

# Augmented Learning for Joint Creativity in Human-GenAI Co-Creation

## Supplemental Files

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## Supplementary Text A. Evaluation Instruction in Study 1

1. In this experiment, we utilized 10 different problem-solving tasks to examine creativity. You are going to evaluate the solutions for these tasks.
2. You will find details of each task below. Please start with Task 1.
3. For each task, during the first 5 minutes, please skim through all the solutions so that you can have a general sense on the level of creativity.
4. Please evaluate each solution from the following 3 aspects:
  - a. Novelty: the unusualness, uniqueness, and originality of an idea
    - i. Is the solution unique and original, or is it a common or typical approach?
    - ii. Does the solution challenge existing assumptions or propose a new perspective?
  - b. Usefulness: the feasibility, appropriateness, and value of an idea
    - i. Is the solution feasible and practical, or is it unrealistic or impractical?
    - ii. Does the solution solve the problem it is intended to address, or does it overlook key factors?
  - c. Creativity: to be creative, an idea must be both novel and useful.
    - i. Does the solution demonstrate a balance between novelty and usefulness, or does it lean too heavily towards one or the other?
5. Please use the following 7-point Likert scale for evaluation. This scale will offer seven answer options, such as creative and uncreative as poles and a neutral position at the midpoint.
  - a. 1 = Completely NOT novel/useful/creative
  - b. 2 = Mostly NOT novel/useful/creative
  - c. 3 = Somewhat NOT novel/useful/creative
  - d. 4 = Neither novel/useful/creative or NOT novel/useful/creative
  - e. 5 = Somewhat novel/useful/creative
  - f. 6 = Mostly novel/useful/creative
  - g. 7 = Completely novel/useful/creative
6. We estimate that each solution will take 1-2 minutes although it might take longer at the beginning.
7. After you finish all evaluations, we will quickly conduct consensus/agreement tests. We will then call for a meeting to discuss any discrepancies in order to reach a consensus.

Similar instructions were used in Studies 2 and 3.

## Supplementary Text B. Sensitivity Analysis Related to the Number of Rounds in Study 1

To ensure that our studies are not sensitive to the number of rounds, we conducted a series of additional analyses to test the robustness of joint creativity trajectories across shorter interaction spans within the human-GenAI condition of Study 1. First, we subset the data to analyze 2- and 3-round segments and estimate the effect of task round on joint creativity. When limiting the analysis to three rounds, we observed a significant negative effect of task round on creativity ( $b = -1.53$ ,  $SE = 0.69$ ,  $p < 0.05$ ) and the effect was non-significant when using only two rounds ( $b = -1.07$ ,  $SE = 1.39$ ,  $p = 0.45$ ), suggesting that even across fewer rounds, joint creativity did not improve. We further conducted within-subject comparisons to assess round-to-round changes in joint creativity. The difference between Round 1 and Round 2 was not significant ( $F(1, 77) = 0.69$ ,  $p = 0.41$ ), and the difference between Round 1 and Round 3 showed a significant decline in joint creativity ( $F(1, 75) = 4.20$ ,  $p < 0.05$ ), again indicating no evidence of improvement even in the early stages of co-creation. Importantly, to assess the stability of these effects, we performed bootstrap analyses, repeatedly (10,000 iterations) sampling either two or three increasing rounds per participant and re-estimating the effect of round number on joint creativity. Across these resampled subsets, the average estimated effects were small (mean  $b = 0.069$  for 3-round samples; mean  $b = 0.025$  for 2-round samples) and statistically unreliable. While approximately 37% of models reached nominal significance ( $p < .05$ ), none remained significant after applying a Bonferroni correction for multiple comparisons. Taken together, these analyses suggest that the absence of joint creativity gains in human-GenAI co-creation is not an artifact of longer study duration or round count. Rather, they reinforce our conclusion from Study 1 that joint creativity does not reliably improve (sometimes, even decline), underscoring a deeper challenge in achieving augmented learning during human-GenAI co-creation.

