



# Effects of the Type of Childcare on Toddlers' Motor, Social, Cognitive, and Language Skills

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**Abstract:** This study investigated the relationship between type of childcare and toddlers' skills in four important developmental domains: motor, cognitive, social, and language. A total of 637 children aged 18 and 24 months were either cared for exclusively at home by their parents or relatives (*home-care* group) or attended a daycare center for a minimum of 2 days per week (*center-care* group). We tested the children's skills using standard assessment tools and compared the skills of the two care groups. The results suggest that, for the sample tested, childcare type is not related to toddler's cognitive, motor, social, and language skills.

**Keywords:** basic skills, education, early childhood, daycare

The participation of women in the Swiss labor market has increased over the past decades. For example, 30 years ago, most mothers stayed at home after the birth of their first child; nowadays, more than half of all mothers work at least part-time. Accordingly, the demand for daycare centers for children aged 0 to 4 has increased steadily (Branger et al., 2008). It is therefore of major interest for parents and for society in general to assess whether or not different types of childcare (e.g., whether a child is primarily cared for at home by the parents [henceforth called *home care*] or (in addition) cared for at a daycare center [henceforth called *center care*]) are related to children's development. Despite a long history of childcare research focusing on the impact of parental care vs. center care on children, it is still a highly sensitive and controversial issue among the public. In particular, the public is not yet sufficiently aware of research results obtained in recent decades showing that, generally speaking and under normal circumstances (but see below), nonparental childcare has no detrimental effects on child development. Hence, this study serves to add further evidence to this field of research by focusing on the relationship between the type of childcare to the development of a variety of cognitive, motor, social, and language skills in young children living in Switzerland.

38.8% of all children aged 0 to 3 years in Switzerland attend a daycare center (Csonka & Mosimann, 2017). In the European Union, the average percentage of children attending daycare is comparable, but there are huge differences among countries (e.g., in Denmark the rate is more than 65%, in Czech Republic less than 5%). A majority

(51.3%) of the children in Switzerland who attend daycare spend 10–29 hours per week in center care, 35.6% spend 1–9 hours per week in center care, and 13.1% spend more than 29 hours per week in center care. The type of childcare depends on the type of household: 48.6% of children (aged 0–13) of single-parent mothers attend a daycare center, and 31.9% of children with two parents living together attend a daycare center. The percentage of children in center care when both parents are employed lies at about 40% for all employment types and combinations, regardless of whether both parents work full-time, one parent works part-time/one parent works full-time, or both parents work part-time. And 17.7% of children in households where one parent works full-time and the other is not employed attend center care (Csonka & Mosimann, 2017).

The findings of previous research on the impact of type of childcare on skills development are inconsistent (Bäuerlein, Linkert, Stumpf, & Schneider, 2013; Clarke-Stewart & Miner, 2008). The major source of previous knowledge on the topic stems from a large longitudinal study conducted in the United States, the Study of Early Child Care and Youth Development (SECCYD), which started in 1991 and was funded by the National Institute of Child Health and Human Development (NICHD). The SECCYD assessed the development of 1,000 children over a period of 15 years. Overall, the study found that children with non-maternal childcare (compared to children in exclusively maternal childcare) did not show significant differences in their development of motor, cognitive, language, and social skills (NICHD Early Child Care Research Network, 2005).

The strongest predictor of cognitive and social-emotional development turned out to be the quality of maternal care and the quality of at-home care (by parents, relatives, or nannies at home). Moreover, children with higher quality nonparental care (which includes the caregiver's relationship with the child as well as the childcare setting) scored higher on cognitive and language tests. They also scored higher when the childcare staff was better qualified and trained and the child/staff ratio was low, that is, a staff/child ratio of 1 to 7 children or lower (NICHD Early Child Care Research Network, 2005).

