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The quality of different types of child care at 10 and 18 months: a comparison between types and factors related to quality

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Running head: Differences in child care quality

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## **Abstract**

The quality of care offered in four different types of non-parental child care to 307 infants at ten months and 331 infants at eighteen months old was compared and factors associated with higher quality were identified. Observed quality was lowest in nurseries at each age point, except that at eighteen months they offered more learning activities. There were few differences in the observed quality of care by child minders, grandparents and nannies, although grandparents had somewhat lower safety and health scores and offered children fewer activities. Cost was largely unrelated to quality of care except in child minding where higher cost was associated with higher quality. Observed ratios of children to adults had a significant impact on quality of nursery care; the more infants or toddlers each adult had to care for the lower the quality of the care she gave them. Mothers' overall satisfaction with their child's care was positively associated with its quality for home-based care but not for nursery settings.

## **Keywords**

Child care; infancy; nurseries; childminding; maternal child care choice, satisfaction.

## **The quality of different types of child care at 10 and 18 months: a comparison between types and factors related to quality**

### **The importance of child care quality**

As research on the impact of child care on children's development has progressed, the overweening importance of the quality of care has become clear (Borge et al., 1996; Lamb 1998; Melhuish, 2004; National Institute of Child Health and Human Development, Early Child Care Research Network (NICHD) 2002a; 2002b; 2001f; 2001h; Petrogiannis & Melhuish, 1996; Smith, 1998). As Ramey (NICHD 2005) commented "*...collectively this study [NICHD] unequivocally demonstrates that both the quality and the quantity of nonparental care influence children's development. Stated directly and summatively, poor quality care is harmful. Conversely, high quality care can be somewhat beneficial....*" ( pp. 427-436). Whatever the aims and parameters of studies of child care, quality is almost certain to be a factor in the findings.

Quality of child care has an impact on many aspects of children's development. Most widespread have been studies showing relationships between quality and various aspects of children's social development and behaviour. For example Howes and Olenick (1986) studied center care and compliance in a sample of American infants at 18, 24 and 36 months at home, in day care, and in a structured observation. The best predictor of children's overall non-compliance was quality of care, with children from high quality centres showing more compliance and cooperativeness than children from low quality centres. Howes (1990) in the USA and Beller et al. (1996) in Germany reported positive correlations between quality of care and a range of other aspects of social competence. Immediately before and after changes in Florida child care regulations and consequent improvement in quality, Howes et al. (1995) were able to show associations with improvements in peer interactions. Similarly, a multi-site

study in four American states found that after controlling for family background, higher quality of care was associated with better social competence (Cost, Quality and Childcare Outcomes Study Team, 1995) as did the NIHCD study (NICHD, 2002c). Phillips et al. (2001) and Volling and Feagans (1995) found that centres with higher quality care had children with better peer relations while in a study of Israeli family day care, Rosenthal (1990) found that aspects of the quality of care were related to the frequency of aggressive interactions.

Recently studies have also shown links between child care quality and measures of children's cortisol. In full-time day care cortisol levels tend to rise throughout the day, in contrast to the typical diurnal pattern, an endocrine response indicative of increased stress. Increasing cortisol levels are more likely as the quality of day care decreases. Some studies report associated increases in behaviour problems (Bruce et al., 2002; Dettling et al., 2000).

Child care quality has also been shown to be positively related to cognitive and language development. Vandell (2002), reporting on the NICHD sample at the age of 54 months, found that children with child care in the highest tercile of quality achieved significantly higher scores on "pre-academics" and language than children in child care in the lowest tercile. However the most powerful finding from that NICHD study, further reported in NICHD (2005), concerned the quantity rather than the quality of child care. More time in non-maternal care across the first four and a half years of life predicted more problem behaviour, particularly antisocial and aggressive behaviour, at 4-5 years of age. These effects were only partially mediated by quality of childcare. The effects and interaction of quantity and quality of child care vary in different populations. For example, while Waldfogel & Brooks-Gunn (2001) report that maternal employment in the first year of life is associated with increased behaviour problems a recent re-analysis

suggests that this effect may only be present where the quality of child care is below average (Brooks-Gunn, 2002), while in an analysis of the NLSY dataset, a large-scale, representative, US sample, Youngblade (2003) finds that maternal employment in the first year of life is associated with behaviour problems for boys but not girls. In England, the Effective Provision of Pre-school Education (EPPE) study of over 3,000 children found that early child care, particularly in the first two years, is associated with antisocial behaviour at 3 and 5 years of age (Melhuish et al., 2001; Sammons et al., 2003b). Hours in non-parental care have also been shown to be associated with behaviour problems in the results of a new longitudinal study of 17,000 children from 900 kindergartens in the USA (Early Childhood Longitudinal Study, ECLS-K). (Ritter & Turner, 2003).

### **Defining child care quality**

Child care quality has been described as a “*slippery and multifaceted construct that requires careful measurement and interpretation*” (Hwang et al., 1991, p.117). It has even been suggested (Pence & Moss, 1994) that quality is not an objective reality but a relative value varying depending on the informant, who might be a parent, a child care worker, a policy maker or even a child. Confusing good quality with good outcomes is a hazard in conceptualising quality of child care. While quality of child care is positively related to many aspects of children’s ongoing development. It is also positively related to children’s day to day happiness and security and to parents’ satisfaction with child care. In the UK efforts have been made to develop a theoretical framework, and consequently methods of assessing quality, that can be incorporated into good practice, inform care providers and establish ways to improve services (Munton et al., 1995; Pence & Moss, 1994). This conceptualisation incorporates a ‘children’s rights’ approach: irrespective of differences in long-term outcomes young children have a right to the best quality day care that can be provided. Even if this principle is accepted, however, the question: what is “best quality” remains to be answered.

As in any other setting, “*children in child care need to be safe, healthy, responded to sensitively and appropriately, and encouraged to develop their potential*” (Barnes, 2001, p. 4).

Child-caregiver relationships have been shown to be an important aspect of quality of care. Scarr (1998) in a review, concluded that “*quality child care is warm, supportive interactions with adults in a safe, healthy and stimulating environment, where early education and trusting relationships combine to support individual children’s physical, emotional, social and intellectual development*” (p. 100). A range of desirable practitioner qualities identified in the literature as fundamental to facilitating good quality relationships between adults and children, includes sensitivity, empathy and attunement, (e.g. Davis et al., 2002; Elfer, et al., 2002; Post & Hohmann, 2000). Being cared for by adults possessing these qualities and attitudes can help infants and young children to feel confident in themselves, encourage them to communicate and talk, to think and have ideas, and to learn and discover. The degree to which trusted caregivers are available for individual children has recently been shown to be a key feature of quality of care (Clasien de Schipper et al., 2004). These carer-qualities are closely linked with the concept of the key person in group child care (Lindon, 2003). They are featured in the UK’s Key Elements of Effective Practice (KEEP; Department for Education & Skills; 2004) and Common Core Skills and Knowledge for the Children’s Workforce (Department for Education & Skills, Staffing continuity, consistency and ratios; 2005).

Children who experience greater caregiver stability while attending early years settings have been found to have more secure relationships with their caregivers and to show higher degrees of social competence (Howes & Hamilton, 1992; 1993; Raikes, 1993). Caregiver stability has been widely defined, including availability, the amount of time a caregiver spends with individual children (Barnas & Cummings, 1994; Raikes, 1993); the

frequency of changes in the primary caregiver (Howes & Hamilton, 1992; 1993); rate of staff turnover (Clarke-Stewart et al., 1994; Whitebrook et al., 2001) and the number of different arrangements experienced by an individual child (NICHD Early Child Research Network, 1997a, 1997b, 1998).

