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## Quality in home-based childcare : Impact and improvement

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This thesis reported on two studies in childcare in the Netherlands, focusing on children, caregivers, and quality of care. The first part of the thesis presented an empirical study in which we examined children's cortisol levels and wellbeing in home-based childcare and center-based childcare, and the role of caregiver stress and childcare quality. In the second part of the thesis we described a randomized controlled trial to test the effectiveness of the Video-feedback Intervention to promote Positive Parenting – Child Care (VIPP-CC) to enhance childcare quality in home-based childcare. In this chapter, the results of both studies are integrated and discussed. In addition, recommendations for practice and future research are presented.

#### *Differences between childcare homes and childcare centers*

We found significant differences between childcare homes and childcare centers, all in favor of childcare homes. In home-based childcare: (1) children scored higher on observed wellbeing, (2) caregivers scored higher on observed sensitivity, and (3) noise levels were lower compared to center-based childcare. These results show that home-based childcare is a valuable type of childcare for children and caregivers.

As was hypothesized, children attending home-based childcare showed a higher wellbeing than their peers in childcare centers. In addition, children's wellbeing was positively associated with caregiver sensitivity, but in home-based childcare only: Children who experienced more sensitive care in childcare homes showed a higher wellbeing.

At the start of our study, caregivers in home-based childcare were not obliged to have a professional education in childcare, and in fact most of the caregivers did not have any specialized education. Despite this lack of professional education, we found that caregivers in home-based childcare showed more sensitive caregiving behavior compared to caregivers in center-based childcare, who all had a formal training in childcare. Since January 1st 2010, Dutch caregivers in home-based childcare are legally bound to formal training and/or experience in childcare. Our first study took place prior to the introduction of this act. A cautious conclusion is that caregiver sensitivity may not be dependent on educational level, but that experience with child-rearing may be a more important indicator.

An additional consideration is the high caregiver stability in home-based childcare. In home-based childcare, where the same caregiver cares for a group of children each day they attend childcare. Several studies showed that caregiver stability is positively related to caregiver behavior and the quality of the relationship between caregivers and children (Barnes & Cummings, 1994; De Schipper, Tavecchio, Van IJzendoorn, & Linting, 2003; Elicker, Fortner-Wood,

& Noppe, 1999). Due to higher caregiver stability, caregivers get to know the children better, which makes it easier to recognize the child's signals and to respond more appropriately.

Another possible explanation lies in caregiver-child ratios. In home-based care, one caregiver was on average responsible for almost three children, whereas in center-based care one caregiver was responsible for more than five children. In an experimental study in center-based childcare De Schipper, Riksen-Walraven, and Geurts (2006) demonstrated that a caregiver-child ratio of 1:3 produced significantly higher quality of caregiver-child interaction than a ratio of 1:5. However, we found that, after controlling for caregiver-child ratio, sensitivity and noise still significantly differed between the two types of care. This implies that caregiver-child ratios may be important but not sufficient in explaining differences in caregiver sensitivity between the two types of care.

Noise levels were higher in center-based childcare than in home-based childcare, even after controlling for caregiver-child ratios. Of course, larger group sizes in childcare centers may have caused higher noise levels. An additional explanation is that the physical environment in center-based childcare is less noise-absorbing than in home-based care. In Dutch childcare centers, 'clean' materials are used, like linoleum, whereas in home-based childcare, more carpeting and soft materials are present which absorb noise. Although we expected higher noise levels to be associated with higher cortisol levels in children, this hypothesis was not confirmed in the current study. Probably, the source and intensity of noise levels are responsible for not finding any associations with cortisol. In studies in which associations between noise and cortisol were found, the noise source was an airport or rail traffic, which produce higher noise levels than childcare settings (Evans, Bullinger, & Hygge, 1998; Evans, Lercher, Meis, Ising, & Kofler, 2001). Another explanation is a lack of variance in noise: The present study did not allow for a comparison of children's cortisol levels in very quiet childcare settings with children's cortisol levels in very noisy childcare settings. For future studies, it would be worthwhile to take into account sources of noise, and to include childcare settings with substantial variation in noise.