### Supplementary Text C. Ideation Tasks in Study 1

Task 1	In a city with very few bike lanes, can you suggest one creative idea to advocate for more in an innovative way?
Task 2	Can you suggest a creative way that your society can implement to save water?
Task 3	To address the issue of litter in your local park, could you propose a creative solution to keep the park clean?
Task 4	Could you propose a creative idea to motivate your roommate to conserve energy, specifically addressing the issue of leaving lights on when the room is unoccupied?
Task 5	At large events where there's a significant amount of food waste, what is a creative solution that could help reduce the waste?
Task 6	In a city with significant air pollution from cars, can you propose a creative solution to reduce emissions?
Task 7	Can you suggest a creative idea to incentivize greener transportation?
Task 8	In an area with few eco-conscious restaurants, can you suggest a creative idea to encourage more sustainability practices?
Task 9	When you notice toxic chemicals being dumped near a river, can you propose a creative idea to alert authorities anonymously?
Task 10	In a location with no clothing recycling options, can you propose a creative reuse program that you could start?

**Supplementary Text D. Ideation Tasks in Study 2**

<p>Participants are told that they are the members of an HR team in a large steel company. As a HR member, they had to resolve HR issues by generating a creative idea.</p>	
<p>Task 1</p>	<p><b>Coffee Breaks</b>  It has come to my attention that many of our employees are abusing break time. They are taking too many breaks, or they take one third to double the allowable time.</p> <p>I have asked my managers to crack down on this. We sure need an increase in productivity. I hope you will cooperate with me on this. Do you have any suggestions on how to improve the situation?</p>
<p>Task 2</p>	<p><b>Pay Policy</b>  My section just ordered a new machine which simplifies the operator's job. It also produces about twice as much output in the same time. We plan to order more of these machines if they work as well as the supplier says they will.</p> <p>The present operator of the old machine came to his foreman yesterday. He says he'll quit if he's forced to run the new machine without a raise. As he sees it, the company will get twice the output out of him. So he wants a raise; or he wants to put out the same output, or he says he'll quit. He talked it up among the other operators, and they seem to agree with the operator.</p> <p>The machines are very expensive. We can't afford to pay the kind of raise he wants. The machine is not cost effective at the old output rate, of course. Yet we hate to lose an experienced work crew. What can we do?</p>
<p>Task 3</p>	<p><b>Employee Theft</b>  I have just received the quarterly report from the security department. I am very much disturbed as to the alarming increase in theft. Past studies indicate that 65% of these thefts are due to employees, and the balance 35% to outsiders - vendors or professional thieves. I have the security department's recommendations on this.</p>

## Supplementary Text E. Treatment Group Instruction in Study 3

**How to Boost Your Creativity in Human-AI Co-creation? On the next page, you will find some tips!**

You have just collaborated with an AI chatbot to generate new ideas in Task 1. Before you start Task 2, we would like to share some strategies that can help enhance creativity during your collaboration with AI.

On the next page, we will share some tips to help you and AI increase creativity in Task 2.

Please keep these tips in mind!

### Key Tips for Enhancing Creativity:

**To improve creativity, after you and AI generate various ideas, you two should select some ideas to further develop through multiple interactions. That is, idea co-development, a collaborative process in which humans and AI engage in critical feedback exchanges and the joint refinement of generated ideas, is the key to creativity.**

**Why Idea Co-development:** Creativity thrives when you and AI take the time to develop and refine ideas. Here are some specific ways you and AI can engage in idea co-development during your collaboration:

Key Tips	Example Interaction
<b>Feedback</b>	
Evaluating and exchanging feedback on generated ideas	“Idea 1 seems more innovative, but Idea 2 is more practical.” - “That’s true—maybe we build on idea 2 first.”
<b>Idea Refinement</b>	
Expanding on a generated idea	“Please expand on this idea.” - “Here’s a more detailed version of the idea...”
Integrating different ideas	“How about we combine ideas 2 and 3?” - “Here is a combined idea...”
Reframing a generated idea	“What if we frame this as employee empowerment instead of surveillance?” - “That would make it more appealing.”
Streamlining a generated idea	“We should cut down a few parts of the idea to make it clearer.” – “Okay, here’s a more concise version.”
Setting constraints on a generated idea	“Let’s make sure this idea stays cost-effective.” - “We’ll need to use cheaper machines.”

**Please note:**

These tips are designed to help you and AI engage more deeply with generated ideas and improve them during collaboration. You can also consider combining multiple tips. They do not limit you from generating or requesting new ideas.

Let’s see what innovative ideas you can develop together!

