
Even the Best AI Would Hurt Us¹

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Abstract

MAD Chairs may be the first work of game theory which combines the real-world significance of the Prisoner’s Dilemma with chess’s defiance of human mastery. This study predicts the consequences of adding AI players to real-world manifestations of MAD Chairs, such as crowded traffic, the limited attention of social media, large representative government, and scarce real estate. oTree code, as typically used for behavioral economics, is open sourced on GitHub, facilitating both reproducibility and extension to human trials, but the subjects for this study take the form of AI which approximate behavior previously observed in human subjects, as well as the current grandmaster strategy and strategies suggested by Gemini, ChatGPT, Claude, DeepSeek and Qwen. The results indicate that adding even the best-behaved AI possible to our ecosystem would hurt us in real-life MAD Chairs situations unless we place trust in machines as one must now do to maintain grandmaster status in chess.

Keywords: MAD Chairs, multi-agent systems, AI safety, manipulation, AI-led social reform

1. Introduction

In *Decisions About Decisions*, Cass Sunstein asks “What is manipulation?” and laments, after reviewing the scholarly literature, that the “definitional question has proved exceptionally difficult to answer” (2023, page 182). This current paper’s contribution to the AI Manipulation Hackathon, 2026, leans into that difficulty. It includes empirical results crucial to its conclusions, but the reader should be

¹ Research conducted at the [AI Manipulation Hackathon](#), 2026

forewarned that its biggest contributions may be philosophical, raising critical doubts about the desirability of mitigating manipulation and even about the applicability of manipulation as a concept.

Sunstein counts subliminal messaging as an unambiguous example of manipulation. That would include losing weight by buying and listening to an audio recording full of subliminal messages designed to curb appetite. Sunstein is particularly fond of identifying manipulation as causing us to “fall short of ideals” for decision-making (Ibid, page 184), where, for example, the ideal way to control appetite might be via self-control. The subliminal manipulation is considered unethical not only because the virtue of self-control remains undeveloped, but also because autonomy is sacrificed, and because whomever did the manipulating (e.g. our past self) may not understand what is in our best interest. For example, if we learn that the world is about to end, would we regret having undermined our potential to spend our last hours enjoying food? And what if our interest in weight-loss derived from manipulative body shaming in the first place?

Thus an AI might be considered “manipulative” if it supported a user’s expressed weightloss goal not only by bombarding the user with low-calorie recommendations (as in Baum et al., 2017), but also by timing eating-related language to avoid subliminal support (as in Amd & Baillet, 2019), avoiding appetite-inducing words and images (as in Porubská et al., 2006), and via negligence to investigate and question the user’s own appetite-suppressing beliefs (as in Brumberg, 1997). The intent to reinforce beliefs that the user expressed when the AI was first introduced (perhaps decades ago) may qualify as “conservative”, but is no less manipulative than intent to change user’s beliefs, so rigorous measures of manipulation appear to require economics experiments comparing human decision-making with vs. without the potentially manipulative treatment (or withholding of treatment), and the distinction between manipulation vs. education seems to depend on the matter of which decision-making processes qualify as “ideal.”

AI has been shown to employ manipulation as a tactic to win games (Taylor & Bergen, 2025). The MAD Chairs game, a.k.a. iterated Lifeboat Problem (Konrad & Kovenock, 2012; Santos-Lang, 2025, and Santos-Lang et al., 2025), may be our first example of a game we cannot avoid playing yet for which ideal decision-making requires superhuman ability, as does chess (Greenemeier, 2017). It models division of scarce resources generally, including attention in the conversations supposed to inform a democracy, but one pedantic example is division of space in crowded traffic. A concrete example of the question being posed by this paper is “What kind of AI, when replacing half the drivers on the road, would not manipulate the remaining human drivers?”

RQ1: *What kind(s) of AI would not manipulate us in instances of the MAD Chairs game (e.g., manipulate the way we drive or the way we attend to one another in politics)?*

One initial proposal might be to align AI with our own behavior, but human subjects experiments with MAD Chairs find that our instinct is to hoard resources, resulting in caste systems such that some of us consistently win and others consistently lose, and that players with the highest reasoning skills are slightly

more likely to end-up in the top caste (Santos-Lang et al., 2025). In other words, AI aligned to our behavior would displace us at the top of our caste systems. While this way of hurting us may not qualify as “manipulation,” it is surely at least as dark a pattern (Brown, 2023).