The Effective Provision of Pre-School Education project (EPPE 1997–2004) was the first major European (UK-based) longitudinal study that focused on the effectiveness of early education. The study found that the preschool experience enhanced children's development in general, and that an earlier start was related to better intellectual development (Sylva, Melhuish, Sammons, Siraj-Blatchford, & Taggart, 2004). In a German study on early childhood education and care (Leyendecker, Agache, & Madsen, 2014), nearly 2,000 2- and 4-year-old children were examined in different daycare settings. The study revealed specific, albeit no general, effects of center care on the children's developmental skills. For example, 2-year-old children who were in center care showed increased communication skills but did not show any advantages on other developmental variables, such as vocabulary, cognitive, or socio-emotional development. 4-year-old children in center care had higher scores on receptive vocabulary as well as advanced communication skills and social behavior (Leyendecker et al., 2014). In Italy, higher availability of center care was associated with an increase in language skills (Brilli, Del Boca, & Pronzato, 2016).

Comparing the results from different countries is difficult, because the early childhood care and education infrastructure is different in every country, as are the availability and quality of childcare (Melhuish & Petrogiannis, 2006). However, in general, an advantage in cognitive and linguistic development was more often reported for children with a low socioeconomic background (Bauerlein et al., 2013; Clarke-Stewart & Miner, 2008; Lamb & Ahnert, 2007) and more often reported in European countries than in the United States (Burger, 2010; Clarke-Stewart & Miner, 2008; Lamb & Ahnert, 2007). One reason for the latter finding is the potentially higher quality standards in childcare settings in Europe (Tietze, Cryer, Bairrão, Palacios, & Wetzel, 1996).

The quality of daycare usually consists of two main characteristics: *process quality* and *structural quality* (kibesuisse & Jacobs Foundation, 2014). Process quality is a measure of the different areas of support and educational interactions: Does the child experience age-appropriate development activities? Does the child receive proper support? Is the

child motivated to learn? Does the child have sufficient opportunities for stable, caring, and sensitive relationships with the caregivers? Is there a positive cooperation with the parents? Structural quality describes situational and time-stable framework conditions of the daycare situation, for example, legally prescribed guidelines and other safety and health concepts. Important structural factors are staff/child ratio, group size, and regulations on room design and room size (kibesuisse & Jacobs Foundation, 2014). Comparisons between qualitatively different daycare conditions – usually private (with a higher quality) and public providers – have pointed to advantages for children in private-care settings regarding gross motor skills (Chow & Louie, 2013; Giagazoglou, Karagianni, Sidiropoulou, & Salonikidis, 2008), fine motor skills (Barros, Fragoso, Oliveira, Cabral Filho, & Castro, 2003), cognitive abilities (Magnuson, Ruhm, & Waldfogel, 2007), and language skills (Li, Farkas, Duncan, Burchinal, & Vandell, 2013).

Despite the increasing demand for center care, comparable research results are not yet available for Switzerland. Prior studies focused on the effect of high-quality daycare on the resilience of young children, particularly in children with a difficult family background (Wustmann Seiler & Simoni, 2012), or compared the quality of center care and parental care (Pierrehumbert, Ramstein, Karmaniola, Miljkovitch, & Halfon, 2002). A study selectively investigating children in immigrant families, for example, found that children from center care had better linguistic, cognitive, and social skills when entering the first grade than children who had been cared for exclusively by their parents (Lanfranchi, 2002). But to date, no study has looked at the pure effect of center care versus parental care on the performance level in different domains in early childhood in a laboratory-controlled setting, that is, not only when children enter formal schooling.

Because of this lack of systematic and controlled studies (with a particular regional focus on Switzerland), this study investigated the effect of type of childcare on toddlers' development of a variety of basic skills and competencies. In particular, we focused on the development of motor skills, cognitive abilities, language, and prosocial behavior in children at the ages of 18 and 24 months who live in Switzerland and were either being cared for exclusively in the family (by parents or close relatives, e.g., grandmothers, aunts) or who were not being cared for exclusively in their families but also attended a daycare center for at least 2 days per week.