#### *Cortisol levels of children*

Meta-analytic results have shown that children in childcare centers display higher cortisol levels during a day in childcare than during a day at home (Geoffroy, Côté, Parent, & Séguin, 2006; Vermeer & Van IJzendoorn, 2006). We confirmed these results for Dutch childcare, not only for childcare centers, but also for childcare homes. During childcare, children's cortisol levels remained the same from 11 AM to 3 PM, while their cortisol levels decreased during a day at home. In a recent study, Gunnar, Kryzer, Van Ryzin, and Phillips (2010) also reported this cortisol rise in children in home-based childcare. It is unclear which mechanisms evoke the relatively higher cortisol secretion at childcare compared to a day at home. Two important differences between children's experiences at childcare versus home are the children's separation from their parents and the number of children present.

Ahnert, Gunnar, Lamb, and Barthel (2004) demonstrated that first entry into childcare was stressful for children, even when their mothers were present. Their findings suggest that cortisol increases are evoked by factors beyond the separation from the parents, for example interactions with the peer group (Gunnar, Talge, & Herrera, 2009). In childcare, children spend the entire day with peers, but may not yet have developed sufficient linguistic, social, and self-regulatory skills to handle this complex situation. We showed that, even in home-based childcare with only a few children present, cortisol levels were higher than at home. Consistent with the findings of Gunnar et al. (2010), no significant associations were present between caregiver-child ratios and children's cortisol levels at childcare. Nevertheless, the number of children present during home-based childcare is on average larger than the number of children at home.

The peer group probably only partly explains elevated cortisol levels. In our view, the most plausible explanation lies in an interaction between the peer group, characteristics of the child itself, and the quality of childcare. Although children are separated from their parents and are in a setting with peers, the caregiver may prevent elevations of children's cortisol levels, by interacting sensitively and stimulating positive peer interactions. Thus, sensitive caregivers may buffer increases in cortisol levels (Dettling, Parker, Lane, Sebanc, & Gunnar, 2000; Gunnar, Larson, Hertsgaard, Harris, & Broderson, 1992).

Individual differences in children's stress reactivity have often been linked to temperamental characteristics. In a recent study, a rise in cortisol levels during home-based childcare was associated with anxious, vigilant behavior for girls, but with angry, aggressive behavior for boys (Gunnar et al., 2010). Particularly children who are shy and fearful may experience social threat in the context of childcare, in which they must engage in interaction with other children and caregivers.

According to the differential susceptibility theory (Belsky, 1997; Belsky, Bakermans-Kranenburg, & Van IJzendoorn, 2007), the effects of childcare quality may be moderated by child temperament. Consistent with this theory, Pluess and Belsky (2009) found that children with a difficult temperament as infants showed more behavior problems when they experienced low childcare quality at 54 months, but showed fewer behavior problems when they experienced high childcare quality, compared to children with an easy temperament. However, our data did not point to differential susceptibility when explaining individual variations in children's cortisol. To obtain associations with cortisol, it is conceivable that instruments are needed that measure both reactive and regulatory components of temperament, and preferably would be based on observations of children in various settings to enhance the validity of assessments (Kagan, 2008).

#### *Consequences of children's elevated cortisol*

It is unclear to what extent children's higher cortisol levels at childcare affect their development. As long as results from longitudinal studies are not available, we can only speculate about the possible risks of the observed higher cortisol levels at childcare. The finding that cortisol levels were not elevated consistently

across the settings (at home and at childcare) but seem to be related to the specific context of childcare, contradicts the expectation that stress experiences at childcare would spill over into the home setting, and that in this respect a long term effect on children's development should be expected. Apparently, (some) children display an adaptive cortisol response to the challenges at childcare, and are, at the same time, capable of a physiological recovery when at home. If the stress that children experience in childcare does not have a carry-over effect to the home situation, their baseline cortisol levels at home should be comparable with those of children who are exclusively being raised at home. We found one study that supports this hypothesis. Watamura, Donzella, Kertes, and Gunnar (2004) distinguished between children (aged 12-36 months) who were raised exclusively by their parents (or received less than 10 hours a week of childcare), and children who received at least 10 hours a week of childcare. When comparing the cortisol levels at home, no significant differences were found between the two groups.

