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Toddlers' transition to out-of-home day care: Settling into a new care environment

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ABSTRACT

This study investigates toddlers' initial reaction to day care entry and their behaviour change over the first few months in care. One hundred and four toddlers (10–33 months of age) in Viennese childcare centres participated in the study. One-hour video observations were carried out at 3 time points during the first 4 months in the setting and coded into a total of 36 5-min observation segments. Multilevel models (observation segments nested within children) with an autoregressive error structure fitted data well. Two weeks after entry into care, toddlers' levels of affect and interaction were low. Overall, changes in all areas of observed behaviour were less than expected. There were considerable individual differences in change over time, mostly unrelated to child characteristics. Significant associations between children's positive affect, their dynamic interactions and their explorative and investigative interest were found.

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1. Introduction

When children first enter out-of-home care, they are confronted by separation from their parents, being in a new setting, unfamiliar routines and people, and generally fewer resources for one-to-one interactions with adults. Adapting to non-parental care arrangements can be a difficult and stressful time for children (Ahnert, Gunnar, Lamb, & Barthel, 2004; Griebel & Niesel, 2009). This is particularly true for infants and toddlers whose emotion regulation largely depends on the availability and closeness of their primary caregivers (Fonagy, Gergely, Jurist, & Target, 2002; Robertson & Robertson, 1989; Schore, 2001; Siegel, 2001; Stern, 1985).

Very young children associate separation from their primary caregivers and being with unknown people in unknown environments with feelings of insecurity, loss and even threat. If they have secure relationships with their primary caregivers they tend to cry and cling onto the leaving parent; when the parent returns they spontaneously search for proximity and contact (Ainsworth, 1969, 1973; Ainsworth, Bleher, Waters, & Wall, 1978; Bowlby, 1969). In the presence of both primary and substitute caregiver, children prefer interacting with their mothers (Farran & Ramey, 1977; Kagan, Kearsley, & Zelazo, 1978). Young children do not seek separation from their parents in new environments (Mahler, Pine, & Bergman, 1975) and at first the parents' absence is associated with distress. In order to take part in stimulating and facilitating interactions and activities in day care, young children first have to overcome initial feelings of insecurity and come to terms with separation from and the absence of their parents (Datler, Datler, & Hover-Reisner, 2010; Roux, 2004). Entering a new care arrangement can be unsettling for children, even if it is not the first time they are confronted with separation from and the absence

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of their parents. Particularly in children at a young age, less stability in care arrangements, changing the primary teacher, or attending multiple care arrangements have been found to be related to less compliant behaviour and lower levels of competent play with peers and resources (Howes & Hamilton, 1993; Howes & Stewart, 1987; Morrissey, 2009; NICHD Early Childcare Research Network, 1998).

1.1. Reactions to day care entry

Not many studies have explored young children's first reactions to day care entry and their transition processes during early day care. Yet, some case studies have shown that when first entering day care, toddlers show insecurity and withdraw from social interactions (Bailey, 2008; Datler, Datler, & Funder, 2010; Datler, Ereky, & Strobel, 2001; Datler, Fürstaller, Ereky-Stevens, 2011; Grossmann, 1999; Niedergesäß, 1989). Mothers and teachers describe the first few weeks of childcare as highly stressful for infants and toddlers (Ainslie & Anderson, 1984). Recent studies have explored associations between childcare experience and children's cortisol levels – a hormone produced in response to stress (Vermeer & Van IJzendoorn, 2006). In the first 2 weeks in care without their mothers' presence, children's cortisol levels have been observed to be 75–100% higher than at home (Ahnert et al., 2004). Throughout the day in childcare (but not at home) children's cortisol levels rise; such increases have been observed particularly in toddlers (Watamura, Donzella, Alwin, & Gunnar, 2003). Some studies have shown that when first entering new care arrangements, children's levels of behavioural distress increase (Ahnert et al., 2004; Cryer et al., 2005) and their behaviour is inhibited (Fein, Gariboldi, & Boni, 1993; Feldbaum, Christenson, & O'Neal, 1980; McGrew, 1972).

Thus, entry to day care can leave young children in distress and can inhibit their participation in interactions with peers and caregivers, as well as their exploration of their environment. Yet, one of the most consistent and positive findings in the childcare literature is that when quality of care is high and when infants and toddlers have good relationships with their care providers, day care experience can promote learning and development and help children to make advances in their social-emotional maturity (Belsky et al., 2007; Brooks-Gunn, Han, & Waldfogel, 2002; Campbell, Lamb, & Hwang, 2000; Dornes, 2006, chap. 7; Howes, Smith, & Galinsky, 1995; Laewen, 1992; NICHD Early Childcare Research Network, 2000, 2003, 2005; NICHD Early Childcare Research Network & Duncan 2003; Sylva et al., 2011). It is a common assumption that good-quality non-parental care settings foster children's learning and development because they offer opportunities to interact with peers and sensitive and responsive adults who engage children in developmentally appropriate, stimulating and cognitively facilitating activities.