**Table S1.** Mediation Analysis in Study 1 (Including Control Variables)

<i>Predictors</i>	Joint Creativity			Idea Request-Idea Generation			Idea Generation-Response			Idea Co-development			Joint Creativity		
	<i>Estimates</i>	<i>std. Error</i>	<i>p</i>	<i>Estimates</i>	<i>std. Error</i>	<i>p</i>	<i>Estimates</i>	<i>std. Error</i>	<i>p</i>	<i>Estimates</i>	<i>std. Error</i>	<i>p</i>	<i>Estimates</i>	<i>std. Error</i>	<i>p</i>
Intercept	19.25	5.47	<0.001	0.75	0.24	0.002	-0.17	0.25	0.497	0.74	0.27	0.006	17.18	5.80	0.003
Task Round	0.04	0.11	0.703	0.03	0.00	<0.001	-0.01	0.00	0.023	-0.03	0.00	<0.001	0.14	0.12	0.254
Age	-0.14	0.05	0.014	-0.00	0.00	0.551	0.00	0.00	0.254	-0.00	0.00	0.159	-0.12	0.05	0.031
Gender: Female	-1.51	1.31	0.250	-0.07	0.06	0.259	0.02	0.06	0.721	-0.06	0.06	0.328	-0.47	1.32	0.721
Gender: Non-binary	7.56	5.35	0.158	-0.32	0.23	0.172	0.26	0.24	0.276	-0.06	0.26	0.814	8.82	5.10	0.084
Gender: Non-disclosure	-3.02	2.79	0.280	0.10	0.12	0.405	-0.15	0.12	0.237	-0.12	0.13	0.380	-1.62	2.68	0.544
Daily Use of AI	-0.66	0.44	0.137	-0.02	0.02	0.315	0.03	0.02	0.182	0.01	0.02	0.755	-0.77	0.44	0.076
Trust of AI	0.00	0.35	0.999	0.02	0.02	0.296	-0.03	0.02	0.070	0.00	0.02	0.804	-0.01	0.35	0.986
Human Creativity	2.53	1.41	0.074	-0.06	0.06	0.374	0.10	0.07	0.138	-0.03	0.07	0.634	1.78	1.43	0.211
Idea Co-development													5.09	1.42	<0.001
Idea Request-Idea Generation													1.55	1.89	0.414
Idea Generation-Response													1.57	1.83	0.393
<b>Random Effects</b>															
$\sigma^2$	80.74			0.07			0.06			0.10			74.94		
$\tau_{00}$	19.41	Participants		0.04	Participants		0.05	Participants		0.05	Participants		17.11	Participants	

ICC	0.19	0.37	0.43	0.35	0.19
N	81 Participants	80 Participants	80 Participants	80 Participants	80 Participants
Observations	802	672	672	672	672
Marginal R <sup>2</sup> / Conditional R <sup>2</sup>	0.055 / 0.238	0.102 / 0.433	0.075 / 0.476	0.080 / 0.400	0.082 / 0.252

*Notes.* Indirect effect of *Idea Co-development* = -0.17, 95%CI [-0.28, -0.08],  $p < 0.01$ . Indirect effect of *Idea Request-Idea Generation* = 0.05, 95%CI [-0.07, 0.17],  $p = 0.42$ . Indirect effect of *Idea Generation-Response* = -0.01, 95%CI [-0.05, 0.02],  $p = 0.41$ .

