Remembering the Last Participant in the Berlin Aging Study (BASE)

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In December, Mrs. A., the last of the participants in the Berlin Aging Study (BASE), passed away aged 107. BASE is a multidisciplinary investigation of old people aged 70 to over 100 years who lived in former West Berlin that was initiated by Paul B. Baltes and colleagues. In the main study (1990–1993), a core sample of 516 men and women were closely examined in 14 sessions covering their mental and physical health, their psychological functioning, and their social and economic situation. Thereafter, BASE was continued as a longitudinal study, and surviving participants were reexamined seven times (Baltes & Mayer, 1999; Delius, Düzel, Gerstorf, & Lindenberger, 2017; Lindenberger, Smith, Mayer, & Baltes, 2010).

BASE participants were drawn from the obligatory city registry to form a stratified sample involving six age groups ranging from 70–74 years to 95+ years, with equal numbers of men and women in each cell. Four research units from different insitutions cooperated closely in the conceptualization, planning, implementation, and data analyses: Internal Medicine/Geriatrics (headed by Elisabeth Steinhagen-Thiessen & Markus Borchelt); Psychiatry (Hanfried Helmchen & Michael Linden); Psychology (Paul B. Baltes & Jacqui Smith); Sociology and Social Policy (Karl Ulrich Mayer & Michael Wagner). The central project coordination and the latter two units were located at MPIB, where the study's database[1] is still housed, now headed by speaker Ulman Lindenberger (see https://www.base-berlin.mpg.de).

Mrs. A. participated in the first BASE measurement occasion (T1) almost 30 years ago, and in all seven timepoints since (see Figure 1 for a photo of her at T6). In this article, we would like to remember her as the last of the 516 BASE participants, in gratitude for the time and effort each of them spent in supporting our research and allowing insights into their lives.

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[1] BASE data are available to interested researchers. See website for more information.

After the last occasion of measurement in BASE (T8 in 2008/09), three colleagues revisited Mrs. A. in 2018 and 2019 (Figure 2):

Kirsten Becker was one of the research assistants who travelled around Berlin visiting the BASE participants to carry out the assessments (see Figure 3). This involved lugging an ancient Macintosh SE/30, weighing some 9 kg, up staircases to reach participants' flats because BASECog—the cognitive battery initially designed and programmed by Ulman Lindenberger and Ulrich Mayr (cf. Lindenberger, Mayr, & Kliegl, 1993)—was installed on these computers and was re-used at each measurement to guarantee continuity of the longitudinal assessments.

Sandra Düzel is a senior scientist who is running BASE-II (https://www.base2.mpg.de), the

Figure 1. Mrs. A. at the age of 93 on the sixth occasion of measurement (T6) in BASE.

Figure 2. Denis Gerstorf, Mrs. A., and Sandra Düzel during their visit in 2018. Mrs A. was 105 years old.

Figure 3. Mrs. A. answering Kirsten Becker's questions in her living room. The test materials for the Digit Letter task (see below) can be seen on the table as well (yellow flip book).

BASE successor, at MPIB. BASE-II is also following a longitudinal design: At T1 (completed in 2014), the sample consisted of 1,600 older adults aged 60–80 years and 600 young adults aged 20–35 years. Another longitudinal assessment is currently underway in the context of "Sex- and Gender-Sensitive Prevention of Cardiovascular and Metabolic Disease in Older Adults in Germany" (https://www.base2.mpg.de/en/gendage, funded by the German Federal Ministry of Education and Research).

Early in his career at the MPIB, *Denis Gerstorf* also visited BASE participants to collect BASE data and later analyzed these for his PhD thesis (e.g., Gerstorf et al., 2006). He is meanwhile the BASE-II speaker and of course LIFE faculty member at HU.

Julia Delius (LIFE newsletter editor and BASE coordinator) interviewed the three of them about their memories of Mrs. A.