So far, little is known about factors that promote young children's involvement with caregivers, peers and resources in day care, especially when they first enter out-of-home care.

1.2. Transition to out-of-home care

Overall it appears that, compared with peers with less day care experience, children who have been in day care for longer are happier in their non-parental care environment (Field, Masi, Goldstein, & Perry, 1988); they show less onlooker or unoccupied behaviour (Schindler, Moely, & Frank, 1987), are more peer oriented and sociable and less difficult with peers (Field et al., 1988; Galluzzo, Matheson, Moore, & Howes, 1988; Howes, 1988; NICHD Early Childcare Research Network, 1998, 2001), engage in more constructive, complimentary and reciprocal play (Howes, 1988; Schindler et al., 1987), and spend less time involved with caregivers (Deynoot-Schaub & Riksen-Walraven, 2006).

Research on young children's transition processes suggests that with increased time in care provisions, children become more engaged. Six weeks after entry, preschoolers have been observed to be more sociable and peer oriented and increasingly active – both verbally and physically (Feldbaum et al., 1980; Fox & Field, 1989; McGrew, 1972). This is also true for younger children; with increased time in day care, toddlers also show more positive and less negative affect, more activity and interest, and more peer contact, even though they have less contact and comforting from adults than they did upon entry into childcare (Fein et al., 1993). Compared with age-matched toddlers at home, those who have been in day care for 4 months have been found to show less crying, more smiling, more object contact, and more positive social interaction (Rubenstein & Howes, 1979).

Settling into childcare seems to take younger children more time than preschoolers: changes in toddlers' behaviour have been observed to be only modest after 3 months in care, but substantial after 6 months in care (Fein et al., 1993). Even after 5 months in care, infants' cortisol levels are higher in childcare than at home (Ahnert et al., 2004). How children react to childcare entry, how they settle in and how childcare affects their development might not depend only on children's ages (Vermeer & Van IJzendoorn, 2006) but on many other factors, including other child characteristics. For example, it has been suggested that boys and those children who are emotionally more negative or temperamentally more fearful, and those with lower self-regulation will be more affected by childcare experiences (Crockenberg, 2003).

It has been suggested that settling into a new day care arrangements is facilitated by children's growing familiarity with their caregivers and peers (Fein et al., 1993). Young children form warm relationships with stable and interactive teachers (Anderson, Nagle, Roberts, & Smith, 1981; Howes & Hamilton, 1992; Rubenstein & Howes, 1979) and their relationships with caregivers become more secure over time (Ahnert, Piquart, & Lamb, 2006; Howes & Hamilton, 1992; Howes, Hamilton, & Matheson, 1994). Some studies have found that more securely attached children and those who experience more positive, prolonged and intense interactions with their caregivers are more explorative and show more cognitive activity in day care

(Anderson et al., 1981; Howes & Rubenstein, 1985; Howes & Smith, 1995; Rubenstein & Howes, 1979). Such findings support the attachment theory hypothesis that children's exploration of their environment depends on their having a secure base (Ainsworth et al., 1978).

Previous studies have found some associations between adult or peer involvement and children's affects. Those children who show more negative affect within the first few months in day care seem to experience more caregiver involvement (Fein et al., 1993; Galluzzo et al., 1988), particularly initiating and comforting (Fein, 1995). Those who express more positive affect have been found to experience higher levels of adult involvement and peer stimulation (Fein, 1995; Fein et al., 1993). The developmental level of children's play as well as their positive affect have been found to be higher if peers are present or more peer interaction is taking place (Fein, 1995; Rubenstein & Howes, 1976, 1979), and highest when they are positively engaged with their peers in care (Rubenstein & Howes, 1979). Yet, the story is not a simple one. Studies about toddlers' behaviour in day care are rare, and some of the findings are inconclusive: associations seem to depend on the kind of interaction or the quality of the relationship between the child and the caregiver, or how long the child has been in care (Fein et al., 1993; Galluzzo et al., 1988).

1.3. Research aims and hypotheses

In order to expand upon previous studies of the effects of childcare on toddlers' development, the aim of the present study is to investigate toddlers' initial reaction to care and their patterns of behaviour change over the first few months in care (Ahnert, Kappler, & Eckstein, 2012; Datler, Funder, Hover-Reisner, Fürstaller, & Ereky-Stevens, 2012). Our hypotheses are:

- (1) When first entering care, young children will express distress, and their participation in interactions with peers and caregivers and their exploration of their environment will be inhibited.
- (2) Within their first months in day care, toddlers will adapt to their new care arrangement. They will increasingly (a) express pleasure and enjoyment in their new care environment; (b) explore and investigate situations in their new environment with interest and (c) take part in interactions with peers.
- (3) There will be significant individual differences in how children react to childcare entry and in how their behaviour changes over time as they adapt to their new care arrangement. Some of these differences will be related to child characteristics.
- (4) There will be associations between children's participation in interactions with caregivers and peers and the level at which they express distress or pleasure and enjoyment, or explore and investigate situations in their new environment with interest.

