Entwicklung des Zeitbewusstseins bei Kindern der 1. bis 4. Klasse.
Forschungsprojekt der PHSH 2005-2007; Markus Kübler

Development of Time Consciousness with Children between the age 6 - 12

An empirical study of n = 297 children
2005 - 2007

Entwicklung des Zeitbewusstseins bei Kindern der 1. bis 4. Klasse.
Forschungsprojekt der PHSH 2005-2007; Markus Kübler

A few words about the presentation

1. Introduction (starting point, research questions)
2. Sample (15 classes and 297 children)
3. Methods (operationalization)
4. Results on time knowledge, chronological perspective, time estimation, time horizon (descriptive statistics)
5. Results in reference to the research questions (ind. stat)
6. Discussion and further questions

Comment: The presentation was given during the annual conference of the „Gesellschaft der Didaktik des Sachunterrichts an der Universität Bremen“ on March the 14th, 2008. The version at hand is supplemented by further comments and didactic conclusions, derived from the results. The discussion about the methods used can be found under the headline „methodological critic“.

Zur Anzeige wird der QuickTime™ Dekompressor „TIFF (Unkomprimiert)“ benötigt.

Entwicklung des Zeitbewusstseins bei Kindern der 1. bis 4. Klasse.
Forschungsprojekt der PHSH 2005-2007; Markus Kübler

1. Introduction
(starting points, research questions)

Starting point:

- Discussions about the age-appropriate use of “erweiterte Lehr- und Lernformen”
- The interrelation of self-contained study management and time estimation/ time management
- Theoretical discussion about time consciousness as a precondition for historical thinking (3rd and 4th dimension of historical awareness)

Research questions:

- *When do children have knowledge about time and a chronological perspective at their disposal?*
- *How does the ability to estimate time and the time horizon of children develop?*
- *Which factors influence the acquisition of time competence and time competence/ time consciousness?*

Entwicklung des Zeitbewusstseins bei Kindern der 1. bis 4. Klasse.
Forschungsprojekt der PHSH 2005-2007; Markus Kübler

State of Research and Methods

Comment: Listed below is only a small sample of studies from different countries. The study of Schorch et. al alone is comparable to ours.

Autorin	Jahr	Inhalt	n	Alter	*Erhebungsmethoden*
Schorch et al.	**1982**	Umfassende Befragung von Kindern zu Zeitwissen, Zeitplanung, Zeitgestaltung	**464** **226**	6 - 10	*Einzelinterview 10Õ* *Gruppeninterview 45Õ*
Carey	**1985**	Untersuchung: Was ist lebendig? und was ist der Tod?: IrreversibilitŠt von Entwicklungen	**24**	4, 7, 10	*Interviews*
zur Oeveste	**1987**	Replikation der Untersuchungen von Piaget; Drei-Berge-Versuch; Puppenspringen-Versuch	**120**	4 Ğ10	*Experimente*
Ehlers	**1989**	Unterricht zum Thema Zeit mit Kindern. Lehrerin u Forscherin. Schlussbefragung der Kinder	**100**	7 - 8	*Beobachtende Teilnahme und Befragungen*
Koepsell	**1991**	Ab wann haben Kinder eine verlŠssliche SchŠtzung von Zeitdauern? Durch Filmschnitte.	**60**	5-6; 7-8; 9-10	*Video-experimente und Befragungen*
Bischof-Kšhler	**2000**	Exp. zur Entwicklung des ZeitverstŠndnisses und zur Entwickl. der ãTheory of MindÒ	**111**	3,2 Ğ4,6	*Experimente*
Friedman	**2003**	Untersuchung zum Verstehen der Gerichtetheit von Zeit (Arrows of Time). Verstehen der IrreversabilitŠt: z.B. Umleeren oder Zerbrechen	**41** **26**	3.5 Ğ4.5 5.5 Ğ6.5	*Befragung nach einer Videodemonstration (RŸckwŠrtslauf)*
Hodkinson	**2004**	Erwerb von Zeitkonzepten fšrdern durch hŠufigen Einsatz von Zeitleiste und Zeitwšrtern	**150**	8-9 Jahre	*PrŠ-Post Untersuchung*

⇒ so far there are very few existing studies on the topic of time knowledge, time estimation, time horizon and chronological perspective *(see Kübler 2007b)*

Entwicklung des Zeitbewusstseins bei Kindern der 1. bis 4. Klasse.
Forschungsprojekt der PHSH 2005-2007; Markus Kübler

State of research

Further information:
-> Handbuch Didaktik des Sachunterrichts

Kübler M. (2007): *Entwicklung von Zeit- und Geschichtsbewusstsein*. In: Kahlert J. et al. (Hrsg.): Handbuch Didaktik des Sachunterrichts. Bad Heilbrunn: Klinkhardt Verlag. S. 338 – 343.

Comment: The article offers a summary of the current state of the scientific discussion and international research in the field of time consciousness, chronological perspective and historical awareness.

Entwicklung des Zeitbewusstseins bei Kindern der 1. bis 4. Klasse.
Forschungsprojekt der PHSH 2005-2007; Markus Kübler

