improves performance. It increases the probability of being placed among the top contestants by 11 percent and increases the probability of winning the competition by 2.5 percent.

As before, I find that specific exposure to the anger of Judge I, Gordon Ramsay, is particularly powerful, as the probability of reaching the top three in the competition increases by 9 percent and the probability of winning it all increases by two percent when facing the wrath and anger of this particular judge. As Table 4 also shows, exposure to anger from the other two judges also yields coefficients that are statistically significant at conventional levels when the dependent variable is the final placement among the top three contestants and when the dependent variable is whether the participant wins the tournament.¹⁶

¹⁴ These results are available upon request.

¹⁵ I also apply logistic regressions instead of probabilistic ones. Results are identical.

¹⁶ While not reported, the robustness tests applied were more extensive than the results shown in Table 3 and Table 4. In particular, I also tested (i) simply bivariate specifications using exposure to anger and removing all the controls; (ii) probits and logits using a dummy on exposure to anger instead of the 'intensity' variable (0 to 4) that I use in Tables 3 and 4; (iii) splitting my data between earlier rounds and later rounds instead of controlling for the number of rounds as shown in the Tables. I do not find any meaningful difference in any of my findings, as regardless of any of these additional robustness tests, I always find that exposure to anger impacts performance positively and that this link is statistically significant at conventional levels. These additional results are available upon request.

Table 4. Alternative Outcome Variables, MasterChef USA

Dependent Variable:	Number of Challenges Among top three		Final Placement Among top three		Winner	
	OLS		Probit		Probit	
	(1)	(2)	(3)	(4)	(3)	(4)
Exposure to Anger	0.525*** (0.083)		0.611*** (0.137)		0.041** (0.180)	
Anger Judge 1		0.595*** (0.100)		0.561*** (0.109)		0.364*** (0.141)
Anger Judge 2		0.307 (0.411)		1.199* (0.707)		0.621 (0.542)
Anger Judge 3		0.339 (0.345)		1.185* (1.055)		1.420* (0.788)
Age	-0.012 (0.101)	-0.013 (0.010)	-0.008 (0.015)	-0.009 (0.149)	-0.004 (0.022)	-0.002 (0.021)
College	0.144 (0.152)	0.139 (0.148)	0.322 (0.289)	0.376 (0.271)	0.462 (0.448)	0.479 (0.449)
Female	-0.043 (0.091)	-0.033 (0.087)	-0.104 (0.215)	-0.132 (0.206)	0.059 (0.354)	0.039 (0.372)
Constant	1.117* (0.611)	1.181* (0.596)	-3.171*** (1.222)	-3.579*** (1.391)	-1.066 (1.581)	-1.252 (1.572)
Observations	197	197	197	197	197	197
R-squared	0.244	0.262	0.178	0.208	0.164	0.181

*** p < 0.01, ** p < 0.05, *p < 0.1 Standard errors in parentheses. Judge 1 = Ramsay, Judge 2 = Bastianich, Judge 3 = Elliot. All regressions include City-Level Controls (poverty rate, household income), season fixed effects, robust standard errors, clustered standard errors (season) as well as these additional individual-level controls: Rounds participated, Caucasian, African American, and Hispanic. I also used city-fixed effects instead of city-level controls. None of these variables are statistically significant in any specification. Neither of these variables is statistically significant in any specification. Data collected by the author from MasterChef USA episodes between 2010 and 2020 along with information from Chong and Chong (2023) and MasterChef Wiki.

MasterChef Canada as a Robustness Test

As a second confirmation study I use data from MasterChef Canada, a competitive cooking reality show broadcast in Canada that is part of the MasterChef franchise, open to amateur home cooks. It premiered in early 2014 and aired during seven seasons until 2020.¹⁷ Overall, the format of the competition is very similar to the version broadcast in the United States, including team, elimination and skill challenges. As in the US version, the show stars three well-known chefs as judges where amateur cooks compete in a series of challenges to become the best home cook in Canada through challenges issued by the judges. The first judge, Alvin Leung, is a highly regarded chef who was born in London and raised in Toronto. Interestingly, he studied and worked as a civil engineer

¹⁷ However, all the contestants in the seventh season (2021) were previous participants of the first six seasons. After a long hiatus, the producers have announced a new season for 2025.