2. Methods

2.1. Sample

The study was carried out in Vienna, Austria, where maternity leave policies are generous; in international comparison, the uptake rate of early care is relatively low, but it is growing steadily. The capital Vienna is the region with the largest uptake of day care for infants and toddlers (26.8% of under 2 year olds in 2009); centre care is the predominant resource for early non-parental care (Statistik-Austria, 2009). Given maternity leave policies in Austria, only a few children enter childcare in their first year, and our sampling therefore aimed at toddlers. In Vienna, most childcare centres are organised by a number of (state-sponsored) providers. With the help of those providers, all day care centres for toddlers were contacted by letter and phone to be invited to participate in the study. If they were interested in participating, they were asked to hand out information letters about the study to all parents enrolling their toddler in the centre. If the parents agreed, they were contacted by a researcher by phone. Data collection took place between 2007 and 2009 (3 waves).

One hundred and four children attending 71 childcare centres (82 childcare groups) in socioeconomically diverse areas of Vienna were involved in the study. 49% of children were cared for in state-run centres, the others attended private centres (16.3% of toddlers in catholic centres, 11.5% in parent-organised groups and 23.1% in mixed-age groups). Group sizes in the centres ranged from 10 to 23 children (mean = 16.06; $SD = 0.31$), with a child-caregiver ratio between 2.5 and 10.5 (mean = 5.4). In some centres ($N = 22$) more than one child participated in the study. Thirty children in those 22 centres shared a childcare group with one or more study children when participating in the study. The number of study children sharing a childcare group ranged from 2 to 4.

Only families with healthy, full-term toddlers participated in the study. Children's age at childcare entry ranged from 10 to 33 months (mean: 22.97, $SD = 4.7$). 54.8% of the children were female. Before enrolment in childcare, all toddlers were cared for at home, primarily by their parents. Sixty-four children (61.5%) had siblings, and 12 of those siblings (11.8%) attended the same childcare group as the study child. In all families, at least one parent spoke German. Children in this study were primarily from White middle-class families; 42.2% of the mothers and 46.5% of the fathers had a higher degree and 24.5% of the mothers and 32.3% of the fathers received formal education until the age of 18/19 (Table 1).

Table 1
Child characteristics and family background.

	N	Frequency	%	Mean	SD
Age (months)	104			22.97	4.70
Gender (girls)	104	57	54.8		
Siblings in household (yes)	104	64	61.5		
Siblings attending same group	102	12	11.8		
Mother education/training	102				
Up to age 15/16 years		29	28.4		
Up to age 18/19 years		25	24.5		
Academic		43	42.2		
Father education/training	99				
Up to age 15/16 years		18	18.2		
Up to age 18/19 years		32	32.3		
Academic		46	46.5		

2.2. Overview of procedures

Participating families were visited in their homes 2 weeks before entry to centre care (Time [T] 0). Visits in the child's care setting were arranged at 3 time points: in the first 2 weeks the toddler was left in the centre without the parent's presence (T1), after 2 months in the setting (T2), and again after 4 months in the setting (T3). At each time point, a trained researcher spent the morning in the childcare setting to carry out observations and interviews and to hand out questionnaires. All researches were conducted in accordance with APA ethical standards in the treatment of the study sample.

Relevant for this paper's analysis are interview and questionnaire data on child characteristics and family background (age, gender, siblings, parental education), and video-taped observations carried out with the children in childcare during the mornings at each of the 3 time points (T1, T2, T3). Each observation lasted an hour and typically included some group activity as well as free play. One aim of the video observations was to identify toddlers' (a) expressions of pleasure and enjoyment in their new care environment; (b) explorations and investigations of their new environment with interest, and (c) reciprocal exchanges with caregivers and peers. Ratings for each child were performed by a separate coder for each of the time points. Coders were blind to the child's ratings at other time points and to child data otherwise collected for the project.

2.3. Instruments

2.3.1. Video ratings of children's behaviours

One-hour video observations were coded in 5-min segments (12 segments). For each of these segments, global judgements on 5 qualitative variables were made (scale 1–5; Table 2): positive mood, negative mood, explorative and investigative interest, dynamic interaction with caregivers, and dynamic interaction with peers.

Positive mood: Children's positive mood signifies the extent to which the child is content, satisfied and pleased with the situation overall. The emphasis is on how happy, joyful or positive the behavioural indicators appear to be. As indicators of the emotional climate, children's tone of voice, behaviour and gestures, and facial expressions were scored. Positive mood can be indicated by smiling, laughing, positive tone of voice, joyful body movement, etc. Ratings were based on the quality and quantity of behaviour, taking account of the intensity and frequency and relative amount of time positive affect is shown (see also NICHD Early Childcare Research Network, 1991; Rosenblum & Muzik, 2002).