1. Survey of the sample (n=297)

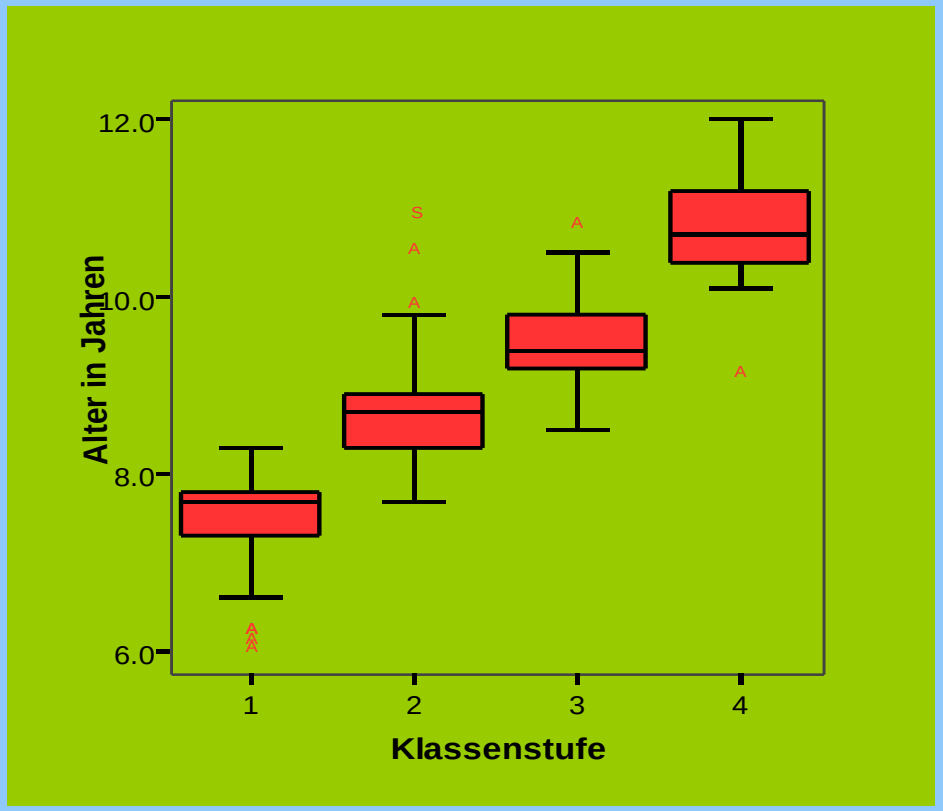
Zeitbewusstsein bei Kindern - †berblick Ÿber die Stichprobe											
Klasse	**Ort**	**n**	**w**	**m**	**loc**	**nicht dt sprachig**		**Alter**			**Bemerkungen**
						n	**%**	**mean**	**SD**	**von bis**	
1	LŠndliche Gemeinde Kt. ZŸrich	**5**	3	2	1	0	*0.0*	74.4	2.7	***6;0 - 6;9***	
1	LŠndliche Gemeinde Kt. SH	**15**	10	5	1	3	*20.0*	92.1	4.3	7;2 - 8;3	
1	LŠndliche Gemeinde Kt. SH	**12**	10	2	1	1	*8.3*	93.2	3.1	7;4 - 8;3	1 Kind bilingue
1	StŠdtische Quartierschule Kt. SH	**21**	15	6	3	2	*9.5*	91.0	3.7	7;1 - 8;1	Zwei Kinderdaten leer/ 19 DatensŠtze
	n = 53										
2	LŠndliche Gemeinde Kt. ZŸrich	**25**	11	14	1	2	*8.0*	105.0	5.2	8;1 - 9;9	
2	LŠndliche Gemeinde Kt. ZŸrich	**6**	3	3	1	0	*0.0*	98.3	5.3	7;10 - 8;10	
2	LŠndliche Gemeinde Kt. SH	**15**	6	9	1	1	*6.7*	102.0	5.0	8;0 - 9;5	
2	StŠdtische Quartierschule Kt. SH	**22**	13	9	3	13	***59.1***	106.2	4.8	8;2 - 9;10	16 vollstŠndig; 18 teilweise; 4 nur sozailstat. Daten
2	StŠdtische Quartierschule Kt. SH	**15**	4	11	3	11	***73.3***	108.9	9.3	8;5 - 10;6	14 vollstŠndig; 1 Kind ohne sozstat.
2	Mittelgrosse Gemeinde Kt. SH	**19**	12	7	2	2	*10.5*	104.5	4.8	8;4 - 9;8	
2	Mittelgrosse Gemeinde Kt. SH	**18**	11	7	2	7	*38.9*	98.3	5.4	7;8 - 9;6	
2	LŠndliche Gemeinde Kt. SH	**16**	9	7	1	1	*6.3*	103.8	5.3	8;1 - 9;9	
	n = 136										
3	Mittelgrosse Gemeinde Kt. SH	**17**	11	6	2	3	*17.6*	116.2	6.4	8;11 - 10;9	2 Kinder bilingue
3	LŠndliche Gemeinde Kt. ZŸrich	**10**	3	7	1	0	*0.0*	111.0	5.4	8;10 - 9;11	
3	LŠndliche Gemeinde Kt. ZŸrich	**19**	9	10	1	7	*36.8*	113.9	3.6	9;0 - 9;11	
	n = 46										
4	LŠndliche Gemeinde Kt. Thurgau	**22**	12	10	1	2	*9.1*	131.4	6.1	***10;2 - 12;0***	
4	StŠdtische Quartierschule Kt. SH	**20**	10	10	3	4	*20.0*	128.7	6.6	9;10 - 11;9	
4	Mittelgrosse Gemeinde Kt. SH	**20**	9	11	2	1	*5.0*	128.9	6.0	10;1 - 11;7	16 vollstŠndig; 3 teilweise; 1 Kind keine Daten
	n = 62										
18	SH 12*; ZH 5*; TG 1	**297**	**161**	**136**		**60**	***20.2***				
				297							

Entwicklung des Zeitbewusstseins bei Kindern der 1. bis 4. Klasse.
Forschungsprojekt der PHSH 2005-2007; Markus Kübler

2. Analyses of the sample

1. There are more children in urban/semi-urban schools who don‘t speak German as their first language (r = .594**)

2. The age range in urban classes is wider than in rural schools (r = .438*)
3. The age variation within a class year increases from year 1 to 4 (r = .605**)
4. The more children with another than German as a first language (in a class) the wider the age range(r = .458*)



Representativeness of the sample:
According to the Federal Statistical Office (FSO) no analogous figures exist. So the following factors were considered in choosing the sample: urban, semi-urban and rural schools; classes with a varying number of non-German speaking children and varying degrees of disciplinary challenges.

Entwicklung des Zeitbewusstseins bei Kindern der 1. bis 4. Klasse.
Forschungsprojekt der PHSH 2005-2007; Markus Kübler

3. Method, field of study and operationalization

Time knowledge 1	Time, days of the week, months, date, seasons
	to set the time, to arrange cards in the correct order, number of correct answers
Time knowledge 2	day before yesterday, yesterday, today, tomorrow, day after tomorrow
	(time vocabulary)past – present - future
	to arrange cards in the correct order, number of correct answers
Chronological perspective	„Today will be yesterday tomorrow.“
	to solve the riddle
Time estimation	*Estimation*: How long does it take you? Reading a text and solving mathematical problems
	hour glass/ interview and test
Time horizon	Events in the oncoming year
	Calendar and event cards
Time concept	Drawing with the input of a *story*

Comment: When developing the study material, attention was given to constructing the tests in a playful, action-oriented way. The duration of the test is no longer than 30 minutes, which is known to be the attention span of primary school children. The reading and maths assignments as well as the drawing were given during class in a period of silent study. The material and the methodological design were tested in a trial run in two classes.

Entwicklung des Zeitbewusstseins bei Kindern der 1. bis 4. Klasse.
Forschungsprojekt der PHSH 2005-2007; Markus Kübler