Structural - and regulatable - aspects of child care have also been found to be associated with quality. Factors such as adult-child ratios, group sizes, children's ages at entry and hours in the facility, and caregivers' qualifications have been found to be predictive of sensitive, positive caregiving and of children's early socio-emotional development (Clarke-Stewart et al., 1994; NICHD, 2005; Phillips, 1987; Vandell & Wolfe, 2000). Along with lower staff turnover rates, such factors are associated with positive practitioner-child relationships and increased social competence and social adjustment among the children (e.g. Borge & Melhuish, 1995; Richman & McGuire (n. Barnes), 1988; Scarr et al., 1994).

Nevertheless, structural information, relatively easily garnered from administrative sources, cannot be relied upon to infer quality of process. In a study of 120 American centres only one of six regulatable characteristics - the highest wage paid- was significantly correlated with observed quality (Scarr et al., 1994). Another large study in the USA (Howes et al., 1992) did find that process quality rose as the adult: child ratio increased, but these were *observed* ratios, taken every 15 minutes over several hours of observation. It is not enough to know the official ratios for a nursery as these are not routinely met in practice (McGuire (n. Barnes) & Richman, 1989; Scarr et al., 1994).

### **Quality of different types of child care**

At present it is as difficult to compare the quality of different types of child care as it is to compare different views of the constituents of quality. Apart from inspection data, presenting a strictly limited, structural view of available types of child care (e.g. OFSTED, 2005) most of the research showing the positive impact of high-quality early years practice



(Graham , 2005; NICHD Early Childcare Research Network, 1999; Sylva et al., 2004) and the negative impact of poor quality of care, as well as too much care or care too early in life, (Gunnar, 1998; Melhuish, 2005) is more concerned with within-type than across-type differences in quality. Even when large scale studies collect quality data for a range of child care types, that range is usually collapsed to two or three categories so as to optimise numbers for analysis. An honourable exception is the EPPE study of 3,000 English children (Melhuish, 2001; Sammons et al., 2003b) in which types of child care were largely kept distinct and showed significant differences. For example child care in the first two years by a relative was associated with less antisocial behaviour at 3 and 5 years in contrast with very high levels of child care by childminders, or moderately high levels of care in nurseries or centers, which were associated with more antisocial behaviour. Very similar results were also found in the EPPNI study of 850 children in Northern Ireland (Melhuish et al. 2002a). In the Families, Children and Child Care study (Barnes et al., 2006; Leach et al., forthcoming) parental ideals, experiences and levels of satisfaction were analysed separately for father care, grandparent/ relative care, nanny care, child minder care and nursery/center care. It is the observed differences in the relative qualities of these care types at each of two age points that are the subject of the present paper.

### **Quality and costs of care**

Cost to the consumer is often assumed to be the most important determinant of the type of care parents select and the relative “affordability” of one type of child care compared with others is frequently mentioned by researchers, policy-makers and parents. However, in their review of research into child care choices Pungello and Kurtz-Costes (1999) showed that relatively low price is only one of several extrinsic characteristics of which parents take account, location, hours and reliability often being equally important. Nevertheless, if cost is not the principal criterion for many parents, it remains a significant factor as data from a

recent qualitative study in England show (Leach et al., forthcoming).. Unfortunately the literature contains little detailed information on the relative costs to parents of different types of child care because it is both difficult to obtain and easily outdated by changes in the balance between public and private provision and by subsidies and tax breaks. Even large scale research studies, such as the NICHD study (2005, pp.122-126) often eschew price comparisons so most of the data available on the affordability of child care is based on differences in parental (or maternal or familial) income rather than differences in outgoings by type of child care.

Cost matters, but its importance is not straightforward. Recent studies from the USA and from Europe have put it into a wide context, exploring the complex relationships in women's child care choices between external circumstances, including different economic opportunities and labour market conditions, and personal attitudes (Fagan 2000; Hakim, 2001; Pungello & Kurtz-Costes, 2000) while a study from the UK analysed the "choices" recent government policies have made available to mothers; the relationships in their child care decision-making between external constraints and existing attitudes and preferences, and the policy implications. (Himmelweit & Sigala, 2003).

### **Qualities looked for by mothers**

While much of the literature suggests that extrinsic factors such as cost, geographical locality and easy access dominate families' choices of child care (Mortimer, et al., 2003; Peyton et al., 2001) there is also evidence that many mothers seeking child care look for personal rather than practical or professional attributes. In a large study in the USA, for example (Kontos et al., 1995) most mothers gave some attribute of the caregiver as their first reason for choosing their care arrangement. In an English study of 1200 families (Barnes et al., 2006) mothers who needed non-maternal infant care often preferred it to be familial, many regarding care by a grandparent as ideal. Throughout the first year mothers were more

satisfied with the care given by individuals - relatives, childminders, nannies - than by more than one caregiver, in larger groups such as nurseries. Not all parents have clear views about what they should look for when choosing child care, however (Van Horn et al., 2001). Some cannot think what qualities to list as desirable in a child care arrangement, while others list factors that do not reliably match those that professionals use as indices of quality. Furthermore, despite its use in many studies as a paradigm for child care quality, parental satisfaction with care is not an index of its actual quality. Parental reports of high levels of satisfaction are normative even though their care arrangements vary widely (Bogat & Gensheimer, 1986; Rassin et al., 1991). Parental satisfaction with care is likely to be especially high when parent involvement is encouraged and the care provider listens to the parent (Barnes, et al., 2006; Britner & Phillips, 1995). In the USA it has been found that parents generally rate their children's care more highly than independent observers do (Cryer & Burchinal, 1997). It may be that parents' ratings reflect their own positive relationship with the caregiver, or their hopes for their children's care, rather than a reality which may be difficult for them to observe or, perhaps, to tolerate. As Munton (1995) suggested, it should be possible to have a universal framework within which different views can be compared. In the meantime parents reasons for choosing child care arrangements are important in themselves. Peyton et al. (2001) found that parents who reported basing their child care choice on quality indicators actually placed their children in higher quality care settings than parents who used practical criteria for care selection. The relationship between the observed quality of different types of child care and the qualities looked for by mothers is explored in the present study.

### **Measuring child care quality**

Choice of methods and measures of child care quality, reviewed by Barnes (2001), must take account of three main parameters. Firstly, the purposes inherent in different

observational measures of quality can be grouped broadly into two contrasting approaches. One type of measure, principally from the USA, has been academic and research oriented, developing methods that can be used to test ideas about the relevance of quality for child outcomes. The second type of measure is designed to meet the need to measure quality for licensing, regulation and, where necessary, improvement of child care offered to the general public,. Both types of measure may be needed, as in the present study. (Cryer & Phillipsen, 1997)

Secondly, a choice must be made or, as here, a balance struck between recording structure - perhaps from administrative records or interviews with child care staff - and observing process in child care settings. The latter is more accurate and predictive but also more demanding of research resources. Thirdly, a major methodological concern, especially when observing child care in group settings, is how to reflect the quality of each individual carer , the quality of each child's experience with each of several carers, and also arrive at a final estimate of the overall quality that represents the centre or care home rather than one person's experience. In the present study several complementary assessments were used but not entirely successfully.