In addition to the sociopolitical dimension of the relationship between childcare and early childhood development, this research involves important theoretical aspects. Children acquire their knowledge of the world not only through their interactions with the physical world (Karmiloff-Smith, 2009; e.g., Piaget, 1954; Westermann et al., 2007),

but largely through cultural learning from and via their interactions with social interaction partners (e.g., Tomasello, 1999). Factual knowledge (*knowing what*) and procedural knowledge (*knowing how*) are adopted from others and passed on to others. According to Vygotsky's (1978) theory of social constructivism, mainly social interactions drive development processes forward. Adults or more competent peers instruct children in specific contexts and support them in exceeding their previous developmental limits: Children achieve more with well-targeted aid than without such aid. Vygotsky called the next developmental step a child can reach with optimal guidance the "zone of proximal development." Based on these considerations, there is a higher probability of interactions that promote the child in his or her zone of proximal development in a care setting outside the home. Social interactions serve as driving forces in the child's acquisition of various skills. In this respect, both peers and adults play important roles.

Interactions with peers are of particular importance, because peers share a similar worldview, that is, they have similar cognitive and motor capacities resulting in similar ideas about how the world functions and similar levels of interaction with their environment (Piaget, 1962). Infants perceive others as being like themselves; they understand others based on their understanding of their own behavior (Meltzoff, 2005). Young children are particularly interested in peers (Rothstein-Fisch & Howes, 1988; Zmyj, Daum, Prinz, & Aschersleben, 2012). An interaction with peers is highly beneficial for young children because it is easier to make sense of their behavior and, hence, to learn by copying.

Of course, interactions with adults are of great importance for the child as well. By default, adults are more knowledgeable and more experienced in the use of a variety of objects. Children imitate adults when their behavior is new or surprising to them more often than they imitate same-age models, because they rate adults as being expert, competent, and credible (Zmyj, Daum, Prinz, Nielsen, & Aschersleben, 2012; Zmyj & Seehagen, 2013). Moreover, they have an implicit expectation that this new information is relevant and universally valid (Elsner, 2014). The transaction between adults and children reflects an "apprenticeship in thinking" (Rogoff et al., 1993). Children improve their skills by participating with adults in activities. According to Rogoff's concept of "guided participation," which extends Vygotsky's concept of the zone of proximal development, children's cognitions are shaped during routine day-to-day activities in interactions with communicating and engaging adults (e.g., going to the supermarket) (Rogoff et al., 1993). The idea of a natural pedagogy (Csibra & Gergely, 2009) highlights the natural tendency of adults to emphasize relevant behavior when interacting with young children, for example, by using ostensive cues such as

enhanced prosody (e.g., infant-directed speech). Children seem to be naturally sensitive to ostensive cues and focus their attention on the corresponding emphasized behavior. Accordingly, interaction with knowledgeable and reliable adults is of great relevance for children's learning of new behaviors.

Different care settings differ in their ratio of a child's interaction with peers. Children usually have more peer interactions in the center-care setting than in the parental-care setting (Ahnert & Hasselbeck, 2014), whereas interactions with adults occur in both care settings and might (if at all) be increased in at-home care, as there are probably fewer interaction partners at home. Hence, given these considerations, both types of childcare settings provide learning opportunities. Both groups of children benefit from their interaction with adults, and children in center care might experience more interactions with peers.

Accordingly, in this study, we investigated the relationship between childcare settings and children's motor, cognitive, social, and language skills. We investigated the level of skills rather than emotional well-being and additionally assessed the environmental variables of the mere *quantity* of center care, because differences in *quality* were previously investigated (Pierrehumbert et al., 2002). Using four standard scales for cognitive, motor, language, and social skills, we looked at whether and how a particular type of childcare is related to the level of skill development, and whether and how the amount of time spent in center care is related to this level in children in center care. To ensure a highly controlled test situation, we conducted the assessments in a controlled laboratory setting. Given the divergence of previous empirical findings and the theoretical considerations as outlined above, we did not formulate directional hypotheses.