Julia Delius (JD): *Why did you decide to revisit Mrs. A. about 10 years after the last official BASE measurement occasion?*

Kirsten Becker (KB): I first met Mrs. A. within BASE 18 years ago. She was always a special person and impressed me on many different levels every time I saw her to assess her functioning. We visited and tested all surviving BASE participants at home or in care homes until the last occasion of measurement in 2008/09. As Mrs. A. was the last survivor among the BASE participants and she had always enjoyed our visits, we decided to revisit her twice over recent years.

Sandra Düzel (SD): As a scientist, I am not only absorbed by the data that our participants con-

tribute but also very interested in talking to individuals like Mrs. A.—she was a perfect example of successful aging.

JD: *How did Mrs. A. react to your suggestion to be revisited?*

KB: Mrs. A. was delighted to take part again! She was always a very motivated participant in BASE and was excited to learn that a new assessment wave had started. She loved being tested in different domains and was especially motivated to archieve good scores in the cognitive tests. At some point, she confessed to me that she had been practicing in advance to prepare herself for the upcoming assessment (that is, she remembered some of the tests from one measurement occasion to the next!). She told us that she had looked up words beginning with the letter S in the dictionary in order to prepare for a fluency test in which she had to produce as many of those as possible within 90 seconds!

SD: And yes—she did very well in these tests (even the ones she couldn't prepare), which made her very proud (see Figure 4). We also saw her ambition on other levels: For instance, she was very interested to find out whether she had meanwhile become the oldest Berliner (and was disappointed to hear that she hadn't).

JD: *Tell us about the two visits. What were your impressions?*

KB: Both times, we were amazed about her positive attitude towards life and how positively she dealt with her own age-related limitations. Moreover, she proudly told us about her daily routines such as putting on her make-up, doing exercises,

and trying out cooking recipes. For instance, she was happy to see that we admired the way she was dressed and how we liked details such as her nicely manicured hands and beautifully polished nails. Moreover, she showed us her morning and evening exercise routine in her bathroom — we loved the way she laughed about her own slow-motion movements, when other older adults may well have complained about their limitations.

SD: Mrs. A. told us that she would never have believed that she would reach such a high age. If she had known in her 80s that she would become more than 100 years old, she would have started far more new projects, such as learning computer skills. This retrospective insight shows that it is never too late to start to learn new things, even very late in life!

On our second visit in 2019, we realized that it was much more of an effort for her to pay attention to the interview and tests. She also told us that she needed more external help on a daily basis for tasks such as getting dressed and preparing meals. On the one hand she was not happy about being dependent on the support of others, on the other hand she very much appreciated being able to stay in her own flat.

JD: *I just want to add a summary of Mrs. A.'s interesting life history at this point to give our readers an impression of what she experienced in her 107 years of life. It is based on a speech given by her grandnephew on the occasion of her funeral.*

A. was born in a small village in Eastern Pomerania (now Poland) in 1912. Her father died at the end of World War I, leaving her mother to bring up 6-year-old A. and her younger sister. A. did very well at school, but had to leave after eight years because the costs for further schooling were too high for the family. She completed a one-year tailoring apprenticeship and then moved to Berlin to work as a household help (like many of her age peers—the booming capital city was the place to go). However, A. decided that this kind of work was not for her and did another one-year apprenticeship at a butcher's to become a trained shop assistant selling sausage ("Wurstfachverkäuferin"). In the mid 1930s, she met her partner Kurt A. When he was conscripted to military service, they decided to marry to make sure that she would be provided for in case things went wrong. Indeed, their marriage did not last long as he was declared missing in action in 1943, just 9 months after their

