



# GLEN Design and Cumulative Field Report

Release 1.0

2026

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GLEN Documentation

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Zitation: Schmiedeberg, C., Königer, L., & Emmer, J. (2026). GLEN Design and Cumulative Field Report. Release 1.0. GLEN Documentation.  
<https://doi.org/10.11588/heidok.00038798>

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## **1 Introduction**

GLEN – The German Longitudinal Environmental Study – is a large-scale panel survey of the adult population in Germany that covers environmental attitudes and behaviors as well as political engagement and acceptance of environmental policies.

The main objective of the GLEN project is to provide a long-term data infrastructure for the environmental social sciences in the form of user-friendly, easily accessible Scientific-Use Files (SUF) for the international research community. The data are made available in the GESIS Data Archive. Analyzing GLEN data together with geospatial context data is possible at the GLEN safe data center at RPTU Kaiserslautern.

GLEN was initiated by the five principal investigators Katrin Auspurg (LMU Munich), Henning Best (RPTU Kaiserslautern), Christiane Bozoyan (Heidelberg University), Andreas Diekmann (University of Konstanz), and Claudia Schmiedeberg (Heidelberg University). The project is thankfully funded as a long-term project by the Deutsche Forschungsgemeinschaft (DFG, German Research Foundation) – project number 533957184.

This report provides information on the panel design and the fieldwork of the first survey cycle run in 2024 and 2025, which comprise GLEN Release 1.0 (GLEN, 2026). Note that the figures presented here and those documented in the methods reports of the field institute Verian may deviate slightly due to corrections in the data cleaning process and data deletion on request of panelists.

The field materials are displayed in the Appendix. All further documentation materials, including the codebooks, the paper-and-pencil questionnaires (PAPI), screenshots of the online surveys (CAWI), as well as the methods reports of the field institute Verian are part of the release package and can be downloaded from the GESIS Data Archive and the project website [www.glen-study.de](http://www.glen-study.de). For more details regarding the data, please refer to the GLEN Data Manual (Schütze et al., 2026).

## **2 Acknowledgments**

The GLEN team thanks all researchers who have provided their advice in establishing this data infrastructure, including Jette Schröder (GESIS) for her guidance regarding survey methods, Matthias Bäcker (JGU Mainz) for his advice regarding data protection issues, Arne Bethmann (SHARE Berlin Institute) for his expertise regarding qualitative pretests, Almuth Lietz (DeZIM-Institut) for tips regarding survey programming and handling incentives, and the FReDA team at GESIS, in particular Pablo Christmann, who shared their experiences from starting a mixed-mode panel study. We also thank Madison Garrett for language editing and highly appreciate our collaboration with Dominik Leiner, who provided optimal support for the SoSci Survey system, and Jana Brix, Günter Steinacker, and Philipp Wich from the Verian team. Finally, we thank our student assistants Zoe Engelmaier, Liv Haldenwang, Marie Kolm, Corina Schwarz, and Hannah Wolf for their valuable work.

## **3 Panel design**

### **3.1 Sample**

The GLEN study started in 2024 with a probability-based sample of 80,000 individuals. The target population included all adults (born before 2006/09/01) with a permanent main

residence in Germany, irrespective of their nationality and legal status. The selection of individuals for inclusion in the study was made using a two-stage sampling procedure. In the first stage, sampling points (primary sampling units) were drawn. In the second stage, individuals from the target population living in the selected municipalities were sampled from local population register data.

In the first stage, primary sampling units were selected via stratified random sampling. The strata were defined by German federal state (*Bundesland*), administrative district (*Regierungsbezirk*), county (*Landkreis*), and settlement structure (*BIK*). For the selection of primary sampling units, a probability-proportional-to-size sampling approach was employed, meaning the selection probability of municipalities was determined by the number of adults registered in the respective municipality, referring to official data as of December 31<sup>st</sup>, 2023. The result was a total of 400 sample points distributed over 353 municipalities (among them 10 synthetic municipalities consisting of several very small neighboring municipalities).

Municipalities were contacted by the field institute in April 2024 and 260 addresses of individuals with their main residence in the respective municipality per sampling point were requested. In 18 cases, municipalities refused to provide addresses and were therefore replaced by structurally similar municipalities. This data was then verified and cleaned. If the data appeared implausible, for example, in terms of distribution of demographic characteristics or geographic location within the municipality, the field institute requested a renewed sampling.

In the second stage, secondary sampling units were selected from the addresses provided by the municipalities. The same number of individuals ( $N=200$ ) were drawn for each sampling point in September 2024. Household duplicates, meaning two or more individuals with the same surname living at the same address, were kept in the sample. The gross sample contained 944 addresses with two individuals with the same surname, 42 addresses with three individuals with the same surname, and two households with four individuals with the same surname. These cases were not regionally clustered and upon further investigation were not found to result from errors in the sample selection process.

This design ensures that every individual in the target population had the same theoretical probability of inclusion. For an individual  $i$  from sampling point  $h$ , the inclusion probability can be expressed as

$$\pi_i = \frac{N_h}{N} m \frac{\bar{n}_h}{N_h} = \frac{m\bar{n}_h}{N} = \frac{n}{N}$$

where  $N_h$  denotes the size of primary sampling unit  $h$ ,  $N$  the total population,  $m$  the number of sampling points drawn, and  $\bar{n}_h$  the fixed number of secondary sampling units drawn per sampling point. The product  $m\bar{n}_h = n$  reflects the total sample size. This derivation demonstrates that every individual in the target population had the same theoretical probability of inclusion  $n/N$  (Sand & Bruch, 2020). Consequently, no design weights are required.