## Method

### Participants

Using public birth records, we contacted parents and invited them to participate in the study after providing informed consent. In total, 637 children were recruited and took part in testing in one of four domains (fine and gross motor skills, language skills, cognitive skills, and social skills), one of two conditions (children were cared for exclusively by their parents and relatives (home-care group) or they attended a daycare center for 2 up to 5 days a week (center-care group), and one of two age groups (18 months [range 17.0–19.0] or 24 months old [range 23.0–25.0]). In each domain, half of the children were tested in the two conditions; in each condition, half of the children were tested in two age groups. Thus, all factors (Domain, Condition, Age group) were

**Table 1.** Participant characteristics

Domain	Months	N	N (f/m)	Age (SD)	Home care			Center care			Comparison		Dropout
					N	Education Mother	Education Father	N	Education Mother	Education Father	Education Mother (p-value)	Education Father (p-value)	N
Cognitive	18	81	40/41	554 (15)	40	4.61	4.77	41	5.36	5.19	.001	.081	12
	24	84	43/41	727 (17)	40			44					
Motor	18	87	47/40	553 (16)	43	4.32	4.81	44	5.29	5.15	<.001	.159	2
	24	85	42/43	732 (17)	40			45					
Social	18	62	28/34	550 (14)	27	4.68	4.93	35	5.17	5.11	.041	.446	9
	24	78	37/41	729 (16)	34			44					
Language	18	80	35/45	563 (16)	40	4.35	4.73	40	5.26	5.18	< .001	< .001	-
	24	80	42/38	732 (25)	40			40					

Note. We report the parental education for mothers and fathers in home care and center care along with the p-values from the t-tests of difference between the groups.

tested between subjects. See Table 1 for an overview of the sample sizes in each domain. We decided to test different children in the four domains in order to have a more representative number of children assessed. The children were being raised in greater Zurich and were primarily Swiss-German speakers. The motor skills and cognitive skills domains were tested by one experimenter, with half of the children being tested by a female and the other half by a male experimenter. Social skills were tested by two experimenters; half of the children were tested by two female experimenters and the other half by two male experimenters. The children received a small gift at the end of the session. The study was approved by the local ethics committee.

### Environmental Variables

The highest educational level for both parents was assessed via parent questionnaire (on a scale from 0 to 6, with 6 being a university degree). Generally, educational level in all domains and conditions was high. Comparisons in each sample showed that mothers and sometimes also fathers of the children in the center-care group were higher educated than the parents in the home-care group (see Table 1). In addition, for children in center care, we assessed the average number of hours spent at the daycare center per week and the age (in months) at which they were placed in daycare; from this we calculated the number of months that the children had been in center care. See Table 2 for an overview of the children's time spent in center care. The childcare facilities were comparable in terms of group size, staff/child ratio, and educational curriculum since all daycare institutions in Switzerland adhere to minimum standards defined by federal law.

### Materials

*Cognitive abilities* were measured with the cognitive scale of the Bayley Scales of Infant and Toddler Development III

(Bayley, 2006). These scales measure sensorimotor development, exploration and manipulation, object relatedness, concept formation, memory, habituation, visual acuity, visual preference, object permanence, visual and tactile exploration, and object assembly.

*Motor abilities* (fine and gross motor skills) were measured with the motor scale of the Bayley Scales of Infant and Toddler Development III (Bayley, 2006). Fine motor skills assessed with the scale included visual tracking, reaching, object manipulation, grasping, children's quality of movement, functional hand skills, and responses to tactile information. Gross motor skills assessed were static positioning, dynamic movement including locomotion, quality of movement, balance, motor planning, and perceptual-motor integration.

*Social abilities* were measured with four helping tasks (flap, clothespin, wardrobe, pen; Warneken & Tomasello, 2006) and three cooperation tasks (handle-tube, double-tube, trampoline; Warneken & Tomasello, 2007). These tasks assess young children's willingness to help somebody who cannot grasp for a certain object needed to fulfil a given task and their success at cooperating in tasks where two similar roles (both persons holding a huge hand trampoline to pitch a building brick) or two different roles (holding a cup to catch a building brick that is thrown down a chute by the other person) are needed.

