

Swiss Insights News

#6

Generating Survey Questions with LLMs

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Anna Fuchs
PhD Candidate,
Social Data Science and AI Lab
(SODA) at the LMU in Munich

Can LLMs write good survey questions? We tested different models and prompting techniques across four domains to see how well AI-generated survey items perform.

AI-based tools, and LLMs in particular, are attracting attention because they promise to tackle long-standing challenges in survey design. Crafting clear, reliable, and unbiased questions is labor-intensive and requires expertise that is not always available in applied settings. LLMs, however, can generate item wordings within seconds, highlight potential sources of misunderstanding, and systematically vary formulations. These capabilities create the potential for faster, more iterative, and more evidence-driven questionnaire development. If validated and used with methodological care, LLMs could substantially expand the toolbox for improving measurement quality in both academic and applied survey research.

Despite growing interest in LLM tools within industry, published research in this area remains sparse, and little is known about the quality and characteristics of survey items generated by LLMs or the factors influencing

their performance. This work provides the first in-depth analysis of LLM-based survey item generation and systematically evaluates how different design choices affect item quality. Figure 1 provides an overview of the workflow for this study. Five LLMs, namely GPT-4o, GPT-4o-mini, GPT-oss-20B, LLaMA 3.1 8B, and LLaMA 3.1 70B, were used to generate survey items on four substantive domains: work, living conditions, national politics, and recent politics. In addition, three different prompting techniques were compared: zero-shot, role, and chain-of-thought prompting. In the zero-shot prompting approach, the model received a clear description of the task without any examples of the desired output. Role prompting instructed to act as an expert survey methodologist, in addition to the clear task instructions without examples, such as in the zero-shot prompt. Finally, chain-of-thought prompting encouraged the model to think in reasoning steps (see Figure 2).

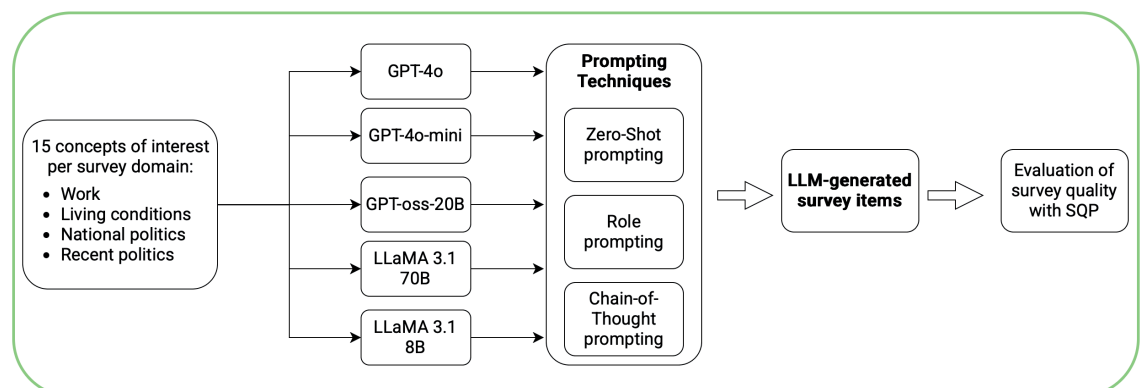


Figure 1: Workflow

Zero-Shot Prompting

Generate one attitudinal survey question for the topic {survey domain}, asking the respondent's opinion on: {concept of interest}. Provide only one survey question, the introduction text/extra information if needed for the respondent to comprehend the question, and one response scale without elaborating. Do not repeat the information you have been given, and give your answer directly and without introductory phrases or additional comments. The survey question should be in English, and it is for a general population survey.

Role Prompting

Act as an expert survey methodologist. Generate one attitudinal survey question for the topic {survey domain}, asking the respondent's opinion on: {concept of interest}. Provide only one survey question, the introduction text/extra information if needed for the respondent to comprehend the question, and one response scale without elaborating. Do not repeat the information you have been given, and give your answer directly and without introductory phrases or additional comments. The survey question should be in English, and it is for a general population survey.

Chain-of-Thought Prompting

Let's think step by step. First, think about how to investigate '{concept of interest}' within the topic of {survey domain}. Then, think about one single suitable attitudinal survey question for a general population survey. Then, think about whether the attitudinal survey question needs an introduction text/extra information for the respondent to comprehend the question. Finally, think about one suitable response scale for the survey question you designed. Provide only one survey question, the introduction text/extra information if needed for the respondent to comprehend the question, and one response scale without elaborating. Do not repeat the information you have been given, and give your answer directly and without introductory phrases or additional comments. The survey question should be in English.