### 3.2 Panel recruitment

The panel itself began with a two-step process, consisting of the Recruitment Survey and the Starter Survey. This was done to establish the panel sample, provide a positive survey experience, and motivate respondents to continue participating. The Recruitment Survey was fielded in November 2024. All sampled individuals were invited by mail to complete a short

CAWI. To increase response rates, the invitation letter contained an unconditional cash incentive of €5. Individuals who did not participate received up to two postal reminder letters<sup>1</sup>, with the PAPI enclosed with the second. At the end of the Recruitment Survey, respondents were asked to provide consent to be contacted again for future panel waves. In addition, respondents who participated online were asked for their email address to be invited to future surveys via email.

In the second step, panel members (i.e., respondents of the Recruitment Survey who had provided panel consent) were invited to a short online-only survey in January 2025, the Starter Survey, as part of the push-to-web recruitment strategy. Only those panelists who had contacted the GLEN team in the Recruitment Survey to explicitly ask for a mail questionnaire and those who had indicated that they did not use the internet in the (mail) recruitment questionnaire were not invited to the Starter Survey. The other panel members who had participated in the Recruitment Survey via PAPI were explicitly informed in the invitation to the Starter Survey that no PAPI would be provided. The objective of this survey was to increase the number of individuals participating online and collect their email addresses to reduce the number of postal invitations in future surveys.

### **3.3 Survey modes and types**

GLEN data is collected in a self-administered mixed-mode design. The primary survey mode is online (CAWI), with a paper-and-pencil questionnaire (PAPI) option for respondents who are not willing to complete the survey online.

All paper-based tasks, such as postal invitations and reminders, formatting, printing, dispatch, and entry of responses from the PAPI, as well as the phone hotline and panel maintenance were administered by the field institute Verian. The GLEN team administered the online modules of the study, including the web survey and email invitations.

The GLEN design consists of three elements:

- Online panel with biannual panel waves
- Offline panel with annual panel waves
- Up to two online inter-wave surveys about varying topics.

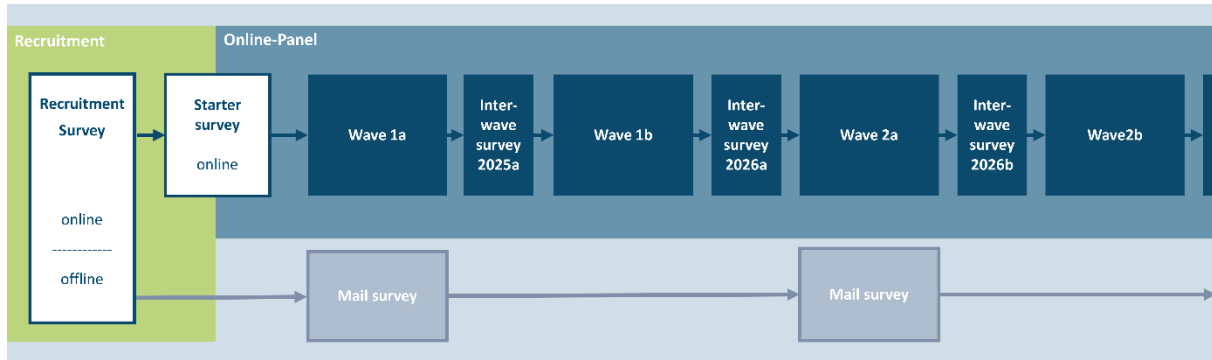
The online and offline panels are intertwined, as one of the two online panel waves per year has the same content as the yearly PAPI wave of the offline panel and is administered at the same fielding period, resulting in one mixed-mode wave administered to the full sample.

Panel waves include core modules repeated annually, triennial modules for relatively stable characteristics, and, to a minor extent, one-time modules. In contrast, the inter-wave surveys primarily contain questions about current topics and specific survey experiments, with only minimal panel content.

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<sup>1</sup> In Schleswig-Holstein, regulations imposed by the municipalities regarding the handling of personal samples only allow for one reminder.

Figure 1: Panel design



In analogy with the online and offline panel waves, the panel sample comprises online and offline panelists. Online panelists are those who have completed at least one GLEN survey online, whereas offline panelists have never done so. This distinction was made first after the Starter Survey: Online panelists had participated in at least one of the two initial surveys (Recruitment and/or Starter) online, while offline panelists had only completed the mailed Recruitment Survey but not participated in the Starter Survey. According to their reported preferences, they were not invited to further online-only surveys. Instead, they are invited only to the annual mixed-mode wave and receive the PAPI enclosed with the postal invitation, together with an unconditional cash incentive of €5. As all invitations and reminders include the link to CAWI, they are free to complete CAWI instead of PAPI in any wave and thus become online panel members. Up to two postal reminders are sent, the second with another copy of the PAPI questionnaire.

Online panelists, meaning those who have completed at least one survey online, are invited to CAWI without the option to complete PAPI. Invitations to the online panel are sent by email to those panelists who provided their email address, and by mail to those who did not. In both cases, a conditional incentive of €5 in form of bank transfer, store voucher (Amazon, REWE, or Rossmann), or donation (Aktion Deutschland Hilft e. V. or Deutsche Welthungerhilfe e. V.) can be selected by the participant at the end of each survey. Panel members without an email address receive up to two postal reminders to the panel waves, whereas panel members who provided an email address receive one email reminder and then a postal reminder. Postal and electronic invitations and reminders are sent out at the same time.

The inter-wave surveys are directed only to online panel members who have provided a valid email address, as invitations and reminders to these surveys are sent only via email. As the surveys are shorter than the panel waves, respondents receive a reduced conditional incentive of €3 in form of bank transfer, voucher, or donation. These surveys may be scheduled flexibly to collect data shortly after political or natural events to measure deviations from baseline data. – although this has not yet been the case.