wedding. A. was living in an eastern part of Berlin and experienced the arrival of the Soviet troops in May 1945. She later reported that she was not harrassed and was soon working as a tailor for the Soviet officers and their wives. This period was followed by a job as a shop assistant at a renowned butcher's in Berlin-Westend from 1947 to 1961. By then, she had a new partner, nicknamed Pullover-Fredi (because he ran a market stall selling clothes). She did not marry him though, because her husband was still considered missing. Every day she travelled across Berlin's sectors from home to work and back. On August 12, 1961 (the eve of the building of the Berlin Wall), she was arrested in the S-Bahn at Friedrichstraße on her way to West-Berlin with a box of silverware in her possession. The lawyer Wolfgang Vogel, known later as a broker of spy swaps between the Soviet bloc and the West in the Cold War (see https://en.wikipedia.org/wiki/Wolfgang_Vogel for more information), defended her in her trial. Rather than being convicted of an attempt to leave the German Democratic Republic ("Republikflucht" would have meant six months in jail), she was convicted of offending against monetary transaction regulations and "only" spent nine weeks in prison. A. stayed in East-Berlin after that, working in the textile industry. Fredi, who lived in West-Berlin, stayed in touch with her and often visited her as he was free to travel. Part of her family was also on the other side of the Iron Curtain in West Germany, and they remained in close contact. Like many of her peers, she finally took the opportunity to leave the GDR upon her retirement in 1972 and resettled in West-Berlin, moving into the flat that became her home for the rest of her life. A. especially enjoyed travelling in her later years and went to Spain, France, Scandinavia, and after the fall of the Berlin Wall, to nearby resorts on the Baltic Sea, often with one of her many good friends. Her last longer trip at the age of just over 90 took her to Andalusia for six weeks—after cashing in her funeral insurance! On her 100th birthday, her family took her to the major sites of her life spread across Berlin. She regularly celebrated her birthday in grand style in a Croatian restaurant near her home, often ending with her favorite drink of Spanish Osborne 103 brandy, toasted by her friends and family. Her grandnephew also emphasized that participating in the Berlin Aging Study from her early 80s onwards was always a special highlight for

her. Despite several accidents and health problems in later life, she was able to stay in her flat until September 2019, but not quite until the end of her life as she would have liked. In sum, Mrs. A. experienced historically interesting and personally often very difficult times, but mastered them with a great zest for life.

JD: *What did Mrs. A. herself have to say about her experience of BASE?*

SD: When we asked her to tell us retrospectively how she experienced her participation in BASE, she replied that she was proud to be part of this study and she loved being tested all the time. She was also quite impressed and astonished by the fact that she was the last remaining participant in BASE and that made her feel proud.

JD: *Why do you think Mrs. A. was so successful in navigating her long, and not always easy life?*

KB: She always seemed satisfied with the conditions of her life, and most importantly, she said she never felt lonely, and was happy on her own. It was her humorous way of looking at life, even when times were hard, that helped her to be satisfied with life and to look back without remorse.

JD: *Did she have her own explanations for her longevity?*

KB: She told us that, throughout her life, she had a younger network of close friends who could barely keep up with her. She was always interested in news and politics and loved traveling in Europe and going for a dance in the evenings when she was in her 70s. She paid attention to being well dressed and spent time on personal hygiene and grooming. If she couldn't sleep, she did not worry about it, and just poured herself a glass of liqueur and watched the night traffic outside her window.

SD: It was always important to her to remain independent, but equally, to be able to adjust her independence in response to age-related limitations over the course of her life. This adaptational capacity made it possible for her to remain happy about the small things in life.

JD: *Unfortunately, Mrs. A. passed away after a fall in September 2019, which required a stay in hospital. Which memories of her will stay with you?*

SD: She was satisfied with herself in every situation. This unrestricted sense of a life well lived impressed us most.

KB: She loved her flat, which was symbolic of her independence, as well as the roses on her balcony that she showed us again and again. She always concentrated on those things she could still do and accepted every age-related impairment without complaining. This approach to life was really very impressive.

JD: *Do any of these special characteristics resonate with what is known about centenarians or so-called super-agers?*

Denis Gerstorf (DG): Yes, for people who become so old, the degree of positive selection is of course extremely high. Mrs. A. lived in a time when, on average, fewer than two out of 10,000 people in Germany reached an age of 100 years or older. Although age-related decrements come into play the older people get, we often still see the positive selection even at advanced ages. This is basically the motivation of an entire subfield of gerontology devoted to the study of centenarians and supercentenarians. To illustrate, look at Figure 4 for her performance in one of the cognitive tests in relation to other BASE participants. As you can see, her level of performance at age 105 corresponds to that of a typical 90-year old. Thus, her cognitive age is more than 15 years younger than her chronological age. This nicely illustrates the enormous variability and individuality of aging, also on variables that are known to be highly age-sensitive. What we have also plotted in the figure is her own aging trajectory over all those years she participated in BASE. As you can see, she always performed extremely well—yet, signs of sizeable age-related decline over the past 10 years can also be seen.