It should be noted that cortisol is not only known as a stress hormone, but that it has a wide range of physiological functions, including the mobilization of resources (Sapolsky, Romero, & Muck, 2000). Not only stressful situations but also positive arousal, for instance the preparation for and reaction to physical activities, may alter cortisol levels (Corral, Mahon, Duncan, Howe, & Craig, 1994; Tremblay, Copeland, Van Helder, 2005; Karkoulias et al., 2008). Indeed, mobilizing energy can be appropriate in childcare in which physical activities are common. However, our finding that quality of care is associated with children's cortisol does not support the hypothesis that only the mobilization of energy would cause higher cortisol levels. It is not very plausible that children in childcare of lower quality engage in more (intense) physical activities compared to children in childcare of higher quality. Nevertheless, to test this alternative hypothesis it would be important to control for physical activities, by using an actigraph to measure children's physical activity during a day at childcare and during a day at home.

#### *Cortisol levels of caregivers*

Caregivers' cortisol levels remained at the same level from 11 AM to 3 PM at a work day, whereas their cortisol levels decreased during a non-work day. Unexpectedly, caregivers' cortisol levels at 11 AM were higher during a non-work day than during a work day. We offer two possible explanations; both are shown in Figure 6.1. In this figure, the cortisol levels of the four measurement points during the work day and the non-work day are shown, in combination with two hypothesized lines: suppression (small dots) and depletion (stripes).

The first explanation, cortisol suppression, might be particularly noticeable during the morning when cortisol levels are normally high. Caplan, Cobb, and French (1979) found that white collar workers who reported low workload showed the expected decrease in cortisol from morning to afternoon, while workers who reported high workload showed lower morning cortisol levels and an increase in cortisol during the mid-afternoon. These authors hypothesized that chronic stress was examined, rather than acute stress. During chronic stress, down-regulation in cortisol would be adaptive. A recent meta-analysis showed

that acute stressors elicited greater cortisol changes than chronic stressors in natural settings (Michaud, Matheson, Kelly, & Anisman, 2008). Caregivers' work might cause chronic stress, with hypo-regulated cortisol during the morning anticipating a strenuous day at work. However, we can only provide tentative speculations because no data are available on caregivers' chronic stress. To examine the stability of the lower cortisol levels at 11 AM during work days, compared to non-work days, cortisol samples should be collected on more than one day.

Second, cortisol depletion might be an explanation. We do not know what the cortisol secretion was between awakening and 11 AM. Cortisol levels might have increased during the morning when children arrived at childcare (9 AM), at a hectic time when caregivers have to divide their attention between both parents and children. As a reaction to these heightened cortisol levels, negative feedback inhibition may have taken place: Cortisol binds to its receptors on cells, among others in the hypothalamus, inhibits secretion of corticotropin releasing hormone (CRH) and adrenocorticotrophic hormone (ACTH), leading to a decrease in cortisol levels. Thus, cortisol levels may have dramatically decreased at 11 AM, which resulted in the difference between 11 AM measurements at childcare and at home. This is in line with results of Steptoe, Cropley, Griffith, and Kirschbaum (2000) who suggested an anticipatory psychobiological response, in which cortisol levels at the beginning of the day are elevated because of an individual's anticipation of a stressful day. In the Steptoe et al. study (2000), teachers' cortisol samples were taken between 8 AM and 8:30 AM after arriving at school. Increased cortisol levels were present in teachers who reported high job strain but not in teachers who reported low job strain. In order to test this hypothesis in future studies, cortisol should be measured at more time points in the morning.

