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MTO 26.4 Examples: Utz, Shaping Form

(Note: audio, video, and other interactive examples are only available online)

<https://mtosmt.org/issues/mto.20.26.4/mto.20.26.4.utz.html>

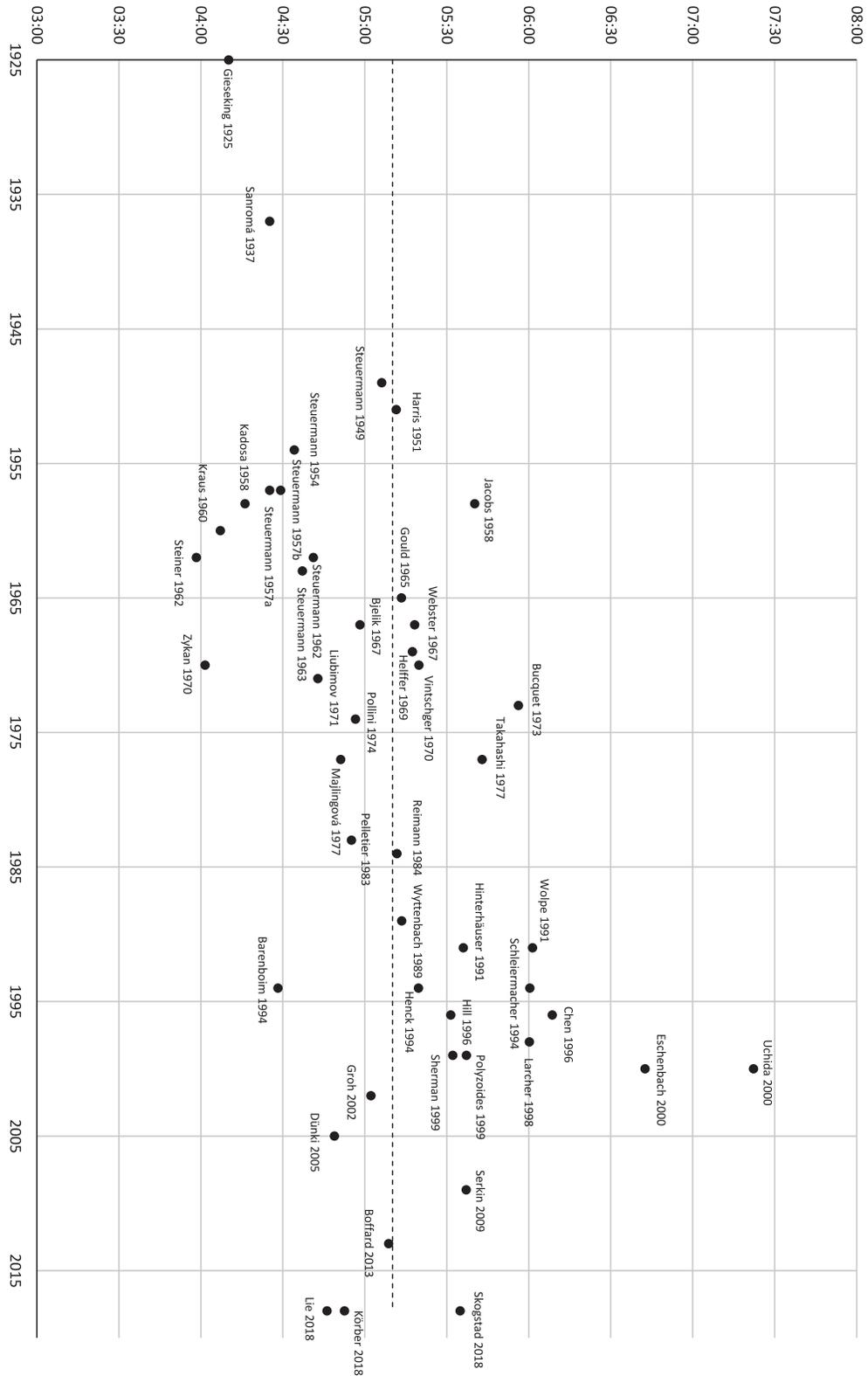
Example 1. Register of the 46 recordings of Schoenberg's *Sechs kleine Klavierstücke*, op. 19, analyzed here; blue text indicates alternative editions of recordings used in cases in which the original could not be obtained

pianist	recorded	released	label
Giesecking, Walter	1925		Welte 3832 (piano roll); digital transfer: https://sverigesradio.se/sida/avsnitt/690310?programid=4778 (18.1.2018)
Sanromá, Jesús María	1937	pre 1940	RCA Victor Red Seal M 646 (mx. nos.: 15862-A/B) mono (78-rpm); Pearl GEM 0076 mono ADD (CD 2000)
Steuermann, Edward	1949	1951	Dial DLP 14 mono (LP); Archiphon WU-035 (CD 2004)
Harris, Johana	1951?	1951?	Cumberland Forest Festival XTV 14148/49 mono (LP)
Steuermann, Eduard	1954		Live recording, Darmstadt International Summer Course for New Music, August 22 nd , 1954, International Music Institute Darmstadt, archive number IMD-M-5697
Steuermann, Edward	1957a	1957	Columbia ML 5216 mono (LP); TACET 186 (CD 2009)
Steuermann, Eduard	1957b	2017	Live recording, Darmstadt International Summer Course for New Music, July 17, 1957, <i>Darmstadt Aural Documents</i> , Box 4, <i>Pianists</i> , NEOS 11630 (CD)
Jacobs, Paul	1958?	1958	Ducretet Thomson 320 C 125 (LP)
Kadosa, Pál	1958	1978	Hungaroton LPX 12009/010 mono + stereo (LP); Hungaroton LPX 12010 2A-03 (LP)
Kraus, Else C.	1960	1960?	Bärenreiter Musicaphon BM 30 L1503 (LP)
Steiner, Karl	1962	1995	Centaur CRC 2241/42 stereo ADD (CD 1995); Wien: Österreichischer Musikrat, Wissenschaftszentrum Arnold Schönberg (CD 2003)
Steuermann, Eduard	1962		Live recording, International Summer Academy of the Mozarteum Salzburg, July 29, 1962, Arnold Schönberg Center
Steuermann, Eduard	1963	2012	<i>Schoenberg – Berg – Webern: The RIAS Second Viennese School Project</i> , audite 21.412 (CD)
Gould, Glenn	1965	1966	Columbia M2L 336 (ML 6216/17) mono (LP); CBS MPK 45558 (CD 1989) (recorded June 1964 and September 1965)
Bjelik, Martin	1967?	1967?	Österreichische Phonotheek Öph 10003 stereo (LP)
Webster, Beveridge	1967?	1967	Dover HCR 5285 mono (LP); Dover HCR-ST 7285 A-3 (LP)
Helffer, Claude	1969	1970	Harmonia Mundi HM 20 752 stereo (LP); Harmonia Mundi France HMA 190752 stereo ADD (CD 1992)
Vintschger, Jürg von	1970?	1970	Turnabout TVS 34378 stereo (LP)
Zykan, Otto M.	1970?	1970	Amadeo (I Classici) SXAM 4176 stereo (LP)
Liubimov, Aleksei	1971?	1971	Melodiia 33S10-06869/70 stereo (LP)
Bucquet, Marie-Françoise	1973?	1973	Philips 6500 510 stereo (LP)
Pollini, Maurizio	1974	1975	Deutsche Grammophon 2530 531 stereo (LP); Deutsche Grammophon 423 249-2 GC stereo ADD (CD 1988)
Majlingová, Lýdia	1977	1978	Opus 9111 0657 stereo (LP); Opus OE 2264 B-01 (LP)
Takahashi, Yuji	1977	1979	Denon OX 7159/160 stereo (LP); Denon 60CO 1060/61 stereo DDD (CD 1986)
Pelletier, Louis-Philippe	1983?	1983	Société Nouvelle d'Enregistrement SNE-509 stereo (LP)
Reimann, Aribert	1984	1985	EMI His Master's Voice (067) (EL) 27 0076 1 digital stereo (LP)
Wyttenbach, Jürg	1989	1991	Accord 200972 stereo DDD (CD)
Hinterhäuser, Markus	1991	1992?	London Hall docu 5 stereo DDD (CD)
Wolpe, Katharina	1991?	1991	Symposium 1107 stereo DDD (CD)
Barenboim, Daniel	1994	1995	Teldec 4509-98256-2 stereo DDD (CD)
Henck, Herbert	1994	1995	Wergo WER 6268-2 stereo DDD (CD)
Schleiermacher, Steffen	1994	1995	Musikproduktion Dabringhaus und Grimm MD G 613 0579-2 stereo DDD (CD)
Chen, Pi-Hsien	1996	1999	hat[now]Art 125 DDD (CD)
Hill, Peter	1996	1999	Naxos 8.553870 stereo DDD (CD)
Larcher, Thomas	1998	1999	ECM New Series 465 136-2 (ECM 1667) stereo DDD (CD)
Polyzoides, Janna	1999	1999	Austro Mechana EM 1707 stereo ??D (CD)
Sherman, Russel	1999	2002	GM Recordings GM2071CD stereo ??D (CD)
Eschenbach, Christoph	2000?	2000	Koch International – 3-7496-2 HI (CD)
Uchida, Mitsuko	2000	2001	Philips 289 468 033-2 PH stereo DDD (CD)
Groh, Markus	2002?	2002	Schmidt Artists MG1232 stereo DDD (CD)
Dünki, Jean-Jacques	2005	2006	Part of Dünki 2006
Serkin, Peter	2009?	2009	Arcana (4) – A 315 (CD)
Boffard, Florent	2013?	2013	Mirare – MIR 191 (CD)
Skogstad, Håkon	2018		private recording for PETAL
Körber, Till Alexander	2018		private recording for PETAL
Lie, Han-Gyeol	2018		private recording for PETAL

Example 2. Op. 19, six recordings of Eduard Steuermann in comparison with average values from 40 recordings by other pianists: duration (above left), main tempo (lower left), percent values (as a percentage of the total duration, above right), and relative standard deviations (expressed as a percent of the main tempo, lower right); the values for the live recordings (1954, 1957b, 1962) are italicized, as are the tempo suggestions from the letter to Michael Gielen, July 24, 1942

<i>duration</i>	<i>op. 19,1</i>	<i>op. 19,2</i>	<i>op. 19,3</i>	<i>op. 19,4</i>	<i>op. 19,5</i>	<i>op. 19,6</i>	<i>total</i>	<i>percent value</i>	<i>op. 19,1</i>	<i>op. 19,2</i>	<i>op. 19,3</i>	<i>op. 19,4</i>	<i>op. 19,5</i>	<i>op. 19,6</i>
Steuermann 1949	01:13	00:54	00:48	00:20	00:34	01:17	05:06	Steuermann 1949	23.9	17.6	15.7	6.5	11.1	25.2
Steuermann 1954	<i>01:00</i>	<i>00:52</i>	<i>00:44</i>	<i>00:18</i>	<i>00:33</i>	<i>01:07</i>	<i>04:34</i>	Steuermann 1954	21.9	19.0	16.1	6.6	12.0	24.5
Steuermann 1957a	01:08	00:48	00:41	00:20	00:31	00:57	04:25	Steuermann 1957a	25.7	18.1	15.5	7.5	11.7	21.5
Steuermann 1957b	01:06	00:48	00:43	00:18	00:30	01:04	04:29	Steuermann 1957b	24.5	17.8	16.0	6.7	11.2	23.8
Steuermann 1962	<i>01:01</i>	<i>00:47</i>	<i>00:46</i>	<i>00:18</i>	<i>00:34</i>	<i>01:15</i>	<i>04:41</i>	Steuermann 1962	21.7	16.7	16.4	6.4	12.1	26.7
Steuermann 1963	01:04	00:48	00:42	00:19	00:36	01:08	04:37	Steuermann 1963	23.1	17.3	15.2	6.9	13.0	24.5
mean	01:05	00:50	00:44	00:19	00:33	01:08	04:39	mean	23.5	17.8	15.8	6.8	11.9	24.4
MAX	01:13	00:54	00:48	00:20	00:36	01:17	05:06	MAX	25.7	19.0	16.4	7.5	13.0	26.7
MIN	01:00	00:47	00:41	00:18	00:30	00:57	04:25	MIN	21.7	16.7	15.2	6.4	11.2	21.5
std. dev. %	7.4	5.7	5.9	5.2	6.6	10.8	5.2	std. dev. %	6.5	4.3	2.8	6.1	5.9	7.0
mean 40	01:17	00:55	01:00	00:21	00:29	01:14	05:14	mean 40	24.5	17.3	19.0	6.8	9.1	23.3
MAX 40	01:37	01:25	01:25	00:32	00:48	02:22	07:22	MAX 40	31.8	21.1	25.0	10.2	15.6	32.1
MIN 40	00:55	00:29	00:42	00:15	00:17	00:47	03:58	MIN 40	18.2	10.0	14.6	4.4	5.6	16.3
std. dev. % 40	13.2	21.0	17.5	17.1	22.9	25.7	13.6	std. dev. % 40	11.7	14.9	12.1	19.0	20.6	13.7
main tempo	op. 19,1	op. 19,2	op. 19,3	op. 19,4	op. 19,5	op. 19,6		std. dev. %	op. 19,1	op. 19,2	op. 19,3	op. 19,4	op. 19,5	op. 19,6
Steuermann letter 1942	<i>100</i>	<i>52</i>	<i>52</i>	<i>112</i>	<i>144</i>	<i>50</i>								
Steuermann 1949	82.5	44.2	43.7	103.4	108.6	34.8		Steuermann 1949	34.3	11.3	21.5	18.7	22.2	19.0
Steuermann 1954	97.1	48.4	49.4	110.0	107.6	39.8		Steuermann 1954	30.3	14.4	17.5	21.5	26.0	16.8
Steuermann 1957a	82.7	49.8	52.6	96.3	109.5	43.7		Steuermann 1957a	26.2	13.3	15.5	19.5	22.0	19.2
Steuermann 1957b	94.7	51.4	50.5	109.8	118.8	44.6		Steuermann 1957b	36.8	15.2	17.4	22.7	26.6	16.1
Steuermann 1962	97.2	53.2	49.6	114.0	114.7	36.8		Steuermann 1962	32.2	15.0	19.1	21.4	33.9	21.4
Steuermann 1963	91.8	50.1	51.3	102.7	107.3	40.4		Steuermann 1963	32.1	12.3	17.6	20.7	27.9	18.0
mean	91.0	49.5	49.5	106.0	111.1	40.0		mean	32.0	13.6	18.1	20.8	26.4	18.4
MAX	97.2	53.2	52.6	114.0	118.8	44.6		MAX	36.8	15.2	21.5	22.7	33.9	21.4
MIN	82.5	44.2	43.7	96.3	107.3	34.8		MIN	26.2	11.3	15.5	18.7	22.0	16.1
std. dev. %	7.5	6.2	6.2	6.1	4.2	9.5		std. dev. %	11.2	11.5	11.1	7.1	16.5	10.3
mean 40	87.5	47.2	37.5	93.9	142.4	39.0		mean 40	27.3	13.4	16.7	24.9	19.6	20.1
MAX 40	132.0	84.0	51.8	134.0	229.6	62.1		MAX 40	46.8	27.3	36.4	46.7	31.1	34.8
MIN 40	57.1	29.7	25.3	62.3	65.0	18.6		MIN 40	17.6	7.7	9.5	13.2	10.2	11.1
std. dev. % 40	16.3	24.8	19.1	18.1	23.6	25.0		std. dev. % 40	25.2	29.5	30.3	33.8	28.2	31.9

