Codility_

Gender Bias
Report

Codility

How can companies run tech recruiting processes to support a more diverse workplace?

We did a deep dive into our data to uncover whether there are differences in performance between genders on Codility coding tests amongst different companies, and whether there are any factors that could systematically help or hinder this.

We found that while there is a difference in performance between genders, the data analyzed so far proves that there is not a gender bias in Codility tasks.

However, we identified some factors to take into account that may ultimately improve the diversity of your technical hiring.

Happy Hiring,

Aga Balcer-Thinlay
Director of Product Research, Codility

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About Codility

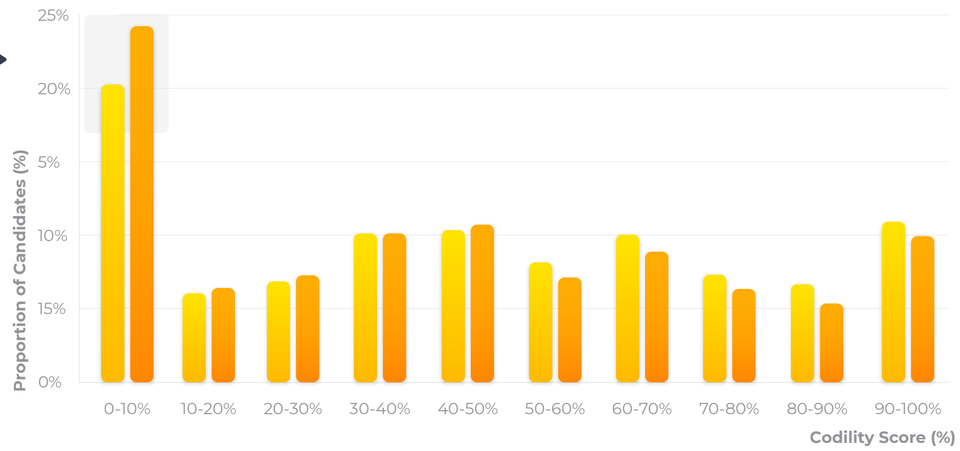
For 10 years Codility has been working with over 1.500+ businesses, facilitating over 10 million skill assessment sessions on behalf of our clients. Over the years, we've learned how to quickly assess programmer expertise and relative suitability for every open position our clients are looking to fill. Codility created the tech assessment movement and we've tested 3x more candidates than newer entrants in the space.

01 Score distribution

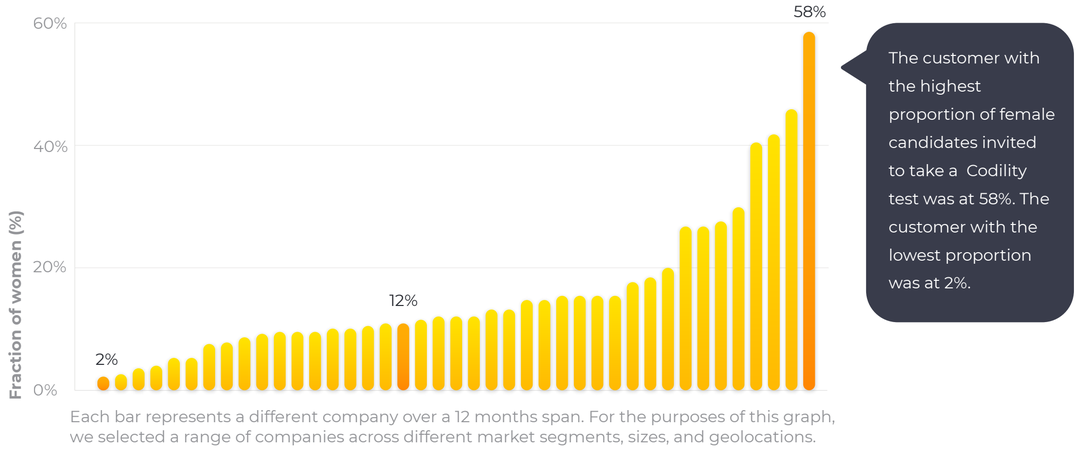
Is there a difference in performance between male and female candidates?