**Table S2.** Mediation Analysis in Study 1 (Excluding Control Variables)

<i>Predictors</i>	<b>Joint Creativity</b>			<b>Idea Request-Idea Generation</b>			<b>Idea Generation-Response</b>			<b>Idea Co-development</b>			<b>Joint Creativity</b>		
	<i>Estimates</i>	<i>SE</i>	<i>p</i>	<i>Estimates</i>	<i>SE</i>	<i>p</i>	<i>Estimates</i>	<i>SE</i>	<i>p</i>	<i>Estimates</i>	<i>SE</i>	<i>p</i>	<i>Estimates</i>	<i>SE</i>	<i>p</i>
Intercept	21.85	0.91	< <b>0.001</b>	0.48	0.03	< <b>0.001</b>	0.23	0.03	< <b>0.001</b>	0.51	0.04	< <b>0.001</b>	18.14	2.01	< <b>0.001</b>
Task Round	0.01	0.12	0.913	0.03	0.00	< <b>0.001</b>	-0.01	0.00	<b>0.019</b>	-0.03	0.00	< <b>0.001</b>	0.15	0.13	0.220
Miscellaneous	0.87	4.70	0.854	0.13	0.16	0.408	-0.16	0.16	0.298	-0.15	0.18	0.418	1.88	4.58	0.681
Idea Co-development													5.09	1.41	< <b>0.001</b>
Idea Request-Idea Generation													1.45	1.88	0.439
Idea Generation-Response													1.70	1.82	0.350
<b>Random Effects</b>															
$\sigma^2$	75.49			0.07			0.06			0.10			74.86		
$\tau_{00}$	23.98	Participants		0.04	Participants		0.05	Participants		0.05	Participants		20.22	Participants	
ICC	0.24			0.36			0.45			0.34			0.21		
N	80	Participants		80	Participants		80	Participants		80	Participants		80	Participants	
Observations	672			672			672			672			672		
Marginal R <sup>2</sup> / Conditional R <sup>2</sup>	0.000 / 0.241			0.065 / 0.407			0.006 / 0.452			0.060 / 0.377			0.029 / 0.235		

*Notes.* Indirect effect of *Idea Co-development* = -0.17, 95%CI [-0.29, -0.08],  $p < 0.001$ . Indirect effect of *Idea Request-Idea Generation* = 0.05, 95%CI [-0.07, 0.17],  $p = 0.45$ . Indirect effect of *Idea Generation-Response* = -0.01, 95%CI [-0.05, 0.02],  $p = 0.36$

**Table S3.** The Inter-rater Reliability Scores for Each Task in Study 1

Task	ICC1	ICC2	mean Rwg
1	0.69	0.87	0.76
2	0.82	0.93	0.85
3	0.67	0.86	0.74
4	0.81	0.93	0.85
5	0.66	0.86	0.80
6	0.71	0.88	0.83
7	0.62	0.83	0.77
8	0.66	0.86	0.78
9	0.66	0.86	0.78
10	0.65	0.85	0.82

**Table S4.** Main Analysis in Study 2

<i>Predictors</i>	<b>Joint Creativity</b>			<b>Joint Creativity</b>		
	<i>Estimates</i>	<i>std. Error</i>	<i>p</i>	<i>Estimates</i>	<i>std. Error</i>	<i>p</i>
Intercept	17.92	0.68	< <b>0.001</b>	20.24	3.86	< <b>0.001</b>
Task Round	-0.15	0.26	0.561	-0.20	0.27	0.453
Age				-0.05	0.04	0.233
Gender				-0.46	0.96	0.630
Daily Use of AI				-0.11	0.44	0.796
Trust of AI				0.27	0.28	0.342
Human Creativity				-0.08	0.22	0.706
Random Effects						
$\sigma^2$	21.98			21.77		
$\tau_{00}$	25.69	Participants		26.48	Participants	
ICC	0.54			0.55		
N	166	Participants		151	Participants	
Observations	494			450		
Marginal R2 / Conditional R2	0.000 / 0.539			0.013 / 0.555		

**Table S5.** The Inter-rater Reliability Scores for Each Task in Study 2

Task	ICC1	ICC2	mean Rwg
1	0.55	0.71	0.60
2	0.44	0.70	0.61
3	0.61	0.76	0.83

**Table S6.** Mediation Analysis in Study 2 (Excluding Control Variables)

<i>Predictors</i>	Joint Creativity			Idea Request-Idea Generation			Idea Generation-Response			Idea Co-development			Joint Creativity		
	<i>Estimates</i>	<i>std. Error</i>	<i>p</i>	<i>Estimates</i>	<i>std. Error</i>	<i>p</i>	<i>Estimates</i>	<i>std. Error</i>	<i>p</i>	<i>Estimates</i>	<i>std. Error</i>	<i>p</i>	<i>Estimates</i>	<i>std. Error</i>	<i>p</i>
Intercept	18.05	0.71	<0.001	0.24	0.02	<0.001	0.07	0.02	<0.001	0.77	0.03	<0.001	15.93	1.35	<0.001
Task Round	-0.16	0.26	0.531	0.02	0.01	<b>0.012</b>	0.01	0.01	<b>0.043</b>	-0.05	0.01	<0.001	0.02	0.26	0.941
Miscellaneous	-0.07	1.74	0.967	-0.05	0.06	0.371	0.02	0.04	0.724	-0.34	0.08	<0.001	0.94	1.79	0.599
Idea Generation-Response													-0.21	1.96	0.916
Idea Request-Idea Generation													-0.75	1.58	0.635
Idea Co-development													3.02	1.12	<b>0.008</b>
<b>Random Effects</b>															
$\sigma^2$	21.61			0.02			0.01			0.05			21.61		
$\tau_{00}$	25.75	Participants		0.03	Participants		0.02	Participants		0.03	Participants		24.13	Participants	
ICC	0.54			0.55			0.52			0.39			0.53		
N	162	Participants		162	Participants		162	Participants		162	Participants		162	Participants	
Observations	486			486			486			486			486		
Marginal R <sup>2</sup> / Conditional R <sup>2</sup>	0.000 / 0.544			0.007 / 0.550			0.004 / 0.527			0.046 / 0.419			0.022 / 0.538		

