

### About the author:

Vasil Yasenov is an applied statistician specializing in causal inference. He holds a Ph.D. in economics and has worked as a data scientist at UC Berkeley, Stanford University, and Adobe Inc. His research has been published in major academic journals such as the Proceedings of the National Academy of Sciences, the Journal of Public Economics, and JAMA Pediatrics. His data work has been featured in The New York Times, The Washington Post, and The Wall Street Journal.

### About the book:

Luca is a curious young boy with a rich sword collection. Unfortunately, his village has recently been captured by an evil king. Now all his friends and neighbors are hungry and miserable because the secret meatball recipe is missing.

How can Luca choose the best sword with which to protect his village and restore happiness? A careful data-driven causal inference analysis might just hold the right answer.

### Praise for “Causal Inference for Toddlers”:

“Not at all random that Yasenov would produce the perfect book explaining causal inference to toddlers.”

**DAVID LAITIN, JAMES T. WATKINS IV AND ELISE V. WATKINS**  
PROFESSOR OF POLITICAL SCIENCE, STANFORD UNIVERSITY

“There are few things in life more important than causal inference or meatballs. This book contains both.”

**SALMA MOUSA, ASSISTANT PROFESSOR OF**  
POLITICAL SCIENCE, YALE UNIVERSITY

“Yasenov brilliantly demonstrates that it’s never too early to start distinguishing between cause and coincidence — or to start making meatballs.”

**DAVID HAUSMAN, ASSISTANT PROFESSOR OF**  
LAW, UC BERKELEY

# CAUSAL INFERENCE FOR TODDLERS: LUCA AND THE MEATBALL RECIPE

BY VASIL  
YASENOV



ILLUSTRATIONS  
GRACE JI



CAUSAL INFERENCE FOR TODDLERS:  
LUCA AND THE MEATBALL RECIPE

TO MY SON

**Causal Inference for Toddlers:  
Luca and the Meatball Recipe**

Written by: Vasil Yasenov  
Illustrated by: Grace Ji  
Edited by: Naomi Lastrucci

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ONCE UPON A TIME, IN A FARAWAY VILLAGE, THERE LIVED A YOUNG BOY NAMED LUCA. LUCA WAS BRAVE, STRONG, AND CURIOUS. HE LOVED EATING DELICIOUS MEATBALLS AND COLLECTING PRECIOUS SWORDS. THE VILLAGE WAS RECENTLY ATTACKED AND CAPTURED BY THE TERRIBLE KING DRAGSTER. KING DRAGSTER DID MANY TERRIBLE THINGS, BUT THE WORST BY FAR WAS STEALING THE SPECIAL MEATBALL RECIPE FROM THE PEOPLE.

THIS SPECIAL RECIPE HAD BEEN PASSED DOWN FOR MANY GENERATIONS IN THE VILLAGE. NOW EVERYBODY WAS GLOOMY BECAUSE THEY COULD ONLY EAT PIZZA CRUST, GOAT CHEESE, AND EGGPLANT. LUCA WAS DETERMINED TO BRING BACK THE RECIPE AND RESTORE HAPPINESS TO THE VILLAGE. BUT THIS WAS A DIFFICULT AND AMBITIOUS GOAL! THE RECIPE WAS LOCKED AWAY IN THE DARKEST ROOM IN THE HIGHEST TOWER IN THE FARTHEST CASTLE OF KING DRAGSTER'S KINGDOM.







TO GET THERE, LUCA WOULD HAVE TO SPEND WEEKS AWAY FROM HOME AND FIGHT MANY, MANY DRAGONS. EVEN THOUGH HE WAS STILL A YOUNG BOY, HE HAD THE LARGEST SWORD COLLECTION IN THE ENTIRE VILLAGE. HIS SWORDS CAME IN ALL SHAPES AND SIZES: BIG AND SMALL, HEAVY AND LIGHT, STRAIGHT AND CURVED. MOST IMPORTANTLY, SOME WERE GOLDEN, AND THE REST WERE NOT. LUCA WAS VERY CURIOUS TO KNOW WHETHER THE GOLDEN SWORDS WERE BETTER.

HE KNEW THAT HE COULD NOT SIMPLY COMPARE HIS WIN RECORD WITH GOLDEN SWORDS TO THAT WITH NON-GOLDEN SWORDS BECAUSE, IN EVERY BATTLE, HE SELECTED HIS SWORD TYPE DEPENDING ON THE ENEMY HE FACED. HE TENDED TO PICK GOLDEN SWORDS WHEN FIGHTING SCARIER DRAGONS. THIS JOURNEY WAS THE PERFECT OPPORTUNITY TO ANSWER THIS QUESTION ONCE AND FOR ALL.