We ran analysis on over 1 million candidate sessions and found that yes, there is a difference in performance between genders.

Score Distribution for Male and Female Candidates
N=1,007,662 men + 154,468 women



Percentage of Female Candidates Invited to Codility Tests by Company
N=41 customers selected from 252 analyzed (274k sessions in 6486 tests)



Each bar represents a different company over a 12 months span. For the purposes of this graph, we selected a range of companies across different market segments, sizes, and geolocations.

What causes this difference?

Diversity is largely driven by the market. The biggest impact on the number of high-scoring female candidates occurs during the initial sourcing phase, when the proportion of female candidates to male candidates is skewed.

There are substantial differences in the proportion of different genders invited to take tests on the Codility platform between customers.

The overall seniority gap between genders is also a contributing factor. Approximately 81% of female developers have 6 years or less of professional coding experience,* and therefore are less likely to be considered for senior developer roles.

*See more in our **2018 Developer Report** here

02

Codility is unbiased

What elements of tasks impact performance differently by gender?

We identified key task characteristics which differentiate the way candidates receive information.

Impact of Task Characteristics on a Candidate's Score and Time Used

The only factor that seemed skewed in favor of females was the presence of math formulas in the task.
No other differences were statistically relevant enough to explain the performance gap in a meaningful way.

	Affect on score		Affect on time used	
	Man	Woman	Man	Woman
Math formulas	↗	↘	↗	⇆
Pictures	↑	↗	⇆	⇆
Complex data structures	↘	↘	⇆	⇆
Contains story	↓	↘	⇆	⇆
Difficult vocabulary	↗	↑	⇆	⇆
Level of difficulty	⇆	⇆	⇆	⇆
Length of description	⇆	⇆	⇆	⇆

Using these elements, we reviewed hundreds of Codility tasks to evaluate how these small variables affect gender.
We found factors that had a slight correlation with candidate performance, but the majority of factors impacted both genders in the same way.