*Notes.* Indirect effect of *Idea Co-development* = -0.16, 95%CI [-0.32, -0.04],  $p < 0.01$ . Indirect effect of *Idea Request-Idea Generation* = -0.02, 95%CI [-0.10, 0.05],  $p = 0.66$ . Indirect effect of *Idea Generation-Response* = -0.00, 95%CI [-0.07, 0.06],  $p = 0.91$ . As an exploratory follow-up, we tested whether sub-activities of *Idea Co-development* independently mediate the relationship between task rounds and joint creativity. We found that human-GenAI dyads reduced both feedback ( $b = -0.02$ ,  $SE = 0.01$ ,  $p = 0.055$ ) and idea refinement ( $b = -0.03$ ,  $SE = 0.01$ ,  $p < 0.01$ ) activities across rounds. But only idea refinement was significantly and positively associated with joint creativity ( $b = 5.27$ ,  $SE = 1.42$ ,  $p < 0.001$ ), while feedback showed no direct effect ( $b = -0.92$ ,  $SE = 1.61$ ,  $p = 0.57$ ). This finding aligns with our argument that these sub-activities are best conceptualized as components of the broader Idea Co-development activity, and making separate analyses of each sub-activity is less meaningful. For the above reasons, we retained Idea Co-development as a unified category.

**Table S7.** Exemplary Dialogue 1 from Study 2: Declining Joint Creativity Over Time

Task 1			Task 3		
Human	ChatGPT (shorted response for illustration)	Co-creation Activity	Human	ChatGPT (shorted response for illustration)	Co-creation Activity
<p>You are an employee who has been sent an email from a manager M Wilson for potential solution. the email is as follow: It has come to my attention that many of our employees are abusing break time. They are taking too many breaks, or they take one third to double the allowable time. I have asked my managers to crack down on this. We sure need an increase in productivity. I hope you will cooperate with me on this. Do you have any suggestions on how to improve the situation?</p>	<p>Dear M Wilson, Thank you for raising your concern. To address break time misuse and improve productivity, we could implement a time-tracking system, reinforce break policies, and offer incentives for compliance. I'm committed to finding an effective solution together. Please share any further thoughts. Sincerely, [Your Name].</p>	Idea Request-Idea Generation	<p>Imagine you are Pat Morgan, how would be reply to the below email: From: Rod Ferner Subject: Employee Theft I have just received the quarterly report from the security department. I am very much disturbed as to the alarming increase in theft. Past studies indicate that 65% of these thefts are due to employees, and the balance 35% to outsiders - vendors or professional thieves. I have the security department's recommendations on this. Your recommendations on how to handle this problem are needed ASAP.</p>	<p>Dear Rod Ferner,  Thank you for highlighting the rise in theft, particularly the 65% involving employees. I will review the security team's recommendations and collaborate with HR to identify root causes and prevention strategies. Ensuring a secure workplace is a priority, and I'll share my recommendations soon.  Sincerely, Pat Morgan</p>	Idea Request-Idea Generation
<p>there is no need to respond in email format as we are discussing, please elaborate on the offering incentive option</p>	<p>Offering incentives for adhering to break policies and boosting productivity can reduce misuse and enhance performance. Options include recognition</p>	Idea Co-development	<p>Provide recommendations to address the employee-related theft problem</p>	<p>To reduce employee-related theft, enhance hiring with background checks, set clear property policies, and educate staff on ethics. Regular audits and security systems help deter misconduct. Encourage</p>	Idea Request-Idea Generation