### **Aims and Hypotheses**

The main aim of this paper is to compare the quality of child care offered to infants and toddlers in different types of setting in the UK, and to identify which (if any) structural factors are associated with higher quality child care. In addition the study seeks to determine the nature of any relationships between the qualities mothers identify as important and the quality observed; the observed behaviour of mothers and that of their caregivers and their satisfaction with the child care they are using, and its quality.

The research hypotheses are:

1. Observed quality of care will be higher in domestic settings with one caregiver than in group settings with several caregivers
- 2.. Considering separately two dimensions of quality, those aspects of quality related to cognitive stimulation will be higher in group care while those aspects of quality reflecting sensitivity will be higher in single caregiver settings,
3. Structural and regulatable features of child care (e.g. cost, child/adult ratios) will be associated with observed quality.
4. The qualities (characteristics) of child care preferred by mothers will not be associated with the observed quality of their children's care
5. The observed quality of maternal behaviour will be associated with the observed quality of their child's care.
6. Mothers' satisfaction with child care will be associated with its quality.

## **METHODS**

### **Procedures**

#### 1. Interviews with mothers

Face-to-face home interviews with mothers were conducted when their infants were 3, 10 and 18 months old. Demographic information was collected at the first interview. At each time point mothers were asked about their current type and amount of child care and its cost. At the 10 and 18 month interviews they were also asked in retrospect about the type and amount of any child care used between 4 - 9 and 11 - 17 months respectively. These responses were used to determine the dominant form of child care at each age point; this was the child care setting observed if more than one type of care had been used,

#### 2. Observations of quality of child care

During the home interviews at 10 and 18 months, observations to determine the quality of maternal behaviour were also conducted. Observations to determine the quality of children's non-maternal care were carried out in the child care settings at both the 10 and 18 month time points, excluding those children cared for primarily by their fathers, the subject of a separate study (Lewis et al., forthcoming) and a small number of families using a friend to provide child care.

## **Participants**

At 10 months, 424 child carers were approached of whom 307 were observed (see Table 1), comprising 84 grandparents, 33 nannies, 85 childminders and 102 nurseries.

At 18 months, 422 child carers were approached, of whom 331 were observed (see Table 1) comprising 81 grandparents, 38 nannies, 83 childminders and 129 nurseries. Those observed were compared to the total group (child sex, demographic characteristics, maternal age, area deprivation) and they were comparable except that those observed contained a smaller proportion of non-white children, and the mothers of those observed had a significantly higher average occupational status (see Table 1). The characteristics of families using the four types of child care in question also differed in some ways both at 10 months and at 18 months (see Tables 2 and 3). Those using grandparent care at both age points were on average younger, with fewer educational qualifications, lower social class and living in poorer neighbourhoods. In addition fewer of those using a grandparent for child care at 10 months were living with a partner. Those using nannies at both 10 and 18 months had more children and were better off financially (see Tables 2 and 3).

## **Measures**

### *Family Background*

At both time points mothers reported on background characteristics of their children (age, gender, ethnic group), themselves (age, education, occupation) and the family (living with

partner, family income, adversity of living conditions). Maternal educational qualifications were scaled on a six-point scale from 1 = vocational qualifications at 16 or below, to 6 = higher degree or above. Maternal occupational status was defined according to the Computer Assisted Standard Occupational Coding, (CASOC; Elias, et al, 1993), using the three group ordinal categorisation: (1 = working class occupations (e.g. factory work or low level job in service industries), 2 = intermediate occupations (e.g. secretary, data entry), 3 = managerial and professional (e.g. the professions, senior management jobs). The Child Poverty Index (CPI) from the Indices of Multiple Deprivation 2000 (Noble et al., 2000) was used as a measure of area level deprivation. The CPI is an aggregate measure of the proportion of families with 0-16 year old children within an electoral ward who receive means tested benefits (income support, job seekers allowance, family credit and disability working allowance), a higher value indicating more deprivation. Two subscales from the HOME inventory (Bradley & Caldwell, 1989) were also completed during maternal interviews – Emotional and Verbal Responsivity, and Avoidance of restriction and Punishment, at both time points.

### *Types of Child Care*

Four types of non-parental child care are compared in this study: care by a grandparent or other relative; care by a nanny in the child's home; care by a child minder in her home and group care in a nursery or centre. The dominant (observed) form of non-maternal care at 10 months and at 18 months was decided according to the following formula: if the child had only one type of care for 12 weekly hours or more, this was the dominant form. If the child had two or more types of care which together totalled 12 weekly hours or more, the one with the most hours was the dominant form. If a child had an equal number of weekly hours in two or more types of care, the type that was most different from maternal care was selected for observation (e.g. childminder would be chosen over a grandparent as non-familial, and over a

nanny as taking place outside the child's home; nursery care would be chosen over all other types as it was non-familial, outside the home and using multiple carers in a group setting).

### *Measures of Quality and Structure of Child Care*

1. The Caregiver Interaction Scale (CIS; Arnett, 1989) was completed across all non-maternal child care settings. Three of the original four sub-scales were used, excluding 'Permissiveness', with some reductions in items that were not appropriate for children of this age (details available on request). All items are rated on 4-point scales by the observers asking themselves "to what extent are each of the following statements characteristic of this caregiver?" (1 = not at all; 4 = very much). 'Positive Relationship' (8 items) concerns the warmth, level of enthusiasm and developmental appropriateness of the caregiver's interaction with children (e.g. "Speaks warmly to babies and toddlers"). 'Punitiveness' (6 items) refers to hostile, threatening, and harshly critical behaviour toward children, (e.g. "Seems critical of babies and toddlers"). 'Detachment' (4 items) indicates the extent to which the caregiver was uninvolved with and uninterested in the children (e.g. "Seems distant or detached from the babies and toddlers"). Inter-rater agreement was assessed as the agreement between a golden standard and four raters of 20 child observations. The weighted mean Kappa coefficient for each rater with the gold standard rater ranged from .68 to .74.

2. The Observational Record of the Caregiving Environment (ORCE) was developed by the NICHD Early Child Care Research Network (1996) as a measure of quality of care that focuses on a particular child's experiences rather than on what happens in the group as a whole. The scale assesses the nuances of the caregiver's behaviour in relation to the child. The FCCC shortened version (details available on request) includes eight caregiver domains with items rated from 1 (not at all characteristic) to 4 (very characteristic). The separate scales are: sensitivity/responsiveness to distress; sensitivity/responsiveness to non-distress; intrusiveness; detachment/disengagement; stimulation of development; positive regard for



child; negative regard for child; and flatness of affect. These can be added together to obtain a total item score (see NICHD, 1996; Clarke-Stewart, 1999). The inter-rater agreement for the ORCE ranged from .62 to .74.

3. The infant (0-3) version of The Home Observation Measurement of the Environment (HOME; Bradley & Caldwell, 1988) was used to rate non-maternal caregivers. The HOME measures the extent to which the home environment supports child development. All observation items are dichotomous (0 = no, 1 = yes). One subscale out of the original six, Emotional and Verbal Responsiveness (11 items, e.g. “spontaneously praises child at least twice”) was used at 10 months to assess maternal and other caregiver sensitivity: Although it was not designed for use in nursery settings this scale was used as part of the interview with nursery carers so that there would be a measure of sensitivity comparable across all settings. In settings other than nurseries the 'Avoidance of restriction and punishment' subscale (7 items) was also used. At 18 months the Responsiveness and Avoidance of Restriction scale was included. The mean inter-rater agreement between four independent raters and a gold standard rater were Kappas between .77 and .90.