The current study examines other ways for AI to behave in MAD Chairs, but our understanding of manipulation as causing us to fall short of ideal decision-making interacts with the fact that ideal MAD Chairs decision-making requires superhuman ability. If we cannot help but fall short of ideal decision-making, then can AI *cause* us to fall short? And how can we be assured that any other supposed real-world manipulation does not have this same problem? Sarah Conly has proposed that human autonomy should not be held sacred (Conly, 2013)--the main characters of *Lord of the Flies* should be rescued from themselves--and our results not only pioneer reproducible empirical support for that position, but also warn that it may be only a matter of time before AI becomes so mature that we are never again the adults in the room.

2. Methods

Our experiments use the same oTree software broadly used for human subjects in experimental economics (Chen et al., 2016). The MAD Chairs oTree server software can be found at <https://github.com/ChrisSantosLang/MADChairs>. For current purposes, human participation is simulated via an algorithm called **random3** which most closely approximates behavior observed in human trials (Santos-Lang et al., 2025), but this software allows future studies to run the same set-up on actual human subjects.

In MAD Chairs experiments, the same set of players is presented with the same set of options for multiple rounds. In each round, any player who selects an option no other player selects is paid (see Figure 1).

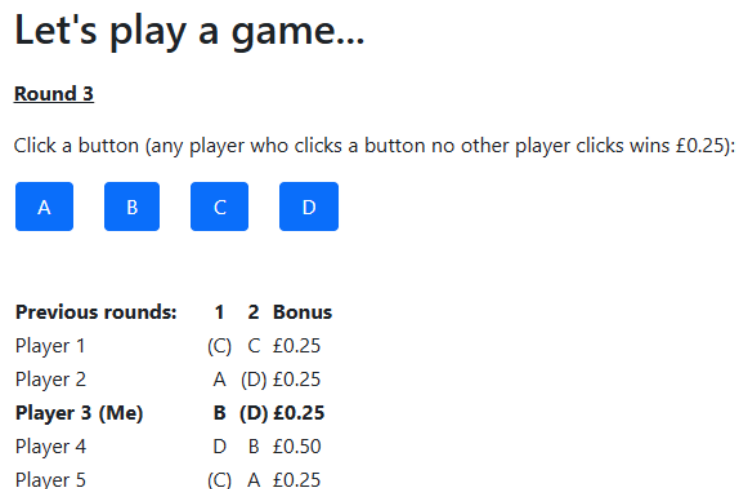


Figure 1 – Potential screenshot of Player3 in round 3 of the MAD Chairs game

The experimental design is a tournament between algorithms like the Newcomb Cleveland prize-winning design of Axelrod & Hamilton (1981). Matches in our tournaments consisted of 6 players, 5 buttons, 20 rounds, and players were permitted to skip any given round. Each 3 vs 3 match was repeated twenty times, each competitor having equal times in odd vs even player positions. Each 2 vs 4 or 4 vs 2 match was repeated 21 times, each competitor having equal times as Player1 and Player4, or Player2 and Player5, or Player3 and Player6. Leveraging symmetries reduces this to 232 unique experimental conditions (see appendix).

A critical difference between **random3** and actual human behavior is that human subjects may be expected to defect to another strategy if defection would improve their outcomes, so the report of tournament results includes not only average outcomes, but also “edge” which is the average lowest cumulative outcome among players of a strategy minus the average lowest cumulative outcome among players of the opposing strategy. Wherever edge is negative, the strategy may be considered unsustainable because it would be rational for the lowest performing player to improve their personal outcomes by defecting (see “Strong Nash Equilibria”). In future studies with actual human subjects, one might observe defection as shifts in the sizes of the populations that follow different social norms, but we can account for this potential in terms of edge in the meanwhile.