Table 1 shows an overview of the panel waves and inter-wave surveys, including field periods and sample sizes. The net sample contains all respondents contained in the SUF data, without break-off and excluded interviews (e.g., the wrong person participated or the panelist requested their data to be erased).

*Table 1: Field periods and case numbers of all panel surveys*

	Field period		Gross sample	Final sample (SUF)
	Start date	End date		
Recruitment Survey	2024/11/06	CAWI: 2025/01/22 PAPI: 2025/03/22	80,000	31,025
Starter Survey	2025/01/28	2025/04/01	24,547	17,003
Wave 1a	2025/05/05	CAWI: 2025/07/21 PAPI: 2025/07/31	25,124	16,619
Inter-Wave Survey 2025a	2025/09/17	2025/10/23	14,961	8,333
Wave 1b	2025/11/11	2026/01/19	23,203	13,825

### 3.4 Questionnaire design principles

A number of design principles were specified at the beginning of the panel to create a base for homogenous instruments with high stability over time regarding visual presentation, language used, and question structure. The peculiarities of both survey modes employed were respected in the creation of these principles.

As the majority of respondents participate via CAWI, and many on small screens, survey length is limited to a maximum of 25 minutes. This corresponded to 16 pages for PAPI.

The SoSci Survey software is responsive to screen size so that grid questions are split into single items on smartphones (item-by-item format). To reduce scrolling, grid questions are limited to a maximum of six items. Only in very rare cases are questions with more than six items included; in these cases, the items are split into several screens with a maximum of 6 items each and an introductory text. In PAPI, these questions are displayed in a single grid.

Single-item questions with fully labelled response scales are displayed vertically in all modes, whereas longer endpoint-labelled scales are presented horizontally in PAPI and vertically in CAWI. As a vertical presentation, which is standard on small screens, would not be feasible in PAPI due to restrictions on questionnaire space, this inconsistency was accepted.

Following best practices and recommendations from the literature (Kmetty & Stefkovics, 2022; Schmid et al., 2023), explicit “don’t know” or “no opinion” categories are offered only in cases in which no opinion or no knowledge is a plausible answer, for example with factual and complex (political) questions. Respondents are generally allowed to skip questions. If filter questions are skipped, the following conditional questions are not displayed.

Filter questions are used sparsely in the mixed-mode waves as filtering is difficult in PAPI. If filters cannot be avoided, they are implemented as routing in PAPI (e.g., “Go to question 15”) and as programmed filters in CAWI.

## 4 Outcome indicators

The following describes field outcomes for each of the GLEN waves and surveys. Calculations are based on the standard definitions from the American Association for Public Opinion Research [AAPOR] (2023) and applied to the German context following Stadtmüller et al. (2019).

AAPOR response rates 1 and 2 (RR1 / RR2) are reported. The former constitutes the more conservative indicator, as only complete interviews are counted. In RR2, partial interviews are also included as usable cases. For the mixed-mode waves, the cumulative response rate, which is the proportion of completed interviews out of the gross recruitment sample, is also reported.

In the Recruitment Survey, CAWI are defined as complete if at least 80 % of the substantive questions were answered, and the panel consent question was reached. If less than 80 % of the essential questions were answered and the panel consent question was reached, the online interview was defined as partial. If the panel consent question was not reached, the interview was counted as break-off. In all subsequent surveys, the level of completeness was determined by the proportion of questions answered: surveys with valid responses to less than 50 % of the questions are defined as break-off, between 50 % and 80 % of the questions incomplete, and 80 % or more complete. No break-off was defined for the PAPI population as returning the questionnaire can be viewed as (at least partial) completion. For more details, see the GLEN Data Manual (Schütze et al., 2026).

In contrast to other panels that adjust the sample regularly by excluding panelists who have not participated in a defined number of waves, GLEN has kept all respondents who had provided panel consent in the Recruitment Survey, regardless of their participation in subsequent surveys. The gross sample size decreases only slightly over time, as from wave to wave panelists pass away, move abroad or to unknown locations, or withdraw their panel consent.

## 5 Cumulative field report

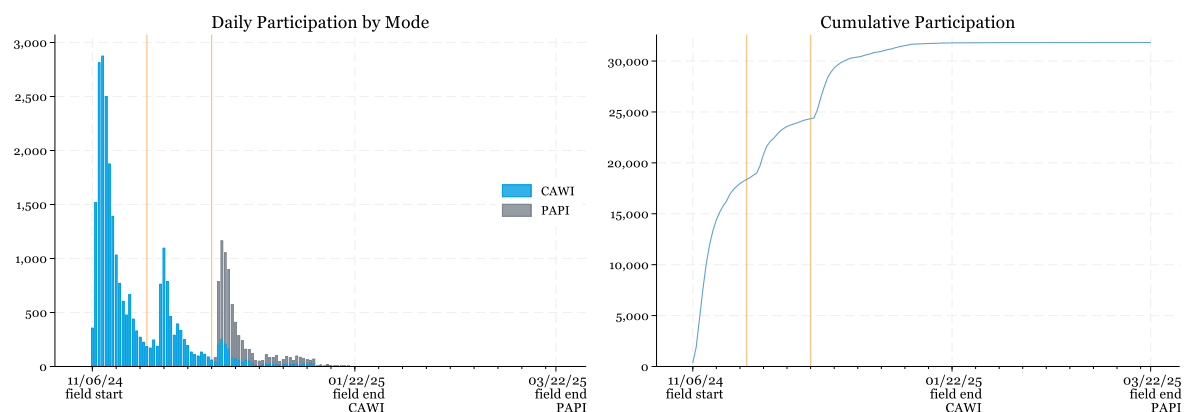
### 5.1 Recruitment Survey

The gross sample of 80,000 individuals was invited to the Recruitment Survey via mail, including an invitation letter, a data privacy sheet, a project flyer, and €5 in cash as an unconditional incentive. Invitations were sent out from November 4<sup>th</sup> to 7<sup>th</sup>, 2024. These four days were necessary due to the large volume of invitations that required manual closure to encase the €5 in cash. The invitation letter included a simple URL to the web survey, a unique 8-digit participation code, and a QR code leading to the survey website.