Children‘s comments

Maths was hard; I liked doing it

It was cool

I enjoyed it

I enjoyed it quite a lot; medium difficult, sometimes easy

really cool and it all worked very well

It was fun because it was very diverse

I liked working with the cards

Overall it was pretty easy; the riddle was very difficult

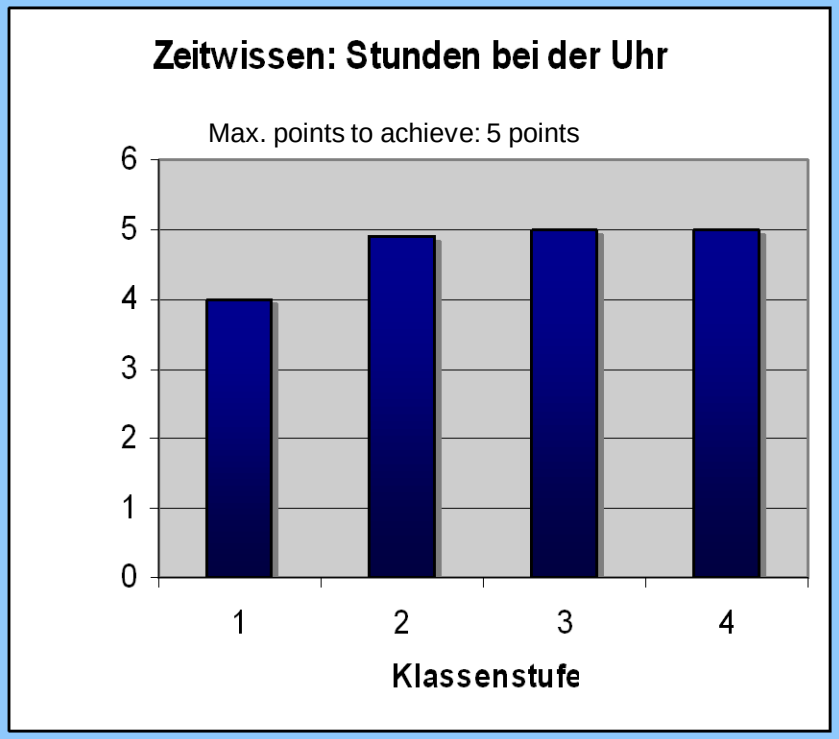
I was happy that you came for a visit

Maths was difficult, reading was easy

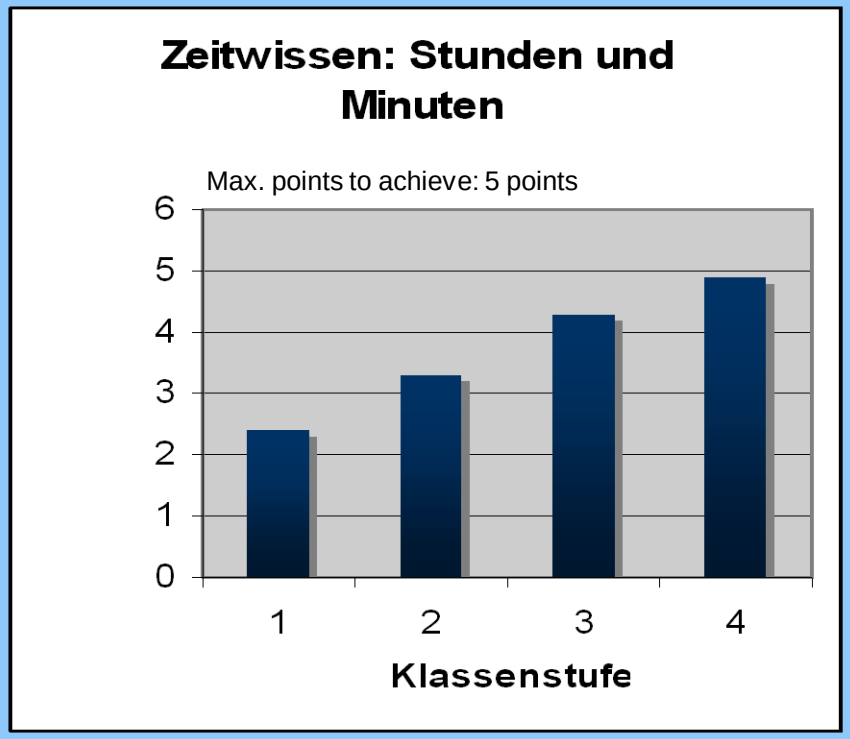
Entwicklung des Zeitbewusstseins bei Kindern der 1. bis 4. Klasse.
Forschungsprojekt der PHSH 2005-2007; Markus Kübler

4. Results *(descriptive statistics)*

4.1. Time knowledge 1



Graph 1:Time knowledge in hours class 1 to 4



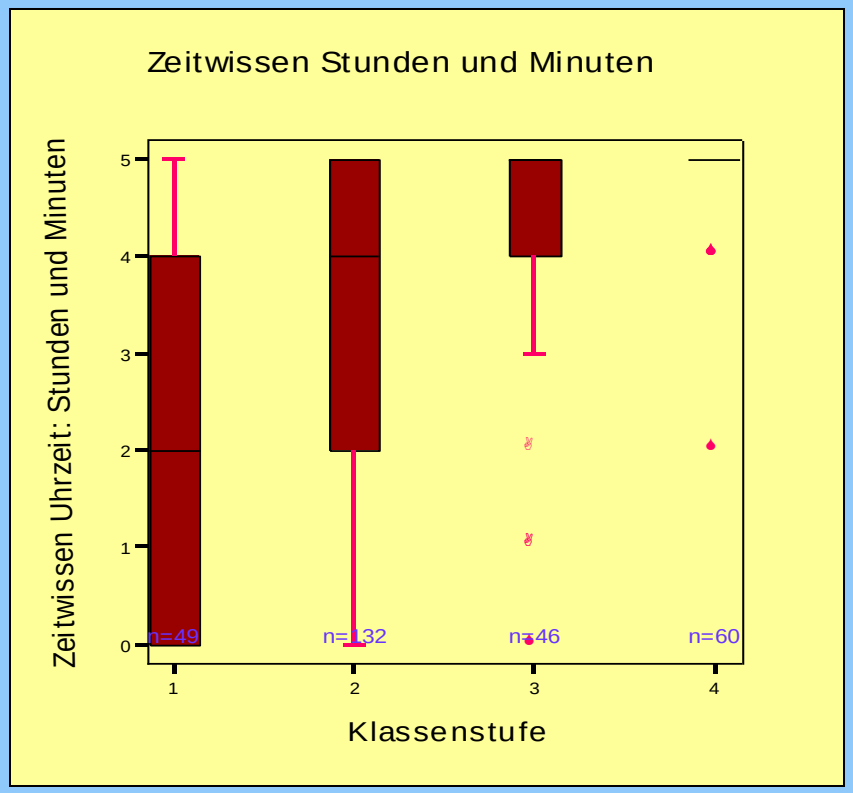
Graph 2:Time knowledge in hours and minutes class 1 to 4

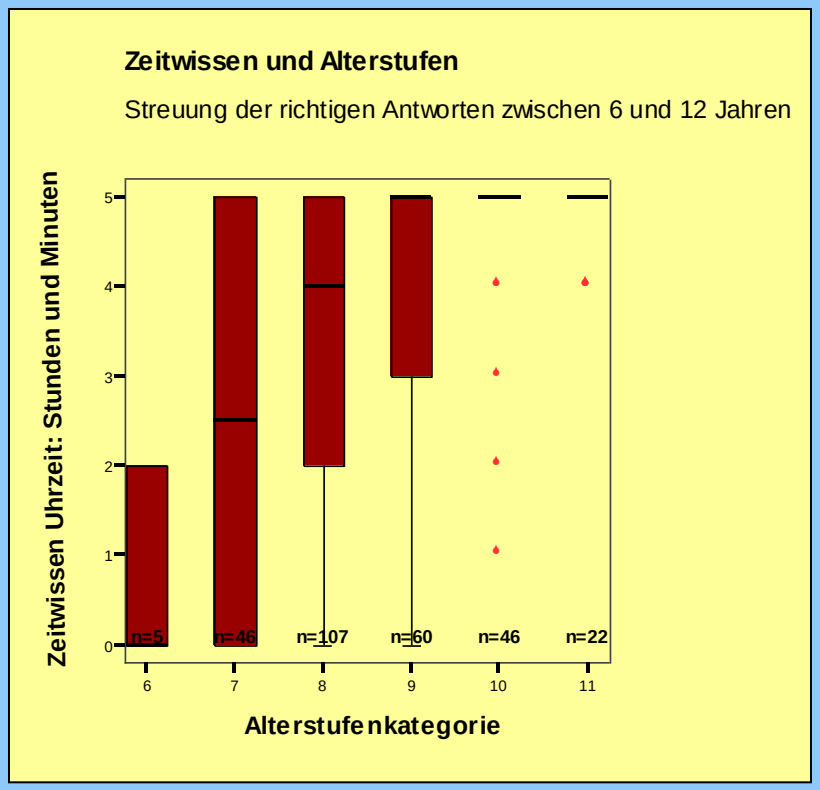
Comment: The graphs demonstrate that children in year one (first grade) are generally well accustomed to reading the hours on a watch, but not yet the minutes.
Didactic conclusion: In most curriculums and teaching materials the topic of „reading the time“ is scheduled too late.

Entwicklung des Zeitbewusstseins bei Kindern der 1. bis 4. Klasse.
Forschungsprojekt der PHSH 2005-2007; Markus Kübler