JD: *Why do you think it is worth concentrating on one of thousands of study participants who have passed through our institutions' numerous studies over the years?*

DG: Taking such a close look often helps illustrate some of the at-times dry theoretical concepts we study. To provide an example, I would like to return to what Kirsten Becker noted above, namely that Mrs. A. was cheating a little on some of the cognitive tests. This is certainly a problem for the psychometric properties of repeated cognitive testing. At another level of consideration though, this is indicative, if not diagnostic, of a number of important points: First, even at the age of 105, Mrs. A. was able to remember events that lay about 10 years in the past, so her episodic
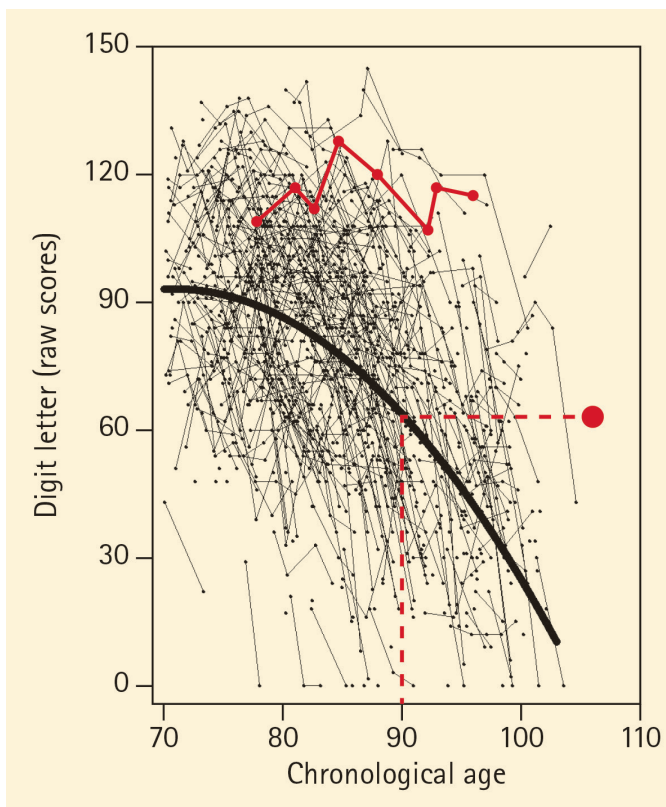
Figure 4. Mrs. A.'s performance in the Digit Letter task (red) in relation to the other BASE participants' (thin black lines) and their average age trajectory (thick black line). As to be seen, her level of performance at age 105 (red dot) corresponds to that of a typical 90-year old. Thus, her cognitive age is more than 15 years younger than her chronological age. This nicely illustrates the enormous variability of aging, also on variables that are highly related to chronological age such as performance on the Digit Letter test. Though happening at a high level, Mrs. A.'s age-related decline over the past 10 years can also be seen.

memory was functioning well. Second, she was motivated to sit down several hours each and every evening (as she told us) in the week before our visit to take a dictionary and try to learn by heart such "useless" things as words that begin with the letter S. This speaks to a well-functioning non-cognitive, motivational system. Third, even at the age of 105, she was obviously in a position to memorize new learning material in a highly efficient manner. On the day of our visit, she produced more than 40 letter-S-words, although the average even for 70-year-olds, the youngest BASE participants, was way below 20. All in all, a highly impressive picture of successful aging in a myriad of different aspects.

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Macintosh SE/30 like the ones used in BASE T1–T8.

International Max Planck Research School on the Life Course (LIFE)

The International Max Planck Research School on the Life Course (LIFE) is a joint international PhD program of the Max Planck Institute for Human Development, the Freie Universität Berlin, the Humboldt-Universität zu Berlin, the University of Michigan, the University of Virginia, and the University of Zurich.

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