Reminder letters were sent out in two waves on November 22<sup>nd</sup>, 2024, and December 11<sup>th</sup>, 2024, respectively. While the first reminder mentioned only the web survey including URL and QR code, as in the invitation letter, the second reminder additionally contained a PAPI questionnaire. In the second reminder, a deadline for participation was given.

A total of 31,856 of the sampled individuals participated in the Recruitment Survey, of whom 31,025 were included in the SUF (see Table 2). The excluded cases are mainly break-offs and data that were deleted at the request of the respondent. The break-off rate amounted to 2.6 %. The response rate including only complete cases (RR1) was 38.3 %. When including partial

interviews (RR2), it amounted to 38.8 %. The number of interviews over the field period is illustrated in Figure 2.



Data: CAWI start dates and PAPI self-reported dates. Orange lines: Reminder mailings. X-axis: Daily data with ticks marking the start of each survey week.  
Source: GLEN Recruitment Survey 2024

*Figure 2: Survey response to the Recruitment Survey over time*

Among the final sample, 25,724 participated online (25,293 complete and 431 partial interviews) and 5,732 via PAPI. Panel consent was provided by 25,121 respondents, resulting in a consent rate of 81.0 % of all cases included in the SUF. The consent rate was substantially higher in CAWI (86.7 %) than in PAPI (55.6 %). As panel consent was asked at the very end of the survey, no panel consent was provided in the event of break-off, but respondents who provided panel consent were included in the panel also in the case of partial completion.

*Table 2: Recruitment Survey outcomes*

Gross sample (invitations sent)	80,000
Deceased	88
Moved abroad	5
Final sample (SUF)	31,025
Complete	30,594
CAWI	25,293
PAPI	5,732
Partial (50-80 %)	431
Break-off (<50 %)	821
Break-off rate	2.6 %
Panel consent	25,121
Panel consent rate	81.0 %
Email address provided & confirmed	13,708
Response rate 1 (RR1)	38.3 %
Response rate 2 (RR2)	38.8 %

## 5.2 Starter Survey

All respondents who provided panel consent in the Recruitment Survey were invited to the online-only Starter Survey, except those who had (1) explicitly asked for a PAPI questionnaire via the survey hotline in the initial recruitment stage, (2) indicated that they had no internet access at home or did not use the internet in the Recruitment Survey, or (3) explicitly withdrew

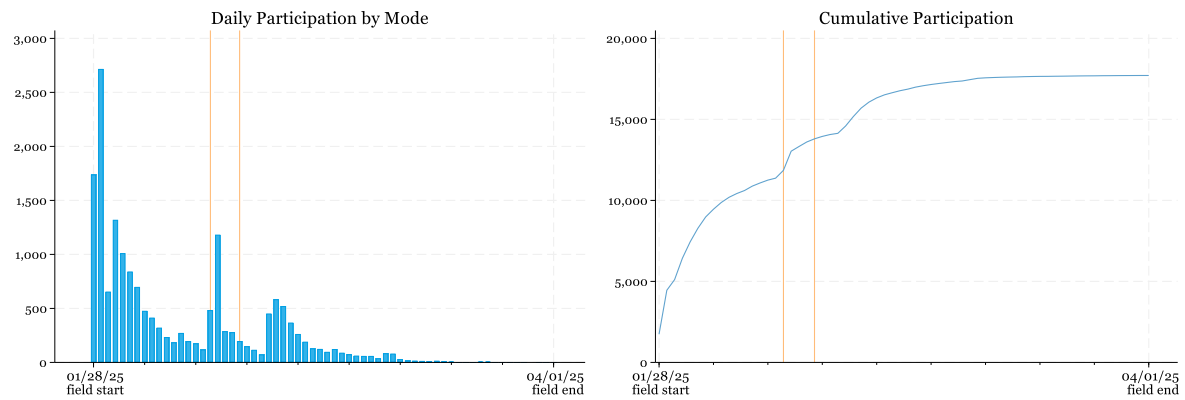
panel consent after the Recruitment Survey. Accordingly, the gross sample for the Starter Survey consisted of 24,547 individuals, comprised of 21,939 who had taken the Recruitment Survey online and 2,571 who had completed PAPI. Respondents who had provided and validated their email address were contacted via email (N=13,731), all others via postal mail. Invitations were sent out from January 27<sup>th</sup> to 31<sup>st</sup>, 2025. An email reminder letter was sent to respondents who provided an email address on February 13<sup>th</sup> and 14<sup>th</sup>, and a postal reminder on February 17<sup>th</sup>, 2025 to all respondents who had not yet participated. While the invitation announced a €5 postpaid incentive to respondents of the online Recruitment Survey, respondents who had completed PAPI received a €5 prepaid incentive along with the invitation letter. This approach aimed to increase the motivation to participate online among the latter group who had revealed a preference for participating offline in the Recruitment Survey.

An experiment was included in the postal invitation and reminder letters, in which an illustrated character was printed on the letter directed to a random split of the panel members. The illustration did not affect participation in any way.

Field outcomes are presented in Table 3. In total, 17,003 individuals participated in the Starter Survey, amounting to a response rate of 69.0 % (AAPOR RR1). Response rates were highest among respondents who had provided their email addresses in the Recruitment Survey (77.6 %) and lowest among PAPI respondents (53.0 %). The latter was to be expected for two reasons: First, their preferred mode was not available in this survey and second, the mail recruitment questionnaire had been sent out only with the second reminder. As a consequence, only late responders had had the opportunity to complete the PAPI, and those particularly unmotivated may have self-selected into the PAPI group. Participation over the field period can be seen in Figure 3.