4. Results of time knowledge, chronological perspective, time estimation, time horizon and time concept.

4.1. Results time knowledge 2 (box plot for class and age)



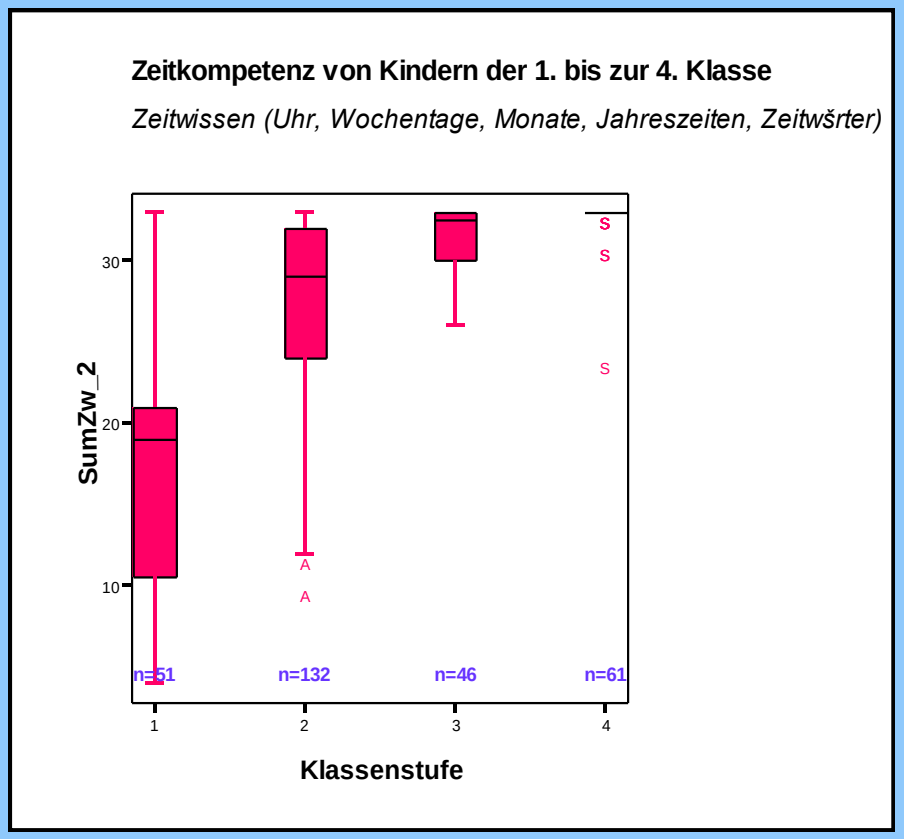


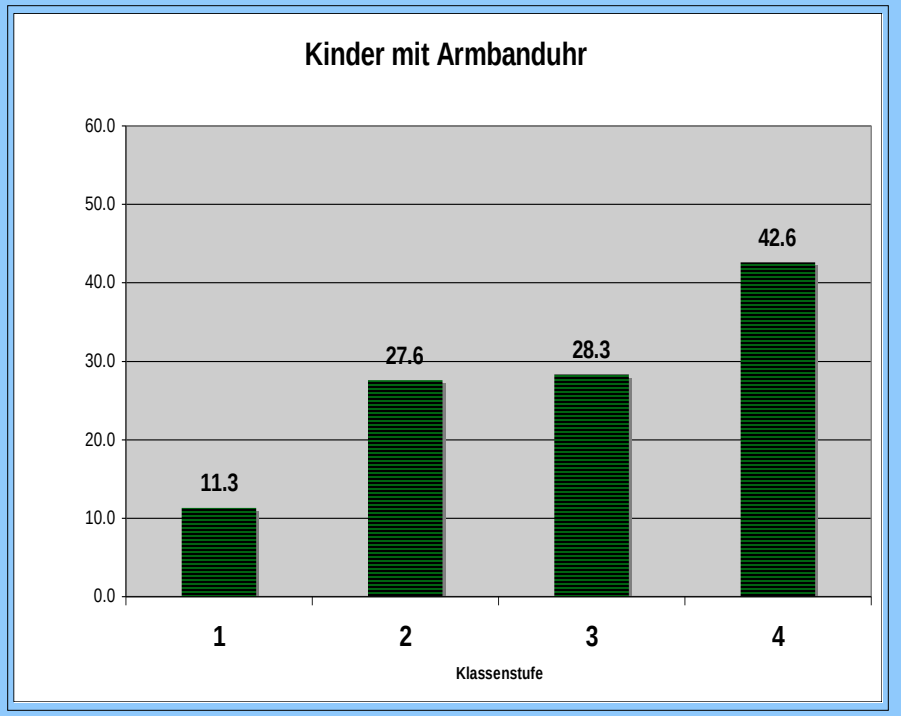
Comment: The above boxplotgraphs illustrate the vast differences between the children's performances. Whereas many children in year one already master the task of reading the time very well, others still have great difficulties. The biggest variation in the analysis of age groups is found at the age of 7. At the age of 10 all children are able to read the watch.
Didactic conclusion: At the age of 7 to 8, a customized, individualized approach in teaching the watch seems to be the most promising one.

4. Results of time knowledge, chronological perspective, time estimation, time horizon and time concept.

Entwicklung des Zeitbewusstseins bei Kindern der 1. bis 4. Klasse.
Forschungsprojekt der PHSH 2005-2007; Markus Kübler

4.1. „Time competence“ (clock, calendar, time vocabulary)





Children possessing an own watch in percent

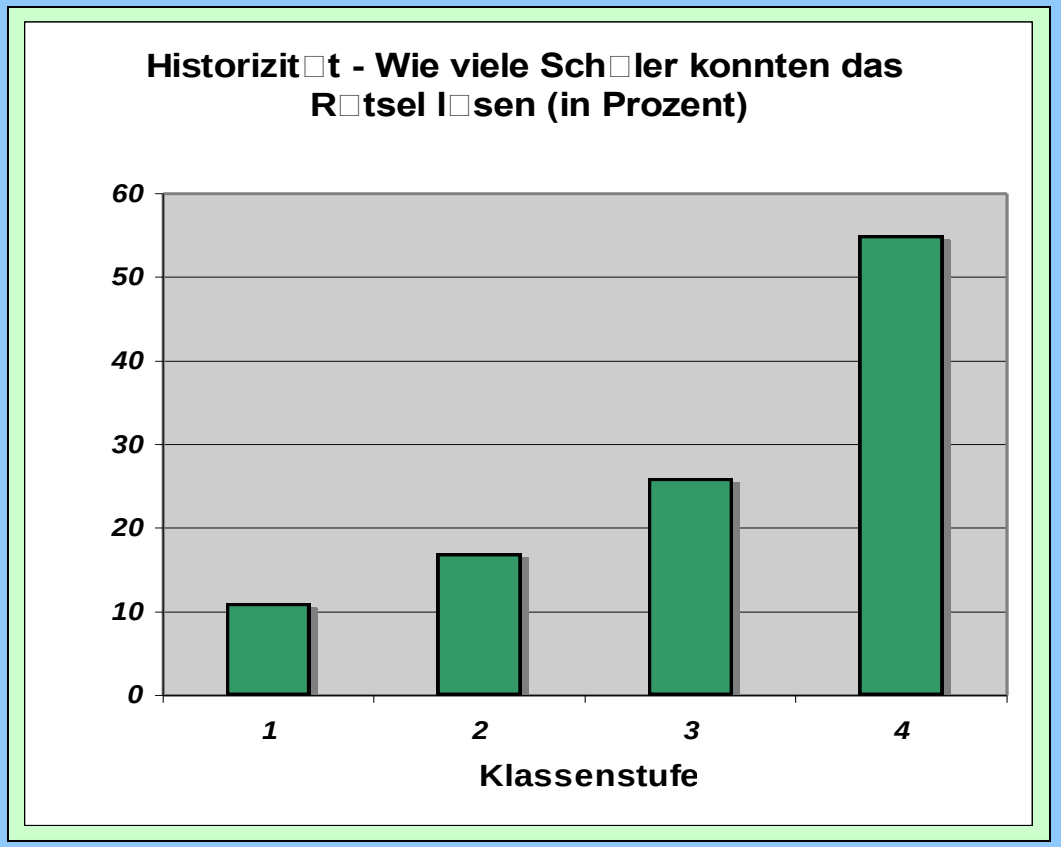
Comment: Time competence describes time knowledge which includes time of day, week days, months, seasons and time vocabulary. Time competence is a precondition for future time management skills. Again a wide variation can be observed in the first two school years which ends in year 4. Interestingly, the wearing of a wristwatch has not the widely assumed positive effect on time competence. Further notice be taken of the fact, that some children in year 1 were already able to solve all the problems.
Didactic conclusion: A sensible promotion of time competence starts the latest in year 1.

4.2. Development of a chronological perspective

Comment: The following riddle was presented to the children, orally as well as in written form: Explain what this riddle means: Today will be yesterday tomorrow!? „*Hüt isch dänn morn geschterd!*“ (Schaffhauser German).

Assumption: For a child to be able to solve this riddle, it needs to be capable of a cognitive change of perspective. Further it must have an understanding of the timeline and is able to mentally move back and forth in time.
The following scaling was used: no or wrong answer = 0; correct answer = 2 (e.g. Today is Thursday, tomorrow is Friday and on Friday Thursday will be yesterday). For answers that were pointing into the right direction but were not complete 1 point were given.

