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All in a day's work: job demands and satisfaction in Australian early childhood education and care settings

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Abstract
Despite acknowledged demands and stresses associated with early childhood (EC) work, and high levels of attrition in the EC workforce, research often shows high ratings of job satisfaction. This article explores these discordant findings by applying Job Demands-Resources (JD-R) Model to explore educator-rated job satisfaction, stress, feeling rushed, and multiple demands using Time Use Diary (TUD) methodology in a sample of well-resourced EC centres. TUD records were completed by 321 educators for 20 randomly selected hours over 10 days of work, generating 3,512 h of data. Overall ratings were high (M = 7.2/10) for satisfaction and low (M = 3.8/10) for job demands, with variations across the day, and by type and number of work activities completed per hour. Demands reduced during 'staff breaks' and time spent 'being with children', and increased when 'communicating with families', providing 'emotional support', and other tasks. Although overall satisfaction was negatively correlated with demands ($r = -0.40$), relatively high ratings were maintained during periods of high job demands. Applying TUD methodology to the JD-R model provided more nuanced understandings of work demands than is possible through one-off surveys. Findings have important implications for supporting quality EC practice and reducing educator burnout and attrition.

Keywords Job demands-resources model · Time use diary · Early childhood education and care · Work complexity · Work activity

Introduction

Early childhood (EC) educators are central to the provision of high quality early childhood education for young children's learning, development and wellbeing (OECD, 2019), yet the work they perform to achieve these outcomes has only recently become the focus of research. Studies have highlighted the complex range of work demands (Harrison et al., 2024), high levels of multi-tasking and

Extended author information available on the last page of the article

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task rotation (Brante, 2009; Harrison et al., 2019; Mitchell et al., 2019), and lack of ‘down-time’ (Thorpe et al., 2020) that characterise early childhood (EC) educators’ daily work. The nature of this work and associated burdens of low professional recognition, educator stress, emotional exhaustion and burnout are factors identified as contributing to high levels of attrition (Bull et al., 2024; Grant et al., 2019; Ntim et al., 2023; Thorpe et al., 2023). In contrast, however, research shows that for many educators, early childhood work is experienced as professionally and socially rewarding (Ciuciu & Robertson, 2020; McCormick et al., 2022), with studies consistently reporting high subjective ratings related to their work—including feelings of competency (Bullough et al., 2014), engagement (Nislin et al., 2016), efficacy (Jeon et al., 2018), resilience (Bouillet et al., 2014), autonomy (Cassidy et al., 2016), and work satisfaction (Aboagye et al., 2020; Schreyer & Krause, 2016). Job satisfaction is considered an important correlate to intention to leave (Kusma et al., 2012; Madigan & Kim, 2021), making this an important consideration in times such as these where high rates of attrition and workforce shortages are widespread (European Commission, 2023).

A productive way of conceptualising these discordant findings is offered by Bakker and Demerouti’s (2007) Job-Demands and Resources model (JD-R) which describes work characteristics through two categories: job demands that require ‘sustained physical and/or psychological (cognitive and emotional) efforts or skills’; and job resources that are ‘functional in achieving work goals, reduce job demands, (and/or) stimulate personal growth, learning and development’ (p. 312). The central assumption of the JD-R model is that for optimal working conditions there needs to be a balance between job demands and job resources. Job strain occurs when high job demands are matched with low job resources. High job resources, on the other hand, influence motivation or work engagement, and can mitigate against job stress.

In this article, the JD-R model (Bakker & Demerouti, 2007) is used to explore educator-rated satisfaction, stress, feeling rushed and having multiple demands in relation to work complexity, task activity, and context in a sample of well-resourced EC centres. The data upon which the JD-R analysis is based was drawn from the Australian Exemplary Early Childhood Educators at Work (EECEW) project (Gibson et al., 2023). EECEW was a multilevel, mixed methods study of high-quality EC centres that documented the personal, professional and organisational dimensions supporting educators’ work from 2016 to 2022. Each of the three phases of the EECEW project built iteratively on the previous phase’s findings. In Phase 1, a digital random time sampling (RTS) smartphone app was used to collect time use diary data (these data are reported in this paper); in Phase 2 focus groups and interviews were conducted; and in Phase 3, case studies were conducted using interviews, survey and observational and documentary data collection techniques.