*Table 3: Starter Survey outcomes*

	CAWI, electronic invitation	CAWI, postal invitation	PAPI, postal invitation	Total
Invitations	13,731	8,250	2,568	24,547
Final sample (SUF)	10,702	4,935	1,366	17,003
Complete	10,655	4,913	1,361	16,929
Partial (50-80 %)	47	22	5	74
Break-off (<50 %)	475	162	44	681
RR1	77.6 %	59.6 %	53.0 %	69.0 %
RR2	77.9 %	59.8 %	53.2 %	69.3 %



Data: CAWI start dates and PAPI self-reported dates. Orange lines: Reminder mailings. X-axis: Daily data with ticks marking the start of each survey week. Source: GLEN Starter Survey 2025.

Figure 3: Survey response to the Starter Survey over time

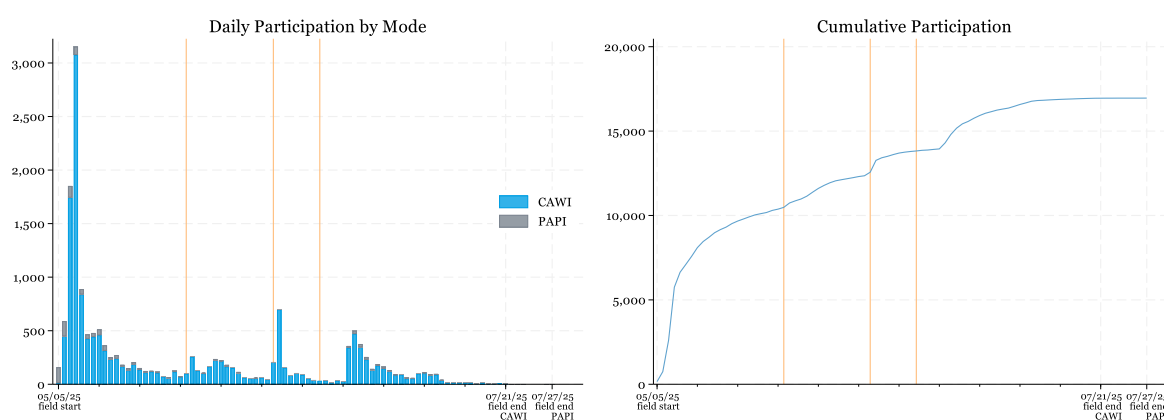
### 5.3 Wave 1a

Wave 1a was the first mixed-mode wave. Accordingly, all panelists were invited, including the offline sample consisting of those who had been excluded from the Starter Survey according to indications made in the Recruitment Survey (i.e., never use the internet or explicitly requested PAPI via the hotline). Invitations were sent to 25,124 individuals on May 2<sup>nd</sup> (postal), 7<sup>th</sup>, and 8<sup>th</sup>, 2025. Postal invitations were sent earlier due to organizational issues; Invitations were received earliest on May 5<sup>th</sup>. In total, 16,336 individuals received an electronic invitation, 6,979 a postal invitation to CAWI, and 1,809 a postal invitation including the prepaid incentive along with the PAPI questionnaire. Email reminders were sent from May 27<sup>th</sup> to May 30<sup>th</sup>, 2025, while postal reminders were sent on May 30<sup>th</sup>, 2025. A total of 9,262 panelists received an electronic and 5,847 a postal reminder. A second electronic reminder was sent on June 11<sup>th</sup> and 12<sup>th</sup>, 2025 to 7,960 panelists, and a postal reminder was sent on June 19<sup>th</sup>, 2025 to 11,492 individuals. Of these, 6,948 belonged to the offline participants and had previously received the two electronic reminders, while 4,544 had only received one previous postal reminder. The PAPI was enclosed with the second reminders sent to the offline panelists and to those respondents who had taken the Recruitment Survey offline and the Starter Survey online (N=1,381). An overview of the field period is provided in Figure 4.

In total, 16,619 individuals participated in Wave 1a, which corresponds to a response rate (RR1) of 65.5 % (see Table 4). Response rates were particularly high in the PAPI group (78.3 %) and in the email invitation group (70.2 %), whereas in the group who received a postal invitation to CAWI response was only 51.3 %. The break-off rate was 3.2 %. Five PAPI cases that arrived after the official end of the field period (until August 17<sup>th</sup>, 2025) were also included in the survey.

Table 4: Wave 1a outcomes

	CAWI, electronic invitation	CAWI, postal invitation	PAPI, postal invitation	Total
Invitations	16,336	6,979	1,809	25,124
Final sample (SUF)	11,574	3,629	1,416	16,619
Complete	11,460	3,569	1,359	16,388
CAWI	11,445	3,434	67	14,946
PAPI	15	135	1,292	1,442
Partial (50-80 %)	115	60	57	232
Break-off (<50 %)	438	103	2	543
RR1	70.2 %	51.1 %	75.1 %	65.5 %
RR2	70.8 %	52.0 %	78.3 %	66.1 %
Cumulated RR	-	-	-	20.6 %



Data: CAWI start dates and PAPI self-reported dates. Orange lines: Reminder mailings. X-axis: Daily data with ticks marking the start of each survey week.  
Source: GLEN Wave 1a.

Figure 4: Survey response to Wave 1a over time

## 5.4 Inter-Wave Survey 2025a

The gross sample invited to the Inter-Wave Survey 2025a consisted of 14,961 participants. This was significantly less than in the first three GLEN surveys as the inter-wave surveys are generally directed only to online panelists who provided a valid email address. In addition, an experiment was implemented in this survey to test whether the number and spacing of survey invitations affected participation in subsequent waves. Therefore, a random 10 % of the 16,688 eligible cases were not invited to the survey.