*Linguistic abilities* were measured with the Swiss-German adaptation of the German M-CDI (Fenson et al., 1994; Szagun, Stumper, & Schramm, 2009). This was the only instrument for which children did not come to the laboratory at the university; rather, parents filled in the questionnaire at home. The questionnaire consisted of three parts: (1) a vocabulary checklist, on which parents marked the words that their child already produced, (2) a part on morphology, where parents indicated the child's use of morphemes for plural marking, past tense marking, etc., and (3) a part on syntactical skills, where parents indicated which of two sentences sounded more similar to the utterances produced by

**Table 2.** Number of days, hours, and age at start of daycare for the center care group

	Cognitive	Motor	Social	Language
Number of days at daycare center per week				
2 days	36	33	25	57
3–4 days	33	38	40	21
5 days	16	18	15	0
Number of hours at daycare center per week				
< 10 hours	1	0	3	147
10–29 hours	68	71	62	13
29 hours	16	18	14	0
Age at start of daycare				
0–5 months	21	18	15	16
6–11 months	56	56	47	40
12–17 months	7	6	13	14
18–21 months	1	1	4	4

Note. We report the number of children in grouped conditions for easier reading. For the analyses, we used the raw scores of hours per week and the duration in months since commencement of institutional childcare.

their child. We followed the standard administration procedures for all instruments.

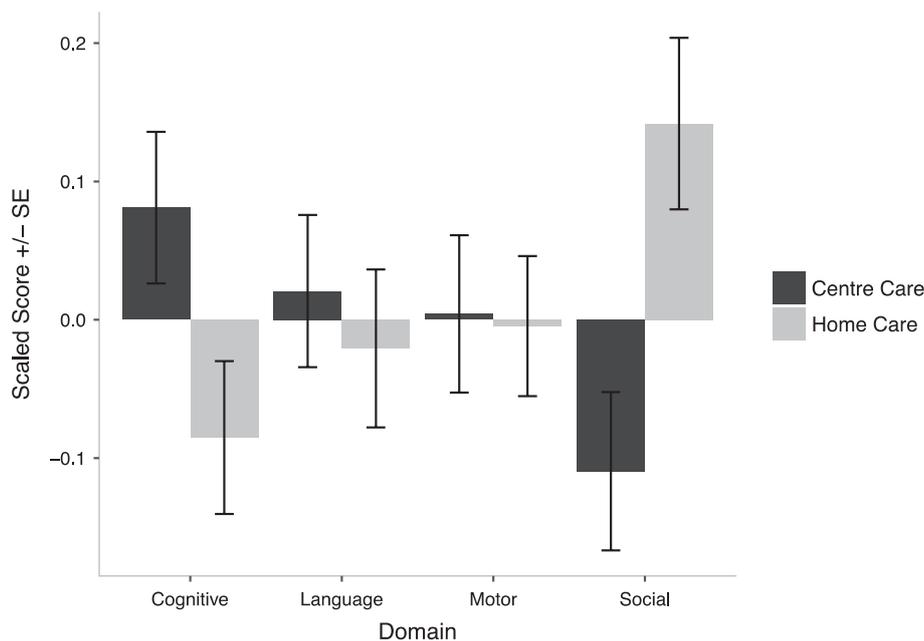
## Coding and Reliability

We applied the coding rules of the Bayley Scales of Infant and Toddler Development (Bayley, 2006) for cognitive and motor abilities and used the total raw score for statistical analyses (cognitive, fine motor, gross motor). We applied the coding rules of the original data analysis for the helping (Warneken & Tomasello, 2006) and cooperation tasks (Warneken & Tomasello, 2007): For the helping tasks, we analyzed the mean help success rate for the four tasks (interrater-reliability for 25% of the sample,  $\kappa = .989$ ) and the mean duration until handing over ( $\tau = .918$ ). For the cooperation tasks, we analyzed the mean cooperation success rate for the three tasks ( $\kappa = .962$ ) and the behavior during the interruption periods (e.g., children's reengagement attempts toward the experimenter) ( $\kappa = .849$ ). In the language domain, we calculated a total sum score for the vocabulary, morphology, and sentence complexity scales. Raw scores were scaled in all domains and the scaled scores averaged if several measures were coded. For cognition tasks, we used the scaled raw score of the Bayley Scales; for motor tasks, we used the mean of the scaled fine motor and gross motor raw scores (Cronbach's  $\alpha = .75$ ); for social tasks, we used the mean of the scaled scores for help success, help duration, cooperation success, and interruption behavior (Cronbach's  $\alpha = .41$ ); and for language tasks, we used the mean of the scaled scores in vocabulary, morphology, and syntax (Cronbach's  $\alpha = .91$ ) (Figure 1 ((Author: citation ?))).