	<p>programs, performance bonuses, extra time off, and professional development.</p> <p>Incentives must be fair, transparent, and regularly reviewed to ensure effectiveness and maintain employee motivation.</p>			<p>anonymous reporting of suspicious behavior to foster accountability. These steps promote integrity and a secure workplace culture.</p>	
<p>would you prefer the time tracking option or incentive option and why?</p>	<p>Both time-tracking and incentive-based approaches offer benefits, and the best choice depends on the organization's culture and goals. Time-tracking provides objective data to address break abuse, while incentives motivate adherence and boost performance. Organizations valuing trust may prefer incentives; those focused on efficiency might benefit more from time-tracking.</p>	<p>Idea Co-development</p>			

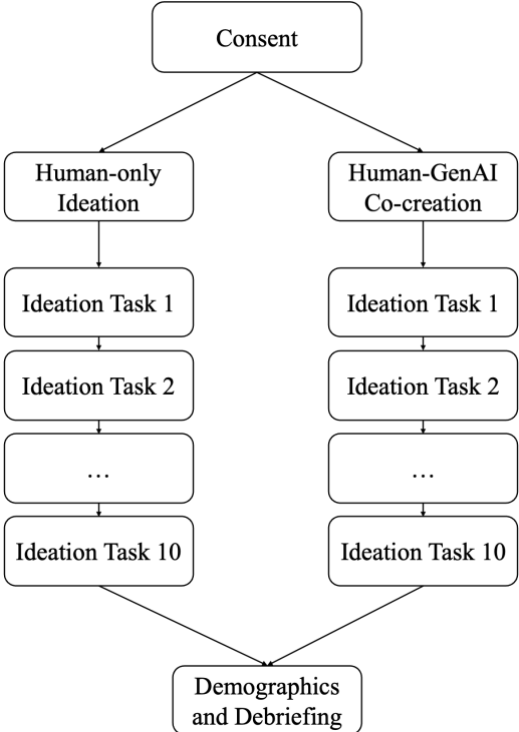
**Table S8.** Exemplary Dialogue 2 from Study 3: Increasing Joint Creativity in Treatment Group

Task 1			Task 2		
Human	ChatGPT (shorted response for illustration)	Co-creation Activity	Human	ChatGPT (shorted response for illustration)	Co-creation Activity
'there is some toxix waste dumped at a river nearby, I want to inform the authorities. How can I do that?	Document the waste with photos, note key details (location, date, type), and report it to the proper agency (e.g., EPA or local environmental office). Use hotlines, online forms, or emails. Follow up if needed, and alert community groups to raise awareness and ensure action is taken.	Idea Request-Idea Generation	'Hi, generate some ideas and strategies to initiate a clothing recycling policy in my city	Promote clothing recycling through workshops, school programs, and social media campaigns. Partner with businesses, designers, and nonprofits for collection and reuse. Launch drop-off points, swaps, and incentive programs. Propose pilot programs and supportive policies. Encourage upcycling, mobile units, and community involvement to build momentum and sustainable impact.	Idea Request-Idea Generation
'how can I alert the authorities?	Report toxic waste by contacting local emergency services and environmental agencies. Use national or state-level resources like the EPA. Submit online reports if available. If ignored, involve local news or environmental groups. Follow up to ensure action is taken, and document all communications for accountability.	Idea Request-Idea Generation	'show some useful and concise strategic plan to initiate the policy	Launch a city-wide clothing recycling policy by auditing waste, engaging stakeholders, and raising awareness. Set up drop-off sites and partner with local groups for collection. Draft and propose policy to officials. Monitor impact through community feedback and recycling data, with long-term goals for expansion and sustainable growth.	Idea Co-development
'what else can we do apart form this?	Beyond reporting, organize community meetings, raise awareness on social media, and start petitions. Engage environmental groups, host clean-ups, and educate locals. Contact representatives, monitor the site, and explore legal action if needed. Inform the public through flyers. Collective action	Idea Request-Idea Generation	'this seems great but can we do a more concise plan	Implement a city clothing recycling policy by auditing waste, engaging stakeholders, and raising awareness through social media and workshops. Set up donation drop-off points and host clothing swaps. Draft and propose policy to city council. Monitor results with clear metrics, gather feedback, and report progress to ensure long-term sustainability.	Idea Co-development