Example 3. Total durations of the 46 analyzed recordings in a chronological scatter plot; mean (dashed line): 5:10; here the average across all 46 recordings is used (5:10); using of the six Steuermann recordings only 1963 gives an average across 41 recordings of 5:13 (see Example 4)



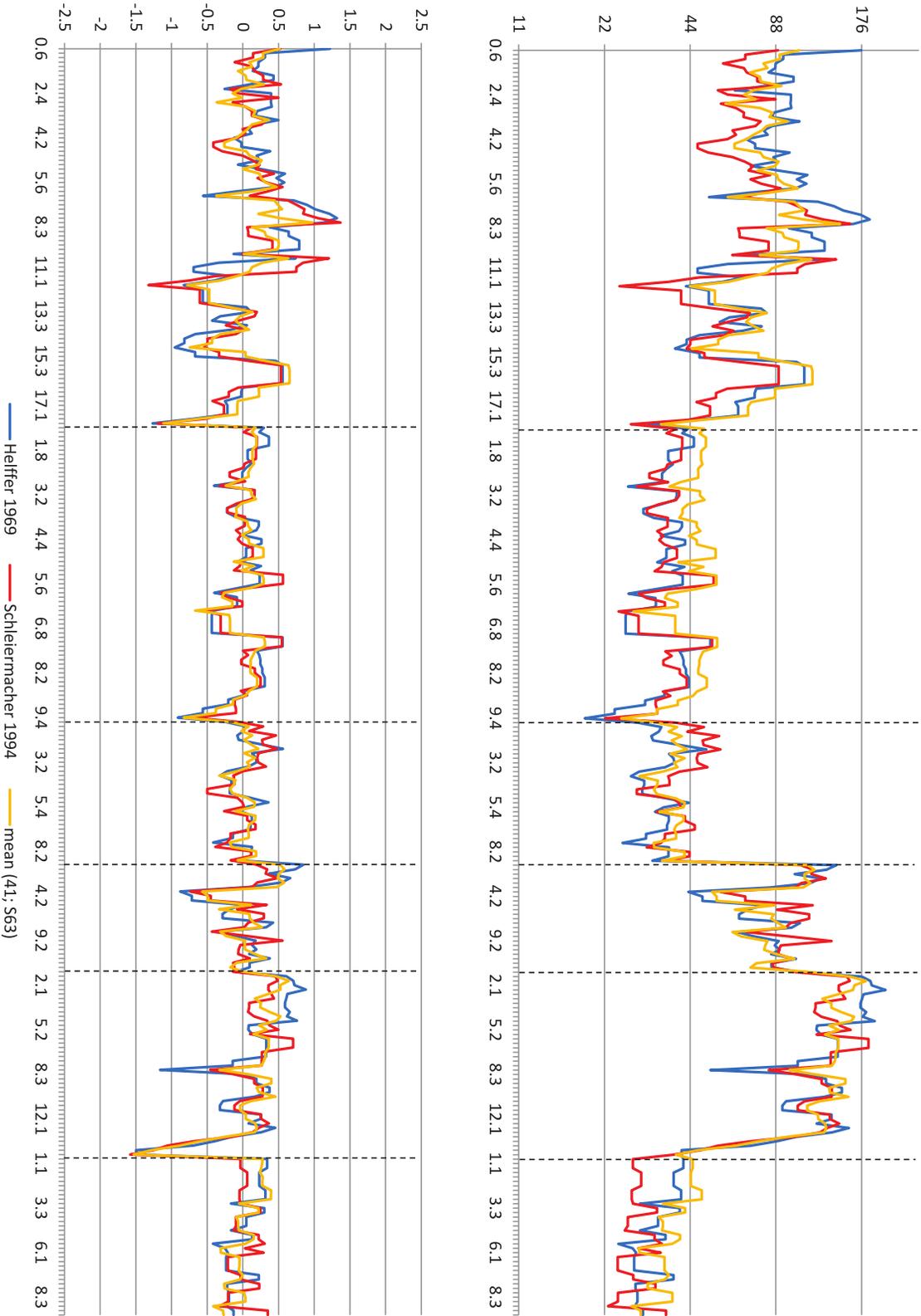
Example 4. Op. 19, 46 recordings from 1925–2018; durations (left) and percent values (as a percentage of the total duration, right), chronologically ordered

<i>duration</i>	op. 19,1	op. 19,2	op. 19,3	op. 19,4	op. 19,5	op. 19,6	total		<i>percent value</i>	op. 19,1	op. 19,2	op. 19,3	op. 19,4	op. 19,5	op. 19,6
Gieseking 1925	01:00	00:42	00:51	00:17	00:29	00:52	04:10		Gieseking 1925	23,9	17,0	20,2	6,6	11,4	20,9
Sanromá 1937	01:04	00:54	00:48	00:20	00:18	01:01	04:25		Sanromá 1937	24,0	20,5	18,0	7,7	6,8	23,1
Steuermann 1949	01:13	00:54	00:48	00:20	00:34	01:17	05:06		Steuermann 1949	23,9	17,6	15,7	6,5	11,1	25,2
Harris 1951	01:37	00:36	00:47	00:32	00:48	00:51	05:11		Harris 1951	31,1	11,7	15,1	10,2	15,6	16,3
Steuermann 1954	01:00	00:52	00:44	00:18	00:33	01:07	04:34		Steuermann 1954	21,9	19,0	16,1	6,6	12,0	24,5
Steuermann 1957a	01:08	00:48	00:41	00:20	00:31	00:57	04:25		Steuermann 1957a	25,7	18,1	15,5	7,5	11,7	21,5
Steuermann 1957b	01:06	00:48	00:43	00:18	00:30	01:04	04:29		Steuermann 1957b	24,5	17,8	16,0	6,7	11,2	23,8
Jacobs 1958	01:15	01:07	01:25	00:15	00:26	01:12	05:40		Jacobs 1958	22,1	19,7	25,0	4,4	7,6	21,2
Kadosa 1958	01:13	00:39	00:57	00:16	00:21	00:49	04:16		Kadosa 1958	28,6	15,1	22,4	6,3	8,3	19,3
Kraus 1960	01:06	00:43	00:44	00:19	00:27	00:47	04:07		Kraus 1960	26,7	17,6	18,0	7,6	11,0	19,1
Steiner 1962	00:55	00:47	00:45	00:18	00:23	00:49	03:58		Steiner 1962	23,0	19,9	19,1	7,7	9,6	20,7
Steuermann 1962	01:01	00:47	00:46	00:18	00:34	01:15	04:41		Steuermann 1962	21,7	16,7	16,4	6,4	12,1	26,7
Steuermann 1963	01:04	00:48	00:42	00:19	00:36	01:08	04:37		Steuermann 1963	23,1	17,3	15,2	6,9	13,0	24,5
Gould 1965	01:23	01:02	00:48	00:18	00:25	01:16	05:13		Gould 1965	26,6	19,9	15,3	5,9	8,0	24,3
Bjelik 1967	01:03	00:56	01:01	00:23	00:27	01:09	04:58		Bjelik 1967	21,0	18,8	20,4	7,8	8,9	23,0
Webster 1967	01:14	00:57	00:55	00:28	00:31	01:13	05:18		Webster 1967	23,4	17,9	17,3	8,8	9,6	23,1
Helffer 1969	01:13	01:05	01:02	00:20	00:29	01:09	05:17		Helffer 1969	22,9	20,4	19,6	6,4	9,0	21,7
von Vintschger 1970	01:24	01:06	00:47	00:22	00:28	01:14	05:20		von Vintschger 1970	26,2	20,5	14,6	7,0	8,6	23,1
Zykan 1970	01:10	00:46	00:42	00:16	00:17	00:51	04:01		Zykan 1970	28,9	19,2	17,2	6,7	7,0	21,0
Liubimov 1971	00:55	00:51	01:00	00:17	00:22	01:18	04:43		Liubimov 1971	19,3	18,0	21,2	6,2	7,8	27,5
Bucquet 1973	01:33	00:54	01:13	00:19	00:29	01:28	05:56		Bucquet 1973	26,0	15,3	20,6	5,3	8,2	24,7
Pollini 1974	01:12	00:51	00:54	00:23	00:31	01:06	04:56		Pollini 1974	24,2	17,3	18,2	7,6	10,6	22,1
Majlingová 1977	01:33	00:29	00:50	00:26	00:36	00:57	04:51		Majlingová 1977	31,8	10,0	17,3	9,0	12,4	19,5
Takahashi 1977	01:20	01:02	01:12	00:20	00:29	01:19	05:43		Takahashi 1977	23,3	18,1	21,0	6,0	8,6	23,1
Pelletier 1983	01:19	00:47	00:58	00:22	00:29	01:00	04:55		Pelletier 1983	26,8	15,8	19,8	7,6	9,7	20,2
Reimann 1984	01:13	00:43	01:07	00:19	00:28	01:21	05:12		Reimann 1984	23,6	13,9	21,5	6,0	9,1	25,9
Wyttenbach 1989	01:17	00:53	00:56	00:25	00:30	01:11	05:13		Wyttenbach 1989	24,7	17,0	17,9	7,9	9,7	22,7
Wolpe 1991	01:27	01:07	01:08	00:18	00:28	01:32	06:01		Wolpe 1991	24,1	18,6	18,8	5,1	7,9	25,5
Hinterhäuser 1991	01:30	00:55	01:06	00:17	00:28	01:20	05:36		Hinterhäuser 1991	26,7	16,5	19,5	5,0	8,3	23,9
Schleiermacher 1994	01:33	01:04	00:55	00:18	00:32	01:38	06:00		Schleiermacher 1994	25,8	17,9	15,2	5,0	8,8	27,3
Barenboim 1994	01:08	00:45	00:57	00:20	00:24	00:53	04:28		Barenboim 1994	25,4	16,8	21,3	7,6	9,1	19,8
Henck 1994	01:19	00:44	01:14	00:18	00:18	01:26	05:19		Henck 1994	24,7	13,8	23,3	5,6	5,6	26,9
Chen 1996	01:22	01:03	01:07	00:21	00:32	01:44	06:08		Chen 1996	22,3	17,0	18,1	5,7	8,6	28,3
Hill 1996	01:23	00:49	00:58	00:24	00:32	01:24	05:31		Hill 1996	25,2	14,8	17,5	7,3	9,8	25,5
Larcher 1998	01:24	01:02	01:09	00:26	00:28	01:32	06:00		Larcher 1998	23,3	17,1	19,2	7,1	7,8	25,5
Polyzoides 1999	01:16	01:08	01:09	00:21	00:28	01:16	05:38		Polyzoides 1999	22,5	20,1	20,4	6,2	8,3	22,5
Sherman 1999	01:10	01:05	01:01	00:22	00:31	01:23	05:32		Sherman 1999	21,0	19,6	18,4	6,6	9,4	24,9
Eschenbach 2000	01:23	01:25	01:15	00:24	00:37	01:38	06:42		Eschenbach 2000	20,7	21,1	18,7	5,9	9,2	24,4
Uchida 2000	01:21	01:12	01:19	00:22	00:46	02:22	07:22		Uchida 2000	18,2	16,3	17,9	5,0	10,5	32,1
Groh 2002	01:07	00:55	01:01	00:16	00:30	01:13	05:02		Groh 2002	22,1	18,3	20,2	5,5	9,8	24,1
Dünki 2005	01:24	00:40	00:54	00:26	00:31	00:54	04:49		Dünki 2005	29,2	13,7	18,8	8,8	10,9	18,6
Serkin 2009	01:17	01:10	01:03	00:20	00:23	01:24	05:37		Serkin 2009	22,7	20,7	18,8	6,0	6,9	24,9
Boffard 2013	01:16	01:02	01:06	00:24	00:20	01:01	05:09		Boffard 2013	24,6	20,0	21,4	7,7	6,6	19,7
Skogstad 2018	01:24	00:48	00:55	00:21	00:28	01:37	05:35		Skogstad 2018	25,2	14,4	16,5	6,4	8,5	29,1
Körber 2018	01:15	00:49	01:01	00:21	00:22	01:05	04:52		Körber 2018	25,6	16,8	20,8	7,0	7,6	22,3
Lie 2018	01:10	00:45	00:43	00:25	00:38	01:05	04:46		Lie 2018	24,4	15,8	15,2	8,6	13,3	22,8
mean 46	01:15	00:54	00:58	00:21	00:29	01:13	05:10		mean 46	24,4	17,4	18,6	6,8	9,5	23,4
MAX 46	01:37	01:25	01:25	00:32	00:48	02:22	07:22		MAX 46	31,8	21,1	25,0	10,2	15,6	32,1
MIN 46	00:55	00:29	00:41	00:15	00:17	00:47	03:58		MIN 46	18,2	10,0	14,6	4,4	5,6	16,3
std. dev. % 46	13,7	20,1	19,3	16,6	21,7	24,6	13,5		std. dev. % 46	11,3	13,9	13,0	17,8	21,1	13,0
mean 41 (S63)	01:16	00:54	00:59	00:21	00:29	01:14	05:13		mean 41 (S63)	24,5	17,3	18,9	6,8	9,2	23,3
MAX 41 (S63)	01:37	01:25	01:25	00:32	00:48	02:22	07:22		MAX 41 (S63)	31,8	21,1	25,0	10,2	15,6	32,1
MIN 41 (S63)	00:55	00:29	00:42	00:15	00:17	00:47	03:58		MIN 41 (S63)	18,2	10,0	14,6	4,4	5,6	16,3
std. dev. % 41 (S63)	13,3	20,9	18,0	17,0	22,8	25,5	13,6		std. dev. % 41 (S63)	11,6	14,7	12,5	18,7	21,2	13,6