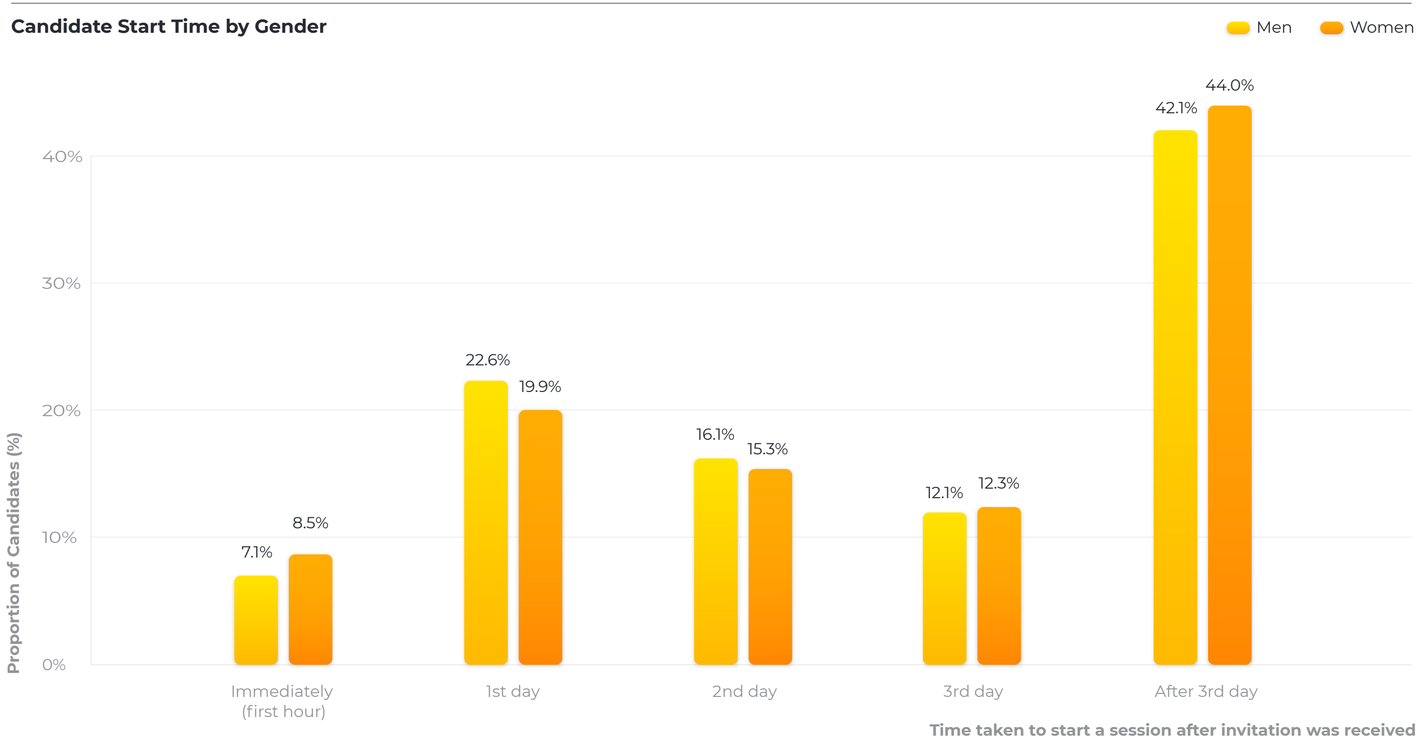
Legend

↑ Very high ↗ High ⇆ Neutral ↘ Low ↓ Very low

03 Candidate behavior

How does usage of time differ by gender?

Both genders used time limits similarly, began editing their code about 8 minutes into the session, and typically started their Codility test 3 days after the invitation was sent.



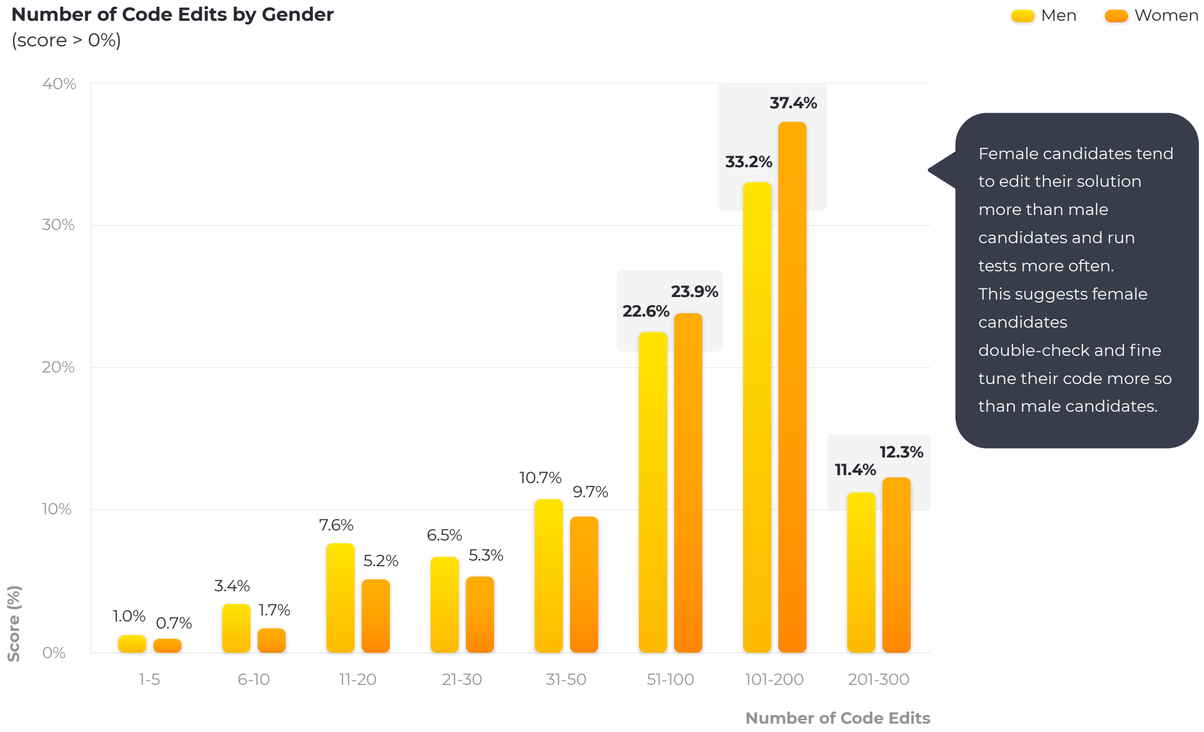
We found that female candidates tend to give up on their session slightly more often than male candidates, with an 11% drop-off rate among females candidates vs. 9% among males.