Negative mood: Children's negative mood comprises their level of discontentment with the situation overall, including how unhappy, dissatisfied or sad the child seems, or how much negative affect is expressed. Included are anger, annoyance and irritability as well as sadness and inhibition. As indicators of the emotional climate, children's tone of voice, behaviour and gestures, and facial expressions were scored. Negative mood can be indicated by crying, tenseness, frowning, objecting or turning away from stimulation etc. Ratings were based on the quality and quantity of behaviour, taking account of the intensity and frequency and relative amount of time negative affect (or flatness) is shown (see also NICHD Early Childcare Research Network, 1991; Rosenblum & Muzik, 2002).

Explorative and investigative interest: The emphasis of this variable is on the level at which the child's attention appears to be investigative and explorative. At the higher end of the scale the child's attention is turned to others (and their activities) and/or resources; the child is concentrating, alert and observant. S/he clearly seems to try to take in, and understand a given situation (e.g., activities carried out by others; objects and their functions). At the lower end of the scale the child does not attend to others or resources in a concentrated, observant way. S/he turns away, stares into space or gazes. S/he does not seem to take in what is going on and shows no explorative or investigative behaviour.

Dynamic interaction with caregivers and peers: The variables 'dynamic interaction with caregivers' and 'dynamic interaction with peers' indicate the level at which the child is engaged in reciprocal exchanges with others. At the higher end of the scale the child is engaged in complementary and reciprocal interactions which are characterised by their turn-taking structure and by role reversal. During their dynamic interactions, the child and the partner are aware of and react to each other's

Table 2

Video-rated variables of children's positive and negative mood, explorative interest and dynamic interaction with caregivers and peers; scale 1–5.

	Positive mood ^a	Negative mood ^a	Explorative/investigative interest
1. Not at all characteristic	- No positive mood indicators are displayed	- No negative mood indicators are displayed	- No exploration - Child does not focus on what objects/activities have to offer
2. Minimally characteristic	- Almost no signs of positive mood - Signs of positive mood are weak, somewhat hesitant	- Brief instances of mild negative affect - No signs of strong negative affect	- Brief moments of observation and explorative activity, but child never actually seems focused or interested
3. Moderately characteristic	- Clear signs of positive affect - Child characteristically satisfied, but not enthusiastic	- Frequent instances of mild negative affect - One instance of strong negative affect	- Some instances of focused observation and explorative activity - Attention is sustained only for brief periods, or longer but not completely focused
4. Highly characteristic	- Some instances of strong positive affect - Child characteristically pleased, happy and playful	- Child discontented, displaying mild negative affect throughout most of the observation period - Some instances of strong negative affect	- Some (extended) periods where the child is clearly interested and focused
5. Exceptionally characteristic	- Child is exceptionally positive in terms of physical and vocal expressiveness - Child radiates and sparkles much of the time - Multiple instances of strong positive affect	- Child distressed for most of the observation period - Regular display of strong negative affect	- Child clearly captivated by its observation/exploration - Child clearly interested and focused, engaged in intense observation or exploration for most of the observation period
	Dynamic interaction with caregivers	Dynamic interaction with peers	
1. Not at all characteristic	- No contact with caregiver - Child initiates contact but is ignored	- No contact with peer/s - Child initiates contact but is ignored	
2. Minimally characteristic	- Caregiver initiates contact but child turns away - Child and caregiver are sharing a situation (e.g., sitting next to each other, child drawing, but caregiver not engaged with child)	- Peer initiates contact but child turns away - Child and peer/s are sharing a situation (e.g., sitting next to each other, child drawing, but peer/s not engaged with child)	
3. Moderately characteristic	- No actual social exchange taking place - Social exchange between child and caregiver happening, but not extended	- No actual social exchange taking place - Social exchange between child and peer/s happening, but not extended	
4. Highly characteristic	- e.g., child points at something, caregiver names object - Reciprocal interaction taking place which is characterised by its turn-taking structure - Some extended give-and-take exchanges between child and caregiver	- e.g., child rolls ball, peer catches - Reciprocal interaction taking place which is characterised by its turn-taking structure - Some extended give-and-take exchanges between child and peer	
5. Exceptionally characteristic	- Complex and dynamic exchange between child and caregiver - Turn taking and role reversal - Succession of exchanges well coordinated - Situations in which social partners initiate change in a shared situation and both respond to each other in a well adjusted way	- Complex and dynamic exchange between child and peer/s - Turn taking and role reversal - Succession of exchanges well coordinated - Situations in which social partners initiate change in a shared situation and both respond to each other in a well adjusted way	

^a Compare NICHD Early Childcare Research Network (1991) and Rosenblum and Muzik (2002).

signals and behaviour; they adjust their behaviours continuously. At the lower end the child is not engaged in interactions with others; if contact is initiated by others, the child ignores these attempts or turns away.