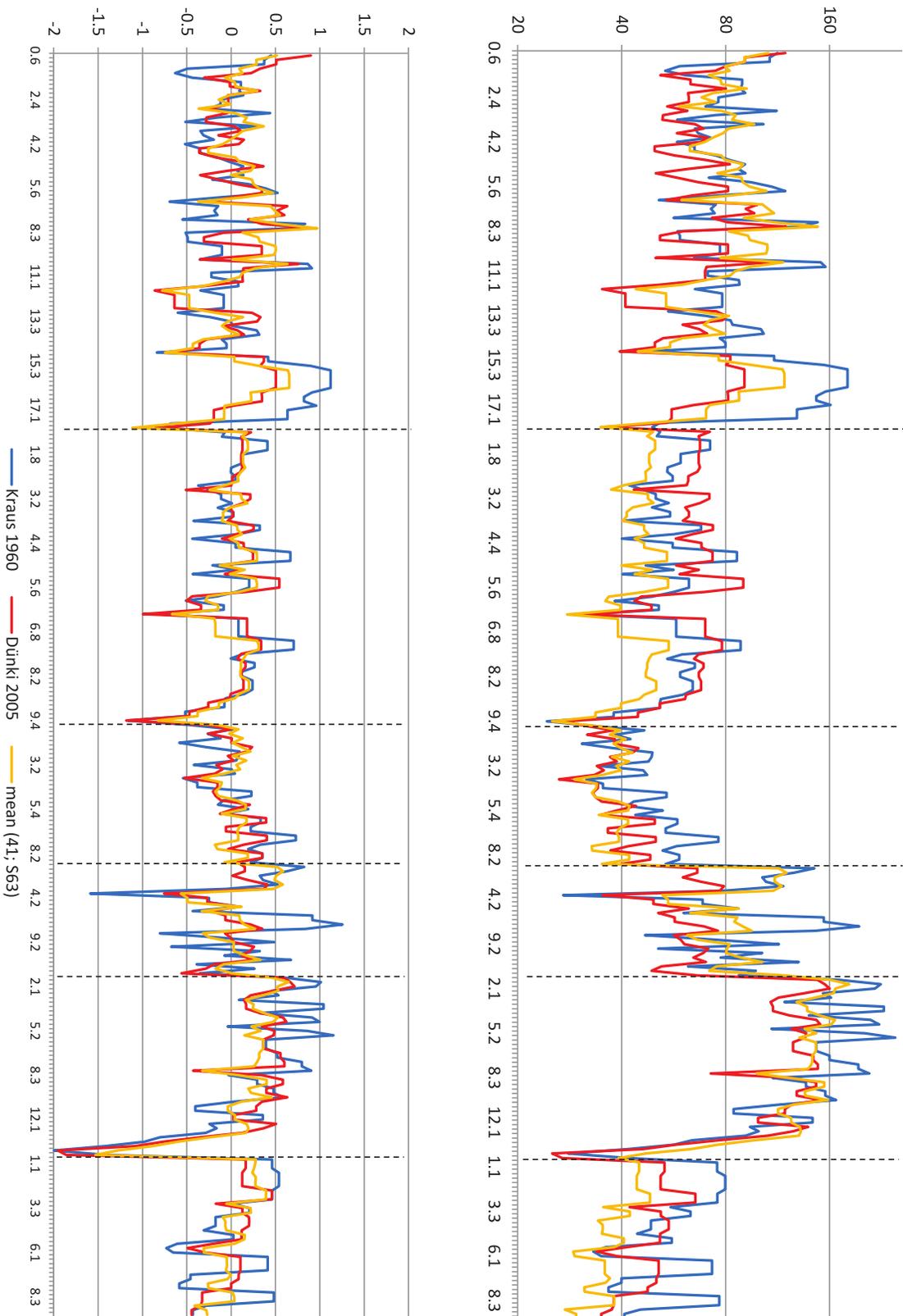
Example 5. Op. 19, 46 recordings 1925–2018; main tempi and their mean, maximum, and minimum values (left), and relative standard deviation from each main tempo for a single piece and performer (right)

<i>main tempo</i>	op. 19,1	op. 19,2	op. 19,3	op. 19,4	op. 19,5	op. 19,6	<i>std. dev. %</i>	op. 19,1	op. 19,2	op. 19,3	op. 19,4	op. 19,5	op. 19,6
Giesecking 1925	111,6	58,5	42,3	107,9	137,4	49,0		31,4	15,2	18,7	20,9	17,3	16,7
Sanromá 1937	107,8	43,4	48,9	109,2	229,6	48,1		37,2	16,1	25,5	39,2	14,4	19,1
Steuermann 1949	82,5	44,1	43,7	103,4	108,6	34,8		34,3	12,2	21,5	18,7	22,2	19,0
Harris 1951	57,1	71,4	46,8	64,4	65,0	62,1		30,2	17,7	18,0	41,2	14,6	34,8
Steuermann 1954	97,1	48,2	49,4	110,0	107,6	39,8		30,3	14,7	17,5	21,5	26,0	16,8
Steuermann 1957a	82,7	49,6	52,6	96,3	109,5	43,7		26,2	13,9	15,5	19,5	22,0	19,2
Steuermann 1957b	94,7	51,3	50,5	109,8	118,8	44,6		36,8	15,4	17,4	22,7	26,6	16,1
Jacobs 1958	87,7	36,9	25,3	134,0	181,8	39,3		30,4	12,5	17,8	24,4	17,5	31,4
Kadosa 1958	89,1	66,9	35,7	113,8	188,6	53,5		24,6	14,1	13,1	24,5	27,3	16,1
Kraus 1960	82,7	59,9	48,5	111,9	162,5	61,7		31,1	20,5	23,3	35,1	27,9	27,2
Steiner 1962	118,9	49,8	47,4	93,4	156,2	54,8		18,8	10,7	14,3	18,9	12,3	19,4
Steuermann 1962	97,2	53,0	49,6	114,0	114,7	36,8		32,2	15,4	19,1	21,4	33,9	21,4
Steuermann 1963	91,8	50,0	51,3	102,7	107,3	40,4		32,1	13,0	17,6	20,7	27,9	18,0
Gould 1965	77,2	37,3	49,0	92,4	143,9	35,5		29,6	12,8	36,4	23,3	17,6	16,6
Bjelik 1967	97,7	43,1	34,0	82,3	127,3	38,4		19,7	10,0	11,1	29,0	18,6	24,5
Webster 1967	81,7	43,1	39,6	62,3	125,8	37,4		24,2	12,6	18,1	19,8	21,6	19,3
Helffer 1969	99,1	38,7	34,6	97,0	143,3	34,2		33,5	15,0	14,4	23,5	25,4	16,6
von Vintschger 1970	70,7	36,4	47,1	92,3	141,0	34,3		22,8	8,8	16,2	39,9	23,8	22,0
Zykan 1970	92,7	51,2	51,8	133,9	205,0	49,5		35,5	14,8	14,2	27,9	19,6	15,3
Liubimov 1971	132,0	42,2	35,8	110,7	171,7	33,6		27,9	9,9	12,8	17,6	21,8	15,0
Bucquet 1973	62,1	46,4	28,9	113,5	169,3	30,0		29,7	27,3	15,3	46,7	26,7	29,0
Pollini 1974	83,1	47,3	37,3	82,5	118,0	39,6		20,3	11,9	12,7	15,0	18,2	17,6
Majlingová 1977	70,5	84,0	43,1	70,9	87,1	44,6		46,8	18,0	14,0	32,2	12,8	12,0
Takahashi 1977	77,9	37,8	28,3	81,1	134,1	30,8		22,5	14,0	17,3	20,7	15,2	13,2
Pelletier 1983	82,6	53,1	37,0	85,5	141,5	48,4		37,4	18,5	19,4	24,9	28,4	16,8
Reimann 1984	84,3	58,5	30,7	96,4	129,0	34,5		25,3	10,5	20,2	22,9	25,8	29,9
Wyttbach 1989	88,1	50,1	39,3	75,8	132,5	39,2		23,7	21,8	21,4	22,2	21,8	23,9
Wolpe 1991	78,3	36,7	31,4	107,7	170,4	31,8		29,4	10,9	16,0	32,5	31,1	22,9
Hinterhäuser 1991	86,8	43,9	32,7	116,1	166,3	31,0		46,2	11,3	18,5	28,3	23,1	24,2
Schleiermacher 1994	78,9	38,5	41,6	102,6	136,5	28,6		29,9	16,1	16,9	13,2	17,6	11,8
Barenboim 1994	93,9	53,9	38,6	87,8	144,3	50,2		20,8	9,5	21,8	19,1	19,4	20,4
Henck 1994	87,1	56,9	28,2	103,1	197,2	38,1		18,4	13,6	14,0	17,0	12,0	31,9
Chen 1996	83,9	40,8	32,8	97,7	130,5	30,3		24,4	8,9	11,0	30,1	20,1	33,2
Hill 1996	85,4	51,5	38,0	84,0	112,5	32,0		27,3	13,7	15,4	25,2	15,9	24,3
Larcher 1998	73,2	37,5	31,8	79,5	120,2	26,9		23,1	10,8	12,9	13,9	17,4	14,8
Polyzoides 1999	91,2	35,3	33,0	101,2	126,8	37,3		22,4	10,1	12,2	19,9	16,0	16,7
Sherman 1999	90,3	35,7	36,5	93,3	127,1	32,0		28,7	10,3	23,1	28,3	28,0	14,7
Eschenbach 2000	89,0	29,7	28,1	81,8	97,1	29,1		29,5	11,0	14,8	23,1	15,1	27,3
Uchida 2000	105,0	36,0	26,0	101,7	87,1	18,6		31,1	14,5	21,1	40,9	28,5	15,3
Groh 2002	100,1	44,2	34,9	102,6	133,6	39,1		17,6	12,2	12,5	17,1	10,6	21,3
Dünki 2005	71,8	67,1	39,0	64,9	128,5	50,2		24,2	13,2	16,3	14,2	16,8	15,0
Serkin 2009	90,7	36,1	39,1	91,2	163,5	33,3		18,8	11,3	21,7	13,2	14,7	14,2
Boffard 2013	77,9	34,8	32,2	84,1	170,6	41,9		21,8	7,7	10,3	19,9	17,5	15,7
Skogstad 2018a	85,7	52,3	38,6	84,9	131,9	27,2		26,3	13,6	9,5	24,6	16,1	11,1
Körber 2018a	85,1	47,1	35,6	87,4	166,8	39,6		30,0	9,5	10,8	17,4	10,2	18,8
Lie 2018a	90,0	54,0	51,0	74,5	93,4	42,3		19,2	16,7	15,7	28,3	23,4	14,6
mean 46	87,9	47,5	39,1	95,5	138,3	39,1		27,9	13,5	16,9	24,4	20,5	19,9
MAX 46	132,0	84,0	52,6	134,0	229,6	62,1		46,8	27,3	36,4	46,7	33,9	34,8
MIN 46	57,1	29,7	25,3	62,3	65,0	18,6		17,6	7,7	9,5	13,2	10,2	11,1
std. dev. % 46	15,4	23,1	20,2	17,3	23,9	23,4		24,0	27,6	28,4	32,8	28,5	30,3
mean 41 (S63)	87,6	47,3	37,8	94,1	141,5	39,0		27,4	13,4	16,7	24,8	19,8	20,1
MAX 41 (S63)	132,0	84,0	51,8	134,0	229,6	62,1		46,8	27,3	36,4	46,7	31,1	34,8
MIN 41 (S63)	57,1	29,7	25,3	62,3	65,0	18,6		17,6	7,7	9,5	13,2	10,2	11,1
std. dev. % 41 (S63)	16,1	24,4	19,5	17,9	23,8	24,6		24,9	29,2	29,9	33,7	28,3	31,6

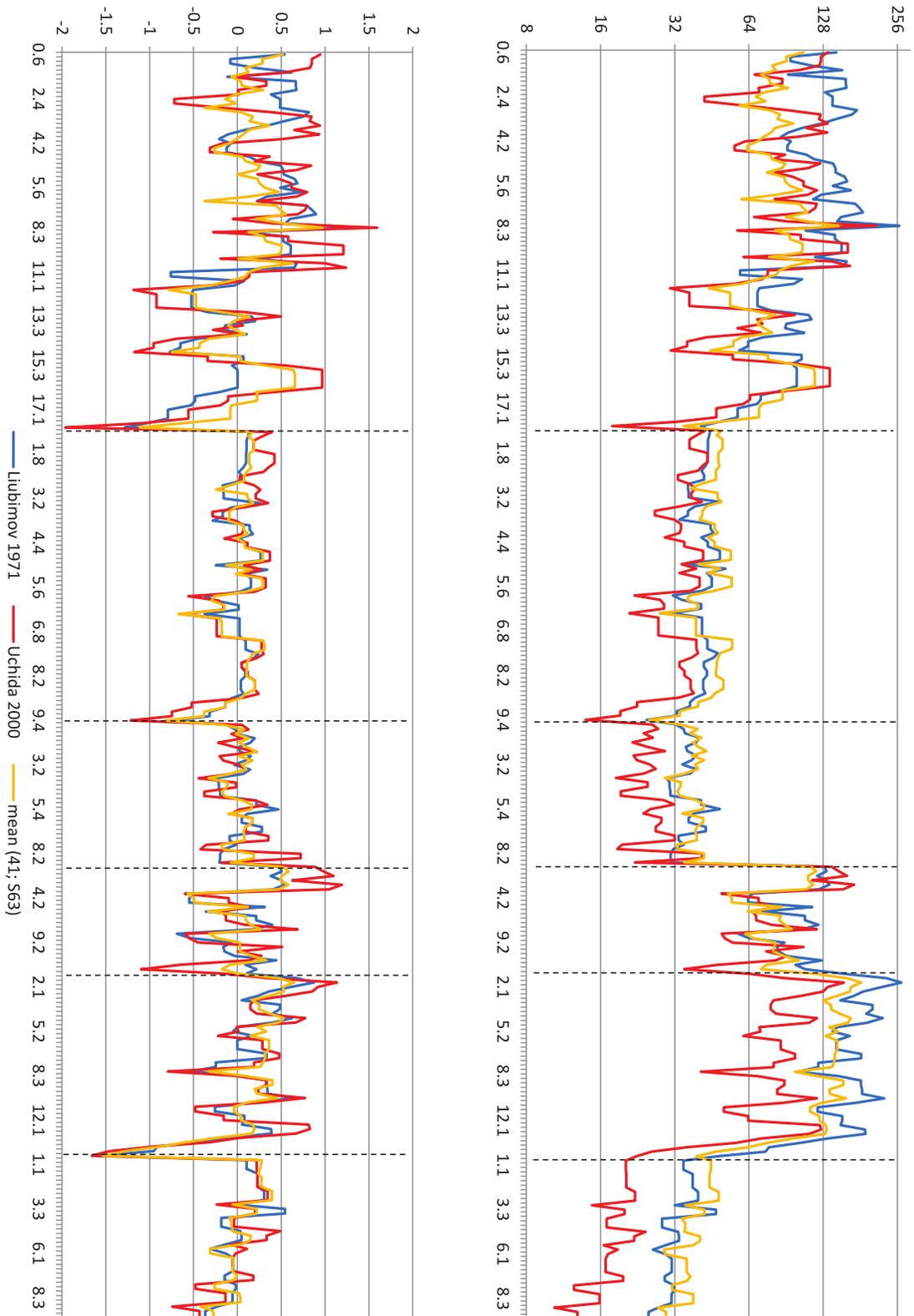
Example 7. Op. 19, frame model; tempo curves for Schleiermacher 1994 and Helffer 1969; absolute tempo values (above) and deviations from the main tempo (below) (logarithmic scaling; 1 = double tempo; -1 = half tempo)