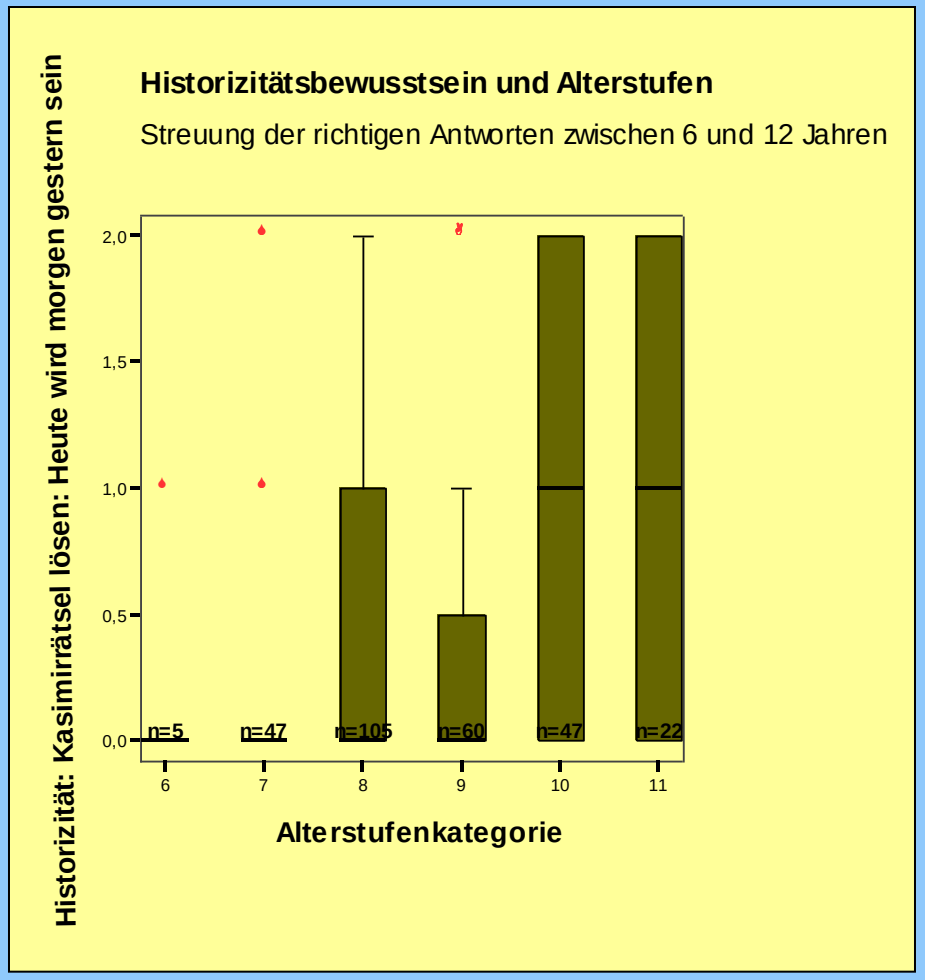
As the graph shows, only 10 percent of the children in year 1 were able to solve the riddle whereas in year 4 already 55 percent of the children were successful. The biggest increase (doubling of the correct answers) can be found between year 3 and 4.



Percentage of children who can answer the riddle correctly

4.2. Development of a chronological perspective

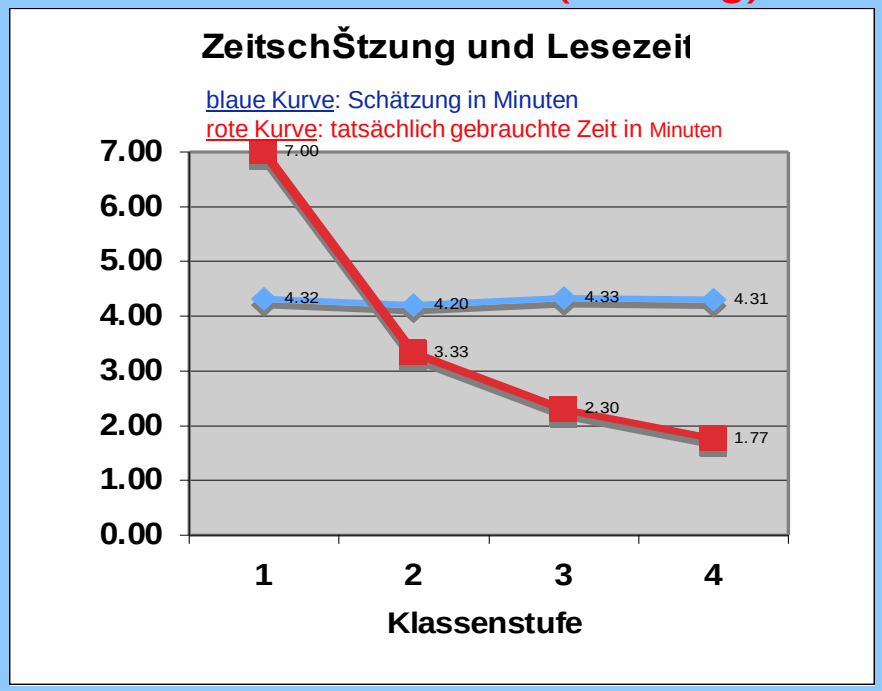
Comment: The box plot graph displays the variation of the ability of a chronological perspective between the age 6 and 12. Only a few children under the age of 8 were able to solve the riddle, whereas the number of successful children increases significantly from the age of 10. However, the variation within the older children is still considerable. At the age of 8 to 9 there are a reasonable number of children who have an inkling concerning the meaning of the riddle.
Didactic conclusion: The results show that the mental orientation on a timeline is much more complex than time knowledge. Even though 6-year old children already have a good grasp on the direction of time (timeline) (according to Friedman 2003), they are not yet capable of using it for mental time travelling.
Methodological critic: Further tests are suggested to gain a deeper understanding of above mentioned results. In order to test whether it is possible for children to develop a chronological perspective at an earlier age, tests with an interventional character seem appropriate.



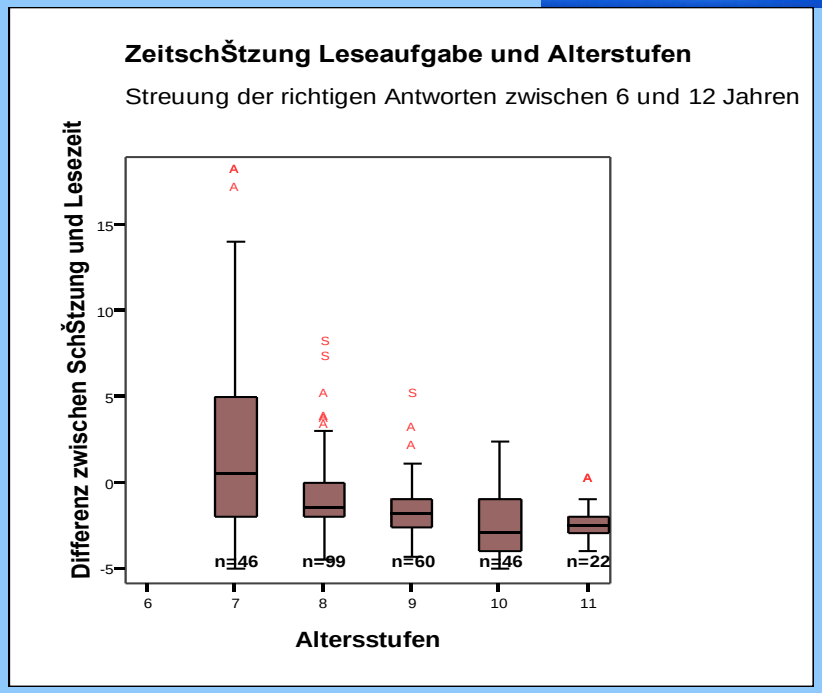
Entwicklung des Zeitbewusstseins bei Kindern der 1. bis 4. Klasse.
Forschungsprojekt der PHSH 2005-2007; Markus Kübler