Double codings for all 5 variables were carried out on 12 randomly selected videotaped observations (a total of 270 5-min segments were double coded). Inter-rater agreement was calculated and agreement between coders was high with a mean weighted kappa of 0.87 (range = 0.81–0.92).

2.3.2. Child temperament

Data on children's temperament was collected via the German version of Fullard, McDevitt, and Carey's (1984) Toddler Temperament Scales (TTS), during the home visit at T0. For the purpose of this analysis, 3 of the original subscales were used. These measure dimensions relevant to children's responses in new situations (Gunnar, 1994; Ahnert et al., 2004): approach-withdrawal (typical reactions to new persons or situations), adaptability (ease with which the child adapts to changes in the environment), and negative mood (amount of irritability and sadness typically displayed by the child). These were averaged into one scale of difficult child temperament, higher values indicating more difficult temperament. Internal consistency was appropriate (Cronbach's Alpha, $\alpha = 0.83$).

Table 3

Descriptives 1: children's mood, explorative/investigative interest and dynamic interactions at childcare entry.

Variables	% of observation sequences (N = 1217) scored as					% of children (N = 104) with maximum scores reaching				
	1	2	3	4	5	1	2	3	4	5
Positive mood	6.6	73.0	16.4	3.7	0.3	0.0	32.7	45.2	20.2	1.9
Negative mood	88.1	8.5	2.8	0.5	0.1	41.3	35.6	16.3	5.8	1.0
Explorative/investigative interest	0.5	21.5	57.4	18.6	2.0	0.0	0.0	25	62.5	12.5
Dynamic interaction with caregivers	14.8	20.4	59.4	5.3	0.2	0.0	1.0	62.5	34.6	1.9
Dynamic interaction with peers	20.0	56.3	22.8	0.9	0.0	0.0	20.2	70.2	9.6	0.0

Table 4

Descriptives 2: children's mood, explorative/investigative interest and dynamic interactions at childcare entry.

	Positive mood	Negative mood	Explorative/investigative interest	Dynamic interaction with caregivers	N	Range	M	SD	r _{ICC}
<i>Time 1</i>									
Positive mood					1217	1–5	2.18	0.61	0.42
Negative mood	–0.37				1217	1–5	1.16	0.48	0.14
Explorative/investigative interest	0.34***	–0.36***			1228	1–5	3.00	0.71	0.31
Dynamic interaction with caregivers	0.29**	–0.08	0.23*		1233	1–5	2.55	0.81	0.23
Dynamic interaction with peers	0.26**	–0.17	0.03	0.34***	1233	1–4	2.04	0.68	0.22
<i>Time 2</i>									
Positive mood					1216	1–5	2.25	0.57	0.30
Negative mood	–0.09				1216	1–4	1.09	0.33	0.14
Explorative/investigative interest	0.20*	–0.11			1220	1–5	3.06	0.73	0.29
Dynamic interaction with caregivers	0.26**	–0.01	0.12		1225	1–5	2.40	0.84	0.26
Dynamic interaction with peers	0.26**	0.13	0.07	0.18	1226	1–5	2.14	0.72	0.26
<i>Time 3</i>									
Positive mood					1211	1–5	2.26	0.55	0.31
Negative mood	–0.06				1211	1–4	1.07	0.29	0.15
Explorative/investigative interest	0.01	0.12			1213	2–5	3.03	0.74	0.28
Dynamic interaction with caregivers	0.29**	0.18	0.00		1215	1–5	2.43	0.81	0.20
Dynamic interaction with peers	0.07	0.14	0.13	0.11	1215	1–5	2.22	0.67	0.23
<i>Total sample</i>									
Positive mood					3644	1–5	2.23	0.58	0.14
Negative mood	–0.19***				3644	1–5	1.10	0.37	0.04
Explorative/investigative interest	0.15***	–0.14***			3661	1–5	3.03	0.73	0.13
Dynamic interaction with caregivers	0.10***	0.02	0.08***		3673	1–5	2.46	0.82	0.11
Dynamic interaction with peers	0.14***	–0.01	0.02	0.02	3674	1–5	2.13	0.69	0.12

* $p < .05$.** $p < .01$.*** $p < .001$.

3. Analytic strategy

With respect to our hypotheses and the data collected on children's behaviour during their first few months in day care, our aims were: (1) to investigate children's scores on positive and negative mood, their explorative and investigative interest and their dynamic interaction with caregivers and peers when entering care; (2) to explore changes in children's scores on these variables over the first 4 months in care; (3) to test individual differences in behaviour at childcare entry, how these changed within the first 4 months, and their associations with child characteristics; (4) to assess associations between children's scores on dynamic interaction with caregivers and peers, and their scores on positive/negative mood and explorative/investigative interest.