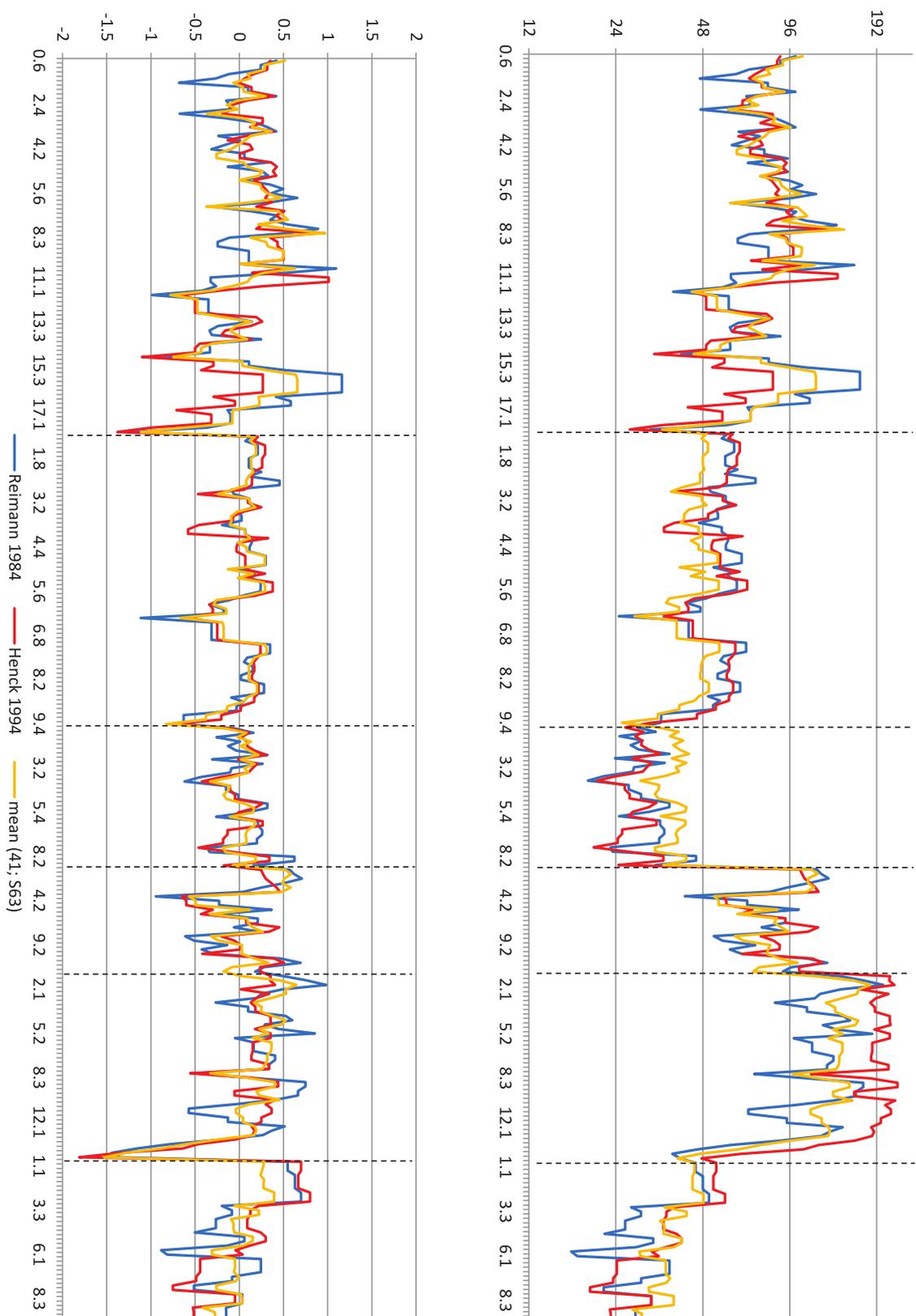
Example 8. Op. 19, opening model; tempo curves for Kraus 1960 and Dünki 2005; absolute tempo values (above) and deviations from the main tempo (below) (logarithmic scaling; 1 = double tempo; -1 = half tempo)



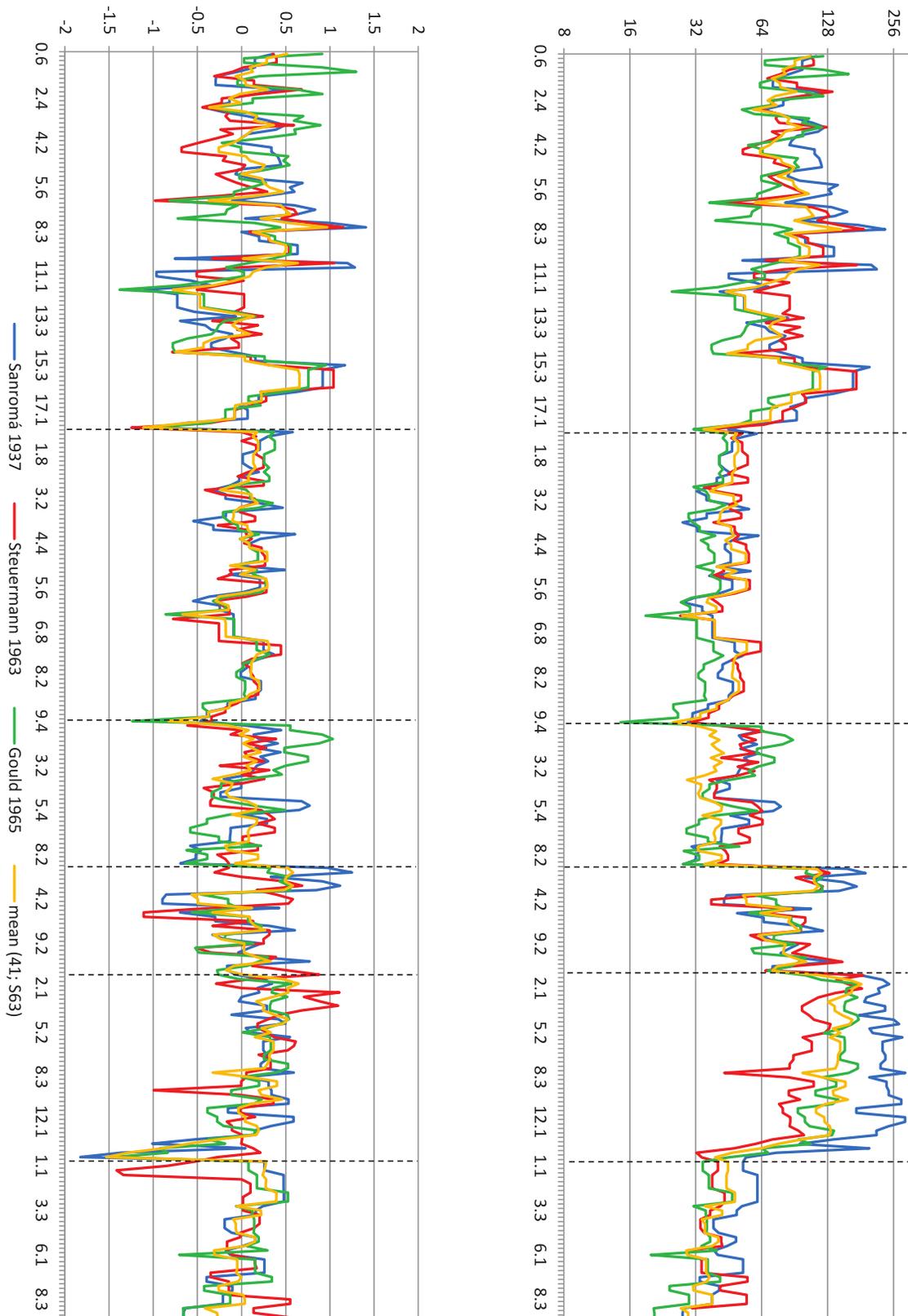
Example 9. Op. 19, finale model; tempo curves for Liubimov 1971 and Uchida 2000; absolute tempo values (above) and deviations from the main tempo (below) (logarithmic scaling; 1 = double tempo; -1 = half tempo)



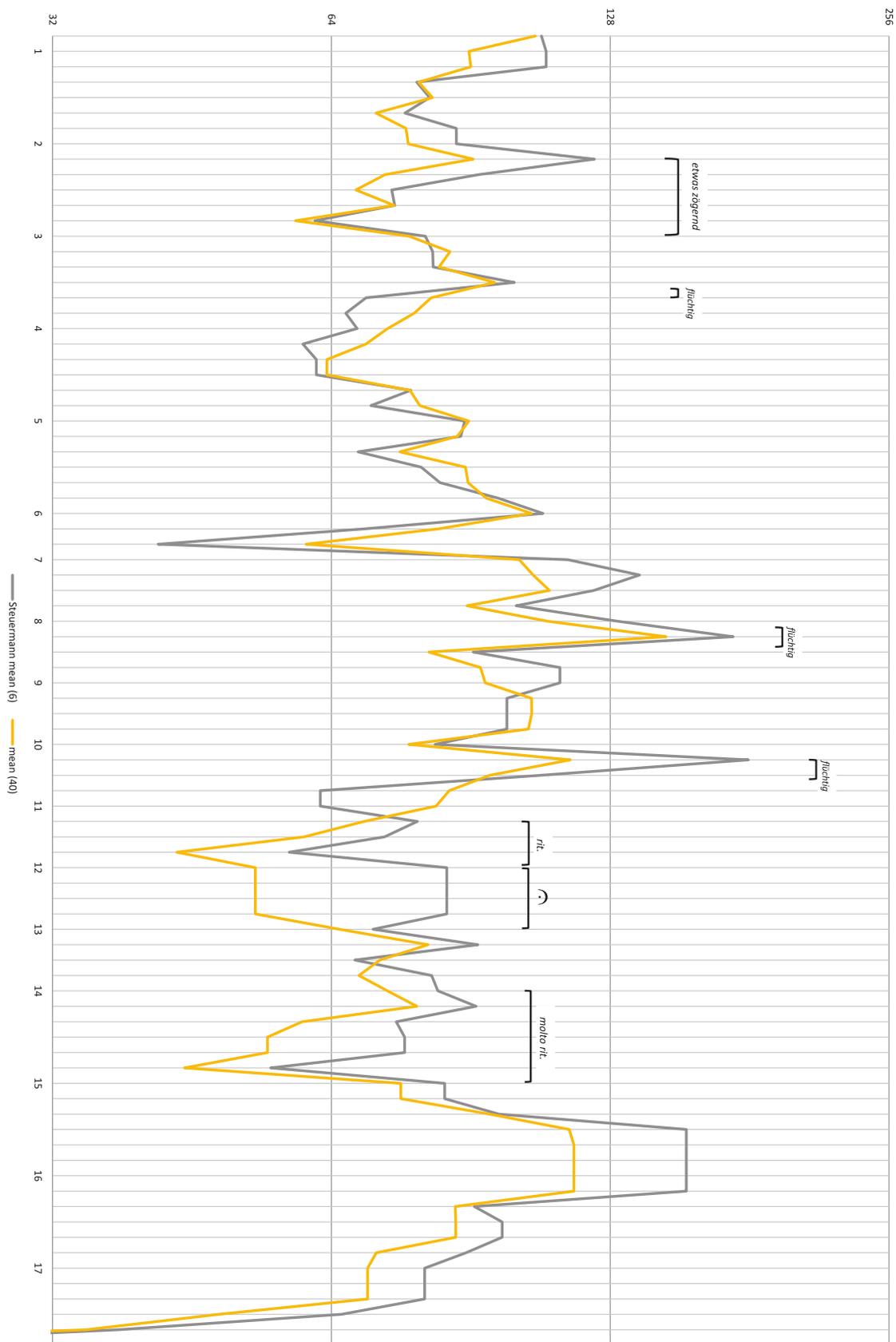
Example 10. Op. 19, contrast model; tempo curves for Reimann 1983 and Henck 1994; absolute tempo values (above) and deviations from the main tempo (below) (logarithmic scaling; 1 = double tempo; -1 = half tempo)



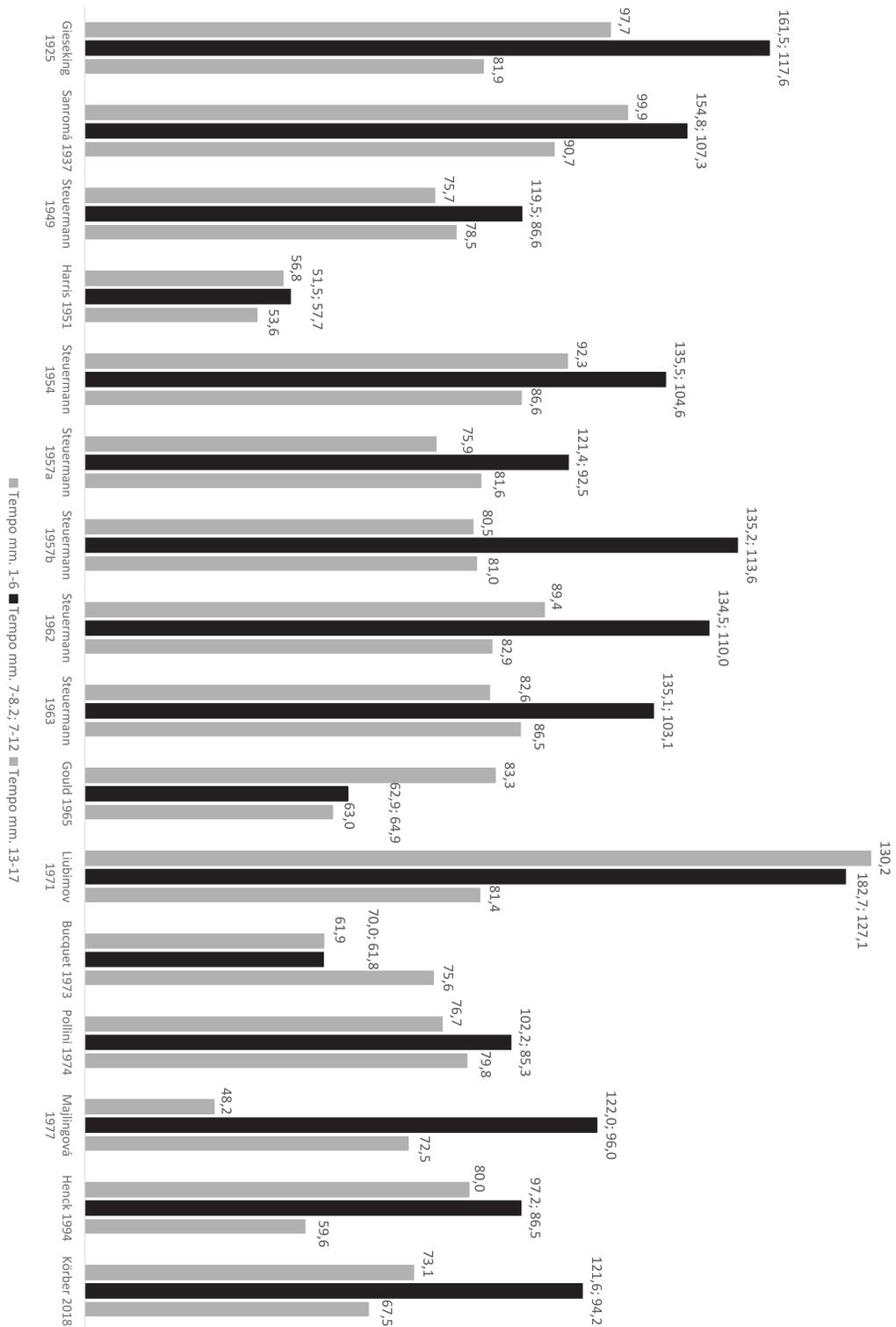
Example 11. Op. 19, accelerando model; tempo curves for Sanromá 1937, Steuermann 1963, and Gould 1965; absolute tempo values (above) and deviations from the main tempo (below) (logarithmic scaling; 1 = double tempo; -1 = half tempo)