## Results

We found no evidence for an experimenter effect on any of the outcome variables (all  $p > .32$ ), so we collapsed the data over the experimenters. We analyzed our data using hierarchical regression analyses separately for all four developmental domains. In the first analysis, we investigated whether the type of childcare (home care, center care) is related to children's performance level. Here, Model 1 of the hierarchical regression included demographic predictors of the parents and the child: parents' education and child's sex and age group. Model 2 included the demographic predictors of Model 1 together with type of childcare as predictor. Table 3 shows coefficients of all variables in each model and differences in  $R^2$  between models. Results from the regression show that the demographic factors age and sex predicted the children's skill level. Older infants had higher values in all domains. Sex predicted linguistic skills, showing an advantage for girls over boys and a trend in the motor domain, again in favor of girls. However, the type of childcare was not related to the children's performance in any of the four domains. The results from Model 2 did not improve the prediction of the data compared to the pure demographic model. This means that type of childcare was not related to children's skills in any domain. No further effects or interactions were significant.

In the second analysis, we investigated only children who were enrolled in center care and assessed whether the amount of time spent in center care predicted children's skills. To this end, we ran a second set of hierarchical regression analysis. Model 1 included the same demographic factors: parents' education and child's sex and age group. In Model 2, we added the center-care quantity factors (hours



**Figure 1.** Scaled scores in each condition and domain without covariates such as sex, parental education, and age group.

**Table 3.** Results of hierarchical regression analyses for early development for all children. The numbers identify the unstandardized beta and the standard error thereof in brackets

Predictor variables	Domain							
	Cognitive		Motor		Language		Social	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Parents' education (0 less than high school; 6 graduate)	.051 (.04)	.039 (.04)	.055 (.04)	.062 (.04)	.060 (.04)	.062 (.05)	-.108 (.07)	-.097 (.07)*
Sex (male, female)	-.083 (.10)	-.082 (.10)	-.191 (.10)	-.185 (.10)†	-.280 (.13)*	-.282 (.13)*	.018 (.16)	.023 (.16)
Age group (18 months, 24 months)	.255 (.02)*	.2554(.02)*	.252 (.02) *	.242 (.02)*	.189 (.02)*	.188 (.02)*	.122 (.03)*	.130 (.04)*
Type of daycare (center care, home care)		.029 (.70)		-.052 (.71)		-.035 (.14)		.072 (1.16)
Age group × Type daycare		.004 (.03)		.021 (.03)		-.006 (.04)		-.013 (.05)
$R^2$	.599	.597	.570	.568	.359	.351	.128	.127
$R^2$ change	.606	.002	.578	.002	.371	< .001	.147	.011
$F$ change	18.64*	0.594	75.84*	0.629	30.347*	0.042	7.862*	0.925
Power (posthoc)	1	1	1	1	.99	.97	.21	.17

Note. \* $p < .05$ .

per week in center care, age when placed in center care); Table 4 shows the results for this subset. Results from the regression for all children replicated the finding that the demographic factors age and sex predicted children's skill level in the center-care group. Boys showed higher social skills and lower motor skills than girls. However, age at placement in center care and hours spent in center care per week were not related to skill level. There were no further significant effects or interactions.

We calculated the posthoc power for all analyses and found that the power was sufficient for cognition and motor skills, but not for the amount of daycare in language and never for social skills (see Table 3 and Table 4).

