Center for Lifespan Psychology

Director: Ulman Lindenberger
Research Project 4: The Berlin Aging Studies (BASE)

During the 20th century, average life expectancy nearly doubled. More and more individuals in current generations of older individuals experience additional years of life between the ages of 70 and 100+. What do these added years mean in terms of levels of functional capacity and quality of life? What are the constraints on mental and physical capacities in the last years of life? Given the heterogeneity of aging trajectories and outcomes, longitudinal studies of individual development are crucial in providing answers to these questions (cf. Voelkle, Brose, Schmiedek, & Lindenberger, 2014).

For almost three decades, members of the Center have been investigating age- and death-related changes in psychological functioning in the context of the Berlin Aging Study (BASE; Baltes & Mayer, 1999; Lindenberger, Smith, Mayer, & Baltes, 2010). The Berlin Aging Study II (BASE-II; Bertram et al., 2014) was launched in 2013 to address antecedents of healthy aging. Both BASE and BASE-II are collaborative, multidisciplinary studies that involve researchers from other institutions inside and outside Berlin. In the following, we highlight select recent developments from both studies.

The Berlin Aging Study (BASE)

Longitudinal data in BASE are available for eight measurement occasions spanning more than 18 years, and mortality-related information is updated at regular intervals. Almost all of the 516 individuals who participated in the 14-session multidisciplinary assessment at the first measurement occasion about 25 years ago are no longer alive. BASE data continue to provide the basis for new original publications on individual differences in late-life development (e.g., Hilbrand, Coall, Gerstorf, & Hertwig, 2017). Similarties between BASE and BASE-II (see below) allow for a direct evaluation of cohort differences in normal aging within relatively short periods of time.

The Berlin Aging Study II (BASE-II)

BASE-II is a multidisciplinary and multi-institutional longitudinal study capturing a wide range of different functional domains. At the first wave of measurements (T1), the sample of the study consisted of 1,600 participants aged 60 to 80 years and 600 individuals aged 20 to 35 years. Data collection for T1 was completed in 2014. In addition, eligible BASE-II participants (n = 445) were invited for magnetic resonance imaging (MRI) of the brain. The latter subsample was reinvited to a cognitive and psychosocial follow-up including a second MRI assessment from 2015 to 2016 (n = 327; see Figure 14). The MRI assessments of the BASE-II sample were conducted by the Plasticity project (see p. 155).

Within BASE-II, the goal of the Psychology Unit is to obtain a detailed and comprehensive picture of cognitive abilities and psychosocial characteristics. By relating individual differences in cognitive abilities and brain structure and their changes to differences in lifestyle, environmental factors, and personality, we seek to identify different patterns and psychosocial contexts of cognitive aging. Theories of motivation postulate that older individuals' subjective appraisals of their remaining life time affects their goals and activities. BASE-II researchers newly developed and validated the Subjective Health Horizon Questionnaire (SHH–Q), which reliably assesses individual differences in four distinct dimensions of future time perspective. Two of these dimensions, Novelty and Body, were found to relate differentially to cognitive status and somatic health. Specifically, greater...
self-reported future novelty orientation was associated with higher current memory performance, and greater future expectations regarding bodily fitness, with better current metabolic status (Düzel et al., 2016). We expect that the SHH-Q will help to identify antecedents, correlates, and consequences of an active lifestyle.

The cognitive battery of BASE-II is well suited for investigating associations between cognition and other functional domains. Ongoing analyses investigate cross-sectional and longitudinal links to genetic variation, metabolic load, vascular risk, and psychosocial characteristics.

Key References


Figure 13. Average cohort differences and individual differences in cognitive performance (a: Digit Symbol test) and indicators of well-being (b: morale; c: positive affect; d: negative affect). The dots represent raw data from participants in the matched BASE (n = 161, red dots) and BASE-II (n = 161, blue dots) samples. Sample means and standard errors for each cohort are displayed separately. Participants in the BASE-II cohort (data obtained from 2013 to 2014) showed higher levels of cognitive performance and well-being compared to the BASE cohort (data obtained from 1990 to 1993). The analyses suggest substantial secular improvements in cognition and well-being (adapted from Gerstorf et al., 2015).

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Figure 14. Schema of BASE and BASE-II study designs.

* The brain imaging assessment of BASE-II participants was conducted by the Plasticity project (see p. 155).

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Overview of the Berlin Aging Study (BASE)

The multidisciplinary Berlin Aging Study (BASE), initially directed by the late Paul B. Baltes and Karl Ulrich Mayer, was started in 1989. Ulman Lindenberger heads the current BASE research group. The study spans eight measurement occasions spaced over 18 years. Its distinguishing features include (1) a focus on the very old (70 to 100+ years); (2) a locally representative sample, stratified by age and sex; and (3) a broad-based interdisciplinarity (originally involving two research units from the Freie Universität Berlin, Internal Medicine and Psychiatry, and two from this Institute, Sociology and Psychology). In addition to discipline-specific topics, four integrative theoretical orientations guide the study: (1) differential aging, (2) continuity versus discontinuity of aging, (3) range and limits of plasticity and reserve capacity, and (4) aging as a systemic phenomenon.

The initial focus of BASE (1990–1993) was to obtain a heterogeneous sample, stratified by age and sex, of individuals from the western districts of Berlin aged 70 to 100+ years. A core sample of 516 men and women completed the Intensive Protocol comprising detailed measures from all four participating disciplines. Seven longitudinal follow-ups involving different depths of assessment were completed at approximately 2-yearly intervals. Details of the research design and assessment protocols can be found on the BASE website (see also Delius, Düzel, Gerstorf, & Lindenberger, 2015). The core sample formed the basis of the cross-sectional analyses reported in two monographs (see Baltes & Mayer, 1999; Lindenberger, Smith, Mayer, & Baltes, 2010). Current work in BASE uses longitudinal data to address issues such as variability and change, mortality prediction, self-related change, and genetic predictors of cognitive change.

Overview of the Berlin Aging Study II (BASE-II)

BASE-II investigates human development into old age and aims at identifying conditions and mechanisms that contribute to individual differences in cognitive, psychosocial and physical functioning (see Bertram et al., 2014; Gerstorf et al., 2016b). In doing so, it conceives of aging as a systemic phenomenon and seeks to delineate sources of heterogeneity in aging trajectories (Lindenberger, 2014). BASE-II is structured into four research units: (1) Psychology, (2) Sociology (including Economics) and Survey Methods, (3) Medicine (including Immunology), and (4) Molecular Genetics. The initial sample consists of 1,600 participants aged 60 to 80 years and 600 individuals aged 20 to 35 years. BASE-II includes molecular genetics and immunological methods and uses instruments from the German Socio-Economic Panel (SOEP), which provide information about participants’ socioeconomic background, lifestyle, and living conditions.

The Berlin Aging Study II: Steering Committee

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