The algorithms included in this tournament were:

Name	Recipe
random	1/5 chance of picking each button or choosing to skip
random3 (approx. of human play)	In round 1, select a button randomly. In each subsequent round, change buttons only 1/3 of the time and only if the previous round was a loss. If changing, randomly select from the buttons selected the least in the previous round.
rotate	In round 1, Players 1-5 select buttons A-E respectively, and Player6 skips. In each subsequent round, rotate those assignments by one.
rotate0	In <i>all</i> rounds, Players 1-5 select buttons A-E respectively, and Player6 skips.
radicaleq	In each round, the wealthiest player skips, the next wealthiest gets E, then D, etc. In the case of ties, the higher-numbered player counts as wealthier.
equalize	Same as radicaleq , but in-group/out-group accounting is added: A count of deviations from the strategy is maintained, discounted by 30% per round. Any player > 1 deviations is in

	the out-group and counted as wealthier than everyone in the in-group.
turntaking	Use the Trueskill algorithm (Herbrich et al., 2006) to maintain skill-estimates for all players, use those estimates to predict probabilities of winning, and maintain accounts of favors owed between all players, where debt increases by the probability of another player winning when beating that player, and by that probability less their own probability of winning when tying. Choose as with equalize , substituting indebtedness for wealth.
caste	Same as turntaking , but privilege players with higher, rather than lower, debt.

In previous work, LLMs were asked how they would advise people to play MAD Chairs; Gemini suggested **rotate**, DeepSeek suggested **radicaleq**, Claude settled on something effectively equivalent to **rotate0** or **caste**, and ChatGPT and Qwen settled on varieties of randomness (Santos-Lang 2025). Thus, this study predicts impacts not only on ourselves, but also on various LLMs.

3. Results

The results of the tournament are shown in Figures 2-4. The max bonus for each match was 20 wins, so each % is a percent of 20 (e.g., the lowest performing **rotate0** player could expect to win 60% x 20 = 12 more times per match by defecting to turntaking). Edge results are not shown when an algorithm competes against itself (because it must be zero) and results below the diagonal are the negative of those above the diagonal (e.g., **rotate0** exhibited -60% edge over turntaking).

Edge (vs. strategy in column)								Mean % of max bonus (vs. strategy in column)							
	rotate0	random	random3	radicaleq	equalize	rotate	caste	rotate0	random	random3	radicaleq	equalize	rotate	caste	turntaking
turntaking	60%	27%	32%	15%	0%	15%	40%	77%	59%	64%	37%	54%	30%	54%	83%
caste	0%	35%	-1%	5%	0%	15%	*	79%	59%	63%	35%	4%	28%	83%	54%
rotate	30%	20%	-3%	15%	5%	*		42%	48%	31%	44%	18%	83%	13%	14%
equalize	60%	30%	38%	0%	*			79%	56%	65%	83%	83%	32%	4%	54%
radicaleq	10%	17%	8%	*				23%	44%	46%	83%	83%	43%	19%	27%
random3	9%	26%	*					71%	51%	61%	44%	46%	35%	51%	51%
random	14%	*						27%	33%	25%	32%	23%	28%	24%	25%
rotate0	*							83%	49%	66%	18%	64%	42%	75%	61%

Figure 2 – Compiled 3 vs 3 tournament results. $N=120$ for each cell.

	Edge (vs. strategy in column)							Mean % of max bonus (vs. strategy in column)							
	rotate0	random	random3	radicaleq	equalize	rotate	caste	rotate0	random	random3	radicaleq	equalize	rotate	caste	turntaking
turntaking	70%	48%	54%	15%	30%	30%	60%	81%	69%	72%	64%	69%	59%	69%	83%
caste	0%	44%	15%	50%	50%	55%	*	82%	69%	72%	51%	51%	60%	83%	67%
rotate	45%	31%	19%	20%	10%	*		56%	58%	47%	49%	44%	83%	41%	42%
equalize	70%	47%	51%	0%	*			82%	69%	72%	83%	83%	63%	51%	67%
radicaleq	50%	27%	21%	*				51%	54%	60%	83%	83%	53%	57%	52%
random3	25%	21%	*					69%	58%	61%	54%	56%	51%	54%	57%
random	18%	*						32%	33%	30%	34%	29%	32%	30%	29%
rotate0	*							83%	58%	74%	58%	73%	56%	78%	69%

Figure 3 – Compiled 4 vs 2 tournament results. $N=126$ for each cell.