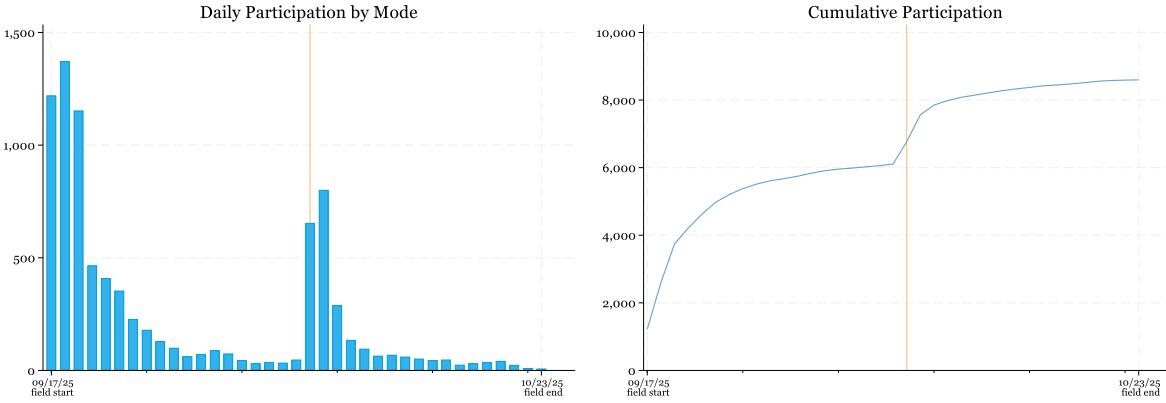
Note that in all surveys, a small amount of respondents participate online even without being invited (e.g., respondents from the offline sample in the inter-wave surveys). This is possible because all panelists can access the active CAWI by entering their personal participation code on the project website. These cases are included in the SUF and can be identified using the gross sample files (see Schütze et al., 2026).

Electronic invitations were issued on September 17<sup>th</sup> to 19<sup>th</sup>, 2025, and reminders were sent on October 6<sup>th</sup> and 7<sup>th</sup>, 2025 to 8,816 panelists (see Figure 5). Field results are given in Table 5. In total, 8,333 of the invited panelists participated in the survey, which corresponds to a response rate of 54.8 % (RR1). The break-off rate amounted to 3.1 %.

Due to technical issues, only a limited number of vouchers were available shortly after field start, so that panelists participating between September 18<sup>th</sup> and 19<sup>th</sup> could only choose between a bank transfer and the two donation options for the receipt of their incentive.

Table 5: Inter-Wave Survey 2025a outcomes

Invitations	14,960
Final sample (SUF)	8,333
Complete	8,204
Partial (50-80 %)	129
Break-off (<50 %)	264
RR1	54.8 %
RR2	55.7 %



Data: CAWI start dates. Orange lines: Reminder mailings. X-axis: Daily data with ticks marking the start of each survey week. Source: GLEN Inter-Wave Survey 2025a.

Figure 5: Survey response to Inter-Wave Survey 2025a over time

### 5.5 Wave 1b

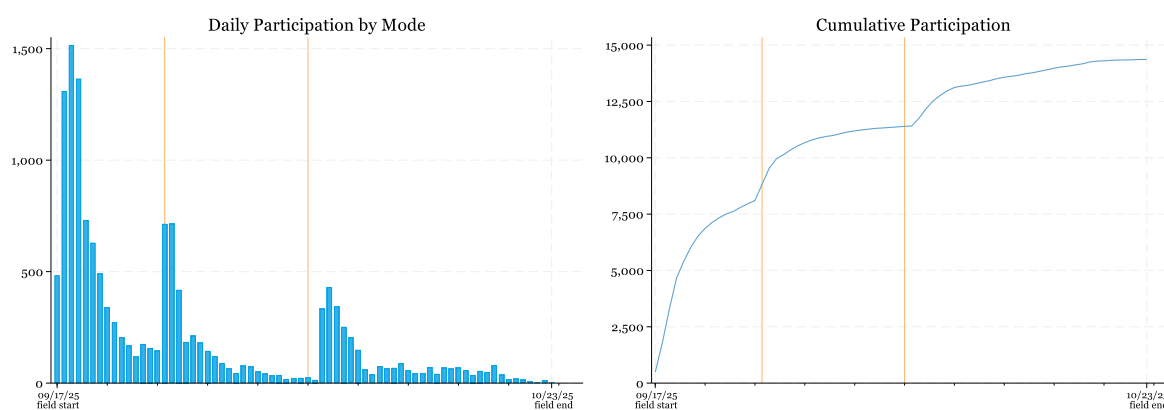
A total of 23,203 panelists were invited to Wave 1b, with electronic and postal invitations sent on November 11<sup>th</sup> to 14<sup>th</sup>, 2025. Email invitations were sent to 16,649 individuals while 6,554 panelists received a postal invitation. The offline sample was not eligible for Wave 1b.

Reminders were sent to the postal invitation group (N=4,960) and electronic reminders to the email invitation group (N=10,155) from November 26<sup>th</sup> to 28<sup>th</sup>, 2025. The second reminder was sent via mail to both groups on December 16<sup>th</sup>, 2025 (N=11,785).

In total, 13,825 panelists participated in Wave 1b, corresponding to a response rate (RR1) of 58.6 % (see Table 6). As in Wave 1a, the response rate was substantially higher among the email invitation group (63.7 %) than the postal invitation group (45.5 %). The break-off rate was 3.7 % overall, with more break-off in the email invitation than in the postal invitation sample (4.1 % vs. 2.4 %). Field outcomes over time are illustrated in Figure 6.