As our data was inherently organised in a hierarchical structure – that is, 5-min observation segments nested within infants – we carried out multilevel models (MLM) for change (Bryk & Raudenbush, 1992; Singer & Willett, 2003), with observation segments at Level 1 (*i*), and toddlers at Level 2 (*j*). Overall 3744 5-min segments were coded. For our analyses we included 3641 segments in which coding of all 5 dependent variables was available, giving between 24 and 36 segments per child ($M_{\text{segments}} = 35.01$, $SD_{\text{segments}} = 1.69$).

Given the relatively large number of observation segments compared with time points, our data structure was akin to a time series model with 2 break points. After an initial descriptive analysis (Tables 3 and 4), we estimated the linear trends across the 3 time points, coding the first time point as zero, in order to interpret the intercept parameter as the onset of childcare (Biesanz, Deeb-Sossa, Papadakis, Bollen, & Curran, 2004).

In order to investigate children's behaviour change across the first few months in care, our baseline model included fixed and random intercept terms, estimating the grand average and dispersion of the dependent variable at onset of childcare. We also included a fixed and random effect of time point (0, 1, 2) estimating the average and dispersion of change over

Table 6
Multilevel models for change: Toddlers' dynamic interaction with caregivers and peers.

	Interaction with carer			Interaction with peers		
	B	SE	p	B	SE	p
<i>Fixed effects</i>						
Intercept	2.56	0.04	***	2.02	0.04	***
Time	−0.27	0.07	***	0.08	0.02	***
Time-squared	0.10	0.03	**	–	–	–
Age ^a	–	–	–	–	–	–
Sibling in group	–	–	–	0.24	0.08	**
Child sex	–	–	–	–	–	–
Problem behaviour ^a	–	–	–	–	–	–
Family educational level ^a	–	–	–	–	–	–
<i>Random effects</i>						
	Interaction with carer			Interaction with peers		
	σ ²	SE	p	σ ²	SE	p
AR1 diagonal	0.59	0.02	***	0.40	0.01	***
AR1 rho	0.27	0.02	***	0.22	0.02	***
Intercept var	0.12	0.03	***	0.08	0.02	***
Int-slope cov	−0.05	0.01	**	−0.03	0.01	**
Slope var	0.04	0.01	***	0.03	0.01	***
<i>Model fit</i>						
	Interaction with carer			Interaction with peers		
	−2LL	Δ−2LL	p	−2LL	Δ−2LL	p
1. Baseline (intercept, phase)	8557.13	–	–	7194.25	–	–
2. Phase-square	8549.66	7.47	**	7199.84	–	–
3. Autoregressive error structure	8325.69	231.44	***	7042.14	152.11	***
4. Covariates	8343.29	–	–	7047.60	–	–
5. Covariates (reduced model)	8325.65	0.03	–	7036.44	5.69	*

* $p < .05$.

** $p < .01$.

*** $p < .001$.

^a Child-level (j) predictors were centred at the grand mean.

In order to explore whether dynamic interaction with caregivers and peers would predict positive and negative mood and explorative/investigative interest, dynamic interaction with caregivers and peers were included as time-varying predictors (see Eq. (2)), centred within clusters (Enders & Tofighi, 2007).

$$y_{ij} = \beta_{0ij} + \beta_{1j} \text{Time}_{ij} + \beta_{2-6} \text{Child characteristics}_j + \beta_{7-8} \text{Dynamic interaction}_{ij} + e_{0ij} \quad (2)$$

with random effects and autoregressive coefficients as above.

4. Results

4.1. Descriptive analysis

Descriptive analysis, presented in Table 3, shows that for the majority of observation segments at childcare entry, ratings indicated only weak signs of positive mood, and no signs of negative mood at all. Within the observation hour, 45.2% of the children reached scores as high as 3 (indicating satisfaction, but not enthusiasm), and only 20.2% had at least 1 5-min sequence of clear happiness and playfulness. Only 35.6% of children showed brief instances of negative affect, and even fewer (16.3%) showed clear signs of negative affect within the hour (Table 3).

Some instances of focused observation and explorative/investigative activity took place in the majority of observation segments, and 62.5% of the children scored as high as 4 within the hour, indicating at least 1 sequence of clear interest and focused activity.

A high number of children had only brief social exchanges with their caregivers during the observation (62.5% scored only as high as a 3 within the hour). However a good proportion of the children (34.6%) scored at least 1 instance of reciprocal interaction with their caregivers (4) and the majority of observation segments were coded with a 3, indicating that most of the time some brief interactions took place. With their peers, toddlers interacted less – for the majority of the time, situations were shared without social exchanges taking place. Yet, the majority of children (70.2%) scored as high as 3 within the hour, indicating that they had at least one brief social exchange with a peer.

4.2. Multilevel models for change in children's behaviour over the first few months in care

Initial analyses (descriptives and correlations, see Table 4) showed that 4–14% of the variance was due to differences between children, warranting multilevel analysis. Our baseline models (Tables 5 and 6) showed that changes in positive and negative mood, explorative/investigative interest and interaction with peers were linear over time, while dynamic interaction with caregivers showed a U-shaped change, starting relatively higher, dropping at 2 months to then increase again. Changes over time were significant for 3 of the 5 variables: dynamic interaction with peers increased over time, while negative mood and dynamic interaction with caregivers decreased.