Giving up is defined as using less than 20% of time and scoring less than 20%. The average rate of giving up across all candidates is 10%.

How does code editing differ by gender?

While both genders behave similarly when it comes to time elements, there is a difference in how they build and test their solution.

Number of Code Edits by Gender
(score > 0%)



Female candidates tend to edit their solution more than male candidates and run tests more often. This suggests female candidates double-check and fine tune their code more so than male candidates.

Score (%) by Number of Pastes into the Codility Interface
N=365k male + 56k female

How does pasting code differ by gender?

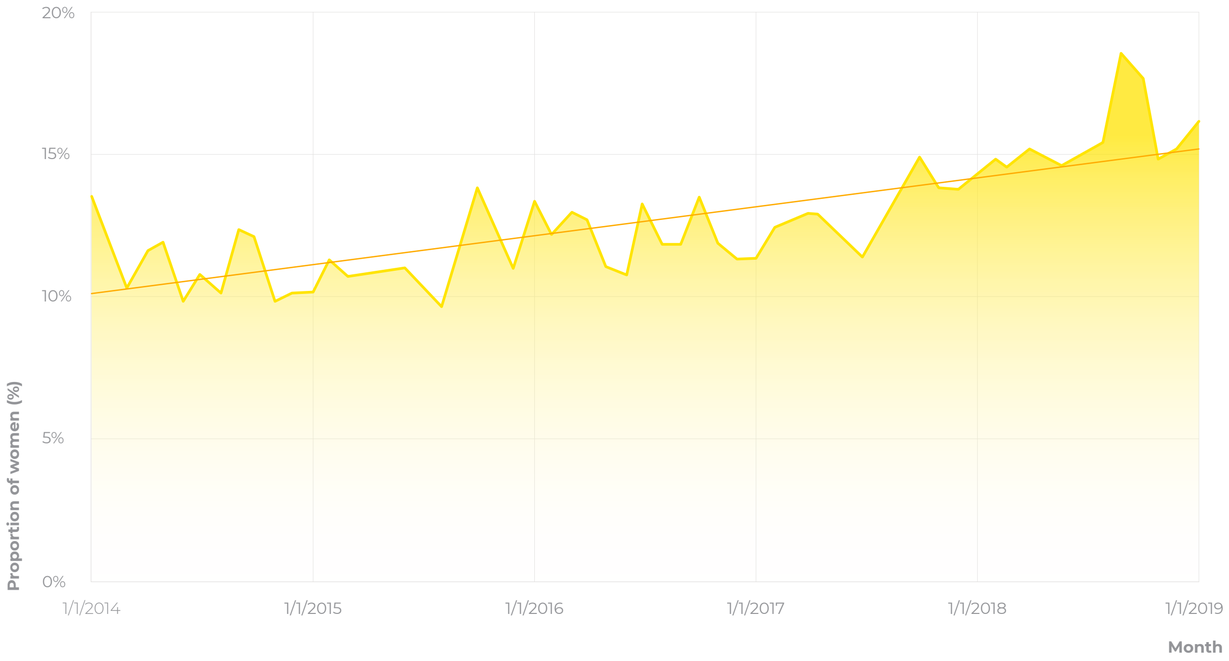
The more often candidates paste code, the lower the score they get, and this affects both genders similarly. Pasting code often suggests a trial-and-error approach. On the other hand, pasting code just once, often suggests the candidate has written, tested, and solved the task in their own editor and is ready to submit.