Example 12. Op. 19, no. 1, tempo curves with mean values across the six Steuermann recordings and mean values across 40 recordings of other pianists (1925–2018)



Example 13. Op. 19, no. 1, mean tempi of the three sections mm. 1–6, mm. 7–12 (the value for mm. 7–8.2 is given additionally), and mm. 13–17 in Steuermann’s six recordings and ten compared recordings (1925–2018); the values given here are real averages, including all beats of the respective sections; however, the passage mm. 15.4–16.2, which is considerably faster in all the recordings, was not included in the calculations for the third section



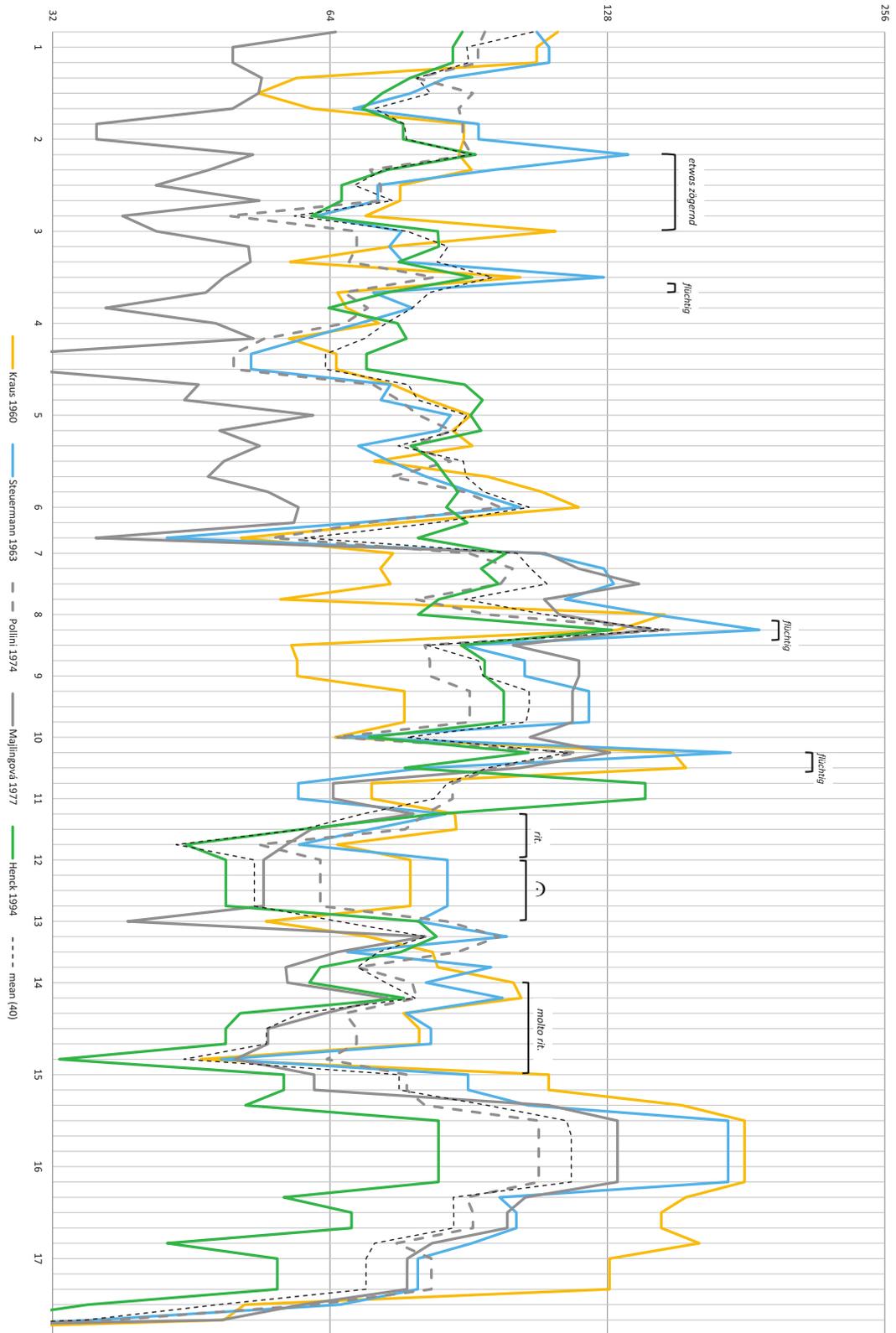
Example 14. Op. 19, correlation table of logarithmically scaled rubato values (deviations of individual tempo points from the respective main tempo points) for 40 recordings in comparison with Steuermann 1963; the mean values were calculated by means of a so-called Fisher z-transformation (see Leonhart 2020)

	1	2	3	4	5	6	1-6 (z)
Pollini 1974	0,807	0,815	0,273	0,873	0,869	0,271	0,764
Sherman 1999	0,750	0,758	0,350	0,752	0,788	0,487	0,726
Webster 1967	0,796	0,806	0,264	0,729	0,842	0,639	0,724
Boffard 2013	0,735	0,737	0,665	0,812	0,797	0,369	0,723
Hinterhäuser 1991	0,674	0,754	0,579	0,808	0,841	0,408	0,718
Reimann 1984	0,776	0,871	0,398	0,629	0,810	0,270	0,708
Pelletier 1983	0,776	0,674	0,704	0,776	0,625	0,535	0,705
Wytttenbach 1989	0,673	0,791	0,474	0,810	0,786	0,533	0,704
Helffer 1969	0,646	0,788	0,528	0,766	0,844	0,251	0,695
Chen 1996	0,574	0,697	0,606	0,657	0,878	0,785	0,690
Hill 1996	0,626	0,720	0,709	0,755	0,864	0,490	0,690
Larcher 1998	0,598	0,847	0,747	0,836	0,750	0,271	0,678
Bjelic 1967	0,669	0,782	0,281	0,723	0,907	0,194	0,677
Polyzoides 1999	0,628	0,794	0,741	0,783	0,625	0,609	0,665
Takahashi 1977	0,658	0,771	0,031	0,650	0,817	0,335	0,665
Giesecking 1925	0,579	0,727	0,359	0,825	0,838	0,369	0,664
Dünki 2005	0,698	0,759	0,447	0,684	0,747	0,243	0,661
Zykan 1970	0,628	0,802	0,529	0,836	0,606	0,430	0,655
Lie 2018	0,624	0,676	0,588	0,557	0,831	0,350	0,654
Steiner 1962	0,478	0,829	0,513	0,719	0,800	0,815	0,649
Vintschger 1970	0,674	0,797	0,472	0,696	0,813	-0,201	0,646
Serkin 2009	0,628	0,583	0,446	0,767	0,745	0,374	0,637
Körber 2018	0,668	0,764	0,276	0,760	0,709	0,066	0,637
Eschenbach 2000	0,551	0,807	0,606	0,786	0,783	0,549	0,629
Kadosa 1958	0,600	0,847	0,291	0,762	0,712	0,088	0,629
Sanromá 1937	0,676	0,562	0,701	0,828	0,548	0,206	0,626
Jacobs 1958	0,644	0,785	0,238	0,765	0,692	0,287	0,623
Schleiermacher 1994	0,593	0,773	0,523	0,717	0,801	-0,278	0,623
Uchida 2000	0,600	0,732	0,437	0,543	0,778	0,308	0,618
Bucquet 1973	0,594	0,740	0,145	0,521	0,792	0,231	0,612
Wolpe 1991	0,504	0,725	0,635	0,717	0,809	0,060	0,611
Groh 2002	0,552	0,812	0,461	0,191	0,762	0,541	0,599
Skogstad 2018	0,543	0,655	0,452	0,669	0,734	0,240	0,596
Kraus 1960	0,646	0,794	0,190	0,546	0,631	0,306	0,593
Barenboim 1994	0,569	0,782	0,166	0,759	0,586	0,505	0,575
Majlingová 1977	0,698	0,578	0,614	0,204	0,710	0,437	0,572
Liubimov 1971	0,409	0,666	0,656	0,814	0,799	0,325	0,564
Henck 1994	0,428	0,706	0,521	0,789	0,797	0,191	0,543
Gould 1965	0,488	0,734	0,301	0,591	0,643	0,425	0,514
Harris 1951	0,428	0,706	0,158	0,502	0,542	-0,005	0,400
mean (z)	0,632	0,756	0,472	0,719	0,770	0,354	0,646

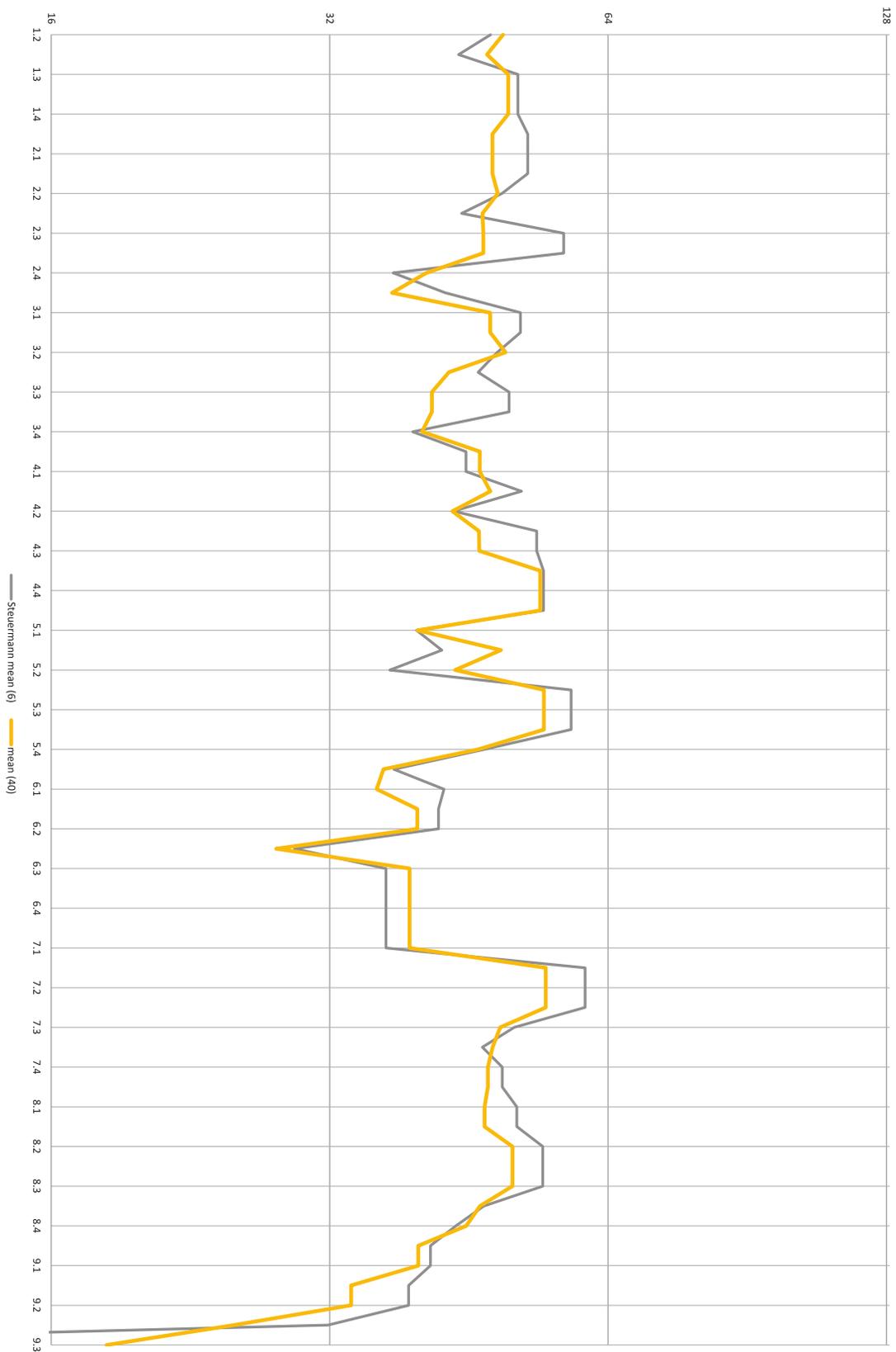
Example 15. Op. 19, pattern matrix of the factor analysis of 41 recordings (including Steuermann 1963)