Considerable individual differences were found in onset and rate of change over time for observed behaviours (i.e., random intercepts and random slopes were significant in all models; Tables 5 and 6). In the next step we included an autocorrelated error structure to account for the dependencies between the residuals. Including 2 parameters (σ^2 and ρ) improved model fit for all observed behaviours, meaning that the residual variances could be constrained to the same value across the 36 observation segments, while the off-diagonal elements showed a clear simplex structure (i.e., the further away from each other in time the observation segments were, the less the residuals covaried). In the case of negative affect we removed one extreme case from analysis.

We then included child characteristics as predictors of onset of each observed behaviour (Tables 5 and 6). We found 2 significant effects. Older children had a higher initial level of positive affect ($b = 0.01$). Having a sibling in the group predicted a higher level of peer interaction ($b = 0.24$). No child characteristics \times time effect was significant (i.e., change over time was unrelated to child characteristics).

We included dynamic interaction with caregivers and peers as time-varying covariates in the models (Tables 5 and 6). An effect is found if the time-varying covariate deviates from its own mean (i.e., its within-person average) and is predictive of a higher or lower level in the response variable. More dynamic interactions with caregivers related to more explorative/investigative interest ($b = 0.07$) and higher positive mood ($b = 0.03$). More dynamic interaction with peers was related to higher positive mood ($b = 0.07$; Table 5).

5. Discussion

The current study investigated toddlers' settling into childcare by exploring their positive and negative mood, their explorative and investigative interest in resources and activities offered by the setting, and their reciprocal exchanges with caregivers and peers. Each of these parameters was measured at 3 time points – within the first 2 weeks without the parent present at childcare, 2 months later, and again 2 months afterwards. The main purpose of this paper was to describe children's reaction to day care entry and their behavioural change over the first 4 months in care. Our hypothesis was that when first entering care, young children would express distress and their behaviour would be inhibited. We expected that they would increasingly (a) express pleasure and enjoyment in their new care environment; (b) explore and investigate situations in their new environment with interest and (c) take part in interactions with peers.

Descriptive results showed that when first entering day care, toddlers were surprisingly flat in their display of negative affect. Previous research has shown that, compared with those at home, toddlers in childcare do not show higher levels of behavioural distress during their time in the centre, but that they do so during picking-up time only (Ahnert & Lamb, 2003). In tune with those findings, toddlers in childcare have been found to engage more negatively with their parents than their caregivers (Nelson & Garduque, 1991; Rubenstein & Howes, 1979). One possible interpretation stems from the fact that, at childcare entry, securely attached infants have been found to express more negative affect to their caregivers than insecurely attached children (Ahnert et al., 2004). This might be because children expect the highest amount of support and sensitivity from those caregivers to whom they are securely attached. Yet the formation of a strong and secure attachment can take time; thus, toddlers in childcare might not be very expressive in terms of their affects in childcare when first entering a new care setting. Another explanation of children's observed levels of low negative affect might stem from the fact that children were seen only within and often at the end of approximately 2 weeks in the setting without the presence of their parent. Had everyone been observed within the first few days without the parent, levels of negative affect might well have been higher.

No associations between children's expressions of negative affect and their interactions with caregivers or peers were found. This might be surprising at first (Fein et al., 1993; Galluzzo et al., 1988), but could be explained by the fact that in our study we did not measure the amount of adult comforting or the amount of interaction per se, but one specific aspect – how dynamic and reciprocal exchanges between children and others were. Another explanation could be that measured levels of negative affect were simply too low to show associations with other variables.

We found that when first entering care, toddlers in this study did not show frequent signs of strong positive affect – most of the time they hardly showed any signs of positive mood at all. Overall, positive affect did not increase over time. Yet, as expected, children who had more dynamic exchanges with caregivers and peers were more positive. Thus, when thinking about children's processes of settling into day care, it is important to consider their affects in relation to their social interchanges. An important consideration for care giving in childcare centres is that infants who do not show negative affect, or those whose affect expression (positive and negative) is generally low, may still be distressed. While emotionally flat toddlers might appear somewhat content from a caregiver's point of view, they may be too wary to interact with caregivers or peers, and too wary to show investigative and explorative interest in ongoing activities or resources. The

quality of interactions provided by caregivers is seen to be crucial during children's transition to childcare, and caregivers have to be well trained in order first to assess different indicators of children's well being, and second to respond specifically to a variety of possible signs of distress. Research will have to assess in more detail which behaviours (or rather which suppressed behaviours) indicate children's distress in their transition to childcare. It will be of particular importance to this research study to investigate how children's behaviour relates to their actual physiological arousal.