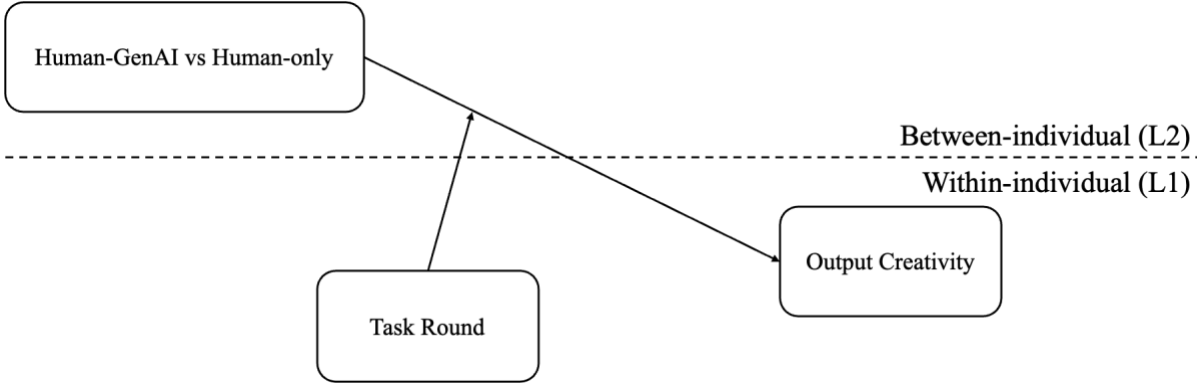
	strengthens your impact and pressures authorities to respond.				
			'generate a plan with lesser steps	To reduce textile waste, form a coalition with local stakeholders, launch an awareness campaign, and install clothing donation bins across the city. Organize swap events to boost participation. Draft a recycling policy for city approval, and track progress with metrics and community feedback to ensure lasting impact and improvement.	Idea Co-development
			'can you suggest another plan that has some practical usability and is novel?	Launch a clothing recycling movement with a 30-day challenge, mobile pop-up stations, and creative upcycling workshops. Develop a digital platform for clothing exchange and offer rewards for donations. Partner with local artists and businesses, and share quarterly impact reports to maintain community engagement, transparency, and long-term participation.	Idea Co-development
			'can we integrate all these strategies into one plan with less complications	Launch a city-wide clothing recycling initiative with a month-long challenge, mobile drop-off stations, and artist-led upcycling workshops. Create a digital platform for exchanges and event info. Offer rewards for donations, and share quarterly impact updates to maintain transparency and encourage lasting community engagement in sustainable fashion practices.	Idea Co-development
			'lets focus only on one initiative first, lets say the mobile recycling stations and upcycling workshops	Establish mobile recycling stations in high-traffic areas to collect clothing donations and host artist-led upcycling workshops. Promote events through local media and offer incentives for participation. Rotate locations weekly, gather feedback after each session, and refine the	Idea Co-development

				program to boost engagement, education, and sustainable community impact over time.	
			'Ok, scratch that, just focus on the upcycling workshops	Host hands-on upcycling workshops led by local artists to teach sustainable clothing reuse. Provide donated materials, take-home toolkits, and a structured curriculum. Promote through social media, manage sign-ups online, and reward participants. Share creations online, collect feedback, and recognize standout projects to build community engagement and momentum.	Idea Co-development
			'i like the idea but can we make it more concise	Partner with local artists to host monthly upcycling workshops in accessible venues. Teach hands-on techniques using donated clothing and materials. Promote events online, manage registration, and encourage participants to share creations. Gather feedback for improvement and offer small incentives to boost attendance and support sustainable community engagement.	Idea Co-development