	Components			
	1	2	3	4
op. 19.1				
Henck 1994	0.974	-0.261		
Lubimov 1971	0.968	-0.447		
Steiner 1962	0.933			
Hill 1996	0.928			
Uchida 2000	0.926			
Polyzoides 1999	0.909			
Schliermacher 1994	0.893			
Groh 2002	0.891			
Hehler 1969	0.872			
Wolpe 1991	0.863			
Stegestad 2018	0.858			
Serkin 2009	0.841			
Wytenbach 1989	0.809			
Kolber 2018	0.806			
Lie 2018	0.802			
Eschenbach 2000	0.801			
Chen 1996	0.800			
Takahashi 1977	0.766			
Kadosa 1958	0.743			
Hinterhäuser 1991	0.743			
Zykan 1970	0.740			
Gieseking 1925	0.735			
Bjellk 1967	0.699			
Borford 2013	0.634			
Dunkl 2005	0.630			
Gould 1965	0.621			
Vinetschger 1970	0.619			
Larcker 1998	0.616			
Wahser 1967	0.600			
Samron 1937	0.594			
Pollini 1974	0.557			
Sierman 1999	0.546			
Jacobson 1958	0.545			
Barenboim 1994	0.494			
Kraus 1960	0.490			
Burquet 1973	0.633			
Harris 1951	0.616			
Majlingova 1977	0.218			
Stuermann 1963	0.416			
Pelletier 1983	0.465			
Reinmann 1984	0.498			
op. 19.2				
Webster 1967	0.965	-0.307		
Pollini 1974	0.945			
Steiner 1962	0.921			
Dunkl 2005	0.914			
Stuermann 1963	0.907			
Vinetschger 1970	0.902			
Korber 2018	0.897			
Kraus 1960	0.897	-0.238		
Barenboim 1994	0.896			
Kadosa 1958	0.895			
Eschenbach 2000	0.894			
Wytenbach 1989	0.893			
Groh 2002	0.890	-0.260		
Zykan 1970	0.889			
Larcker 1998	0.889			
Burquet 1973	0.887	-0.365		
Sierman 1999	0.886			
Hinterhäuser 1991	0.884			
Bjellk 1967	0.882			
Jacobson 1958	0.881			
Polyzoides 1999	0.870			
Reinmann 1984	0.866			
Lubimov 1971	0.840			
Schliermacher 1994	0.839			
Takahashi 1977	0.837			
Dunkl 2005	0.822			
Vinetschger 1970	0.822			
Gould 1965	0.821	0.280		
Uchida 2000	0.820	0.243		
Hehler 1969	0.820	0.243		
Hehler 1969	0.819	0.243		
Pelletier 1983	0.810	0.263		
Samron 1937	0.800	0.342		
Pollini 1974	0.791	0.337		
Borford 2013	0.791	0.337		
Hill 1996	0.778	0.380		
Wolpe 1991	0.776	0.380		
Stuermann 1963	0.772	0.380		
Skogestad 2018	0.765	0.371		
Henck 1994	0.765	0.371		
Zykan 1970	0.756	0.230		
Chen 1996	0.750	0.371		
Majlingova 1977	0.681	0.297		
Samron 1937	0.666	0.297		
Harris 1951	0.653	0.297		
Serkin 2009	0.575	0.297		
op. 19.3				
Lubimov 1971	0.796	0.563		
Samron 1937	0.790	0.563		
Borford 2013	0.773	-0.267		
Stuermann 1963	0.723			
Pelletier 1983	0.677	-0.219		
Groh 2002	0.661	-0.302		
Hill 1996	0.618	0.698	0.256	
Korber 2018	0.618	0.698	0.256	
Stuermann 1963	0.614	-0.380	0.315	
Wolpe 1991	0.585			
Barenboim 1994	0.585			
Larcker 1998	0.570			
Gieseking 1925	0.570			
Kadosa 1958	0.518			
Hehler 1969	0.493			
Lie 2018	0.402			
Barenboim 1994	-0.909			
Kraus 1960	-0.781			
Gould 1965	0.452			
Sierman 1999	0.242	-0.760	-0.219	0.370
Hinterhäuser 1991	0.267	0.756	0.254	0.236
Serkin 2009	0.485	-0.697		
Wytenbach 1989	0.485	-0.697		
Takahashi 1977	-0.226	-0.662	0.524	
Polyzoides 1999	0.304	-0.662	0.211	
Webster 1967	0.333	-0.647	0.291	
Dunkl 2005	-0.596	0.275	0.261	
Vinetschger 1970	0.576	0.229	0.399	
Pollini 1974	0.805	0.229	0.399	
Burquet 1973	0.802	0.222	0.399	
Harris 1951	0.266	0.242	0.399	
Jacobson 1958	0.716	0.219	0.399	
Hinterhäuser 1991	0.339	0.219	0.399	
Hehler 1969	0.337	0.219	0.399	
Henck 1994	0.317	0.219	0.399	
Reinmann 1984	-0.489	0.537	0.222	
Uchida 2000	-0.346	0.511	0.273	
Zykan 1970	0.506	0.506	0.297	
Chen 1996	0.681	0.213	0.399	
Harris 1951	-0.244	0.213	0.399	
Skogestad 2018	0.312	0.332	0.399	
Majlingova 1977	0.208	-0.292	0.291	0.585
Chen 1996	0.208	-0.292	0.291	0.585
Schliermacher 1994	0.239	0.361	0.333	0.520
Polyzoides 1999	0.460			
op. 19.4				
Eschenbach 2000	0.967	0.969		
Barenboim 1994	0.949			
Bjellk 1967	0.936			
Pollini 1974	0.897			
Kadosa 1958	0.897			
Gieseking 1925	0.872			
Larcker 1998	0.871	-0.294		
Vinetschger 1970	0.840	0.232		
Hehler 1969	0.839			
Hinterhäuser 1991	0.839			
Takahashi 1977	0.815			
Stuermann 1963	0.808	0.309		
Wytenbach 1989	0.779	-0.313		
Dunkl 2005	0.774			
Samron 1937	0.759	-0.215		
Borford 2013	0.735	-0.233	0.300	
Kadosa 1958	0.721	-0.255		
Lie 2018	0.715			
Webster 1967	0.701	0.220	0.441	
Lie 2018	0.699	0.220	0.441	
Pelletier 1983	0.699	0.220	0.441	
Hehler 1969	0.688	-0.242		
Hill 1996	0.688	-0.242		
Hinterhäuser 1991	0.688	-0.242		
Zykan 1970	0.688	-0.242		
Korber 2018	0.684	0.263	0.212	
Wytenbach 1989	0.684	0.263	0.212	
Reinmann 1984	0.610	0.263	0.212	
Schliermacher 1994	0.578	-0.298	0.399	
Serkin 2009	0.552	-0.207	0.316	0.447
Steiner 1962	0.492	-0.470	0.316	0.447
Polyzoides 1999	0.472	-0.233	0.274	
Skogestad 2018	0.472	-0.233	0.274	
Burquet 1973	-0.851			
Reinmann 1984	-0.851			
Samron 1937	-0.597	0.428	0.349	
Hehler 1969	-0.587	0.357	0.349	
Jacobson 1958	0.338	-0.587	0.357	
Hehler 1969	0.338	-0.587	0.357	
Henck 1994	0.446	-0.581	0.315	
Lubimov 1971	0.392	-0.473	0.241	0.258
Majlingova 1977	0.392	-0.473	0.241	0.258
Uchida 2000	0.518	0.644	0.644	
Chen 1996	0.518	0.644	0.644	
Harris 1951	0.331	-0.287	0.594	
Zykan 1970	0.331	-0.287	0.594	
Groh 2002	0.331	-0.287	0.594	
Samron 1937	0.331	-0.287	0.594	
Vinetschger 1970	0.331	-0.287	0.594	
Chen 1996	0.331	-0.287	0.594	
Harris 1951	0.331	-0.287	0.594	
Sierman 1999	0.383	-0.415	0.495	
Samron 1937	0.383	-0.415	0.495	
Kraus 1960	0.263			
Wolpe 1991	0.263			
Gould 1965	0.239	-0.371	0.331	0.440
op. 19.5				
Larcker 1998	1.061			
Borford 2013	0.977	-0.238		
Eschenbach 2000	0.968			
Bjellk 1967	0.956			
Pollini 1974	0.951			
Kadosa 1958	0.951			
Schliermacher 1994	0.930			
Uchida 2000	0.928			
Stuermann 1963	0.924	0.214		
Skogestad 2018	0.924	0.214		
Hill 1996	0.917			
Gieseking 1925	0.912			
Dunkl 2005	0.909			
Hehler 1969	0.908			
Chen 1996	0.908			
Lie 2018	0.908	-0.210		
Barenboim 1994	0.905	0.257	-0.200	
Serkin 2009	0.899	0.300		
Wolpe 1991	0.899	0.300		
Barenboim 1994	0.899	0.300		
Wolpe 1991	0.899	0.300		
Hinterhäuser 1991	0.890			
Lubimov 1971	0.890			
Hinterhäuser 1991	0.890			
Burquet 1973	0.886			
Stuermann 1963	0.886	-0.260		
Pollini 1974	0.879			
Polyzoides 1999	0.878			
Webster 1967	0.878			
Serkin 2009	0.872	0.222		
Vinetschger 1970	0.872	0.222		
Steiner 1962	0.870			
Bjellk 1967	0.857	-0.398		
Groh 2002	0.856	0.233		
Kadosa 1958	0.842			
Reinmann 1984	0.842			
Sierman 1999	0.825	-0.442		
Wytenbach 1989	0.825	-0.442		
Takahashi 1977	0.778			
Stuermann 1963	0.760	0.330		
Hehler 1969	0.760	0.330		
Majlingova 1977	0.716	0.238	0.330	
Wolpe 1991	0.716	0.238	0.330	
Uchida 2000	0.716	0.238	0.330	
Samron 1937	0.696	0.441	0.330	
Vinetschger 1970	0.696	0.441		

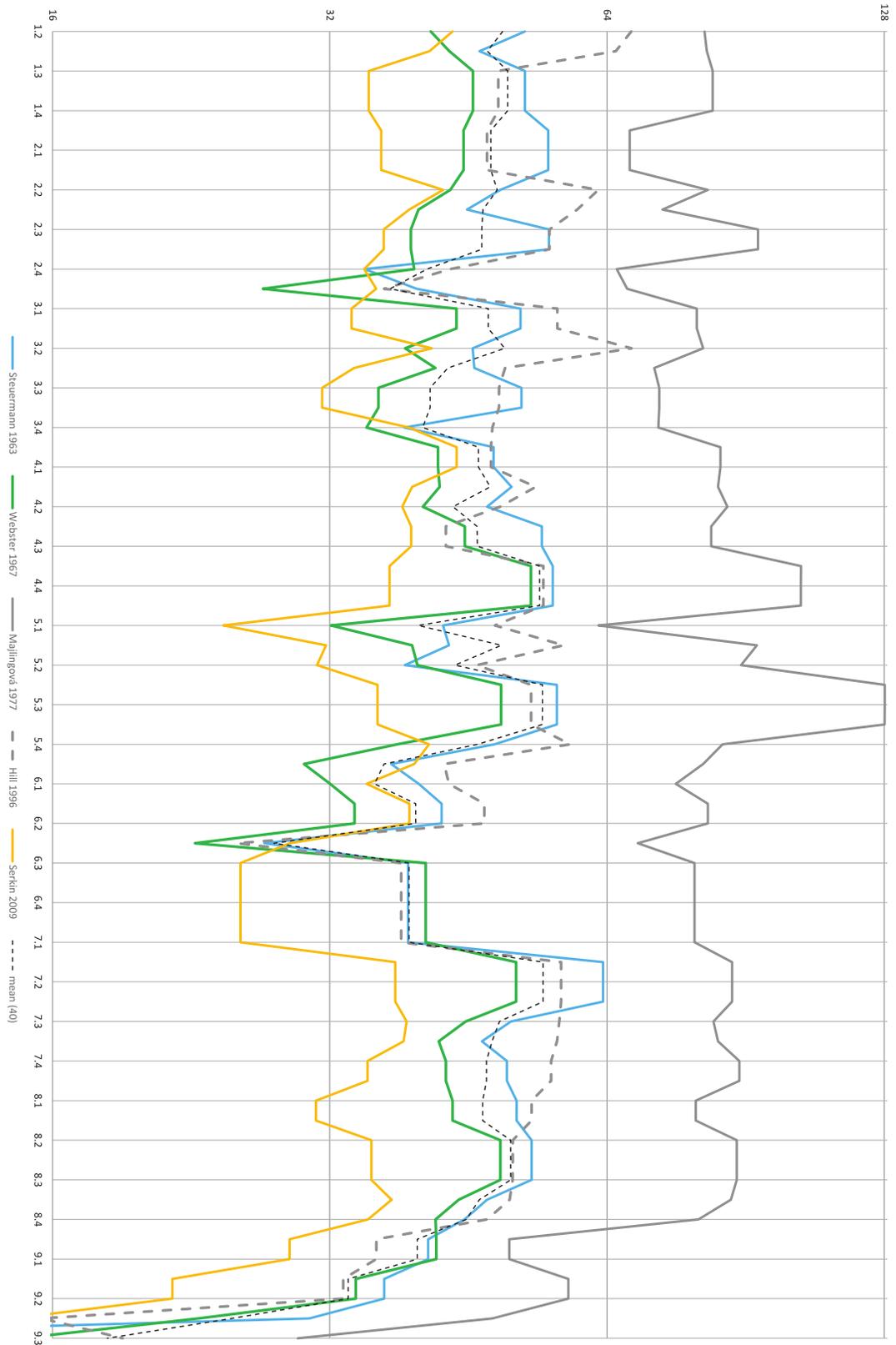
Example 16. Op. 19, no. 1, tempo curves for Steuermann 1963, mean values across the 40 compared recordings, and four recordings chosen on the basis of the factor analysis



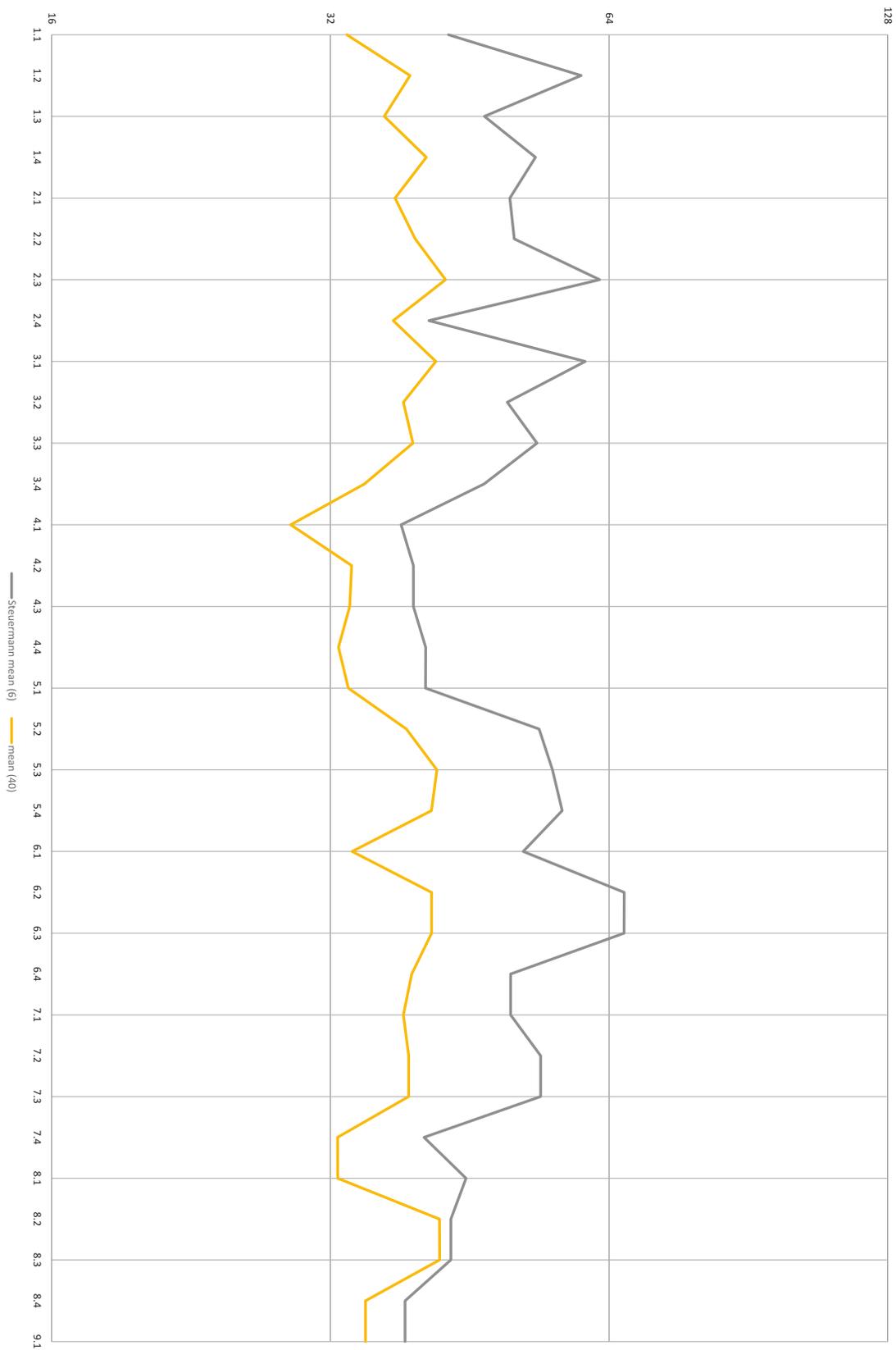
Example 17. Op. 19, no. 2, tempo curves with mean values across the six Steuermann recordings and across 40 recordings of other pianists (1925–2018)