4. Results of time knowledge, chronological perspective, time estimation, time horizon and time concept.

4.3 Time estimation1 (reading)



Blue: estimation of the children; red: real time to read (mean)



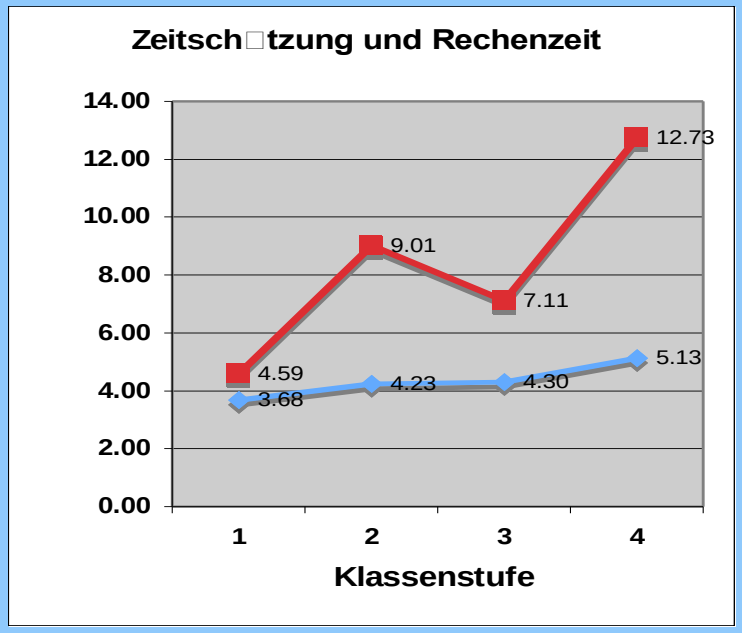
Boxplot: Difference between estimation and time to read

Comment: The same text was presented to all children, thus explaining the fact that the average reading time decreases with higher age (children can read better and faster). Again an astonishing diversion can be observed, especially in year 1. Whereas some children needed up to 22 minutes (!) for one page (text size 16) others finished within 30 seconds. Estimating the time by pointing to different sized hourglasses (3, 4, 5 minutes) resulted in a tendency toward the middle. School beginners tended to overestimate their own capabilities (a fact well documented in the literature) whereas older children in year 3 and 4 did the opposite: they underestimated their reading speed. Nevertheless the overall effect – as can be seen in the box plot – shows a distinct increase in time estimation skills from age 8 on (the diversion decreases significantly).
Didactic conclusion: Children need to get the opportunity to reflect their own learning progress. This way the ability to estimate time can be practiced early on.

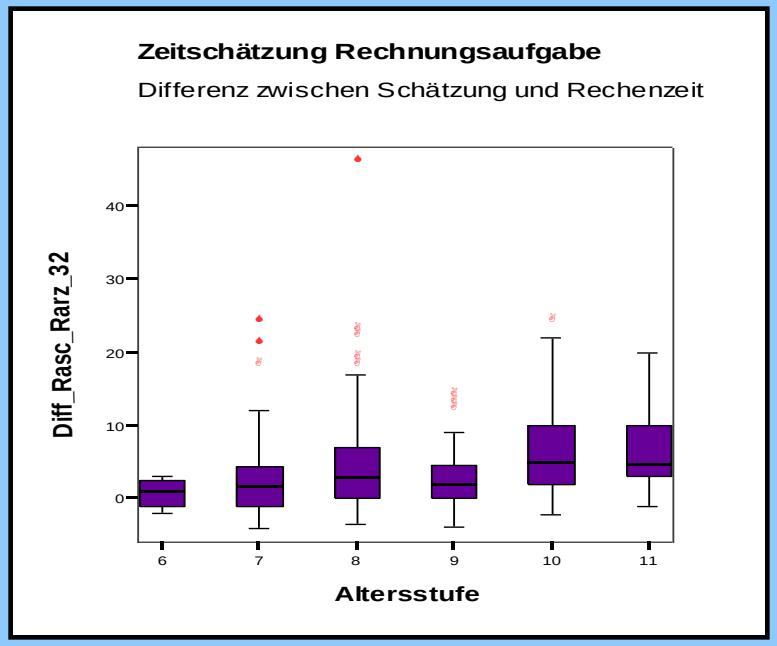
Entwicklung des Zeitbewusstseins bei Kindern der 1. bis 4. Klasse.
Forschungsprojekt der PHSH 2005-2007; Markus Kübler

4. Results of time knowledge, chronological perspective, time estimation, time horizon and time concept.

4.3 Time estimation 2 (Calculating)



Blue: estimation of time for the mathematical task
Red: real time for the mathematical task



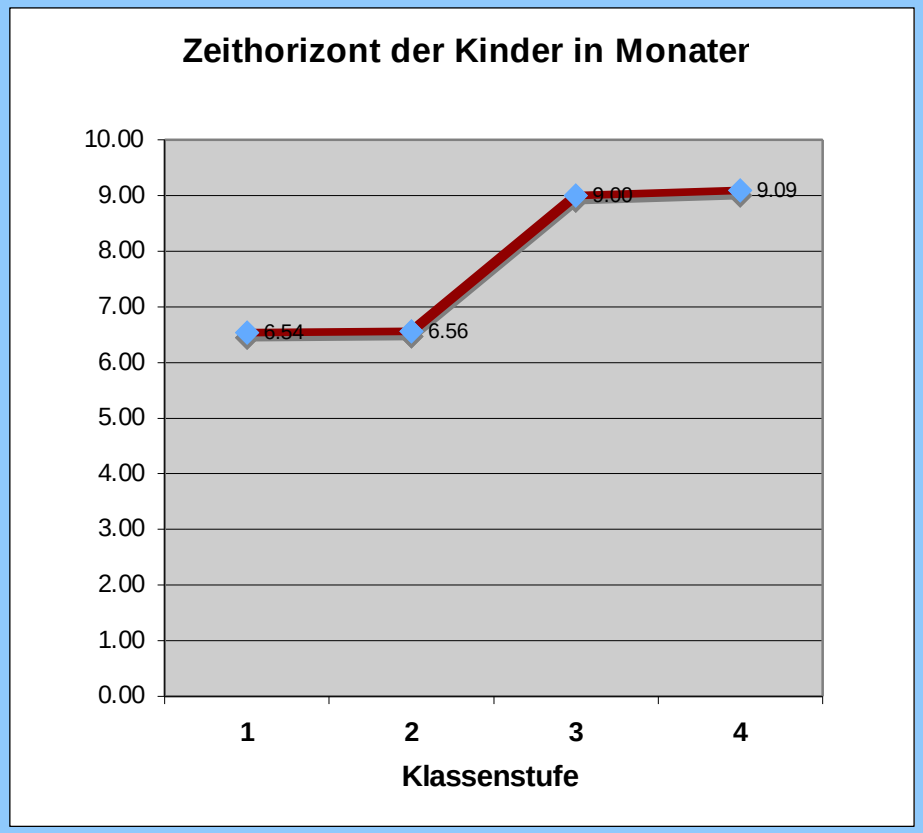
Boxplot: Difference between estimation and real time

Comment: Another approach was chosen to test time estimation through mathematical problems. For each year (grade) the same amount of summations and subtractions were given to the children, based on the corresponding „Zahlenbuch“ (year 1, 2, 3 and 4). Thus, children in year 1 had to add 3 + 5 for example, whereas children in year 4 had to solve 325 + 567. Even though children in year 4 estimated their efforts significantly higher than the ones in year one, the estimation difference actually increases with more school years, not – as would be expected – lessens. The dispersion also shows no clear results. Thus, the plausible explanation that this increase is due to different mathematical performances can not be verified.