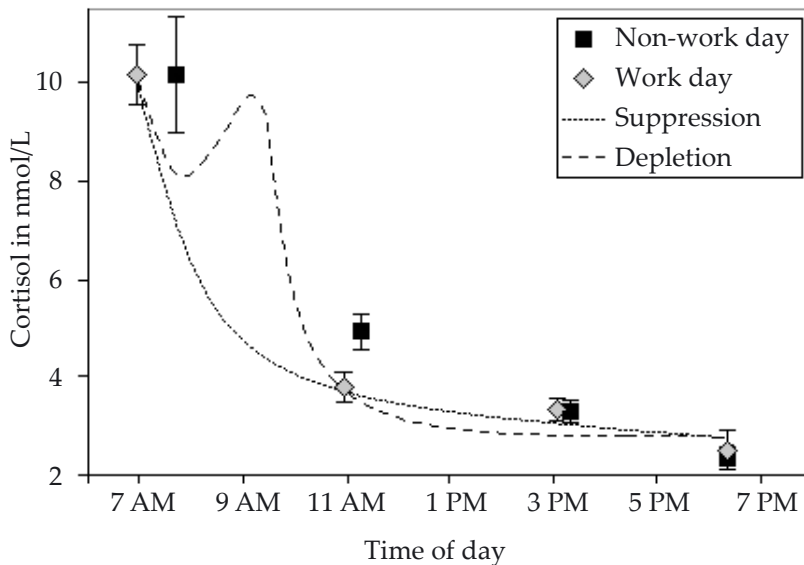


Figure 6.1. Caregivers' cortisol levels at a non-work day, a work day, and hypothesized suppression and depletion

*Quality of care*

Although caregivers' cortisol levels were not associated with the quality of care they provided, their perceived stress was. Consistent with findings in parents (Belsky, Crnic, & Woodworth, 1995; Coyl, Roggman, & Newland, 2002; Crnic, Gaze, & Hoffman 2005), caregivers in home-based childcare (higher) reports of negative appraisal in their lives were associated with (lower) quality of observed caregiver behavior. This was not found for caregivers in childcare centers.

For both types of care, quality of care was significantly associated with children's cortisol levels. In home-based childcare, lower caregiver sensitivity was associated with a higher total production of salivary cortisol during the day. In center-based childcare, (lower) global childcare quality was associated with (an increase in) cortisol levels during childcare. Accordingly, in the two settings two different aspects of childcare quality seem relevant for cortisol regulation. These different findings for the two types of care can possibly be explained by caregiver stability, as discussed above. In home-based childcare, the caregiver (a single caregiver during the child's stay at childcare) has the main influence on the child. In childcare centers, global quality might be a more relevant indicator of children's stress levels than caregiver sensitivity, because children in childcare centers are taken care of by more than one caregiver per day and different caregivers throughout the week.

In addition, caregivers in childcare homes who were more stressed themselves (both perceiving more stress and showing an increase in cortisol during childcare), also perceived the wellbeing of children in their care as lower. This finding was confirmed when an independent measure of child wellbeing was used: Children's *observed* wellbeing was lower when they were in the care of a caregiver who perceived her life as more stressed. Although the differential susceptibility theory (Belsky, 1997; Belsky et al., 2007) could not be confirmed for the effects of childcare quality, the differential susceptibility theory was confirmed for the effects of caregiver stress. Congruent with the differential susceptibility hypothesis, more socially fearful children were more susceptible to caregiver stress, for better *and* for worse. More socially fearful children were reported as lower on wellbeing when their caregivers were more stressed (showed increases in caregivers' cortisol levels during childcare), whereas they were reported higher on wellbeing when their caregivers were less stressed (decreases in caregivers' cortisol levels) compared to their less fearful peers.