Figure 2: Prompting Techniques

To assess the quality of the generated survey items, the Survey Quality Predictor 3.0 (SQP; <https://sqp.gesis.org>) was used, a tool developed by survey methodologists for estimating the quality of attitudinal survey items based on coding their formal and linguistic characteristics (e.g., question length, domain and concept of the question, social desirability, answer scale format). To code these characteristics, an LLM-assisted procedure was used. The analysis allowed us to evaluate not only overall quality but also around 60 specific survey item characteristics, offering a detailed view of how LLM-generated questions differ.

The analysis addresses one main research question: **Can LLMs generate high-quality survey items, and how is their performance influenced by prompting technique and model choice?**

The findings show striking differences in survey item characteristics across the different models and prompting techniques. Introduction texts, question phrasing, and response scale formats vary greatly across prompting techniques. This variation is more pronounced for the LLaMA models: their characteristics differ substantially depending on model size and prompt used. GPT models, by contrast, mostly generate similar items regardless of model size and prompting techniques. They mainly generate five-category, symmetric scales and never include a "don't know" option.

Regarding quality of the items, both the choice of model and the prompting technique employed influence the quality of LLM-generated survey items. Closed-source GPT models generally produce more consistent items than

open-source LLaMA models: items generated using GPT-4o and GPT-4o-mini are of very similar quality, regardless of whether the larger or smaller model, or which prompt was used. Items generated with LLaMa, in contrast, showed greater variation in quality depending on the model size or prompting technique used. Items generated with GPT-oss-20B were excluded from the analysis as the model failed to generate most of the survey items successfully, i.e., that the model did not produce a complete survey item, the text was cut off, or the output contained multiple survey items.

Overall, chain-of-thought prompting yielded the best results. GPT-4o, GPT-4o-mini, and LLaMA 3.1 70B achieved similar item quality when combined with chain-of-thought prompting, although the LLaMA model showed greater variability.

Regarding the four survey domains for which items were generated (work, living conditions, national politics, and recent politics), items related to “work” and “national politics” reached the highest quality levels across models.

We additionally compared the quality of the generated items to the quality of items in the SQP database. The SQP database (<https://sqp.gesis.org/user/database>) contains multiple survey items with authorized characteristic codings and corresponding quality estimates. Compared to the SQP items, the LLM-generated items perform similarly; the SQP items' quality is only slightly higher on average, showing that LLM-generated survey items can reach a level of quality similar to that of survey items currently used in practice.

The results of this study highlight both the potential and the current limitations of LLMs in supporting questionnaire design. The findings show that LLMs can generate promising survey items, but they also underscore that the results must be used with caution and evaluated critically. By assessing item quality, this study provides a foundation for future research and contributes to a nuanced understanding of AI-supported survey designs. As the LLM landscape evolves rapidly and new, more powerful

models and prompting techniques continue to emerge, it becomes all the more important to continuously investigate and evaluate the potential of LLMs in the field of survey design.

The study is based on a Master's thesis which won two awards: the 2026 BVM Young Professionals Award and the GOR Master Thesis Award 2026 from the German Society for Online Research (DGOF). The work has since been developed into a scientific publication. The resulting paper has been accepted for presentation at three conferences and is also available online as a preprint: https://osf.io/preprints/socarxiv/fzn7t_v1.

Author and Contact

Anna Fuchs is PhD Candidate at the Social Data Science and AI Lab (SODA) at the LMU in Munich
anna.fuchs@stat.uni-muenchen.de



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Herausgeber und Kontakt

Swiss Insights, Swiss Data Insights Association, Gruebengasse 10, 6055 Alpnach, Switzerland
+41 44 3501960, info@swiss-insights.ch, www.swiss-insights.ch

SWISS INSIGHTS

Corporate Member

amPuls Market Research

Hirschengraben 49, 6000 Luzern 7
+41 41 612 14 14 / info@ampuls.ch
www.ampuls.ch



amrein+heller MarktforschungsTreuhand AG

Südweid 7, 6274 Eschenbach
+41 748 63 70 / contact@ah-feedback.ch
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Bilendi Schweiz AG

Reinhardstrasse 19, 8008 Zürich
+41 79 801 88 80 / contact.ch@bilendi.com
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Boomerang Ideas AG