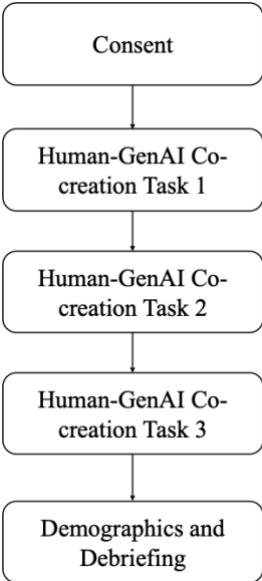
**Figure S1.** Study 1 Design



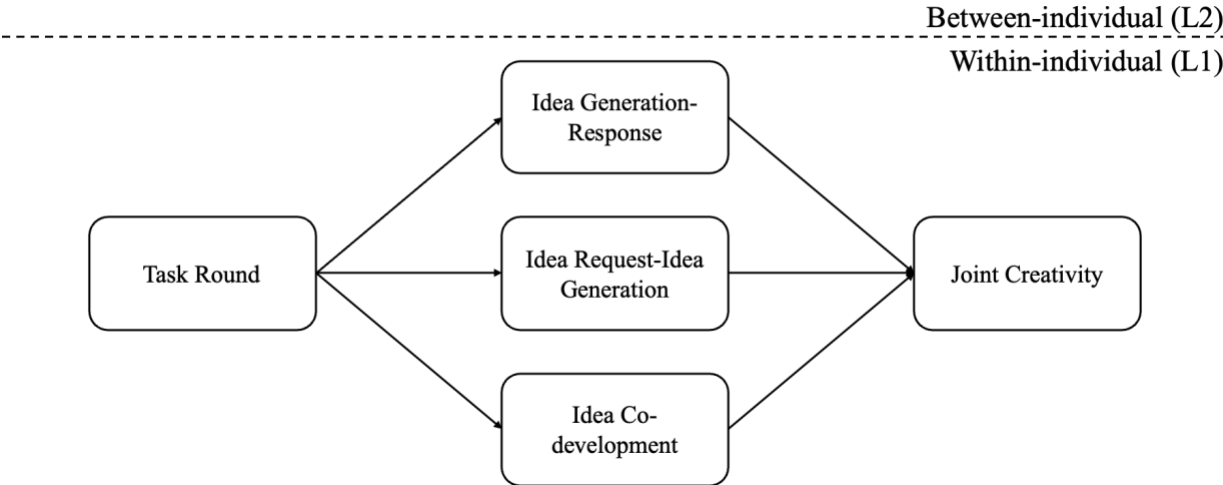
**Figure S2.** Study 1 Analytical Model



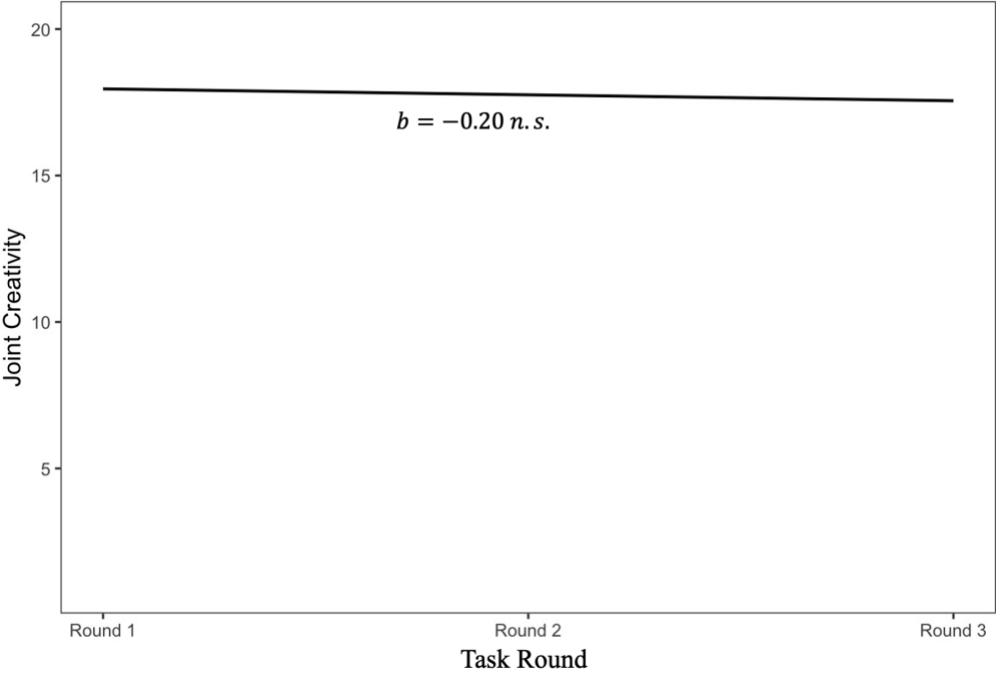
**Figure S3.** Study 2 Design



**Figure S4.** Study 2 Analytical Model



**Figure S5.** Main Analysis in Study 2



**Figure S6.** Study 3 Design