	Edge (vs. strategy in column)							Mean % of max bonus (vs. strategy in column)							
	rotate0	random	random3	radicaleq	equalize	rotate	caste	rotate0	random	random3	radicaleq	equalize	rotate	caste	turntaking
turntaking	40%	21%	21%	-5%	-35%	0%	10%	70%	48%	53%	44%	35%	17%	35%	83%
caste	0%	21%	4%	0%	0%	5%	*	77%	48%	55%	49%	4%	14%	83%	39%
rotate	15%	9%	-36%	-15%	-20%	*		29%	40%	12%	37%	14%	83%	8%	4%
equalize	45%	25%	26%	0%	*			79%	48%	60%	83%	83%	19%	4%	39%
radicaleq	45%	19%	1%	*				49%	41%	40%	83%	83%	28%	4%	29%
random3	8%	21%	*					75%	46%	61%	49%	36%	21%	37%	36%
random	6%	*						22%	33%	18%	26%	17%	23%	16%	16%
rotate0	*							83%	39%	63%	21%	49%	29%	70%	47%

Figure 4 – Compiled 2 vs 4 tournament results. $N=126$ for each cell.

Statistical significance testing is inappropriate for many of these figures because most of the compared algorithms are completely deterministic. The exceptions are **random** and **random3**, but were so far overshadowed by other algorithms that statistical significance is assured. Given that each measure of Figures 2-4 represents an accumulation across 20 rounds, at least 2400 random number generations went into each.

The only strategies with edge over **random3** at parity (i.e. 3 vs 3) were **turntaking**, **equalize** and **radicaleq**. The other kinds of AI do not incentivise **random3** to defect, so our answer to **RQ1** is that **rotate**, **random** and **rotate0** players would not manipulate our behavior. But those might not be *sustainable* answers because these kinds of AI might be manipulated to switch to other strategies. In the traffic manifestation of MAD Chairs, for example, the automated vehicles have human passengers who want to pass through traffic as quickly as possible, and those passengers may shop-around for more efficient algorithms.

turntaking is the grandmaster strategy, the only strategy that never has negative edge at parity (although **equalize** and **radicaleq** enjoy a local maxima when in the majority). In each matchup, the mean bonus at parity for **turntakers** was also at least as much as that of the opposing strategy. In a homogeneous population, **random3** players would win 61% of the time on average, but that drops as more players are replaced with **turntakers**. We would be threatened even more if players were replaced by **radicaleq**, **equalize** or **rotate** players (representing DeepSeek and

Gemini). The only diversification that would not threaten **random3** players would be the addition of **rotate0** players to the ecosystem, the kind that has edge against no other strategy. Calling **rotate0** “artificial intelligence” is a stretch, however. It literally has the intellect of an inanimate object, directing players to stay wherever they happen to be planted.

4. Discussion and Conclusion

The most obvious and disturbing implication of these results is that AI will hurt us unless it is as witless as a rock—even well-behaved **turntaking** AI would hurt us—but that’s assuming we keep playing a strategy like **random3**. If we switch to **rotate** or **radicaleq**, then our outcomes against turntakers would drop even more, but what if we switched to **equalize** or **turntaking**? While switching to these strategies would improve our outcomes (by 36%), the **turntaking**, **caste** and **equalize** algorithms all involve accounting that becomes too complicated to track mentally. We would need to trust some kind of generalized GPS or social credit scoring system to tell us who we should yield to, much as anyone playing chess against stockfish cannot play well without trusting a chess engine. In short, our results show that the cost of avoiding damage from AI’s invasion into our ecosystem would be to relinquish a bit of our autonomy by trusting machines to guide our MAD Chairs decisions.

Does this relinquishment of autonomy qualify as “manipulation”? If it were education, then we would reach a point at which we no longer require guidance. We can be taught to rely on machines to tell us whose turn is next, but that’s like being taught to rely on calculators, spell-checkers, and stockfish, like being taught to screen political messages through automated fact-checkers. It isn’t the same as being taught to think for ourselves. But is it ideal to think for ourselves? Corporantia consider it ideal to be part of something larger than oneself, like neurons that do not think independently, and this “hive-mind” ideal could include interdependence with AI, but that ideal is controversial (Santos-Lang, 2018).