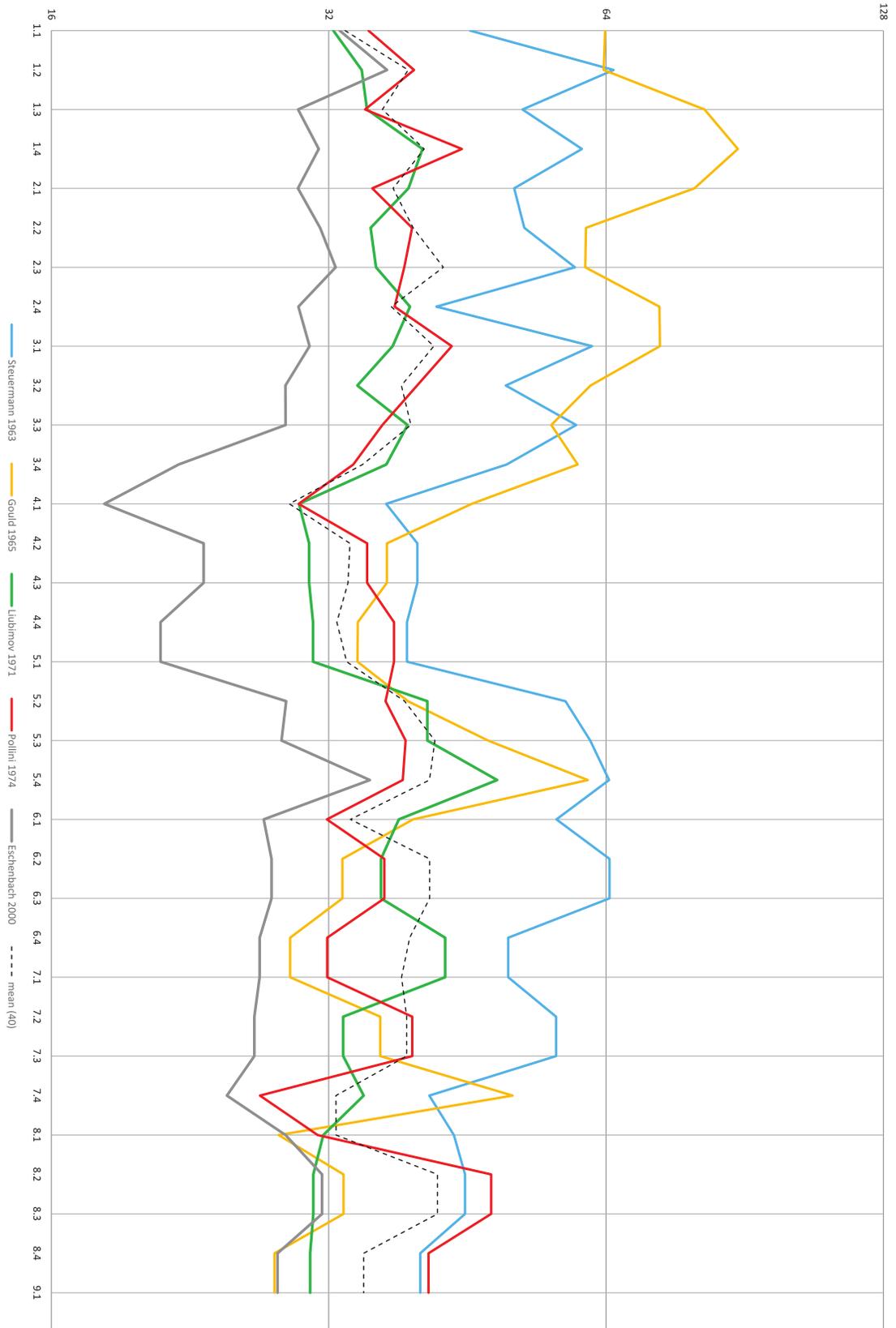
Example 18. Op. 19, no. 2, tempo curves for Steuermann 1963, mean values across the 40 compared recordings and four recordings chosen on the basis of the factor analysis



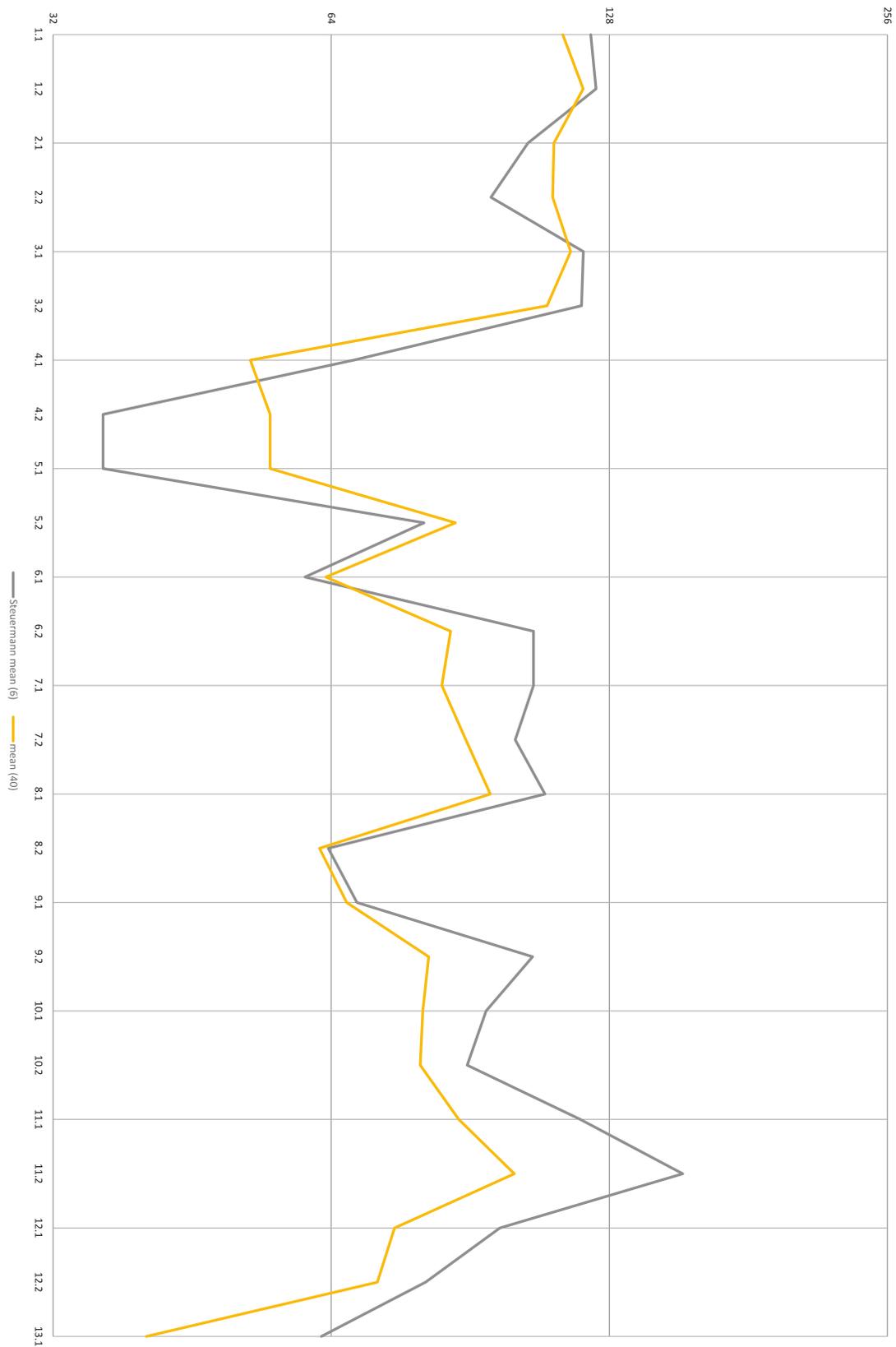
Example 19. Op. 19, no. 3, tempo curves with mean values across the six Steuermann recordings and across 40 recordings of other pianists (1925–2018)



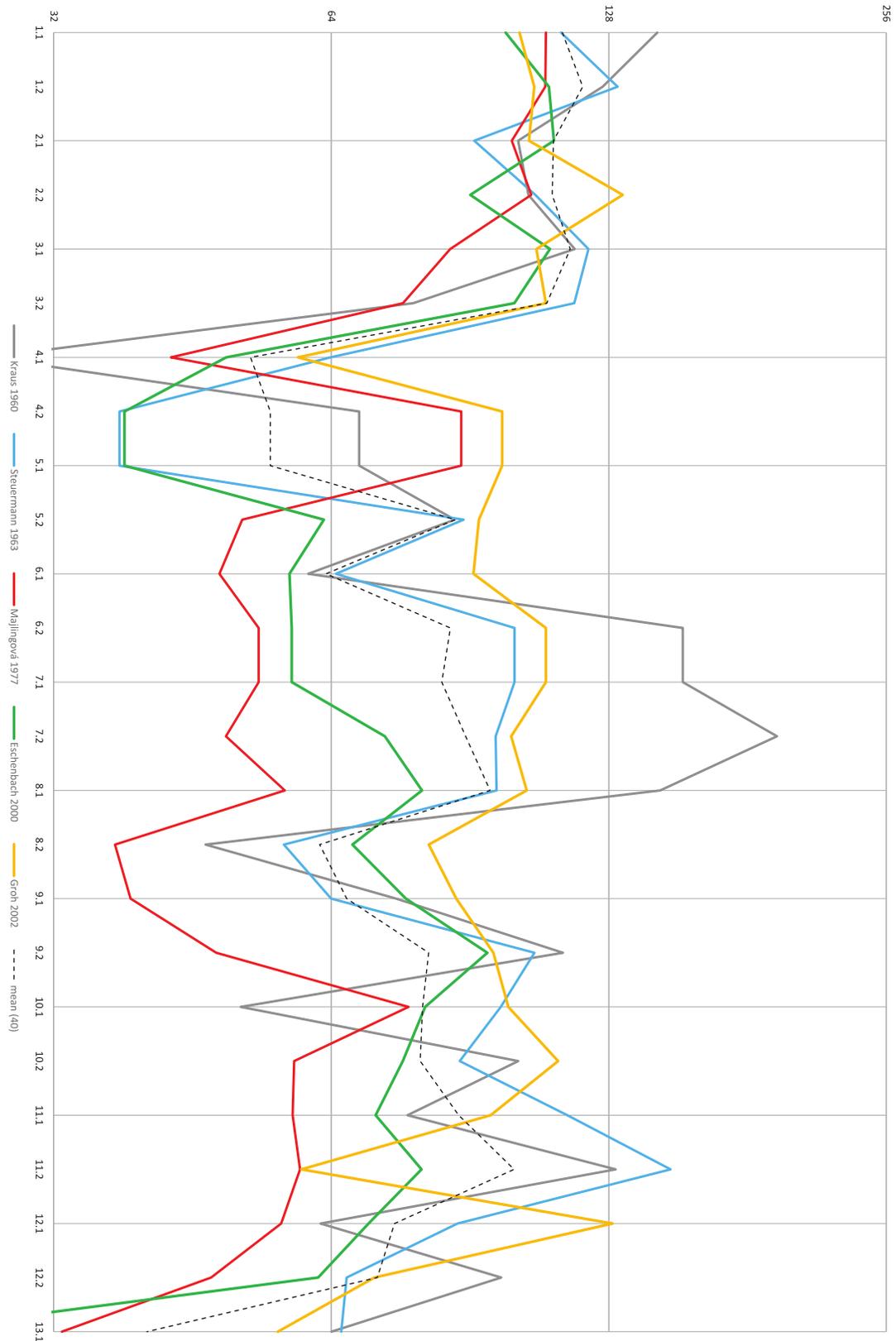
Example 20. Op. 19, no. 3, tempo curves for Steuermann 1963, mean values across the 40 compared recordings and four recordings chosen on the basis of the factor analysis