The paper proceeds with a review of extant literature that has used the JD-R model to analyse data concerned with diverse EC work contexts. It then details the relevant methodology, analysis and results concerning educator-rated satisfaction and demands. The discussion draws together results and literature to present the contributions, as well as the limitations of this paper.

Literature review

Job demands and resources model applied to the EC work context

Despite long usage of the JD-R model in workplace research across many occupations (Taris et al., 2017), research applying the JD-R model to the EC work context only began in the last decade (Nislin et al., 2015). As publication dates cited here indicate, studies using JD-R to understand workforce challenges have increased markedly over the past five years. This is most likely due to increasing interest across national contexts in understanding and improving EC workforce retention. In research with general educator and teacher samples, the JD-R model has been applied to examining topics such as: turnover intentions (Heilala et al., 2024; Hu, 2020); relationships between turnover and burnout (Schaack et al., 2020); work engagement (Lipscomb et al., 2022); emotional labour (Gu et al., 2020); and stress (Nislin et al., 2015). Other researchers have used the JD-R model to investigate specific educator cohorts, for example, the occupational well-being of beginning teachers (Li et al., 2021), the burnout and stress of special education EC teachers (Jeon et al., 2022), or the job resources and demands of educators working with high needs child and family populations (Farewell et al., 2022).

Across all of the studies mentioned above, there tends to be a focus on the demands of EC work and their negative impact on outcomes (such as turnover). However, the JD-R model can also be very useful for generating understandings of what resources support positive outcomes for educators, and which could be used to inform interventions to improve their work experience, performance, and retention. For example, Lipscomb et al. (2022) suggested that 'early childhood teachers who have stronger protective factors may adapt more positively when they face challenging circumstances at work' (p. 676). Similarly, Farewell et al. (2022) suggested that 'personal and external *resources* may have a larger impact on job satisfaction compared to personal and external *demands* among ECE staff' (p. 203, emphasis in original).

Defining and measuring job demands and resources in the EC work context

Recent JD-R studies have sought to separate the role of personal versus external job demands and resources in the EC workforce (Farewell et al., 2022; Lipscomb et al., 2022). External, or work-related, demands of the EC context include features of educators' workload, such as hours of work, staff:child ratios, class size and composition (Schaack et al., 2020), perceived job insecurity (Gu et al., 2020), physical demands including ergonomic pain and general health (Heilala et al., 2021; Kwon et al., 2021) and emotional labour (Lipscomb et al., 2022). External emotional demands also include perceptions of children's behaviour (e.g., 'difficult to handle'), workplace stressors (Lipscomb et al., 2022) and interpersonal conflict (Gu et al., 2020). A further aspect of workload demands is referred to as ‘work overload’ measured by Gu et al. (2020) via educator ratings, e.g., ‘How often is there a great deal to be done?’ (1 = less than once per month or never, to 5 = several times per day). EC work is also characterised by multiple competing demands, defined as multi-tasking, which involves doing two (or more) tasks simultaneously and is known to impose additional cognitive, perceptual and motor demands on individuals (Cumming et al., 2024), and task rotation which involves switching between different tasks. High rates of task rotation can result in distraction, errors and fatigue (Monsell et al., 2000).

Job resources that relate to external, work-related conditions include: measures of work climate, incorporating educator ratings of collegiality, leadership, shared vision, job control and fairness (Schaack et al., 2020); feelings of being supported in and at work (Lipscomb et al., 2022); salary levels and job support (Li et al., 2021); and educator ratings of resource adequacy, supervisory behaviour/leadership, teamwork (Farewell et al., 2022); working conditions (Schreyer & Krause, 2016); the meaningfulness of work (Gu et al., 2020), and the quality of physical work environment (Kwon et al., 2021). While most of the reviewed JD-R studies focus on these ‘external’ resources and job demands, many authors recognise the potential value of also considering a range of ‘personal’ demands and resources in understanding aspects of EC work contexts. For example, in their study of JD-R in Head Start services, Farewell et al. (2022) included educator-rated resiliency and mindfulness as ‘personal’ resources and perceived stress and depression as ‘personal’ demands. JD-R research has also shown that experiences of job demands and resources can differ according to a range of individual demographic variables including age, job tenure, and qualification as a teacher (defined as university degree-qualified) or educator (vocationally qualified) (Gu et al., 2020). These differentiations of personal and external hint at the need for more nuanced interpretations when using JD-R as a model for understanding the relationships among demands and resources in EC educators’ work.