Entwicklung des Zeitbewusstseins bei Kindern der 1. bis 4. Klasse. Forschungsprojekt der PHSH 2005-2007; Markus Kübler

4. Results of time knowledge, chronological perspective, time estimation, time horizon and time concept.

4.4. Time perspective (referring to the future)



Graph: Mean of time perspective from class 1 to 4 in months

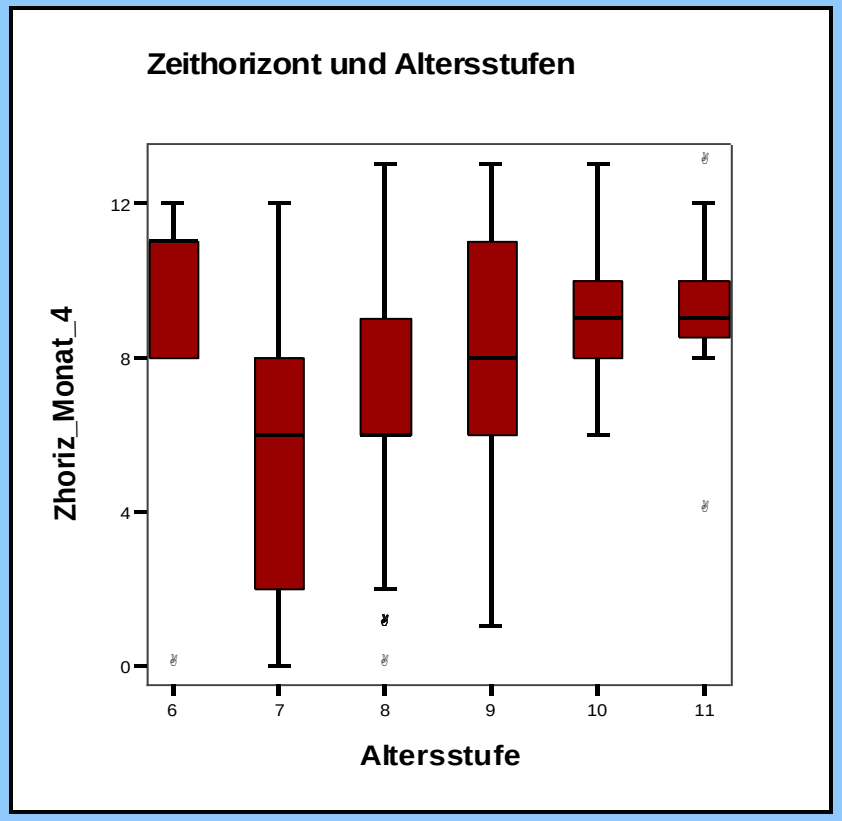
Comment: A timeline calendar was laid out on the floor for the children. The length of the calendar was 5 metres; it included the current month (together with the year and the days) and covered 13 months. The children's task was to place (personal) future events on the timeline with event cards (e.g. my birthday cake, second advent, sledging during ski holidays, a bike tour, camping or swimming in the sea during summer holidays). The event card placed furthest on the timeline by the child was used to measure the time horizon. Even though some of the events occurred twice on the timeline sometimes (e.g. Christmas), it was noticeable that most children only used an event once. Thus, the cyclicity of events was not understood spontaneously. However, the average time horizon increases from 6.5 to 9 months with age.
The capability to structure future und to fill it with meaning was measured by counting the number of used event cards. In year one children used 4.4 cards on average, in year 3 the mean value rose to 7 cards.
Didactic conclusions: The year, the months, the seasons and the yearly cycle ought not only be taught in the form of lists and affiliations, but also as a chain of personal experiences.
Methodological critic: The 18 classes were not interrogated at the same time. The first classes were asked just before Christmas, the others right afterwards. Having a major event coming up imminently may have an effect on the time perspective.

4.4 Time perspective (referring to the future)

Comment: Birthdays, Christmas and family celebrations were very important in the children's perception. Again a wide dispersion can be observed with children from 7 to 9 years of age, followed by a sharp decrease. At age 10 and 11 the time perspective settles on 9 months into the future. Could this also be the common time horizon of adults?
Strikingly, there are children up to the age of 10 who barely have a time perspective of a month, thus living entirely in an unstructured present.

Didactic conclusions: An expansion of such a future time perspective might be possible through specific training, especially with young children with a time horizon below average.

Methodological critic: The limitation to 13 months on the time line may have prevented some children from expressing the cyclicity of certain events.



Boxplot: Dispersion of time perspective from 6 to 11 years

Entwicklung des Zeitbewusstseins bei Kindern der 1. bis 4. Klasse. Forschungsprojekt der PHSH 2005-2007; Markus Kübler

4. Results of time knowledge, chronological perspective, time estimation, time horizon and time concept.

4.5 Time concepts (in collaboration with Tina Ammann)

A content analysis of children's drawings to a story of a polar bear named Kasimir: *„Tell me what time looks like!"*

3. Cyclical time cocept

Comment: The children painted a large variety of time concepts:
1.No explicit time concept: These children painted a scene from the story with the polar bear (or did not understand the assignment).
2. *The clock as time concept*: A large number of children expressed time simply as measured time.
3. *Cyclic concept of time*. These children drew a yearly cycle with trees, leaves, fruit etc.
4. *Time as a linear development concept*: Growth and development of plants or themselves are depicted in the drawings of these children. Obviously they thematize the irreversibility of and development in the time line.
The complexity of time concepts increases with age.

Methodological critic: The drawing assignment with the story made it possible for all children to make a drawing, also the ones without an explicit time concept. However, it needs to be considered whether the story distracted the children from the actual assignment. Also, an additional interview might bring further results.

Entwicklung des Zeitbewusstseins bei Kindern der 1. bis 4. Klasse.
Forschungsprojekt der PHSH 2005-2007; Markus Kübler

5. Inductive statistics

5.1. Age or schooling as determining variable?

(Regression analysis)

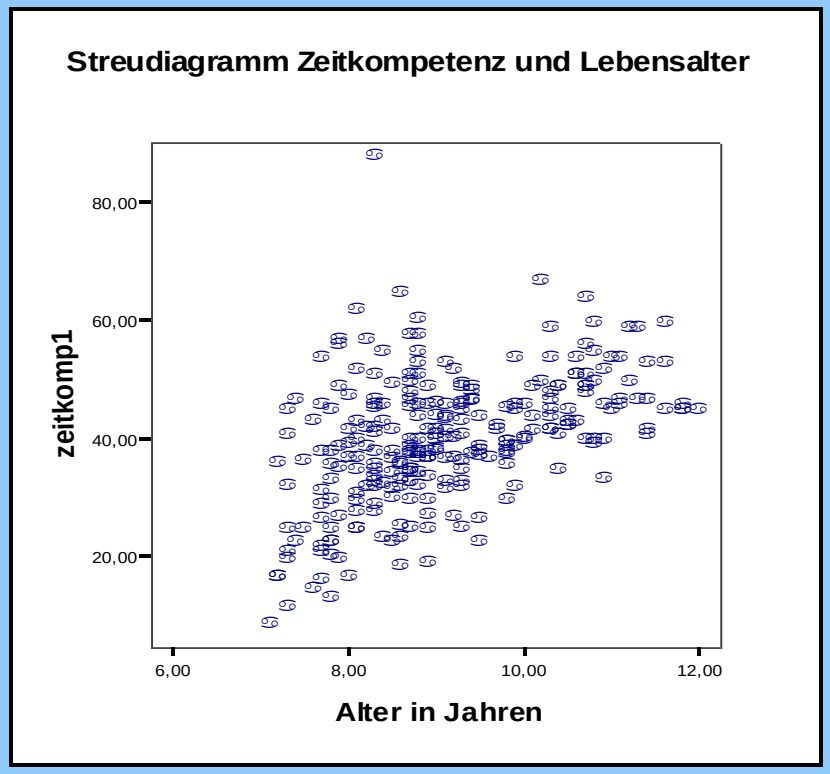
	Lebensalter In Jahren zum Zeitpunkt der Untersuchung	Unterricht bezÜglich der zutreffenden Variablen
Zeitwissen (Uhr, Kalender)	.573**	*.703***
Zeitkompetenz (ZW + Zeitwšrter)	*.474***	.559**
HistorizitŠt	*.371***	.001
ZeitschŠtzung im Lesen*	*Kein brauchbares Resultat*	
ZeitschŠtzung im Rechnen*	*Kein brauchbares Resultat*	
Zeithorizont in Monaten	*.362***	.100