SO ONE DAY, HE PACKED ALL HIS SWORDS AND A NOTEBOOK—ALONG WITH EGGPLANT AND GOAT CHEESE SANDWICHES PREPARED BY HIS MOM AND DAD—AND HE WENT OFF ON HIS QUEST! LUCA FOUGHT AGAINST MANY SCARY DRAGONS ALONG THE WAY. HE ALWAYS PICKED A SWORD FROM HIS BACKPACK AT RANDOM, AND DID NOT LOOK WHAT KIND IT WAS.



AFTER EACH BATTLE, LUCA WOULD WRITE IN HIS NOTEBOOK WHETHER HE HAD WON OR LOST AND THE KIND OF SWORD HE HAD USED. WEEKS INTO HIS JOURNEY, HE FINALLY REACHED THE DOOR TO THE DARKEST ROOM IN THE HIGHEST TOWER OF THE FARTHEST CASTLE.

HE WAS ABOUT TO ENTER HIS LAST AND MOST DIFFICULT BATTLE: AGAINST KING DRAGSTER HIMSELF. NOW WAS THE PERFECT TIME TO FIND OUT WHETHER GOLDEN SWORDS WERE INDEED BETTER.

LUCA PLACED ALL HIS SWORDS ON THE GROUND AND MATCHED EACH GOLDEN SWORD WITH THE MOST SIMILAR NON-GOLDEN SWORD. WHEN HE WAS DONE, HE HAD MULTIPLE PAIRS OF NEARLY IDENTICAL SWORDS.

WITHIN EACH PAIR, THE ONLY DIFFERENCE BETWEEN THE SWORDS WAS THAT ONE OF THEM WAS GOLDEN. HE THEN CHECKED EACH PAIR OF SWORDS AGAINST HIS RECORD OF WINS AND LOSSES TO SEE WHICH SWORDS WON MOST OFTEN.







AT LAST, LUCA HAD THE ANSWER:  
GOLDEN SWORDS WERE BETTER!  
ALL ELSE EQUAL, LUCA WAS MUCH MORE  
LIKELY TO WIN A BATTLE WHEN  
HE HAD A GOLDEN SWORD IN HAND!

THIS PATTERN WAS SO STRONG THAT IT  
COULD NOT HAVE BEEN MERE CHANCE.  
ARMED WITH THIS KNOWLEDGE,  
LUCA CHOSE HIS FAVORITE GOLDEN SWORD  
AND HEADED INTO THE FINAL BATTLE.

KING DRAGSTER WAS ALREADY WAITING  
FOR HIM, ARMED WITH HIS OWN GREAT  
SWORD. BUT LUCA WAS NOT AFRAID.  
HE TRUSTED THE NUMBERS AND KNEW  
HE HAD THE BEST WEAPON.

AS THEY BATTLED, LUCA SUDDENLY  
NOTICED THAT KING DRAGSTER WAS  
FIGHTING WITH A SILVER SWORD.  
THE KING DID NOT KNOW THAT  
GOLDEN SWORDS WERE BETTER!





LUCA DELIVERED THE FINAL BLOW: HE USED THE HEAVY GOLDEN SIDE OF HIS WEAPON TO SLASH KING DRAGSTER'S SILVER SWORD. THUS, LUCA DEFEATED THE AWFUL KING!

AFTER THE BATTLE, LUCA FOUND THE KING'S TREASURE CHEST. INSIDE WAS THE SECRET MEATBALL RECIPE! HE PUT THE RECIPE IN HIS BACKPACK AND HEADED BACK TO HIS VILLAGE.

WHEN LUCA RETURNED HOME, EVERYONE CHEERED AND WELCOMED HIM AS A HERO! THE MAYOR ORGANIZED A WEEK-LONG MEATBALL FESTIVAL WITH MUSIC AND DANCING TO CELEBRATE

LUCA'S BRAVE DEED THAT HAD RESTORED HAPPINESS IN THE VILLAGE. BUT THE HAPPIEST OF ALL WAS LUCA, FOR HE KNEW A SECRET THAT NOBODY ELSE DID: THE BEST SWORDS WERE GOLDEN.



THE END