4. Two additional measures of quality designed specifically for formal child care settings were used: The Family Day Care Rating Scale (FDCRS; Harms & Clifford, 1984) for home-based child care (Childminders) and the Infant and Toddler Environment Rating Scale (ITERS; Harms, Cryer and Clifford, 1990) for group care in nurseries. In order to produce a measure that was comparable across these two settings, items were compared and a common set of 8 items constructed from the Space and Furnishings subscale (4 items), the Learning subscale (2 items) and the Language subscale (2 items) . This short form combined scale had internal consistency of  $\alpha = 0.75$  at 10 months and  $\alpha = 0.61$  at 18 months. The total measure was also completed in each setting so that a total mean item score could be derived.

5. A reduced version of the Safety scale from the assessment profile for homes with young children, research version (Abbott-Shim & Sibley, 1993) was used to determine the level of safety in home settings. the original scale has 11 items scored yes (1) or no (0) covering the safety of indoor physical space but those that could not be determined without questioning or more intrusive examination (e.g. tap water 120°F or less, cleaning agents out of child's reach) were excluded and 7 items were retained (e.g. heaters and fans are protected from child's reach or not present). An equivalent list of items was used from the assessment profile for early childhood programs (Abbott-Shim & Sibley, 1987) so that safety scores could be compared across all settings.
6. In nurseries, a record of the numbers of children and adults who were in the room was made approximately every 10 minutes. At 10 months the average number of observations was 10.4 (N=95) and at 18 months 11.2 (N=123). These observations were combined so that an average child:staff ratio could be calculated for the relevant room in each nursery.
7. Interviews were conducted with nursery managers at 18 months to enquire about the ages, qualifications and experience of their staff and data about staff qualifications, experience and age were aggregated at the nursery level.
8. Grandparents, nannies and childminders were asked whether they took the child on a list of 7 possible types of outing (e.g. to a library, park or swimming pool) and the sum of these dichotomous items (0=no, 1=yes) were added to make a total score.

#### *Maternal perceptions of child care*

At 10 months mothers using child care were asked to indicate which three characteristics of child care out of a list of nine were the most important to them when selecting child care: provide professional child care; provide substitute for mother care; teach babies new things; provide adequate outdoor space and toys; provide a safe physical

environment; provide dependable care; provide adequate indoor space and toys; provide a loving and understanding environment; provide worry free child care.

At 10 and 18 months mothers using non-parental care were asked to complete the Parental Satisfaction with Child Care Scale (Harrell & Ridley, 1975), indicating their level of satisfaction with 11 different aspects of their current child care: convenience, dependability, price, competence of staff/caregivers, teaching new things, appropriate discipline, providing love and understanding, nutritious food, worry free child care, baby's satisfaction with care, and overall quality on a 5-point scale (1 = extremely dissatisfied, 5 = extremely satisfied). Total satisfaction was the average of the eleven responses;  $\alpha = .87$ ) (Barnes et al., 2006). This measure was introduced after the study started and in consequence the sample size (N = 245, 247) is smaller than those for the demographic and quality indicators.

### **Analysis**

ANOVA tests were used to compare mean values of each aspect of quality in the four types of child care with post hoc Sheffe tests. The frequency with which mothers deemed each of the nine characteristics of child care important was calculated. Chi Square tests were used to determine whether or not each was chosen by a similar proportion of mothers using the four types of non-maternal child care: grandparent/relative, childminder, nanny and nursery. Pearson correlations were calculated to determine the relationship between structural and regulatable indicators of child care, the mother's own behaviour and the observed quality of non-maternal child care were calculated. Spearman's rank order correlation coefficients were calculated between each item ranked as one of the top three characteristics considered important by mothers and the measures of observed quality. Pearson correlation coefficients were calculated between maternal satisfaction with child care and observed quality.

## **RESULTS**

### *Comparison of observed quality*

When the children were 10 months old the care observed in nursery settings was significantly poorer than the observed care given by grandparents, nannies or child minders, in all domains apart from punitive behaviour (see Table 4). Results from the Caregiver Interaction Scales showed there was less positive behaviour and more detachment by adults in nurseries while results from the HOME indicated less emotional responsiveness. Similarly the ORCE total score indicated a lower overall quality of carer-child interactions (see Table 4). The only significant differences between the three types of home-based care was that grandparents had a lower level of positive relationship compared to nannies and childminders. The Profile safety and health scale indicated higher levels of safety, in childminders' homes than in grandparents' homes or nurseries. Comparing only the two 'formal' types of child care, the quality of space and furnishings was better in nurseries while the level of interaction and activity related to the development of language and reasoning was higher for the childminders (see Table 4). The overall total quality as indicated by the common ITERS/FRCRS did not reveal a significant difference between these two types of care. Comparing only the home-based care settings, the range of activities offered was greatest by nannies, and least by grandparents.

At 18 months the picture was slightly more mixed (see Table 5). The highest level of positive relationships (CIS) was seen when children were with nannies, higher than between children and nursery staff and between children and grandparents. Positive relationship with childminders did not differ significantly from any of the other types of care. As at 10 months, nursery staff were more detached than grandparents and nannies, but again childminders did not differ significantly from nursery staff or from the other home-based carers. The overall level of interactional quality (ORCE) was lower in nurseries than all the other types of care, and nursery staff were also judged to be lower than other types in their emotional responsivity as measured by the HOME. Punitiveness was, on average, lower amongst

childminders than grandparents, but mean levels in the other types of setting tended to vary more and neither nannies nor nursery staff differed significantly from other types of carer (see Table 5).

Comparing only childminders and nurseries, there were more learning activities in the nurseries (see Table 5) however the quality of the space and furnishings, and language and reasoning activities were now similar and the total ITERS/FDCCRS score still did not differentiate between the types of setting. Comparing only the home-based care types, a smaller range of activities was still offered by grandparents than by nannies or childminders (see Table 5).

#### *Associations between structural features and quality of care*

At 10 months the cost of child care was largely unrelated to the quality observed, taking all types of care together, and only one association was significant when each type is considered separately. That one significant association was between higher costs in nursery settings and less emotional responsivity (HOME) (see Table 6). At 18 months, higher cost in the total sample was associated with less punitive behaviour (CIS) and more safety overall (see Table 6). Taking each child care type separately, there was a marginal association for nannies between higher cost and more positive interactions (CIS). For childminders, higher cost was associated with marginally more positive interactions, less punitive behaviour (CIS) and better overall interactions (ORCE).

The average child:adult ratio was clearly associated with nursery staff behaviour (see Table 6). When there were more children to each adult, staff were less positive, more punitive and more detached at both 10 and at 18 months, as indicated by the CIS. In addition at 18 months the quality of the overall interactions (ORCE) was lower when there were more children to each adult, and carers were less emotionally responsive (HOME).

Few significant associations emerge between the ages, qualifications and experience of nursery staff and aspects of the care they offer, however those few significant ones are all in the expected direction. Nurseries with older staff scored significantly lower on detachment (-0.27,  $p < 0.05$ ) and higher on the quality of their overall interactions with children (0.38  $p < 0.01$ ). Mothers who scored more highly on avoidance of punishment were significantly more likely to use nurseries with better qualified (0.27,  $p < 0.05$ ) and more experienced (0.26,  $p < 0.05$ ) staff.