04 Supporting diversity

How can companies improve diversity?

The proportion of female candidates invited to a Codility session has steadily increased over the past 5 years.

Proportion of Female Candidates Invited to Codility Over the Past 5 Years



This is a trend driven by customers and is increasing at a faster rate than before.

Companies have the power to shape the diversity in their engineering teams

01 You get what you put in. No matter how you run your tech recruitment processes, the biggest shift will happen after you review existing sourcing strategies and develop new diversity-oriented tactics. You can take a look at existing campaigns, events and job listings, review language and graphics to ensure female candidates feel welcomed and excited to apply for your team.

02 Ensure your tech recruiting team represents the diverse workplace you desire. From the sourcers to the interviewers to management, bringing diversity to your tech recruiting team will help encourage diversity in your pipeline.

Do you help to recruit other developers in your company?

Codility 2018 Developers Report

03 Review your existing tech recruiting tools, such as Codility, to confirm they are unbiased and support your diversity efforts. Retrain key end-users on important tools to ensure they understand best-case practices and are not unintentionally creating bias.

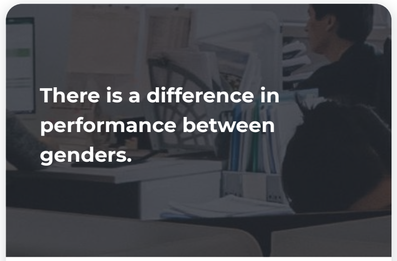
04 Establish diversity as a core value of the company so hiring teams understand why it is significant and how diversity brings value to your company.

05 No matter how you are screening and interviewing your candidates, understand that male and female candidates behave differently in screening tests. Once this is understood, your team can take these into account when creating tests and reviewing candidates.

05 Key conclusions

Key Conclusions

We found that while there is a difference in performance between genders, the data analyzed so far proves that there is no gender bias in Codility tasks.

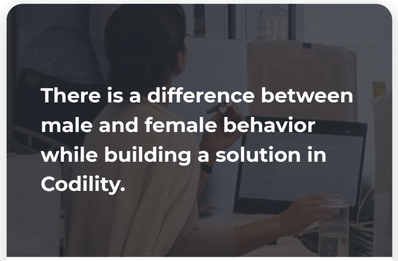


There is a difference in performance between genders.

Almost 5% more female than male candidates score 10% or lower, and overall, male candidates have a 1-3% edge over female candidates in all scores over 50%.

The overall seniority gap between genders is an aggravating factor.

Approximately 81% of female developers have 6 years or less of professional coding experience, therefore there is likely less female participation in senior developer recruitment campaigns.

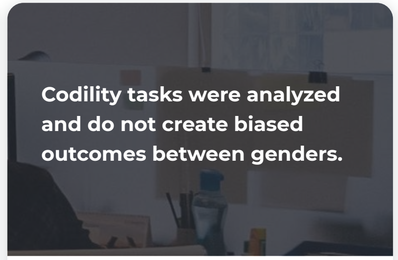


There is a difference between male and female behavior while building a solution in Codility.

This difference suggests female candidates do more double-checking, fine-tuning, and editing of their code after receiving feedback from running the solution.

The biggest impact on the number of highly-scoring female candidates occurs during the initial sourcing phase.

There are substantial differences in the proportion of different genders invited to the Codility platform between customers - the lowest proportion is 2% female candidates, and highest is 58%.



Codility tasks were analyzed and do not create biased outcomes between genders.

After analyzing over 1 million sessions, no findings were statistically relevant enough to explain the performance gap in a meaningful way.

Over the past 5 years the proportion of female candidates invited to Codility sessions has steadily increased.

Continue to review and create tactics to improve diversity, like ensuring sourcing efforts represent your desired workplace demographics, and establish diversity as a core company value.