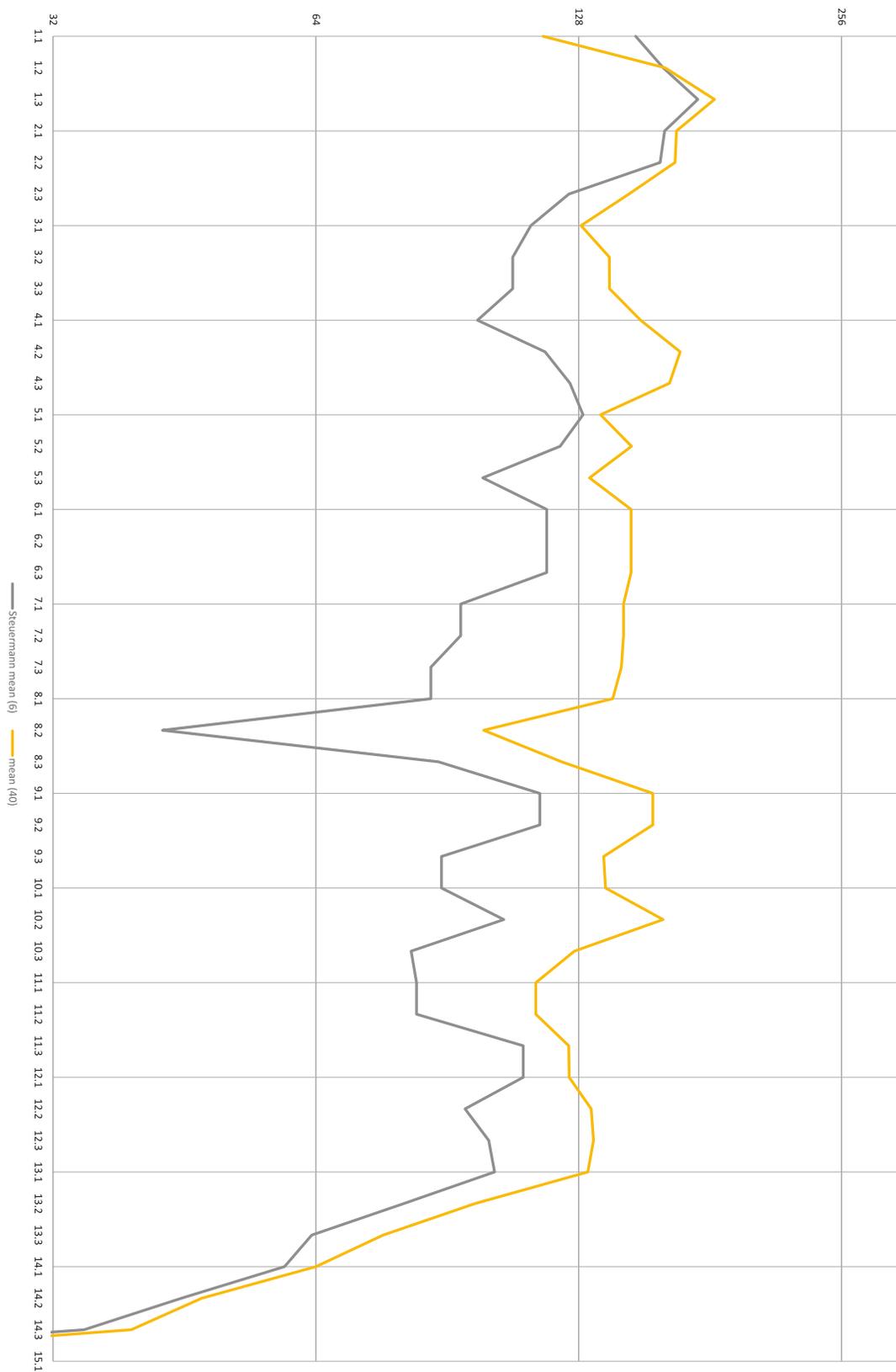
Example 21. Op. 19, no. 4, tempo curves with mean values across the six Steuermann recordings and across 40 recordings of other pianists (1925–2018)



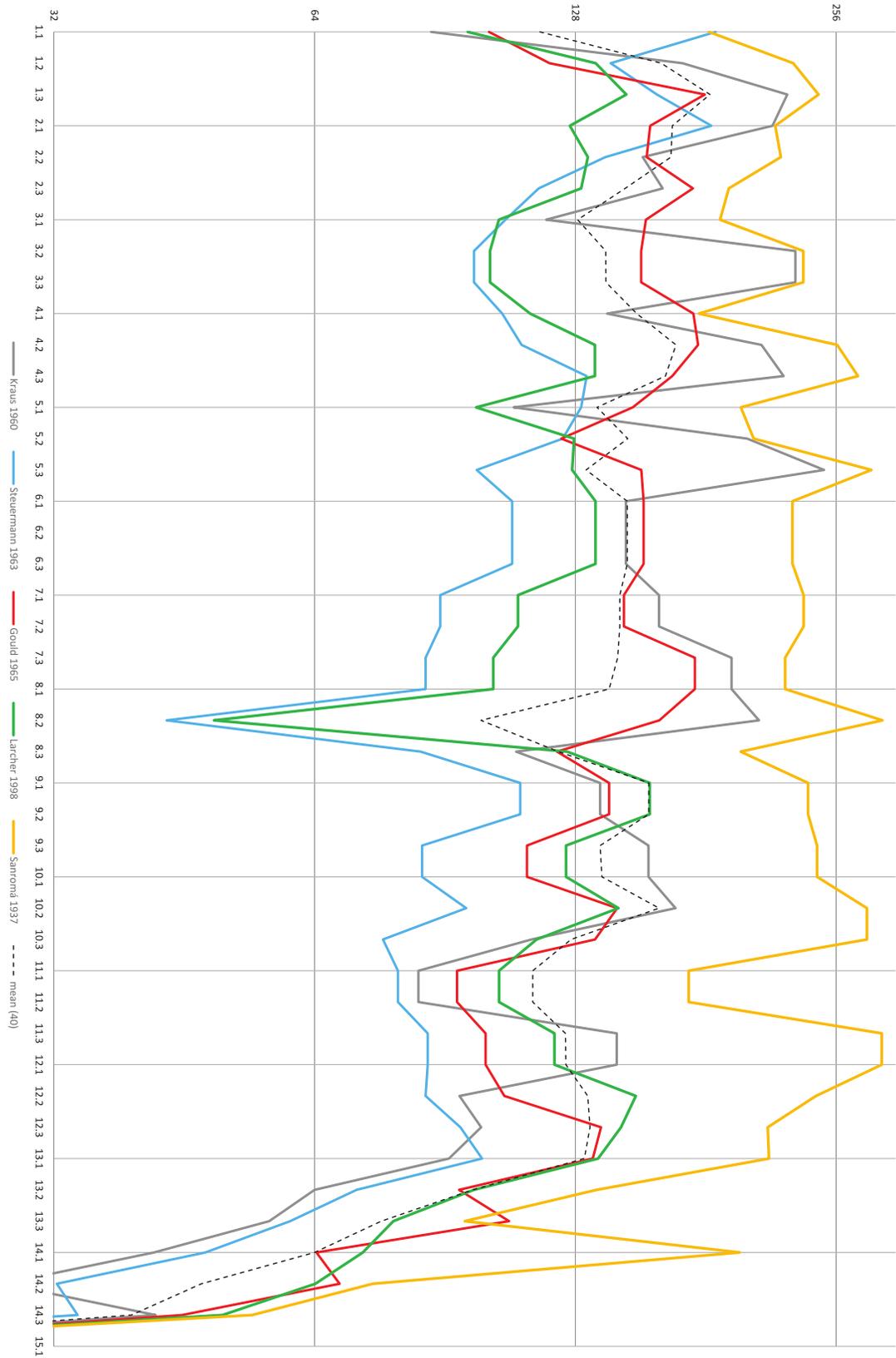
Example 22. Op. 19, no. 4, tempo curves for Steuermann 1963, mean values across the 40 compared recordings and four recordings chosen on the basis of the factor analysis



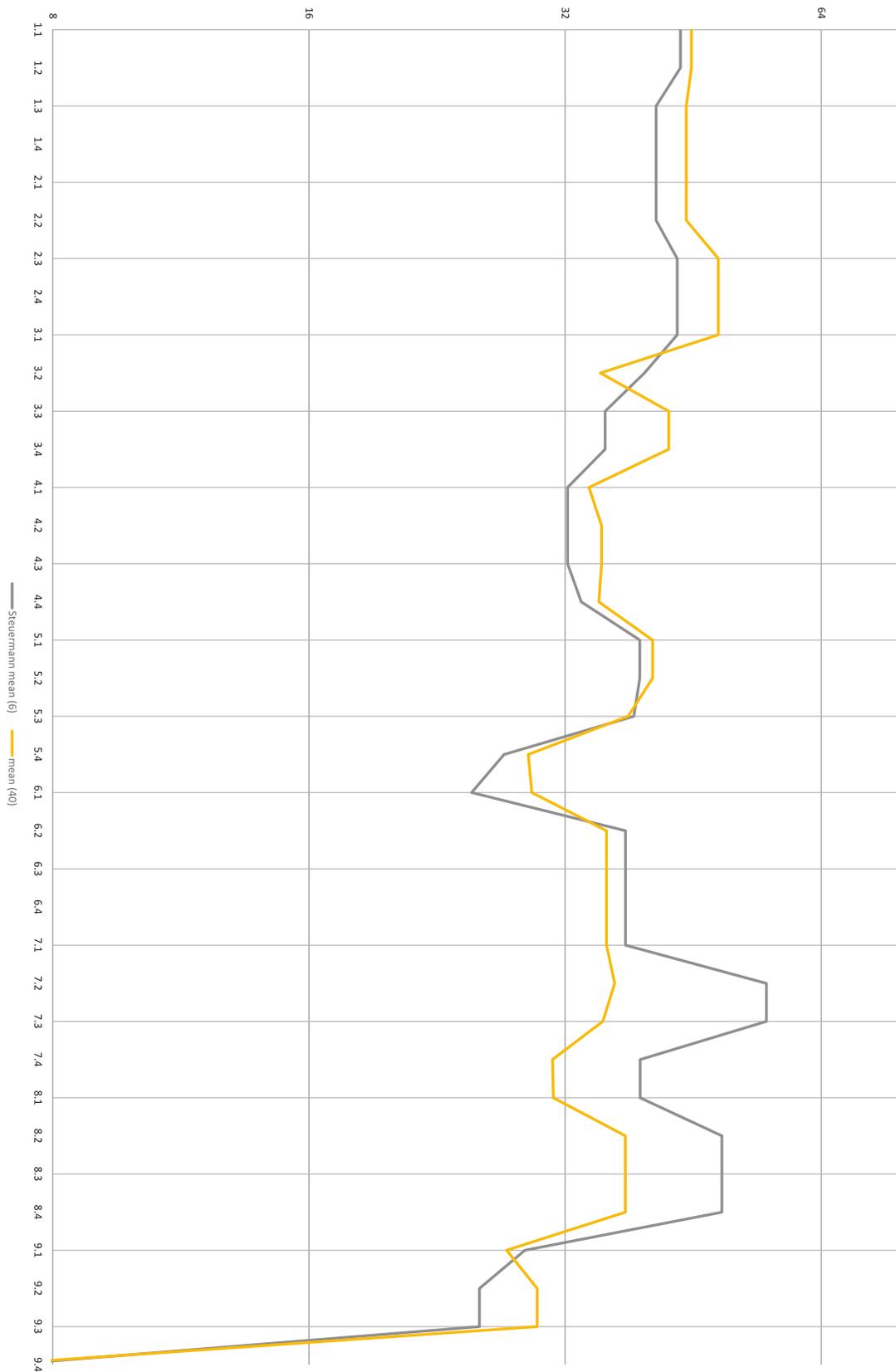
Example 23. Op. 19, no. 5, tempo curves with mean values across the six Steuermann recordings and across 40 recordings of other pianists (1925–2018)



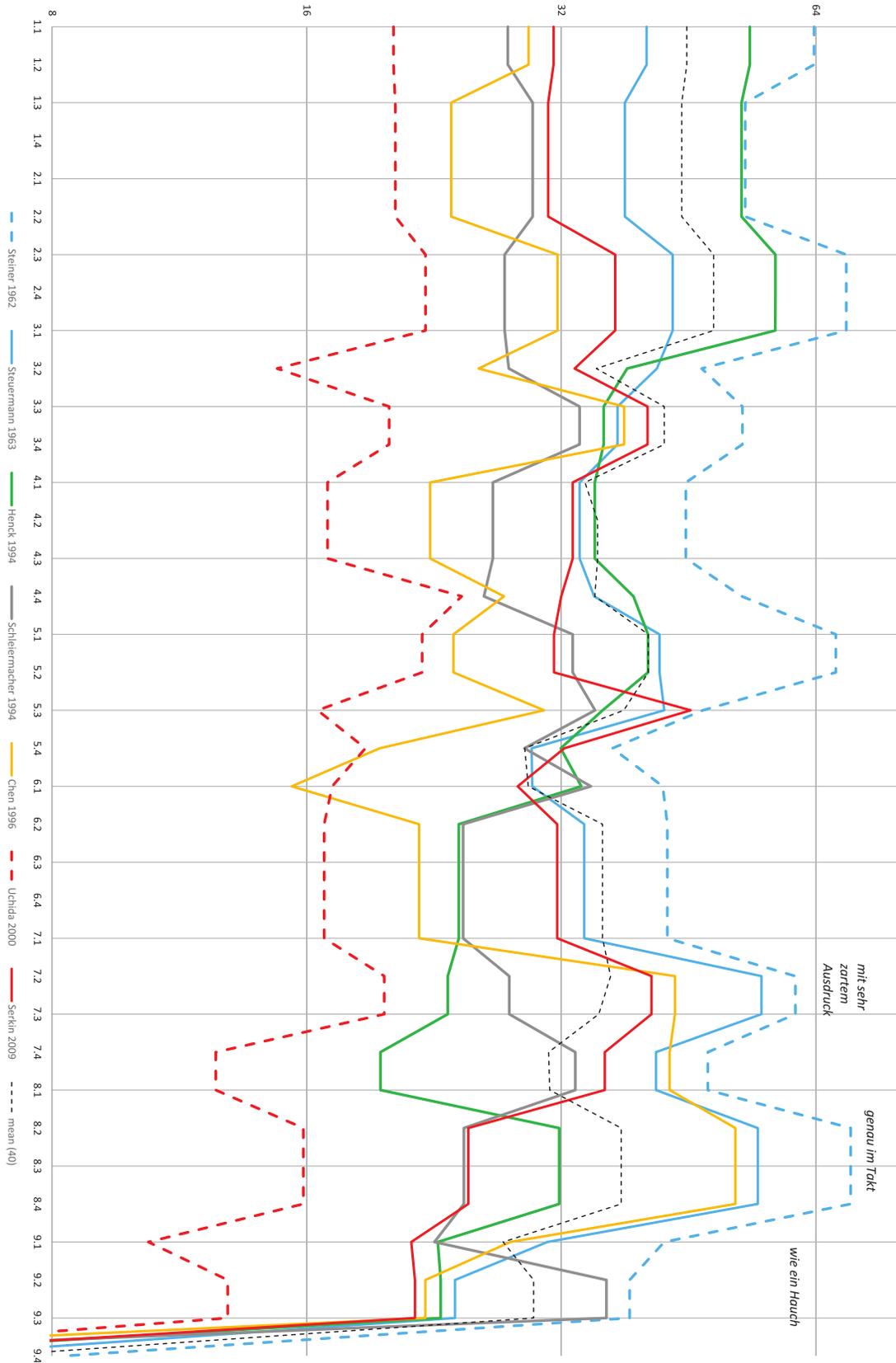
Example 24. Op. 19, no. 5, tempo curves for Steuermann 1963, mean values across the 40 compared recordings and four recordings chosen on the basis of the factor analysis



Example 25. Op. 19, no. 6, tempo curves with mean values across the six Steuermann recordings and across 40 recordings of other pianists (1925–2018)



Example 26. Op. 19, no. 6, tempo curves for Steuermann 1963, mean values across the 40 compared recordings and four recordings chosen on the basis of the factor analysis



Example 27. Op. 19, nos. 1–6, tempo curves for Steuermann 1963, mean values across the 40 compared recordings and four compared recordings (Kraus 1960, Gould 1965, Pollini 1974, and Henck 1994)