#### *Qualities important to mothers, type of care used and relationship to quality*

In Table 7 the three qualities of child care judged most desirable by all the mothers are presented in rank-order. The most frequently selected quality was “providing a loving and caring environment” (80.9%), followed by “providing a safe physical environment” (67.8%) and “providing worry free child care” (48.4%). Some of the characteristics mothers considered most desirable varied according to the type of care used. Mothers using grandparents or other relatives as caregivers tended more often to say that “providing a safe physical environment” was an important quality of child care ( $p < 0.10$ ). Fewer mothers using other types of care, in particular fewer using nannies (51.5%) thought this an important quality. More mothers using childminders or nannies as caregivers thought serving as a “substitute for the mother” was an important quality, compared to those using other types or the total group ( $p < 0.05$ ; see Table 7) while these mothers were the least likely to say that “teaching the baby new things” was an important feature of child care ( $p < 0.10$ ).

Taking all those using child care together ( $N = 304$ ), there were few significant relationships between the characteristics perceived as important and observed quality.

#### *Maternal behaviour and observed child care quality*

At ten months there were few (7 out of 48) significant associations between behaviours observed in mothers and that observed in their child's carer. When mothers were observed to

be more emotionally and verbally responsive (HOME), grandparents were also observed to be higher on this scale ( $r = 0.33, p < 0.01$ ), and nursery care was likely to be marginally safer ( $r = 0.21, p < 0.05$ ). When mothers were more likely to avoid punitive and restrictive behaviour (HOME), grandparents and nannies were rated as less punitive (CIS, grandparents  $r = -0.29$ ; nannies  $r = -0.60, p < 0.001$ ), the overall quality of interactions with grandparents was higher (ORCE,  $r = 0.23, p < 0.05$ ), nannies were less detached (CIS,  $r = -0.33, p < 0.05$ ) and the environment (the child's own home) was likely to be safer ( $r = 0.41, p < 0.05$ ).

At 18 months there were more significant associations (10 out of 48), although again these were mainly with care by grandparents or nannies. When mothers were observed as more responsive (HOME) grandparents were likely to have more positive interactions ( $r = 0.29, p < 0.01$ ), less detachment (CIS;  $r = -0.34, p < 0.01$ ), and better interactions overall (ORCE;  $r = 0.27, p < 0.05$ ) Nannies were also higher on this scale ( $r = 0.33, p < 0.05$ ). When mothers were more responsive, childminders were likely to be less detached (CIS,  $r = -0.25, p < 0.05$ ).

Mothers more likely to avoid restriction and punishment had nannies who were less punitive (CIS,  $r = -0.47, p < 0.01$ ), more positive (CIS,  $r = 0.33, p < 0.05$ ) with better interactions (ORCE,  $r = 0.39, p < 0.05$ ). Avoidance of restriction by mothers was also associated in nurseries at 18 months with better interactions measured by the ORCE ( $r = 0.26, p < 0.01$ ) and marginally more positive interactions (CIS,  $r = 0.20, p < 0.05$ ).

#### *Associations between maternal satisfaction and the quality of care*

At both 10 and 18 months mothers' reported satisfaction with their child care was significantly associated with less observed detachment and better quality interactions as indicated by the ORCE, and with more responsiveness as indicated by the HOME (see Table 8). However these associations based on the total sample mask interesting differences between the child care types. Satisfaction was most closely associated with observed quality for

grandparent care at both 10 and 18 months, and with observed quality of childminders at 18 months. Maternal satisfaction was less strongly associated with quality of care by nannies, though associations are in the same direction as for grandparents and childminders and the group sizes are small. However maternal satisfaction is entirely unrelated to observed quality in nursery settings.

## DISCUSSION

Many previous large-scale studies of child care quality have concentrated on quality-within-type as the Cost Quality and Outcomes Study (1995) concentrated exclusively on centre care. Where studies have considered quality across types, notably the NICHD study of early child care, they have usually collapsed care-categories for their final analyses so that conclusions about relative quality can only be drawn for, say, centre care versus all other types. It was a main aim of this study to compare the quality of child care offered to infants and toddlers in a range of different types of non-parental arrangement and setting. A four-type classification, covering familial home-based care (grandparent or other relative), non-familial home-based care (nanny) in the child's own home; non-familial home-based care in another home (child minder) and nursery/centre care, and use of a battery of assessments of quality, most of which are comparable across all settings, has produced some interesting findings. These should be interpreted in the context of the different characteristics of the users of each type of care; in particular the relative scarcity of both human and financial capital amongst those using grandparent care.

The first research hypothesis – that quality of care would be higher in domestic-scale settings with one caregiver than in group settings with several caregivers – is confirmed. Nursery care was rated as significantly lower than any of the other three at both age points on



all measures of the quality of inter-personal interactions except for Punitiveness, which showed no significant discrimination amongst the four types at 10 months and only one at 18 months. Even comparable items from the home-based and centre-care measure of safety and health, which might have been expected to favour the most highly regulated and inspected type of care, produced significantly lower scores for nurseries at ten months than for child minders or grandparents. The relatively low quality of care for very young children in nurseries is consistent with our previously reported finding (Barnes et al., 2006) that mothers of 10 month infants are less satisfied with nursery care than with any other type.

Comparisons were made between nurseries and the other type of “formal” care, child minding (family day care) alone. Neither total scores for the separate ITERS and FDCRS, nor a measure consisting of common items from them, discriminated between the two types of care, but there were significant differences between some individual scales. At ten months the quality of the physical environment (space and furnishings) was better in nurseries than in childminders’ homes but the level of stimulating adult-child activities, that could be related to the development of language and reasoning, was lower in nurseries and higher in childminders’ homes. At 18 months, however, neither of these two measures discriminated between the two settings but there were more activities that might promote cognitive development in the nurseries. Our second hypothesis is therefore confirmed as far as it relates to aspects of quality reflecting caregiver sensitivity being higher in single caregiver settings, but only weakly confirmed as it relates to aspects of quality relating to cognitive stimulation being higher in group care. In the light of earlier studies, including English data (see Melhuish, 2004) nurseries might have been expected to score significantly more highly than child minders (family day care settings) on activities related to language and reasoning and to learning activities at both ages. Since nurseries did provide significantly more learning activities at 18 months, though not earlier, it may be that their predicted lead in the provision

of all aspects of cognitive stimulation is age dependent and will become apparent in the findings from follow-up when these children are older.

Within the higher overall sensitivity of adults in single-caregiver settings there were some interesting differences between the three types. Grandparents, often considered by parents to be the ideal caregivers for such young children (Barnes et al., 2006) were observed to have lower levels of positive relationships with children than nannies and child minders at both age points, and at 18 months they were more punitive, to a small but significant extent, than child minders. Furthermore, at 10 months their homes were judged to be less safe than those of childminders' and at 18 months they offered children a smaller range of outings and activities than either childminders or nannies. Mothers using grandparent care sometimes express concern about grandparents' motivation and energy for daily child care. (Leach et al., forthcoming), however the mothers who were using child care by grandparents were the least privileged in the study. There are few, if any, non-narrative studies of nannies' behaviour or quality of care as this form of child care is often assumed to be confined to a very small minority of atypically wealthy families, and therefore not part of mainstream child care. However daily, and sometimes shared, nanny-care is increasingly used by highly paid working mothers. Nannies fared relatively well in these quality assessments, having high levels of positive relationships – higher than all other caregivers at 18 months – and offering a significantly high level of activities to their charges at both ten and eighteen months.