for two decades before he shifted towards the culinary arts. Leung is known for his creative take on traditional Chinese food, which he calls "X-Treme Chinese". He currently owns and operates several restaurants around the world, some of which have received Michelin stars. His flagship restaurant, based in Hong Kong, currently holds two Michelin stars.¹⁸ Leung is shown to be very strict, with no room for nonsense. His behavior resembles somewhat that of Gordon Ramsay in terms of his aggressiveness, stoicism, and his inclination to having outbursts of anger. The second judge, Michael Bonacini is a British-Canadian chef owns eleven restaurants, some of them considered among the best in Canada.¹⁹ Bonacini is perceived as a friendly and nice judge with infrequent bursts of anger although he might get annoyed when competitors are disrespectful or do not follow the rules. Overall, he tends to be positive, encouraging contestants and providing advice. Finally, the third judge, Claudio Aprile, is a celebrated Canadian chef and throughout his career he has gone through some of the most renowned Michelin-starred restaurants around the world. He was born in Uruguay, but was raised in Toronto, where he has owned and operated several highly acclaimed restaurants in the city.²⁰ Overall, while none of these three judges have the same standing as Gordon Ramsey in the culinary world, it is clear that reputation and credibility-wise, Alvin Leung is a step up than the other two MasterChef Canada's judges.

Table 5 presents summary statistics for the case of MasterChef Canada. The key variable of interest, exposure to anger, ranges from zero to two in the Canadian case, which as described above simply means that whereas some contestants were never exposed to anger by the judges, others were exposed up to two instances of anger by the judges. Notice that 84.1 percent of the contestants were never directly exposed to the judges' anger, 13.4 percent were exposed to the anger of the judges one time and 2.4 percent of the contestants were exposed to anger two times.

Table 5. Summary Statistics, MasterChef Canada

Variables	Mean	Std. Error	Min	Max
Age	31.82	7.870	19	69
Exposure to Anger	0.183	0.448	0	2
College	0.500	0.503	0	1
Female	0.488	0.503	0	1
Caucasian	0.707	0.234	0	1
Minority	0.293	0.457	0	1
Top Three Placement	0.219	0.416	0	1
Final Placement	7.433	4.115	1	15
Top	0.902	1.171	0	6
Winner	0.073	0.262	0	1
Household Income	84100	14345	61300	102000
Poverty Rate	9.887	3.896	8.98	13.30

Source: Data collected by authors from MasterChef Canada episodes between 2014 and 2020 along with complementary information from MasterChef Wiki. The number of observations for all the variables is 82.

¹⁸ en.wikipedia.org/wiki/Alvin_Leung

¹⁹ masterchef.fandom.com/wiki/Michael_Bonacini

²⁰ www.claudioaprile.com/

My main MasterChef Canada findings are shown in Table 6. As before, the main variable of interest is Exposure to Anger. I find that exposure to demonstrations of anger by the judges to contestants is negatively linked to their final placement in the competition. This is shown in Column 1, which means that exposure to anger increases the final placement of the average contestant in the competition. This link is statistically significant at one percent. Interestingly, and analogous to the results for the MasterChef USA case, my findings appear to be driven by Judge 1, Alvin Leung, who as described above is the analogous Chef to Gordon Ramsay for the US case, that is, the one with the most international prestige as well as highest culinary accomplishments in the Canadian case.

Table 6. Exposure to Anger, MasterChef Canada

	Dependent Variable: Final Placement	
	Ordinary Least Squares	
	(1)	(2)
Exposure to Anger	-3.129*** (0.915)	
Exposure Anger Judge 1		-4.319*** (1.269)
Exposure Anger Judge 2		-.1465 (1.648)
Exposure Anger Judge 3		-2.963 (2.909)
Age	0.112** (0.053)	0.119** (0.058)
College	-2.042** (0.849)	-1.746* (0.933)
Female	-0.314 (0.841)	-0.587 (0.902)
Constant	3.124 (2.496)	2.858 (2.369)
Observations	82	82
R-squared	0.261	0.293

*** p < 0.01, ** p < 0.05, *p < 0.1 Standard errors in parentheses. Judge 1 = Leung, Judge 2 = Bonacini, Judge 3 = Aprile. All regressions include province-level controls (poverty rate, household income), season fixed effects, robust standard errors, clustered standard errors (season), as well as these additional individual-level controls: rounds participated and an ethnic minority dummy. I also used province-fixed effects instead of province-level controls. None of these variables are statistically significant in any specification. Regressions with non-clustered standard errors yield analogous results. Please, notice that the scale of the dependent variable is inverted, a negative coefficient in the anger variable indicates a higher final placement. Data collected by the author from MasterChef Canada episodes between 2014 and 2020.

Similar to the MasterChef USA case, I also test three alternative outcome variables instead of final placement: (i) the total number of cooking challenges in which a contestant placed among the top three throughout the competition, (ii) a dummy variable that capture if the contestant ends among

the top three of the competition and (iii) a dummy variable that equals one if the contestant wins the competition. Empirically, I follow the specification (2) above. My findings are presented in Table 7.

