

****Unlocking the Potential of Generative AI in Behavioural Research: A New Frontier****

In January 2025, a groundbreaking webinar series kicked off, exploring the intersection of artificial intelligence (AI) and behavioural research. The first session, focused on ***generative AI***, set the stage for a deeper understanding of how AI can revolutionise the way we study human behaviour. This blog post will summarise the key insights from the webinar, offering a glimpse into the exciting possibilities—and challenges—of using AI in behavioural research.

**What is Generative AI, and How Does It Differ from Analytical AI?**

AI is a broad term that encompasses a range of technologies, but for the purposes of behavioural research, it's helpful to distinguish between two main types: ****generative AI**** and ****analytical AI****.

- ****Generative AI**** is all about creating new content. Whether it's text, images, or even entire research studies, generative AI tools like ChatGPT, Claude, and DeepSeek are designed to produce original outputs based on user inputs. These tools are particularly useful for tasks like drafting papers, generating ideas, or even creating intervention designs.

- ****Analytical AI****, on the other hand, is focused on making sense of existing data. Tools like IBM Watson classify information, make predictions, and provide insights based on patterns in the data. This type of AI is commonly used in fields like fraud detection, weather forecasting, and medical diagnosis.

The webinar primarily focused on generative AI, as it offers unique opportunities for behavioural researchers to streamline their work and generate innovative ideas.

**A Brief History of AI: From Logic-Based Systems to Deep Neural Networks**

AI has come a long way since its early days in the 1990s, when logic-based systems ruled the roost. These early AI systems relied on strict rules and absolute truths, making them useful for specific tasks—like diagnosing medical conditions—but limited in their flexibility.

Fast forward to today, and ****deep neural networks**** have taken centre stage. These networks, which consist of multiple layers of interconnected nodes, are capable of processing vast amounts of data and learning complex patterns. The “deep” in deep neural networks refers to the multiple layers that allow these systems to perform tasks like image recognition, language translation, and even generating new content.

Generative AI models, in particular, have made significant strides in recent years. By converting information into numeric representations, these models can generate content across different languages and modalities, making them incredibly versatile tools for researchers.

How Does Generative AI Work?

At its core, generative AI relies on **prompt engineering**—the art of crafting specific instructions to guide the model's output. For example, a researcher might instruct the model to “generate a concise bullet point list of behaviour change techniques to support healthy eating.” By refining the prompt, the researcher can elicit more precise and useful responses.

The context provided by the user also plays a crucial role. Generative AI models take into account both the immediate input and prior interactions within the same conversation, allowing for more coherent and contextually relevant outputs.

One of the key takeaways from the webinar was the importance of **prompt specificity**. The more specific the question, the more tailored the response. For instance, asking for a “one-paragraph summary” or instructing the model to “think step by step” can dramatically improve the quality of the output.

**Practical Applications of Generative AI in Behavioural Research

Generative AI has a wide range of applications in behavioural research, from mundane tasks to more complex analytical work. Here are some of the ways researchers can leverage these tools:

1. **Summarising Documents:** AI can quickly condense lengthy research papers or reports into concise summaries, saving researchers valuable time.
2. **Preparing Presentations:** Need to create slides or bullet points for a talk? Generative AI can help structure your content and generate ideas for visuals.
3. **Generating Ideas:** Stuck in a creative rut? AI can brainstorm new research questions, intervention strategies, or even potential hypotheses.

4. **Drafting Papers:** From outlining a research paper to drafting entire sections, AI can assist with the writing process, allowing researchers to focus on refining their arguments.

5. **Thematic Analysis:** AI can help identify themes and patterns in qualitative data, making it easier to analyse large datasets.

6. **Literature Reviews:** Conducting a scoping review? AI can assist with searching for relevant studies and summarising key findings.

One of the most exciting benefits of generative AI is its ability to **generate ideas that might not occur to a human researcher**. By offering fresh perspectives and novel approaches, AI can help kickstart projects and inspire new lines of inquiry.