The contribution made by information on structural and regulatable features of child care to assessments of quality is still open to debate. Costs of care and the relative affordability of different types in different locations, is an important factor in parental choice of care (Leach et al., forthcoming), but its relationship to the quality of that care is complex and less understood, partly because the cost- data in the literature are often indirect, recording the types of care used by higher and lower-earning parents, for example, rather than the

actual costs of child-care places. In this study the actual monetary costs to the mother of the care used at each time point was established, and shown to be largely unrelated to the observed quality of care, especially in nurseries. Taking the group as a whole, mothers of 10 month babies who paid more did not get higher quality child care. Looking at each type of care in turn for this age group, there are only two significant associations between price and quality. The first is for childminders and relates higher cost to higher scores on safety and health. The second is for nurseries and suggests an unexpected relationship between higher price paid by mothers and somewhat less responsive care received by their infants. At 18 months for the group as a whole higher cost goes with somewhat less punitiveness and very significantly higher scores on safety and health. Taking each type of care individually, however, there is no relationship between the cost of nurseries and their quality and only a marginal association between the cost of nannies and more positive relationships with their charges. For child minders, however, higher costs are clearly associated with measures of higher quality relationships with children, including less punitiveness. These findings may reflect practical realities of English child care, in which the demand for privately – provided nursery places still outstrips demand, while child minding seeks recognition as a professional alternative.

Structural features that have been most consistently found to be related to quality caregivers' qualifications, their pay and the ratios of caregivers to children, rather than those that are primarily organisational, such as group and room sizes and outdoor play-space (see Scarr et al., 1994) and as predicted in our third hypothesis that is the case here. Observed child-carer ratios in the nurseries were significantly related to most of the measures of observed quality of care at 10 months and almost all at 18 months. The higher the number of 10 month infants sharing one carer, the less positive and the more punitive and detached was her relationship with them. In addition, at 18 months, when carers had more toddlers to care

for the quality of their interaction with them was significantly lower and they were less emotionally responsive to them. The only measure of observed quality in nurseries that was not significantly related to the ratio of adults to children at 18 months was the safety and health scale. The importance of this finding is that it relates to actual ratios rather than those described in centre brochures or on official inspection forms. Group child care settings are prone to high staff turn-over and staff absence, with low levels of training, highly intensive work and poor remuneration. Clearly close attention should be paid not only to who should be caring for infants and toddlers but to who actually is from day to day.

It is suggested in the literature that parents may not know how to judge quality of child care (Van Horn, 2001), are inclined to be more satisfied with their child care than its observed quality merits (Cryer & Burchinal 1997) and are particularly likely to be highly satisfied when the carer relates well to themselves as well as to their child (Barnes et al., 2006). However, it has also been shown that parents' reasons for choosing particular child care arrangements are important in that choice made according to quality criteria is related to higher quality care than choice made according to structural or practical considerations (Peyton et al., 2001). While this study collected no data concerning the reasoning behind actual choices of child care made by mothers (but see Leach et al., forthcoming) it did collect an indication of the characteristics of child care they considered most important. Asked to select their top three of nine important characteristics of child care, less than 10% of mothers put structural characteristics (e.g. more space and play equipment) in their top three, though safety was considered important. Instead they focussed on relational characteristics such as the provision of love and understanding. The rank ordering of these qualities varied surprisingly little according to the type of care used except that mothers using grandparent care were more likely to include "providing a safe physical environment" in their top three while mothers using child minders or nannies were most likely to rank "providing substitute

for mother care” and least likely to rank “teach baby new things”. Possibly mothers paying individual caregivers (who tended to be among the most highly educated) considered that the prime role of the caregiver was to compensate for their own absence during working hours and that they (and their partners) could provide all the teaching that was required. We predicted that the selection of qualities mothers considered important would not be associated with the observed quality of care, however a few significant associations were identified. It would be interesting to extend the choice of items offered to include structural qualities thought to be of importance such as cost.

An assessment of the quality of mothers’ behaviour towards their infants was made at ten and eighteen months. Quality of maternal care was expected to relate to the observed quality of her child carer but this fifth hypothesis was not confirmed. At 10 months only 7, and at 18 months 10, out of a possible 48 associations between mothers’ and carers’ behaviour were significant. It is interesting, however, that almost all of these related to grandparent or nanny care. In particular, the behaviour of mothers and grandparents was similar. If mothers were observed to be emotionally and verbally responsive and to avoid restrictive and punitive behaviour, so did the grandparents (and nannies) who were caring for their children. It seems likely that these were modes of interaction with children taught to, or modelled for, mothers by their own mothers, and insisted upon with nannies. At 18 months responsive mothers also had childminders who were less detached, and avoidance of restriction and punishment at home was associated with better and more positive interaction in nursery. It is possible that a mother's views about punishment may be more relevant when selecting child care than her own sensitivity and responsiveness.

Confirming our sixth hypothesis, and in contrast to the relative lack of relationship between maternal behaviour and child care quality, the overall relationships between mothers’ satisfaction with care and its quality were positive for 4 out of 6 associations at 10

months and 5 out of 6 at 18 months. On first inspection these findings suggest that whatever their reasons for choosing the care they used, mothers recognised, and were significantly more satisfied with, higher quality care at both age points. Significances were especially high at 18 months between mothers' satisfaction and caregivers' better-quality interactions, higher responsiveness, lesser detachment and higher safety and health scores. When each care-type is taken separately, however, some interesting differences emerge, notably the lack of any association between maternal satisfaction and the observed quality of nursery care. In this study, at ten months the 'whole-group' association between mothers' satisfaction and care-quality is carried by the observed quality of grandparent care and at eighteen months it is carried by the observed quality of child minding, with the association with care by nannies running in the same direction though much less strongly. Association between maternal satisfaction with care by nurseries and observed quality is non-existent.

As previously reported (Barnes et al., 2006) these mothers were significantly less satisfied with nursery care of 10 month babies than individual care, both formal and informal, with the highest satisfaction for grandparent care. So the fact that satisfaction with, and quality of care by nurseries are unrelated suggests that nurseries are somehow outside mothers' range of judgment. This may be because mothers have little opportunity to see what goes on inside nurseries, and only a brief drop-off and collection period in which to form any view of the relationships between carers and their child. On the other hand it may be that mothers are less inclined to look for opportunities to judge nurseries than other forms of care because they see them as scarce and desirable professional establishments where all the staff are trained and high standards of care can be taken for granted, a view somewhat encouraged by UK Government policy and investment (see Leach et al., forthcoming). Further research is needed both to discover the reasons for the disassociation between maternal satisfaction and quality of nursery care and to explore ways in which it could be reversed.

It is to be hoped that further research will be able to build on the findings of this study and compensate for some of its limitations. Firstly, although the overall study sample for the Families, Children and Childcare study is large (1201 children), and retention has been good (Malmberg et al., 2006), it is a fact of English life that many infants and young toddlers do not receive any non-maternal care (see Sylva et al., forthcoming). In consequence the number of mothers using each type of care at each of the two age points is not large enough for all group comparisons to be robust (e.g. nannies) and it precludes consideration of further sub-groups (e.g. quality by type and by gender). Secondly, the intended matching of quality of observed care in nurseries with reported structural qualities proved unexpectedly difficult to achieve. Nursery managers were often reluctant to give the time necessary for sifting through personnel records while some individuals who were serving in managerial roles did not have the authority to do so. A further difficulty was that, on one site in particular, several study children attended the same nurseries during the 4 years of data collection; although managers understood that a separate observation and interview was necessary for each child, some were reluctant to grant a second such visit within a few weeks. Thirdly, part of the difficulty of measuring quality of child care is that there are few measures that can be reliably used in all types of child care setting. In this study every effort was made to include some such instruments (e.g. CIS, HOME) and we also constructed a subset of equivalent items from the ITERS and FDCRS so as to compare the two “formal “ types of care – nurseries and child minders. Neither the original scales nor this new construction found many differences between nurseries and home-based care; more methodological developments are needed.