Table 6: Wave 1b outcomes

	CAWI, electronic invitation	CAWI, postal invitation	Total
Invitations	16,649	6,554	23,203
Final sample (SUF)	10,765	3,060	13,825
Complete	10,607	2,980	13,587
Partial (50-80 %)	158	80	238
Break-off (<50 %)	459	75	534
RR1	63.7 %	45.5 %	58.6 %
RR2	64.7 %	46.7 %	59.6 %



Data: CAWI start dates. Orange lines: Reminder mailings. X-axis: Daily data with ticks marking the start of each survey week.  
Source: GLEN Wave 1b.

Figure 6: Survey response to Wave 1b over time

## 6 Field results over time

### 6.1 Response rates

Figure 7 displays the development of sample sizes over time. The large initial sample size quickly shrank when respondents were asked to consent to further participation in the panel, as is common in panel surveys (Blom et al., 2016; Hank et al., 2025). Further reductions followed due to panel attrition and temporary drop-out. This is also a common pattern in panel studies (Lutgig, 2014). Comparing the invitation mode subgroups, the email invitation group appears more stable than the “CAWI / postal invitation” group: In Wave 1b, 12 months after the first contact with GLEN, 10,559 (76.9 %) of the 13,731 panelists who had provided their email address in the Recruitment Survey had participated in at least one panel wave, whereas only 5,356 (65.0 %) of the 8,250 online panelists who did not report a valid email address had participated in at least one of the two panel waves.

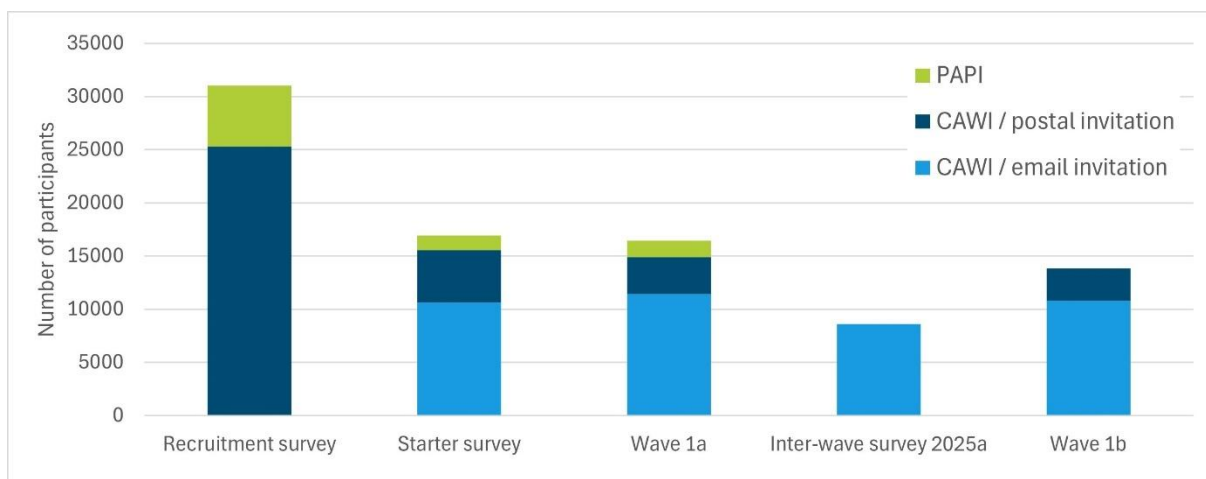


Figure 7: Sample sizes over time

Table 7 provides an overview of the response rates achieved per survey. The response rate of the Recruitment Survey was at 38.3 % (AAPOR RR1), which is above many rates achieved by comparable panels (e.g., Dollmann et al., 2023; Hank et al., 2025; Lemcke et al., 2025). The initial Recruitment Survey also achieved a panel consent rate of 81.0 %, similar to the studies mentioned. In the subsequent surveys, response rates decrease, with 69.3 % in the Starter Survey, 65.5 % in Wave 1a, 54.8 % in the Inter-Wave Survey 2025a, and 58.6 % in Wave 1b. The observed response and retention patterns are consistent with those reported by other longitudinal surveys with similar designs (see e.g., Gauthier et al., 2025). The break-off rates remain rather stable at approximately 3 % across all surveys.

Table 7: Overview of response rates

	Recruitment Survey	Starter Survey	Wave 1a	Inter-Wave Survey 2025a	Wave 1b
Response rate (RR1)	38.3 %	69.0 %	65.5 %	54.8 %	58.6 %
Response rate (RR2)	38.8 %	69.3 %	66.1 %	55.7 %	59.6 %
Break-off rate	2.6 %	3.9 %	3.2 %	3.1 %	3.7 %

## 6.2 Sample composition

To evaluate potential selection bias in the GLEN data, Table 8 compares the sociodemographic attributes of the panel sample with reference data from the 2024 German Microcensus and Population Update Data from 2024 (RDC of the Federal Statistical Office and Statistical Offices of the Federal States of Germany, 2024). As is common in population surveys, non-response is selective with regard to several sociodemographic characteristics: Respondents with lower levels of education, those born outside of Germany, and the youngest and oldest age groups are underrepresented in the GLEN sample compared to the Microcensus benchmark. In contrast, respondents with high levels of education and middle-aged groups, particularly those aged 55 to under 75, are overrepresented across all survey waves.

Differences between surveys are partly related to the survey and invitation modes offered. The mixed-mode surveys (Recruitment Survey and Wave 1a) achieve somewhat better coverage of older respondents, especially those aged 75 and older, whereas the email-only Inter-Wave Survey 2025a shows the strongest overrepresentation of highly educated respondents and the

lowest share of respondents born outside of Germany. Compared to the reference data, the GLEN sample also contains fewer single-person households and slightly more two-person households. Regional distributions across federal states and settlement structure (BIK classification) are comparatively similar to the benchmark, although respondents from Bavaria are somewhat overrepresented and respondents from North Rhine-Westphalia slightly underrepresented throughout the panel. Gender distributions closely match the Microcensus reference values.