Data from this study also suggests that toddlers scored relatively low on measures of social interaction when first entering day care. Most of the time, instances of social exchanges were only brief, but at least those brief instances took place in the majority of observation segments, and a good proportion of children had a least one instance of reciprocal turn-taking interaction within the observed hour. Social contact with peers was less intensive; the majority of the time social situations were shared without any interaction taking place. Yet, at least most children interacted briefly with a peer at least once during the observation.

While the toddlers in our study were observed to be relatively un-engaged in terms of their affect and their actual interactions when first starting day care, they showed more active interest in resources and ongoing activities and interactions. Frequent instances were seen in which children were observant, alert and concentrated and turned their attention to resources or others and their activities. The majority of children were observed in some prolonged situations of explorative/investigative interest. Thus, while the study children seemed relatively inactive in other areas of behaviour, they were actively participating in terms of trying to comprehend situations (e.g., activities carried out by others; objects and their functions). Importantly, those children who had more dynamic exchanges with their caregivers showed more explorative/investigative interest. These findings underscore the importance of exploring multiple areas of behaviour when exploring children's adaptation to day care.

Surprisingly few associations between child characteristics and children's scores on affect, explorative interest and dynamic interaction were found. Only 2 predictors were significant: older children showed more positive affect, and children with siblings in the group had more dynamic interactions with peers.

Results from our multilevel models indicated that some changes took place while children settled into day care over the first 4 months. Negative mood decreased slightly, and dynamic interaction with peers increased. Dynamic interaction with caregivers decreased over time, which might be surprising at first. One explanation might be that, over time in their new setting, caregivers might view the toddlers as more settled in, and as a result offer less support and comfort, thus reducing the number of instances in which they offer one-to-one interactions (Williams, Mastergeorge, & Ontai, 2010). In particular, caregivers might offer fewer one-to-one interactions with children in response to children's increase in social participation with their peers.

Overall, changes in children's behaviour over time were generally small, and maybe less than was expected. More change might have been seen if observations had taken place again at a later time point, for example, 6 months after enrolment into childcare. This suggestion is supported by some of the project's qualitative case studies (Datler, Funder, et al., 2012) and some previous research which has shown that adaptation to childcare is a process that takes time (Ahnert et al., 2004; Fein et al., 1993). Thus, the findings of the study so far must be interpreted with regard to its limitations. The study would have been strengthened if video observations had been carried out more intensively over the first few days of the toddlers attending childcare without their parents present, and if they had taken place over a longer period of time. However, qualitative observations according to the Tavistock model (Datler, Datler, & Hover-Reisner, 2011; Elfer, in press; Rustin, 2006, 2011) were carried out for 6 months, and questionnaire data on children's adaptive behaviour was collected after 6 and 12 months in care; these will be included in further analysis.

The study would have been strengthened if observations of children's behaviour (and behaviour change) had been conducted in their home environment as well. This seems relevant because when entering care, children might not only be less engaged in their new childcare setting, but also change their behaviour in their home environment – in particular, they have been shown to put additional emotional demands on their parents (Ahnert & Lamb, 2003; Nelson & Garduque, 1991; Rauh, Ziegenhain, Mueller, & Wijnroks, 2000; Rubenstein & Howes, 1979). Another caveat relates to the fact that this research took place in a culture with generous maternity regulations where toddlers start childcare comparably late, and where childcare centres generally are of relatively high quality (Harms & Clifford, 1989). To add to this limitation, results were obtained in centres serving middle-class samples. Therefore, findings may not pertain to other cultures or countries or to lower-quality centres serving other populations.

Finally, an important result of this study is that in all measured areas of behaviour children changed in significantly different ways. For some, positive mood increased, for others it decreased, and for others again it was linear (and so on). Adding child characteristics (age, gender, siblings in group, temperament, and educational background) to the models did not contribute to explaining individual differences in children's scores.

Both the extent of individual difference in change in behaviour over the first few months in care, and the fact that child characteristics such as age and temperament did not explain some of these differences were surprising to us. These findings need further investigation. Potentially important factors that might be related to children's settling-in processes have not yet been included in this analysis (Datler, Datler, et al., 2011; Datler et al., 2011b). These include information on childcare quality, relationships and interactions between toddlers and their caregivers, parental behaviour during leave taking, and children's physical stress levels (Ahnert et al., 2012). One of the important contributions of this study is that detailed information on those factors has been collected and will be included in further analysis. It will be the aim of further analysis to predict individual differences in toddler's reaction to day care entry and their behavioural change in the first few months, using

information collected as described above. This should help to extend our knowledge as to how best to support toddlers' settling into day care.

Conflict of interest statement

None of the authors of this publication (Wilfried Datler, Katharina Ereky-Stevens, Nina Hover-Reisner, Lars-Erik Malmberg) have any actual or potential conflict of interest, including any financial, personal or other relationships with other people or organisations (within three years of beginning the submitted work) that could inappropriately influence, or be perceived to influence, their work.

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