However, the webinar also emphasised the importance of **subject matter expertise**. While AI can generate content, it's up to the researcher to identify errors, vagueness, or biases in the output. Human oversight remains critical to ensuring the validity and reliability of AI-generated results.

Using AI for Intervention Design

One of the most promising applications of generative AI is in the design of behavioural interventions. The webinar outlined a step-by-step process for using AI to develop effective interventions:

1. **Generate a Long List:** Start by using a general language model (like ChatGPT or Claude) to generate a broad list of potential intervention components.

2. **Select Plausible Items:** Review the list and identify items that seem reasonable or evidence-based.

3. **Refine with Focused Models:** Input these items into more specialised, science-based models (like Ellicit or Site) for more refined results.

4. **Vary Prompts:** Experiment with different prompts to explore how the behaviour, population, and setting might influence the intervention design.

5. **Apply to the Behaviour Change Wheel (BCW):** Use the BCW framework to evaluate the intervention across key criteria, such as acceptability, practicability, and effectiveness.

6. **Human in the Loop:** Finally, refine the results based on your own expertise and knowledge.

The webinar provided an example of using this process to design an intervention aimed at reducing bullying in schools. By leveraging AI, researchers were able to conduct a rapid scoping review—a task that would have previously taken weeks—in just a few hours.

Limitations and Cautions

While generative AI offers immense potential, it's not without its limitations. The webinar highlighted several key concerns:

- **Evidence Base:** General AI models may include non-evidence-based information, so it's important to verify the accuracy of the output.
- **Accuracy and Consistency:** AI models can produce different responses to the same prompt, requiring multiple iterations and human review to ensure consistency.
- **References:** General language models often struggle to provide accurate references, so it's best to use science-based tools for research purposes.
- **Ethical Considerations:** As AI becomes more integrated into research, ethical concerns around data security, bias, and environmental impact will need to be addressed.

The webinar also stressed the importance of using AI with a **critical eye**. While AI can be a powerful tool, it should never replace the researcher's own expertise and judgment.

Addressing Bias and Other Concerns

One of the most pressing challenges in AI is the issue of **bias**. AI models don't introduce bias—they reflect the biases present in their training data. To mitigate this, researchers need to:

- Be aware of potential biases.
- Use diverse prompting strategies.

- Augment AI outputs with external sources of information.
- Employ human oversight to ensure the validity of results.

The webinar also touched on the environmental impact of AI. As models grow larger and more complex, their carbon footprint increases. However, there's a growing trend toward developing smaller, more efficient models that maintain high performance while reducing environmental impact.

The Future of AI in Behavioural Research

Looking ahead, AI has the potential to democratise knowledge and make behavioural science more accessible to a wider audience. The role of the behavioural scientist is also evolving—from being a gatekeeper of knowledge to a facilitator who helps others understand and apply the science of behaviour.

One particularly intriguing area of research is the use of **synthetic participants**—AI-generated individuals who can be used to test behavioural interventions. While this approach offers exciting possibilities, it's important to compare synthetic participant responses with those of real participants to ensure representativeness.

**Key Takeaways

- **AI is a Tool, Not a Replacement:** While AI can assist with many tasks, human expertise remains essential.
- **Prompt Specificity Matters:** The more specific your prompts, the better the AI's output.
- **Ethical Considerations are Crucial:** As AI becomes more integrated into research, ethical concerns around bias, data security, and environmental impact must be addressed.

**What's Next?

The next webinar in the series will focus on **analytical AI**, exploring how machine learning can be used for data analysis and prediction. The third session will delve into the **responsible use of AI**, covering ethical considerations and bias mitigation.

In the meantime, researchers are encouraged to explore the potential of generative AI in their work—while keeping a critical eye on its limitations and ethical implications. The future of behavioural research is here, and AI is poised to play a central role in shaping it.

This blog post is based on the insights shared during the January 2025 webinar on AI in behavioural research. For more information, including slides and additional resources, [visit the BRUK website.](#)