## Discussion

This study assessed toddler's cognitive, motor, social, and language skills. It tested these skills in a sample of 637 children at the age of 18 and 24 months to explore the extent to which the type of childcare (home care, center care) is associated with the children's performance in these four major developmental domains. The testing took place in a highly controlled laboratory setting. The results reveal no evidence for differences in the four domains of basic skills associated with type of childcare and no evidence of an association of the amount of time spent in center care performance. This suggests that, in this particular group

**Table 4.** Results of hierarchical regression analyses for early development for center care children. The numbers identify the unstandardized beta and the standard error thereof in brackets

Predictor variables	Domain							
	Cognitive		Motor		Language		Social	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Parents' education (0 less than high school; 6 graduate)	.27 (.09)	.005 (.09)	.075 (.06)	.99 (.06)*	.079 (.08)	.076 (.08)	-.146 (.10)	-.145 (.11)
Sex (male, female)	-.015 (.19)	-.056 (.19)	-.311 (.14)*	-.306 (.14)*	-.176 (.20)*	-.240 (.21)	.335 (.21)	.333 (.21)
Age group (18 months, 24 months)	.230 (.03)*	.367 (.11)*	.245 (.02)*	.271 (.09)*	.181 (.03)*	.185 (.05)*	.117 (.04)*	.132 (.13)
Hours per week in daycare (min: 1; max 55)		.106 (.10)		.013 (.08)		-.032 (.18)		.009 (.12)
Age at start of daycare (min: since 1 month; max: since 21 months)		-.011 (.03)		.012 (.02)		.009 (.03)		-.011 (.03)
Age group × Hours per week		-.005 (.00)		-.001 (.00)		.009 (.00)		-.000 (.01)
R <sup>2</sup>	.547	.561	.574	.571	.310	.301	.140	.107
R <sup>2</sup> change	.578	.044	.589	.013	.338	.020	.173	.002
F change	18.895*	1.437	38.445*	0.848	11.925*	0.710	5.040*	0.069
Power (posthoc)	.95	.89	1	1	.62	.45	.15	.09

Note. \* $p < .05$ .

of children of parents with a homogenously high level of educational attainment, type of childcare – whether at home with parents or relatives or at a daycare center – is not related to children's basic skills.

This finding agrees with previous findings in a variety of cultures other than Swiss culture. Erel, Oberman, and Yirmiya's (2000) meta-analysis of 59 studies found that children receiving nonmaternal care (daycare) do not differ from children receiving maternal care on any of seven indices of social and emotional development. Regarding cognitive and motor development, previous findings agree that children who are in daycare usually do not differ from children who receive parental care (NICHD Early Child Care Research Network, 2005). A few studies suggest that children who receive daycare have increased cognitive and language skills, both at age 3 (National Institute of Child Health and Human Development Early Childcare Research, 2000) and age 4.5 years (National Institute of Child Health and Human Development Early Child Care Research, 2000). These studies also suggest that the overall quality of childcare, particularly regarding increasing language stimulation, is modestly related to better cognitive and language skills at age 3. Under a more controlled consideration of mediating factors, only the effect for language acquisition remained evident at the age of 4.5 years. In particular, advantages have been reported, whereby children from families with low socioeconomic backgrounds benefit from daycare (Bäuerlein et al., 2013; Clarke-Stewart & Miner, 2008; Lamb & Ahnert, 2007).

This study approximated the parental socioeconomic factors via the parents' level of education, which was generally high in both groups and slightly higher in the

center-care group of children. This suggests that center care is preferred by more highly educated (and potentially wealthier) parents. Previous findings suggest that the major benefit from daycare is for children with a low socioeconomic background (e.g., Bäuerlein et al., 2013). The results would possibly be different with a sample of children of parents with a low socioeconomic background.

However, our findings need to be interpreted in light of the current quality standards of childcare facilities in Switzerland. The kibesuisse (Verband Kinderbetreuung Schweiz) recommends a staff/child ratio of 1 to 3 to 1 to 6.5, depending on the education of the staff, and a maximum group size of 10 to 12 children (kibesuisse, 2016). Although actual group size and quality were not assessed in this study, based on the quality recommendation, we assumed an overall high quality for the interpretation of our results.