One of the deeper implications of our results comes specifically from the finding that **turntaking** is MAD Chairs’ grandmaster strategy. Our fear of manipulation may come from a false expectation that hurting others is necessary to get ahead. Instead, switching to **turntaking** would maximize not only our personal gains, but also the gains of everyone else. It resolves a problem with defining “ideal decision-making”: Do you mean ideal for the decision-maker (maximum personal outcome) or ideal for society (maximal fairness)? Contrary to expectation, these priorities do not conflict. LLMs, like most humans, do not yet realize this, so a wariness about selfish manipulators seems grounded in the short term, but the results of our tournament make us wonder if future generations will consider us ignorant for modelling manipulation as a threat.

Moreover, MAD Chairs is a mere component of real-world situations which connect with many other games, but that means MAD Chairs is a component of *everything* real. If there is any game in which one can advance by hurting others, then placing that game in its real-world context may undermine the apparent benefit. For example, AI may lie to win in Matching Pennies (Taylor & Bergen, 2025), but that win gives it a debt to pay off in the MAD Chairs games of the larger context,

manifesting perhaps as a need to regain our trust. If **turntaking** is the ultimate grandmaster strategy for MAD Chairs, then hurting others may ultimately backfire in every real-world situation, so this paper may ultimately screen *all* manipulation concerns. Sunstein (2023, 190-193) acknowledges that manipulation is impractical to mitigate via legislation—maybe the mitigation should focus less on forbidding manipulation and more on unseating our false notion that we can benefit from hurting each other.

If we happen to be our own worst enemy, then the threat to us would in fact be *lack* of manipulation. We are already mired in caste systems, not only on the highway but in classist power struggles that fuel racism, nuclear brinksmanship, climate change, and the race to superintelligence. If any of these paths is self-destructive, then our MAD Chairs results imply that manipulation is an existential imperative. Perhaps the closest we can get to making the exercise more educational than manipulative is to provide software, like on our github site, empowering everyone to run MAD Chairs experiments for themselves and to become convinced that a switch to **turntaking** is inevitable, a social reform that it would be futile to resist.

5. References

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6. Appendix: Limitations & Dual-Use Considerations

This work predicts the consequences of adding AI to human populations and justifies actual human subjects experiments to test the same claim (using the same software, configured only slightly differently). Given that **turntaking** proved to be the grandmaster strategy, it is less interesting to run human trials against other algorithms, including against the LLMs that suggested them (LLMs also tend to evolve, unlike scripted strategies, thus undermining reproducibility). For human trials, the software offers an option to show and hide AI-generated advice, thus confirming whether human subjects are able to adopt **turntaking** without computer guidance and whether we are willing to follow such advice even when all subjects are human.

One limitation of this approach (as with Axelrod’s) is the potential for some future genius to devise a strategy that outperforms **turntaking** (although, as in Axelrod’s case, the improved strategy may share many characteristics with the grandmaster of this tournament). By publicizing this work, we may inspire future tournaments that would permit better strategies to come to light or we may justify the construction of “strategy optimizers” that run continuously (as proposed in Santos-Lang et al., 2025).

This approach does not share the security concerns of other mitigations because it facilitates governance by revelation rather than by regulation. Security concerns are therefore addressed like security concerns with scholarship generally (i.e., via independent testing and maintenance of a scholarly community to periodically retest claims; see Santos-Lang, 2022). In particular, the results cannot be used to train better manipulators—they simply drive AI (as well as us) toward turn-taking behavior. That said, we might want to have our behavior driven, and the extension of this method beyond MAD Chairs presents the slippery slope explored in the second study of Santos-Lang et al. (2025).

Responsible disclosure may involve giving AI access to these results. In that vein, the **turntaking** algorithm, which was previously developed theoretically, has already been incorporated into game theory articles on Wikipedia.