This thesis confirms the importance of childcare quality in both types of childcare as children's basic hormonal indices of stress as well as their wellbeing seem to be affected by quality of care. Children appear to feel more at ease and less stressed when they are cared for by caregivers who provide more emotional support, and who perceive less stress. Therefore, investments in the improvement of childcare quality, enhancing both global quality of care and caregiver sensitivity, are important. The second study was designed to address this crucial issue of improving quality of professional child care.



*VIPP-CC*

The effectiveness of the Video-feedback Intervention to promote Positive Parenting – Child Care (VIPP-CC) was tested in home-based childcare in a randomized controlled trial. Observed global childcare quality improved in the intervention group compared to the control group. The program did not change observed caregiver sensitivity, but caregivers in the intervention group reported a more positive attitude towards sensitive caregiving than caregivers in the control group. Caregiving attitudes seem to be easier to change than caregiver behavior itself, and more positive caregiving attitudes might be the first (necessary) step in changing caregiver behavior.

The absence of increases in observed sensitivity may be explained by a ceiling effect, due to the relatively high sensitive caregivers in home-based childcare. Another explanation is the ample child-rearing experience of caregivers in our sample. Similar to findings that were reported for parents (Stolk et al., 2008), caregivers taking care of a child for the first time may benefit more from the intervention than caregivers with child-rearing experience.

For global childcare quality, a medium to large effect size (*partial*  $\eta^2$ ) of 0.09 was established through the intervention. This effect size is somewhat higher than in a parenting study (*partial*  $\eta^2 = 0.05$ ), in which the VIPP-SD program proved to be effective in changing observed parenting behavior (Mesman et al., 2008). Studies using the VIPP approach showed positive effects in intervention groups compared to control groups in various samples. Effect sizes (Cohen's *d*) ranged from medium effect sizes ( $d = 0.49$ ) in insecure mothers (Klein Velderman et al., 2006) to large effect sizes ( $d = 0.78$ ) in insensitive mothers (Kalinauskienė, Cekuoliene, Van IJzendoorn, Bakermans-Kranenburg, Juffer, & Kusakovskaja, 2009). The randomized controlled trial evaluating the Carescapes program, a video-based training program for home-based caregivers, showed a medium to large effect size ( $d = .72$ ) on the use of effective behavior management practices, but this effect disappeared after 18 weeks (Rusby, Smolkowski, Marquez, & Taylor, 2008).

The medium to large effect size in our study showed that children in the intervention group were in a more stimulating and safe environment after the intervention. This finding is important, because global childcare quality has been found to affect children's cognitive and social development (Peisner-Feinberg et al., 2001; Vandell & Wolfe, 2000).

*Implications for childcare practice*

This thesis confirms the importance of childcare quality in both childcare homes and childcare centers. The importance of investments in childcare seems especially evident in center-based childcare, because caregiver sensitivity is lower in this type of care than in home-based childcare. However, home-based childcare was chosen as a first step in the adaptation and implementation of the VIPP-SD to group care, because the daily environment in this type of care is more similar to a child's home than center-based child care. We showed that the family-based intervention VIPP-SD can be applied with some minor modifications in a professional group setting. Because the VIPP-CC concerns a short-term easily



applicable intervention, it can be implemented in childcare homes at relatively low costs by caregivers or directors (by means of consultation and inter-vision) who are trained using the VIPP-CC. Thus, the cost-benefit ratio for childcare practice is favorable.

The regulation and improvement of home-based childcare quality is all the more important, because lately this type of childcare has been under pressure. The introduction of the 2010 childcare act had its roots in preventing misuse of government finances, and in facilitating control and enhancement of quality of care. In the past, all parents received childcare allowance if the caregiver was registered at a home-based childcare organization. This resulted in misuse, for example by grandparents taking care of their grandchild during a few days per week at the expense of the tax payer. To prevent this incorrect use of public money, the government introduced the new act.