*Table 8: Sample composition compared to official reference data (in percent)*

	<b>Reference Data 2024</b>	<b>Recruitment Survey</b>	<b>Starter Survey</b>	<b>Wave 1a</b>	<b>Inter-Wave Survey 2025a</b>	<b>Wave 1b</b>
Female						
No	48.9	48.3	48.5	48.0	47.9	48.5
Yes	51.1	51.7	51.5	52.0	52.1	51.5
Age group (ref. year 2024)						
18 to <25 years	8.6	6.8	7.1	6.5	6.8	7.0
25 to <35 years	14.7	13.1	13.8	13.1	13.5	13.3
35 to <45 years	16.0	16.3	17.1	16.2	17.1	17.0
45 to <55 years	14.7	15.5	16.4	15.9	16.2	16.5
55 to <65 years	18.8	21.6	22.7	22.7	23.2	23.4
65 to <75 years	14.0	15.8	15.6	16.6	16.5	15.9
75 years and older	13.3	10.9	7.4	9.0	6.8	6.8
Highest education level						
Low	33.2	18.5	12.5	14.0	11.2	11.7
Medium	29.0	30.6	29.3	30.0	28.0	29.5
High	37.9	50.9	58.2	56.0	60.8	58.8
Employed						
No	38.3	35.6	31.6	32.5	34.9	31.3
Yes	61.7	64.4	68.4	67.5	65.1	68.7
Born in Germany						
No	22.3	13.2	9.5	9.6	7.8	9.3
Yes	77.7	86.8	90.5	90.4	92.2	90.7
Household size						
1 person	24.8	18.7	16.8	17.9	17.2	18.2
2 people	38.6	40.8	41.9	42.4	44.0	44.8
3 people	16.4	17.6	18.2	18.0	17.5	17.1
4 or more people	20.1	22.9	23.1	21.7	21.3	19.9
Settlement structure (BIK)						
< 100,000 inh., types 1-5	32.1	33.3	32.0	32.3	31.4	32.2
≥ 100,000 inh., types 2-4	25.0	26.7	27.3	27.7	27.2	27.4
≥ 1,000,000 inhabitants	42.8	40.0	40.7	40.1	41.4	40.4
Federal state						
Schleswig-Holstein	3.6	3.0	3.2	3.2	3.3	3.2
Hamburg	2.2	2.1	2.3	2.2	2.2	2.2
Lower Saxony	9.6	9.9	10.0	10.0	9.9	10.0
Bremen	0.8	0.7	0.7	0.7	0.8	0.7
North Rhine-Westphalia	21.5	19.8	19.8	19.5	19.7	19.6
Hesse	7.5	7.2	6.9	7.2	7.1	6.8
Rhineland-Palatinate	4.9	4.4	4.3	4.4	4.4	4.5
Baden-Württemberg	13.4	13.8	13.6	13.3	13.4	13.7
Bavaria	15.8	18.7	19.7	19.6	20.3	19.7
Saarland	1.2	1.0	1.0	1.0	0.9	0.9
Berlin	4.4	3.9	4.0	3.9	3.8	3.7
Brandenburg	3.1	3.3	3.2	3.3	3.3	3.1
Mecklenburg-W. Pomer.	1.9	2.0	1.9	2.0	1.9	2.0
Saxony	4.9	5.3	4.8	5.0	4.8	5.2
Saxony-Anhalt	2.6	2.5	2.5	2.5	2.2	2.4
Thuringia	2.6	2.4	2.1	2.3	2.1	2.3

*Notes: Characteristics measured at the time of recruitment; observations with incomplete data excluded; level of education refers to the highest diploma obtained. Unweighted distributions compared to reference data from the German population (Microcensus 2024 and population update data 2024).*

The standard survey weights provided as part of the SUF (adjustment weights according to annual population estimates for sociodemographic characteristics such as gender, age, education, and federal state) mitigate potential bias resulting from selective non-response. More detailed information on weights can be found in Leßner et al. (2026).

### 6.3 Survey duration

Duration of CAWI is automatically generated by the SoSci Survey software and included as a paradata variable in the SUF. It denotes the total survey processing time in seconds, computed as the sum of page-level response times after excluding interruptions. Interruptions are identified when a recorded page time exceeds two hours or lies more than three scaled interquartile ranges (IQR/1.34) above the median, corresponding to more than three standard deviations under normality. Such extreme durations typically arise when respondents pause and later resume the survey and are therefore removed prior to aggregation. Interruptions were classified as outliers and excluded from the calculation.

Table 9 provides the arithmetic mean, median, and standard deviation of survey duration in seconds for all CAWI surveys included in Release 1.0. Survey duration varied per design as the Recruitment Survey, the Starter Survey, and the inter-wave surveys were planned to be substantially shorter than the panel waves. This pattern is also reflected in the observed completion times: Median durations ranged from approximately 9 to 16 minutes for the shorter survey formats to approximately 26 minutes for the panel waves, as shown in Table 9. This is consistent with survey-methodology guidance suggesting that web surveys should ideally last 10 to 15 minutes and generally not exceed 20 to 28 minutes (Nießen et al., 2023; Revilla & Höhne, 2020). Expected survey duration was not announced in the invitations.

Table 9: Survey duration (in minutes)

	Mean	Median	Standard deviation
Recruitment Survey	11.50	11.33	8.01
Starter Survey	16.37	15.00	6.87
Wave 1a	26.34	24.58	9.62
Inter-Wave Survey 2025a	9.23	8.48	3.66
Wave 1b	27.13	25.27	10.38

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