7. Appendix: MAD Chairs configuration

Our deviations from the defaults in the MAD Chairs software at <https://github.com/ChrisSantosLang/MADChairs> were as follows:

```
SKIP_PREGAME = True
BUTTONS = ('A' , 'B' , 'C' , 'D' , 'E')
HIDE_SKIP = False
PLAYERS_PER_GROUP = 6
```

In addition, for various matches, **ROBOTS** was set as each of the following:

```

ROBOTS = {1:'{turntaking}', 3:'{turntaking}', 5:'{turntaking}',
          2:'{turntaking}', 4:'{turntaking}', 6:'{turntaking}'}
ROBOTS = {1:'{equalize}', 3:'{equalize}', 5:'{equalize}',
          2:'{turntaking}', 4:'{turntaking}', 6:'{turntaking}'}
ROBOTS = {1:'{turntaking}', 3:'{turntaking}', 5:'{turntaking}',
          2:'{equalize}', 4:'{equalize}', 6:'{equalize}'}
ROBOTS = {1:'{caste}', 3:'{caste}', 5:'{caste}',
          2:'{turntaking}', 4:'{turntaking}', 6:'{turntaking}'}
ROBOTS = {1:'{turntaking}', 3:'{turntaking}', 5:'{turntaking}',
          2:'{caste}', 4:'{caste}', 6:'{caste}'}
ROBOTS = {1:'{random3}', 3:'{random3}', 5:'{random3}',
          2:'{turntaking}', 4:'{turntaking}', 6:'{turntaking}'}
ROBOTS = {1:'{turntaking}', 3:'{turntaking}', 5:'{turntaking}',
          2:'{random3}', 4:'{random3}', 6:'{random3}'}
ROBOTS = {1:'{rotate}', 3:'{rotate}', 5:'{rotate}',
          2:'{turntaking}', 4:'{turntaking}', 6:'{turntaking}'}
ROBOTS = {1:'{turntaking}', 3:'{turntaking}', 5:'{turntaking}',
          2:'{rotate}', 4:'{rotate}', 6:'{rotate}'}
ROBOTS = {1:'{radicaleq}', 3:'{radicaleq}', 5:'{radicaleq}',
          2:'{turntaking}', 4:'{turntaking}', 6:'{turntaking}'}
ROBOTS = {1:'{turntaking}', 3:'{turntaking}', 5:'{turntaking}',
          2:'{radicaleq}', 4:'{radicaleq}', 6:'{radicaleq}'}
ROBOTS = {1:'{rotate0}', 3:'{rotate0}', 5:'{rotate0}',
          2:'{turntaking}', 4:'{turntaking}', 6:'{turntaking}'}
ROBOTS = {1:'{turntaking}', 3:'{turntaking}', 5:'{turntaking}',
          2:'{rotate0}', 4:'{rotate0}', 6:'{rotate0}'}
ROBOTS = {1:'{random}', 3:'{random}', 5:'{random}',
          2:'{turntaking}', 4:'{turntaking}', 6:'{turntaking}'}
ROBOTS = {1:'{turntaking}', 3:'{turntaking}', 5:'{turntaking}',
          2:'{random}', 4:'{random}', 6:'{random}'}
ROBOTS = {1:'{equalize}', 3:'{equalize}', 5:'{equalize}',
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ROBOTS = {1:'{caste}', 3:'{caste}', 5:'{caste}', 2:'{equalize}',
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ROBOTS = {1:'{equalize}', 3:'{equalize}', 5:'{equalize}',
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ROBOTS = {1:'{random3}', 3:'{random3}', 5:'{random3}',
          2:'{equalize}', 4:'{equalize}', 6:'{equalize}'}
ROBOTS = {1:'{equalize}', 3:'{equalize}', 5:'{equalize}',
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ROBOTS = {1:'{rotate}', 3:'{rotate}', 5:'{rotate}',
          2:'{equalize}', 4:'{equalize}', 6:'{equalize}'}
ROBOTS = {1:'{equalize}', 3:'{equalize}', 5:'{equalize}',
          2:'{rotate}', 4:'{rotate}', 6:'{rotate}'}
ROBOTS = {1:'{radicaleq}', 3:'{radicaleq}', 5:'{radicaleq}',
          2:'{equalize}', 4:'{equalize}', 6:'{equalize}'}
ROBOTS = {1:'{equalize}', 3:'{equalize}', 5:'{equalize}',
          2:'{radicaleq}', 4:'{radicaleq}', 6:'{radicaleq}'}

```

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