Table 7. Alternative Outcome Variables, MasterChef Canada

Dependent Variable	Number of Challenges		Final Placement		Winner	
	Among top three		Among top three			
	OLS		Probit		Probit	
	(1)	(2)	(3)	(4)	(5)	(6)
Exposure to Anger	0.618** (0.297)		0.577 (0.364)		1.095* (0.402)	
Anger Judge 1		0.791* (0.440)		0.833* (0.491)		1.336** (0.579)
Anger Judge 2		0.449* (0.283)		0.133 (0.514)		0.274 (0.491)
Age	-0.139 (0.136)	-0.012 (0.013)	-0.029 (0.022)	-0.025 (0.021)	-0.050 (0.039)	-0.046 (0.033)
College	0.368 (0.251)	0.389 (0.262)	0.657 (0.339)	0.658* (0.346)	0.014 (0.449)	-0.036 (0.406)
Female	-0.154 (0.245)	-0.094 (0.250)	-0.221 (0.321)	-0.157 (0.334)	0.089 (0.382)	0.232 (0.424)
Constant	1.299** (0.614)	1.230** (0.615)	0.295 (0.885)	0.174 (0.866)	0.313 (1.088)	0.166 (0.915)
Observations	82	82	82	80	82	80
R-squared	0.139	0.162	0.562	0.118	0.213	0.213

*** p < 0.01, ** p < 0.05, *p < 0.1 Standard errors in parentheses. Judge 1 = Leung, Judge 2 = Bonacini. The variable Judge 3 (Aprile) had to be dropped because of collinearity issues. All regressions include province-level controls (poverty rate, household income), season fixed effects, robust standard errors as well as these additional individual-level controls: rounds participated and an ethnic minority dummy. I also used province-fixed effects instead of province-level controls. None of these variables are statistically significant in any specification. Please, notice that the scale of the dependent variable is inverted, a negative coefficient in the anger variable indicates a higher final placement. Data collected by the author from MasterChef Canada episodes between 2014 and 2020.

As observed, these additional results appear to confirm our previous findings. When testing exposure to anger and additional performance-related measures I find that in the majority of cases the corresponding coefficients reflecting performance are positive and statistically significant at conventional levels. In particular, notice that the probability placing among the top three of the competition increases by 13 percent when the contestant is exposed to Judge 1's anger. Furthermore, the probability winning the competition increases by around 11 percent. What is particularly interesting is that these findings not only confirm the previous results regarding the role of Judge 1, Alvin Leung, but they are also consistent with the results regarding MasterChef USA and the role played by the lead Judge, Gordon Ramsay in the American competition.

Final Remarks

I study the link between exposure to anger and performance by using data from the US version of the syndicated television cooking competition MasterChef. In particular, I record every instance of anger expressed by judges to any individual participants in each of the episodes broadcast in ten years of the show, from 2010 to 2020 and find that the link is positive and statistically significant. Contestants exposed to angry judges end up higher in the final competition rankings, increase their probability of success in cooking challenges, increase their probability of reaching the top three places as well as increase their probability of winning it all. I repeat the very same exercise using data for the Canadian version of the same cooking competition and find remarkably similar findings. Most notably, I confirm that the reputation of the Judges matters. The most internationally recognized Chefs in both MasterChef USA and MasterChef Canada appear to carry the bulk of my findings. Exposure to the anger of an internationally recognized chef appears to be particularly relevant in terms of performance of the contestants.

A few caveats are in order. First, I do not venture to call my findings causal, since as suggestive as my findings are, I cannot rule out either reverse causality or the presence of unobservables driving my key variable of interest and any dependent variable simultaneously. In fact, judges may become angry at good contestants because they may have higher expectations from them.²¹ Furthermore, perhaps judges become angry when the contestants do something unusual, such as taking unnecessary risks and anger may be just a sign of taking more risks which in turn may lead to higher performance. Yet another view may be that judges may become angry when someone performs below their expected level, so that anger may only be reflecting underperformance of the contestant.²² Second, it is important to emphasize that my findings, as economically relevant as they are, are based on short-term episodes of anger in a constrained, time-limited environment. Long-term exposure to anger may yield different results. Related to this, and from a policy perspective, it is unclear whether showing anger is an effective way to increase performance and thus, productivity. It may be useful in highly focused and time-limited environments, such as highly competitive tournaments, but my findings do not say anything about longer lasting “anger strategies” to help improve performance in a sustained manner. Still, I hope that my findings may elicit discussion and additional research on this understudied issue, as the policy implications can be very relevant.

²¹ I am very grateful to the editor Eldad Yechiam for raising these comments.

²² Many thanks to an anonymous referee for providing this comment.

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