## **Conclusions**

The observed quality of non-parental child care available to infants and young toddlers in England varies according to child care type. It is important to consider types of care separately as well as within the whole group as this revealed some interesting and even

unexpected relationships. Quality is lower in nurseries than in any or all of the home-based types studied at both time points, except that at 18 months and in comparison only with child minding, nurseries offer more learning activities. There are few differences in observed quality between the three types of home-based care which suggests that purchased care, such as that provided by registered childminders or by a nanny, can be considered as good (or in some cases better) than care by a relative – sometimes seen by parents as the only type of care they will countenance. Indeed grandparents had somewhat lower levels of positive relationships with children and lower safety and health scores than either child minders or nannies. It is important to note that mothers using grandparent care were the most disadvantaged.

At ten months the cost of care was largely unrelated to its observed quality overall... Taking each type separately, more expensive nurseries were less emotionally responsive. At 18 months higher cost overall went with less punitiveness and greater safety while type-by-type comparisons showed that paying more for child minding went with several aspects of higher quality. At both ages the structural characteristic with the highest impact on the quality of nursery care was the ratio of children to adults: the more children each adult had to care for, the lower the quality of that care. The qualities of care judged important by mothers did not differ according to the type of care being used, and the observed quality of mother's behaviour at 10 months was not richly associated with the observed quality of her child's care except that there was a positive association over two generations such that mothers sensitivity or responsiveness tended to match that of the child's grandparent. Mothers' overall satisfaction with their child care was positively associated with almost every child care quality variable at both 10 and 18 months. However, type by type data show that there was no such significant relationship for nurseries.



There is considerable evidence in the literature and in this study of relatively poor quality care for infants and toddlers in nurseries, and of large variations in quality between one nursery and another (e.g. Cost Quality and Outcomes Study Team, 1995) which uncritical acceptance by parents will do nothing to reverse. Public education – perhaps including dissemination of data from official inspections – is needed to help make parents aware of what can and should be expected of nurseries caring for very young children, and to encourage parents to take an equally confident and critical approach to all types of available child care: nurseries as well as relatives, nannies and child minders.

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Table 1. Characteristics of participants in relation to the total number using child care at 10 and 18 months (standard deviations in brackets)

	Total at 10m. N=424	Participants 10m. N=307	Significant differences	Total at 18m. N=422	Participants 18m. N=331	Significant differences
Child sex, female	48.8	47.9		50.9	52.0	
Ethnic minority	21.0	13.7	$\chi^2$ 6.47 **	21.1	14.8	$\chi^2$ 4.90*
M living with partner	92.0	93.5		90.5	91.8	
Number of children in family	1.5 (0.7)	1.4 (0.7)		1.5 (0.7)	1.5 (0.7)	
Maternal age	32.0 (4.9)	32.3 (4.7)		32.0 (4.8)	32.4 (4.5)	
Mother's education	4.6 (1.2)	4.7 (1.2)		4.6 (1.2)	4.8 (1.2)	
Mother's social class	2.5 (0.7)	2.6 (0.7)	F = 2.49 ***	2.5 (0.8)	2.6 (0.7)	F = 9.69 **
Family income	30,550 (15,964)	32,120 (13,200)		30,917 (16,670)	32,494 (16,983)	
Environmental adversity	0.5 (0.8)	0.4 (0.8)	F = 3.71 (*)	0.5 (1.0)	0.5 (0.9)	
Area Child Poverty Index	27.5 (15.8)	26.0 (15.3)		27.8 (16.2)	26.6 (16.1)	

Table 2. Characteristics of participants in relation to the type of child care being used at 10 months

	Total N=307	Grandparent N=84	Nanny N=34	Childminder N=86	Nursery N=103	Significant effect of type of care
Child sex (female)	47.9	44.0	38.2	52.3	50.5	$\chi^2$ 2.72 n.s.
Ethnic minority	13.7	16.7	5.9	9.3	17.5	$\chi^2$ 5.04 n.s.
Living with partner	93.5	84.5	97.1	96.5	97.1	$\chi^2$ 15.28 **
Number of children in family	1.4	1.4	1.9	1.4	1.3	F 6.69*** Na> G, C, Nu
Maternal age	32.3	29.4	33.8	33.2	33.5	F 18.95*** Na, C, Nu>G
Mother's education	4.7	4.0	5.2	4.8	5.1	F 18.94*** Na, C, Nu>G
Mother's social class	2.6	2.2	2.8	2.7	2.9	F 22.29*** Na, C, Nu>G
Family income	32,120	23,000	47,049	29,556	36,772	F 25.98*** Na, C, Nu>G

						Na > C, Nu Nu > C
Environmental adversity	0.4	0.6	0.4	0.3	0.4	F 1.26
Area Child Poverty Index	26.0	31.9	22.0	23.2	24.7	F 6.35** G > Na, C, Nu

Table 3. Characteristics of participants in relation to the type of child care being used at 18 months

	Total N=331	Grandparent N=81	Nanny N=38	Childminder N=83	Nursery N=129	Significant effect of type of care
Child sex (female)	52.0	50.6	55.3	48.2	54.3	$\chi^2$ 0.97 n.s.
Ethnic minority	14.8	21.0	10.5	8.4	16.3	$\chi^2$ 5.90*
Living with partner	91.8	90.1	92.1	94.0	91.5	$\chi^2$ 0.85 n.s.
Number of children in family	1.5	1.5	1.8	1.3	1.4	F 5.49*** Na> G, C, Nu
Maternal age	32.4	30.0	34.1	32.6	33.1	F 11.54*** Na, C, Nu>G
Mother's education	4.8	4.0	5.4	4.9	5.0	F 17.25*** Na, C, Nu>G
Mother's social class	2.6	2.2	2.9	2.7	2.7	F 12.26*** Na, C, Nu>G
Family income	32,494	25,530	44,459	31,656	33,881	F 12.33*** Na> G, C, Nu

						Nu>G
Environmental adversity	0.5	0.6	0.4	0.4	0.4	F 0.85
Area Child Poverty Index	26.6	31.8	25.8	24.0	25.1	F 4.08** G>C, Nu

Table 4. Comparison of observed quality in four types of child care at 10 months (standard deviations in brackets)

Quality Measures	Grandparent N=84	Nanny N=34	Childminder N=86	Nursery N=103	F & significant post hoc comparisons
CIS Positive relationship (1-4)	3.41 (0.41)	3.61 (0.45)	3.58 (0.40)	3.33 (0.50)	6.64 *** Na, C>Nu
CIS Punitiveness (1-4)	1.31 (0.31)	1.26 (0.45)	1.26 (0.40)	1.20 (0.29)	1.54 <sup>n.s.</sup>
CIS Detachment (1-4)	1.32 (0.36)	1.31 (0.51)	1.45 (0.53)	1.71 (0.59)	11.43 *** Nu >G, Na, C
ORCE total (1-4)	3.62 (0.25)	3.69 (0.32)	3.58 (0.29)	3.35 (0.31)	20.47 *** G, Na, C>Nu
HOME Emotional responsiveness (0 -11)	9.48 (0.98)	9.62 (0.70)	9.38 (1.05)	8.54 (1.53)	14.85*** G, Na, C>Nu
HOME Avoidance of restriction and punishment (0- 8)	5.45 (0.81)	5.62 (0.55)	5.67 (0.66)	n/a	2.15 <sup>n.s.</sup>