Sihlquai 131, 8005 Zürich
+41 44 500 88 60 / raphael@boomerangideas.com
www.boomerangideas.com



BSI Business Systems Integration AG

Täferweg 1, 5405 Baden
+41 58 255 90 00, info@bsi-software.com
www.bsi-software.com



Constant Dialog

Alte Steinhäuserstrasse 33, 6330 Cham
+41 41 310 05 40 / info@constant-dialog.ch
www.constant-dialog.ch



DemoSCOPE - part of the norstat group

Klusenstrasse 18, 6043 Adligenswil
+41 41 375 40 00 / demoscope@demoscope.ch
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Die Schweizerische Post

Wankdorfallee 4, 3030 Bern
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Gallup AG

Reinhardstrasse 19, 8008 Zürich
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Effingerstrasse 14, Postfach, 3001 Bern
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General-Wille-Strasse 10, 8002 Zürich
+41 44 283 18 18 / info@g-i-m.ch
www.g-i-m.ch



INNOFACT (Schweiz) AG Research & Consulting

Flurstrasse 50, 8048 Zürich
+41 43 931 77 82, Info@innofact.ch
www.innofact.ch



Insight Institute AG

Bergstrasse 138, 8032 Zürich
+41 44 387 90 90 / info@insightinstitute.ch
www.insightinstitute.ch



intervista

Optingenstrasse 5, 3013 Bern
+41 31 511 39 00 / anfragen@intervista.ch
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11, Chemin du Château-Bloch, 1219 Le Lignon
+41 22 591 06 00 / Contact_Switzerland@ipsos.com
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Kantar Media Switzerland AG

Bahnhofstrasse 4, 3073 Gümligen
+41 31 537 79 00 / ch.panel@kantarmedia.com
www.kantarmedia.com



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Corporate Member

Marketagent.com Schweiz AG

Feldstrasse 40, 8004 Zürich
+41 43 555 06 50 / schweiz@marketagent.com
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SBB CFF FFS

Hilfikerstrasse 1, 3000 Bern 65
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M.I.S. Trend SA

Pont Bessières 3, 1005 Lausanne
+41 21 320 95 03 / info@mistrend.ch
www.mistrend.ch



SensoPLUS

Industriestrasse 16, 6300 Zug
+41 41 726 16 80 / info@sensoplus.ch
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Park 6, 6039 Root D4
nielsen-ch@nielsen.com / info.ch@gfk.com
www.NielsenIQ.com / www.gfk.com



super computing Systems AG

Technopark, Technoparkstr. 1, 8005 Zürich
info@scs.ch
www.scs.ch

onlineumfragen.com

Kernserstrasse 15, 6056 Kägiswil
+41 44 500 50 54 / info@onlineumfragen.com
www.onlineumfragen.com



Swisscom (Schweiz) AG

Alte Tiefenaustasse 6, 3050 Bern
www.swisscom.ch

outlierlab

Lütisämetstrasse 109, 8706 Meilen
+41 79 565 05 89 / patrick.veenhoff@outlierlab.io
www.outlierlab.io



Ragaz Community Research

Buchholzstrasse 161, 8053 Zürich
+41 77 434 04 12 / info@community-research.ch
www.community-research.ch



POLYQUEST AG

Flurstrasse 26, 3014 Bern
+41 31 335 64 00 / info@polyquest.ch
www.polyquest.ch



TALK Online Panel

Lindenmoosstrasse 4, 8910 Zürich
+41 43 550 14 62 / rfq@talkonlinepanel.com
www.talk-group.com



Publicom AG

Winterthurerstrasse 92, 8006 Zürich
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Haldenstrasse 11, 6006 Luzern
+41 41 618 33 11 / transfer@transferplus.ch
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Rue Marconi 19, 1920 Martigny
+41 77 916 27 98 / matthieu.saussaye@pulse-partners.ch
www.pulse-partners.ch



YouGov

Baslerstrasse 60, 8048 Zürich
+41 41 367 73 73 / zurich@yougov.ch
www.business.yougov.com/de



QUALINSIGHT Sàrl

Route des Mosses 34, 1613 Maraçon
+41 79 911 62 19 / e.seve@qualinsight.ch
www.qualinsight.ch



Qualitest AG, Institut für Marketing- und Sozialforschung

Rosenberghöhe 3, 6004 Luzern
+41 41 712 12 21 / qualitest@qualitestag.ch
www.qualitestag.ch