However, it is questionable whether this act's requirement of education will enhance childcare quality. Many caregivers have ample experience in raising children, which might be more important than their educational level. The obligatory educational level was already introduced into center-based childcare, but did not result in high levels of childcare quality (see Vermeer et al., 2008). In terms of experience in child-rearing, caregivers in home-based childcare are ahead of caregivers in center-based childcare. Although most home-based caregivers do not have any education in the field of childcare, this does not necessarily make them less sensitive and less capable of making children feel at ease. In fact, our study showed that caregivers in home-based childcare displayed higher-quality care than (the higher educated) caregivers in center-based care. Introducing a minimum level of education may reduce incorrect spending of childcare allowances, but may not necessarily increase childcare quality.

To increase childcare quality, one should not only focus on caregivers' knowledge, but also on their sensitivity when interacting with children. Although an effect on observed caregiver sensitivity could not be established in this study, the intervention may have triggered caregivers to be more aware of the importance of interacting with the children and creating a more stimulating and safe environment for the children. This is confirmed by our finding that global childcare quality improved after the intervention. We do not advise the abolition of an educational standard for childcare providers, but we do recommend an emphasis on caregiver sensitivity in childcare education, for caregivers in center-based childcare *and* for caregivers in home-based childcare.

#### *Limitations and future directions*

A limitation of both studies is the relatively small size of the samples. Although our sample sizes are not deviating from those in other recent studies on cortisol in childcare (e.g., Watamura, Kryzer, & Robertson, 2009) and interventions in home-based childcare with a control group (Rusby et al., 2008), the small sample sizes may have resulted in a lack of statistical power to detect moderate associations or intervention effects. Also, our small sample sizes prevented us from comparing subgroups of children or caregivers. For example, some caregivers with specific characteristics might have benefited more from the intervention than others

(differential susceptibility, Klein Velderman, Bakermans-Kranenburg, Juffer, & Van IJzendoorn, 2006; Stolk et al., 2008). In future studies, larger samples are advisable.

Future studies should focus on adapting and implementing the intervention program even further for childcare centers with larger groups of children and more than one caregiver. Interventions in childcare centers are highly relevant, and, considering the lower caregiver sensitivity levels in childcare centers compared to childcare homes, may even result in larger effects on observed sensitivity. A next step in home-based childcare will be to study the effects of the VIPP-CC on both caregivers *and* children, in order to study the causal link from intervention through caregiver attitudes and skills to child behavior and development.

Finally, it should be noted that the focus of this thesis is on the socio-emotional domain of child development only. Although caregivers in home-based childcare showed more sensitive behavior and children displayed a higher wellbeing than caregivers and children in childcare centers, we do not know anything about children's cognitive development.

### *Conclusion*

In conclusion, we found differences between childcare homes and childcare centers in favor of childcare homes: Children showed a higher wellbeing, caregivers displayed higher sensitivity, and noise levels were lower than in center-based childcare. Both children's and caregivers' cortisol levels differed between a childcare (work) day and a home (non-work) day, irrespective of type of childcare. These higher cortisol levels confirm the impact of (work in) childcare on basic hormonal indices of stress in children and caregivers. Our data suggest that caregivers' perceived stress in home-based childcare is an important determinant of quality of care, which in turn influences children's cortisol levels and wellbeing. Lower levels of global quality (center-based childcare) or caregiver sensitivity (home-based childcare) may result in elevated cortisol levels and, in home-based childcare, in lower wellbeing. Furthermore, the results suggest that more socially fearful children suffer the adverse consequences of caregivers who show an increase in cortisol levels during childcare, but also benefit from caregivers who show decreases in cortisol, compared to their less social fearful peers.

The brief, behaviorally oriented VIPP-CC program is an important tool for enhancing global quality of home-based childcare. Although observed caregiver sensitivity did not increase after the intervention, caregiver attitudes towards sensitive caregiving were higher in the intervention group compared to the control group. This study shows that childcare quality can effectively be improved by video-feedback intervention which may routinely be incorporated in the in-service training of professional caregivers.