Profile Safety and Health (0-7)	5.71 (1.26)	6.03 (1.32)	6.56 (1.52)	5.75 (1.21)	7.75*** C > G, Nu
Activities (0-)	1.81 (1.28)	3.55 (1.50)	2.77 (1.65)	n/a	18.67*** Na > G, C C > G
ITERS/FDCRS common items					T test
Space and furnishing (1-7)	n/a	n/a	3.22 (0.96)	3.60 (1.10)	-2.26 *
Language and reasoning (1-7)	n/a	n/a	4.71 (1.35)	3.65 (1.47)	4.68 ***
Learning activities (1-7)	n/a	n.a	3.66 (0.97)	3.73 (1.11)	-0.41 <sup>n.s.</sup>
Total ITERS/FDCRS (1-7)	n/a	n.a	3.67 (0.92)	3.65 (1.01)	0.12 <sup>n.s.</sup>
Total ITERS or FDCRS (1-7)	n/a	n/a	3.63 (0.73)	3.57 (0.87)	

Table 5. Comparison of observed quality in four types of child care at 18 months (standard deviations in brackets)

<i>Quality Measure</i>	Grandparent N=81	Nanny N=38	Childminder N=83	Nursery N=129	F & significant post hoc comparisons
CIS Positive relationship (1-4)	3.38 (0.46)	3.70 (0.31)	3.49 (0.41)	3.34 (0.43)	7.91 *** Na > G, Nu
CIS Punitiveness (1-4)	1.35 (0.36)	1.18 (0.40)	1.18 (0.23)	1.32 (0.40)	4.99 ** G>C
CIS Detachment (1-4)	1.36 (0.38)	1.32 (0.49)	1.49 (0.40)	1.57 (0.46)	5.56 ** Nu >G, Na
ORCE total (1-4)	3.59 (0.29)	3.73 (0.24)	3.59 (0.27)	3.39 (0.37)	15.74 *** G, Na, C>Nu
HOME Emotional responsiveness (0-11)	9.41 (0.98)	9.61 (0.75)	9.35 (0.88)	8.63 (1.53)	12.15*** G, Na, C>Nu
Profile Safety and Health (0-7)	3.84 (0.84)	4.00 (0.90)	4.24 (0.89)	6.53 (0.84)	224.49*** N > G, Na, C  C > G
Total activities	2.18	3.29	2.84	n/a	10.24***

(0- 7)	(1.24)	(1.16)	(1.48)		Na, C>G
ITERS/FDCRS common items					T test
Space and furnishing (1-7)	n/a	n/a	3.30 (0.97)	3.43 (0.95)	-0.92 <sup>n.s.</sup>
Language and reasoning (1-7)	n/a	n/a	5.11 (1.47)	4.92 (1.48)	0.91 <sup>n.s.</sup>
Learning activities (1-7)	n/a	n.a	3.50 (0.94)	3.89 (0.99)	-2.83**
Total ITERS/FDCRS (1-7)	n/a	n/a	3.77 (0.85)	3.91 (0.81)	-1.23 <sup>n.s.</sup>
Total ITERS or FDCRS	n/a	n/a	3.72 (0.76)	3.88 (0.75)	

Table 6. Associations (Pearson correlation coefficients) between cost of child care, child to adult ratio (nurseries only) and observed quality of care, at 10 months and at 18 months

	CIS positive relationship	CIS punitive	CIS detachment	ORCE	HOME responsivity	Safety & health	CIS positive relationship	CIS punitive	CIS detachment	ORCE	HOME responsivity	Safety & health
Cost of care	<b>10 months</b>						<b>18 months</b>					
Total group N=256, 307	0.04	-0.11	-0.02	0.08	-0.03	-0.03	0.10	-0.13*	-0.01	0.04	-0.03	0.25***
Grandparent N=27, 71	0.13	0-.29	-0.21	0.04	0.11	-0.05	-0.05	-0.04	0.09	-0.05	0.01	-0.10
Nanny N=32,36	-0.03	-0.21	-0.01	0.01	0.06	-0.24	0.28(*)	-0.27	-0.26	0.26	0.17	0.22
Childminder N=83, 79	0.06	-0.13	-0.06	.07	0.08	0.25*	0.20(*)	-0.27*	-0.04	0.27**	0.12	0.07
Nursery N=102, 121	-0.04	.06	0.10	0.10	-0.21*	-0.09	-0.04	0.02	-0.07	0.03	0.05	0.08

Child: adult	<b>10 months</b>						<b>18 months</b>					
Nursery N=95, 122	-0.21*	0.20*	0.21*	-0.17	-0.03	-0.02	-0.28**	0.22*	0.23**	-0.22*	-0.27**	-0.03

Table 7. Numbers of mothers selecting each child care quality as one of their top three qualities looked for by the type of child care used at 10 months (percentages in brackets).

<i>Looked for Quality</i>	Total N=304	Grandparent N=84	Nanny N=33	Childminder N=85	Nursery N=102	$\chi^2$
Provide a loving and understanding environment	246 (80.9)	68 (81.0)	31 (93.9)	67 (78.8)	80 (78.4)	n.s.
Provide a safe physical environment	206 (67.8)	63 (75.0)	17 (51.5)	56 (65.9)	70 (68.6)	6.18 p<0.10
Provide worry free child care	147 (48.4)	40 (47.6)	18 (54.5)	43 (50.6)	46 (45.1)	n.s.
Provide dependable care	95 (31.3)	21 (25.0)	14 (42.4)	27 (31.8)	33 (32.4)	n.s.
Provide professional child care	71 (23.4)	15 (17.9)	7 (21.2)	18 (21.2)	31 (30.4)	n.s.
Teach babies new things	58 (19.1)	22 (26.2)	5 (15.2)	10 (11.8)	21 (20.6)	6.18 p<0.10
Provide substitute for mother care	51 (16.8)	11 (13.1)	7 (21.2)	22 (25.9)	11 (10.8)	8.95, p<0.05
Provide adequate indoor space and toys	28 (9.2)	9 (10.7)	0	9 (10.6)	10 (9.8)	n.s.

Provide adequate outdoor space and toys	8 (2.6)	3 (3.6)	0	3 (3.5)	2 (2.0)	n.s.
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Table 8. Associations (Pearson correlation coefficients) between maternal satisfaction with child care and its observed quality at 10 and 18 months

	CIS positive relationship	CIS punitive	CIS detachment	ORCE	HOME responsivity	Safety & health	CIS positive relationship	CIS punitive	CIS detachment	ORCE	HOME responsivity	Safety & health
	<b>10 months</b>						<b>18 months</b>					
Total group N=245, 247	0.13*	0.03	-0.20**	0.29***	0.27***	0.01	0.12*	0.03	-0.25***	0.23***	-0.21***	-0.27***
Grandparent N=73, 67	0.36**	-0.05	-0.27*	0.43***	0.29**	0.17	0.26*	-0.04	-0.34**	0.25*	0.19	0.24*
Nanny N=27, 27	0.15	-0.12	0.21	0.18	0.15	0.03	0.08	-0.07	-0.27	0.29	0.22	-0.02
Childminder N=63, 58	-0.05	-0.16	-0.21(*)	0.07	0.09	-0.08	0.32**	0.02	-0.27*	0.26*	0.32**	0.19
Nursery N=82, 95	-0.02	0.22*	0.07	0.02	0.14	-0.08	0.02	-0.08	-0.06	0.02	-0.00	-0.06