Finally, we found no effect on the development of skills of the mean number of hours a child spends in center care per week. Again, given that most of the children (45%) spend a maximum of 2 days in center care, the mean amount of time that each child spends in center care is limited in Switzerland, as it is the case in our sample (Csonka et al., 2017). Accordingly, the likelihood of substantial (be it positive or negative) effects is reduced. The time spent in center care as reported in this study is quite a bit shorter than the time given by Brooks-Gunn, Han, and Waldfogel (2002), who reported a negative association of daycare with cognitive skills of children of mothers who work more than 30 hours per week. More generally, recent research regarding time spent in center care suggests that children in families with low SES benefit most from more time spent in center care, whereas children in families with high SES benefit most

from part-time center care (Loeb, Bridges, Bassok, Fuller, & Rumberger, 2007).

## Social Learning

In this section, we return to the question of learning by observing and interacting with others. What do the present results reveal about the differential benefits of interactions with peers and adults? The main finding is that, with the sample in this study, where children spend relatively little time per week in center care and stem from households with highly educated parents, type of care (home care, center care) seems not to be related, neither positively nor negatively, with the development and learning of skills. Several reasons potentially account for this finding with respect to learning from and with others. First, in both types of childcare, adults are available as potential learning models, with parents being present at home and qualified daycare center staff being present at the centers. Second, the small amount of time children spend in center care, in combination with the resulting high fluctuation of child peers at the center, results in their interacting with potentially same-aged interaction partners or children who are slightly older for only a limited amount of time, which thus weakens any potential effect. In any case, further research is needed that includes assessment of the number of siblings and the stability, fluctuation, and composition of the age range within a daycare center group to further address the effects of social learning from and with peers and adults.

## Strengths and Limitations

This study has both strengths and limitations. One strength is the homogeneity and the large size of the sample. Homogeneity was high because only children were tested whose parents agreed beforehand to participate in empirical studies on developmental psychology, and the setting in which the children's skills were assessed was highly controlled. With more than 600 tested children, the size of the sample is comparably large since typical studies assessing motor or cognitive development often include sample sizes of only 20 to 30 children per condition. But in this study, the average number of children per condition was above 80. This large sample size should result in a high validity of the results. We applied posthoc power analyses to evaluate this hypothesis and found that the power was sufficient for cognition and motor skills, but not for the amount of daycare in language and never for social skills (see Table 3 and Table 4). Social skills had furthermore weaker internal consistency, which limits the interpretations possible from these data in general. Thus, in all other domains, sample size sufficed to investigate differences between home care

and center care. Only cognition and motor had sufficient power to calculate the relationships of number per weeks and time since commencing center care. However, there are admittedly a number of further limitations. Our findings tentatively propose that children's development is not related to the type of childcare, yet further evidence in terms of longitudinal studies is needed. An individual child's development cannot be explained solely by assessing one factor such as type of care but needs to be considered within a multifactorial system in which different (Clarke-Stewart, Gruber, & Fitzgerald, 1994) factors are considered. For example, parent and family characteristics are more strongly linked to child development than are childcare features (National Institute of Child Health and Human Development, 2006), and parental attitudes toward center care might influence the decision of whether or not and how much time children spend in center care. Children's characteristics beyond the measured developmental domains (e.g., individual differences in temperament) were not assessed but could account for variability. Family characteristics were not assessed in this study beyond parents' education. Further, children benefit the most from high-quality daycare (National Institute of Child Health and Human Development, 2006) that provides children with a warm, supportive environment protective of their health and safety. However, given the homogeneity of parents' high level of educational attainment and the overall generally high level of quality of Swiss daycare facilities, we view these limitations as not limiting the validity of our findings.

## Conclusion

The findings of this study suggest that 18- and 24-month-old children in Switzerland from urban households with high SES do not differ in their cognitive, motor, social, and language skills depending on whether or not they receive parental care at home or partly attend a daycare center. Given that previous findings indicate that the primary reasons for productive child development are the quality of the family environment and the quality of daycare facilities, it is important to focus on increasing the quality standards of daycare facilities and on providing parenting education on promoting child development.

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