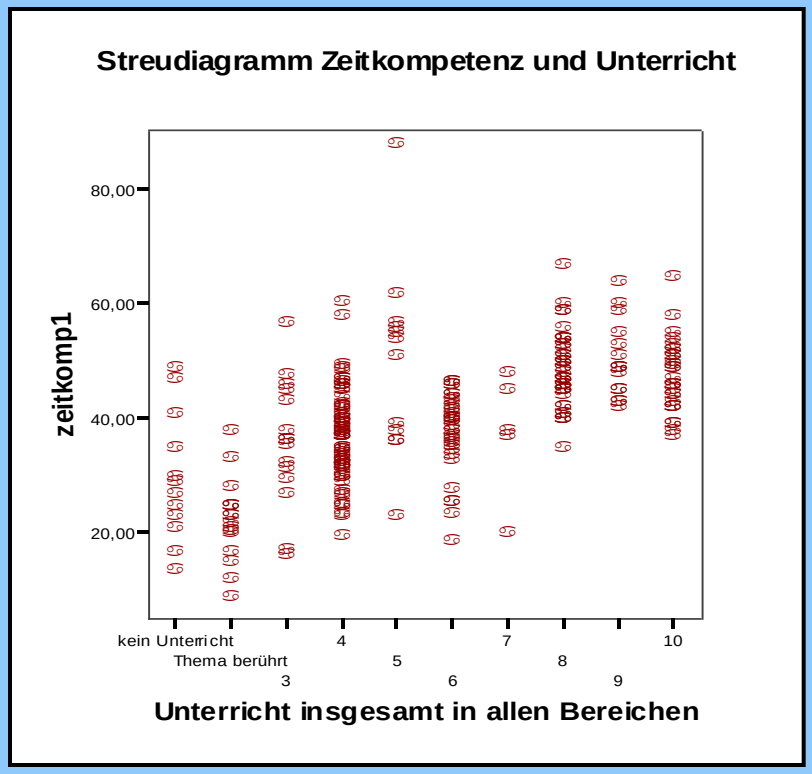
Place of residence, educational background of the parents, length of stay in Switzerland and *wristwatch* are *not linked in significant ways.* Contrary to the study of Ben Baruch/Melitz (1995), who found social factors to be the critical ones, no such conclusions can be drawn here!

Comment: In addition to the test and the interviews, socioeconomical data was collected. The teachers were furthermore asked about their teaching and the class curriculum. Regression analysis was used to determine links between independent variables and the examined ones as well as the intensity between them.
According to the results, schooling seems to have a greater effect on time knowledge and time competence than maturity. Time horizon and chronological perspective however, seem to be influecenced by age more than schooling.

Entwicklung des Zeitbewusstseins bei Kindern der 1. bis 4. Klasse.
Forschungsprojekt der PHSH 2005-2007; Markus Kübler

5.2 *Inductive statistics*: Age or schooling?





Comment: see page 21 (continued): The scatter diagram as well as the boxplot clearly display an increase in time competence with children who have very poor results at a young age. These very poor results decrease with age until they finally disappear. Disturbingly however are the results concerning children who display good results between the age of 8 and 10 but then fail to improve further with age. A possible explanation though might be a ceiling-effect.
Didactic conclusions: Particularly weaker children seem to profit from schooling and improve their time competence. Thus it is reasonable to suggest that weak learners should be specially pushed.

Entwicklung des Zeitbewusstseins bei Kindern der 1. bis 4. Klasse.
Forschungsprojekt der PHSH 2005-2007; Markus Kübler

5.3. Is the process of acquiring time consciousness influenced by different factors? A temporary conclusion.

- ***Time knowledge*** respectively time competence is acquired through ***schooling and increasing age***; other variables have no detectable influence.

  Comment: The regressions suggest a significantly stronger influence of schooling on the acquisition of time competence than age, respectively aspects of maturity.

- ***Chronological perspective*** seems to be mainly a ***developmental task***.

  Comment: The analysis shows a link between age and chronological perspective, thus suggesting it to be a developmental or respectively maturity task. As chronological perspective is not a topic in primary schools though, this result could be artificial. A study with interventional character could bring clarity.

- The capability ***to estimate time*** seems to develop with increasing age.

  Comment: Since time management und correct time estimation on how long certain tasks take to be solved are not taught in a systematic way in primary schools, there can be no reliable conclusions drawn as to which factors are an influence.

- The ***time horizon*** of children increases with higher age and the dispersion decreases.

  Comment: Even though time knowledge is taught and practiced in very different ways, this seems to be of no influence to the results concerning time perspective. There is a link to age however.

6. Discussion and further questions

6.1. What needs to be done from here on? (Outlook)

- The methodological question about how to measure the capacity to estimate time remains open and needs to be further elaborated.
- The question about the capability for chronological perspective awareness will be further investigated with an appropriate extension of the study setting.
- The data will additionally be analysed with a specific model (=SEM/Amos 16.0)

6.2. Discussion

Entwicklung des Zeitbewusstseins bei Kindern der 1. bis 4. Klasse.
Forschungsprojekt der PHSH 2005-2007; Markus Kübler

6. Literature on the subject (a sample):

Zur Anzeige wird der QuickTime™ Dekompressor „TIFF (Unkomprimiert)" benötigt.

Kübler, Markus (2007b): *Entwicklung von Zeit- und Geschichtsbewusstsein*. In: Kahlert, J.; Fölling-Albers, M.; Götz, M.; Hartinger A.; v. Reeken, D.; Wittkowske, S. (Hrsg.): Handbuch Didaktik des Sachunterrichts. Bad Heilbrunn: Klinkhardt Verlag. S. 338 – 343.

Kübler Markus (2007a): *Entwicklung von Zeitbewusstsein bei Grundschulkindern (1. – 4. Klasse)* – Werkstattbericht einer empirischen Untersuchung. In: Lauterbach R. et al. (Hrsg.): Kompetenzerwerb im Sachunterricht fördern und erfassen. Probleme und Perspektiven des Sachunterrichts, Bd. 17. Bad Heilbrunn: Klinkhardt. S. 69 – 80.

Kübler M. (2006): *Die Entwicklung von Zeitbewusstsein bei Grundschulkindern* – Werkstattbericht (Kurzfassung). In: Jahresbericht der Pädagogischen Hochschule Schaffhausen 2005/2006. Schaffhausen: S. 29 - 30.

Kübler M. (2004): *Zeit – Zeitgefühl – Zeitbewusstsein*. Einführungsartikel. In: Mensch+Umwelt. Zeit. Zeitschrift für die Primarschule. Heft Nr. 4/2004. Kehrsatz: Lugert Verlag. S. 4 – 8.

Kübler Mirjam, Kübler Markus, Catani Reto (2004): *Wochenplan – das selbstgesteuerte Zeitmanagement*. Einführung des Wochenplanes (auch) an der Unterstufe. In: Mensch+Umwelt. Zeit. Zeitschrift für die Primarschule. Heft Nr. 4/2004. Kehrsatz: Lugert Verlag. S. 50 – 53.

Final notes

1. Included in the original presentation were the children's *drawings* and detailed information on the geographical location of the classes. These have been omitted here for reasons of data privacy protection.
2. A summary of the presentation given at the annual conference of the GSDU will be published in the Jahresband of the Gesellschaft der Didaktik des Sachunterrichts in March 2009 (Klinkhardt Verlag).
3. A detailed list of literature can be ordered directly from the author (markus.kuebler@phsh.ch). Feedback also, will be highly appreciated.

Markus Kübler, June the 10th, 2008