Limitations of existing measures of job demands and resources

An acknowledged limitation of much of the extant research reporting educator stress, satisfaction, demands and resources is that it draws on global ratings gathered via a one-off survey of educators (e.g., Farewell et al., 2022; Heilala et al., 2021; Jeon et al., 2022; Schaack et al., 2020). While many studies have used surveys as a stand-alone data collection tool, these tools have sometimes coincided with other data collection measures (e.g., Kwon et al., 2021; Nislin et al., 2015), and in some cases, have been used to predict outcomes longitudinally (Gu et al., 2020; Li et al., 2021). Nevertheless, all these studies invite respondents to provide ratings of their overall experiences of their EC work. This methodology fails to account for the peaks and troughs of intensity that have been shown to be characteristic of EC educators’ working day (see for example, Harrison et al., 2024; Kusma et al., 2011; Mitchell et al., 2019) and fails to illuminate particular aspects of work educators find rewarding/satisfying and demanding/stressful.

The EECEW study sought to overcome these limitations by using time use diary (TUD) methodology to gather time-specific (rather than global) ratings of JD-R in the EC work context over a two-week period. TUD methodology has been successfully applied in EC and school contexts in Germany, the United States, Australia and New Zealand (Harrison et al., 2019, 2024; Kusma et al., 2011; Mitchell et al., 2019; Ryan et al., 2004; Thompson et al., 2023), with findings providing important insights into time spent by educators in different work activities, by whom, and with what intensity or complexity. In this study, and for the first time, educators' subjective ratings were also included.

Summary and study aims

While the body of research using JD-R in studies concerned with the EC work context is still developing, some key points are evident. Firstly, a range of demands and resources characteristic of educators' work have been identified and explored in the context of workforce challenges such as turnover, burnout and stress, together with demographic, cultural and other variables. Little attention has been given, however, to potential distinctions in job demands and resources in different types of EC settings (e.g. preschool versus long day care[1]) or for educators who hold different qualification levels (e.g. university versus vocationally qualified) or have different positions and levels of responsibility (e.g. room leaders and teachers versus educators and assistants). In addition, very few of the reviewed studies have sought to assess the role of quality in the JD-R model and those that have, positioned quality in conflicting terms. Schaack et al. (2020), for example, included participation in quality improvement and rating systems (QRIS) as a job demand, while Nislin et al. (2015) posited that educators 'encountering higher work resources perform better at work by offering higher quality ECE' (p. 48).

In Australia, the regulatory system for EC requires all services (centre- and home-based) for children aged birth to 5 years to participate in the national QRIS, which involves a repeated process of assessment and rating (A&R) on the National Quality Standard (NQS) (Australian Children's Education & Care Quality Authority [ACECQA], 2018; Togher & Fenech, 2020). Services are externally assessed on seven Quality Areas, with 15 associated Quality Standards, and receive an overall rating of Working Toward NQS, Meeting NQS, or Exceeding NQS. A national study of quality improvement in Australian long day care centres led by Harrison et al. (2020) showed clear links between improvement to Exceeding NQS and well-supported and resourced educators (Davis et al., 2023) and a positive work climate characterised by collaborative leadership and teamwork (Irvine et al., 2024). The Australian QRIS ratings are publicly available, offering a unique opportunity to select specific samples for research purposes. A sample of high-quality EC centres,

[1] In Australia, preschool and long day care are the terms used for an early childhood education program. Preschool programs are offered for a full day (e.g., 9.00 am–3:00 pm) or half days during school terms for 4-year-old children (and in some cases for 3-year-old children) in the year/s prior to formal schooling. Long day care centres provide education and care for children aged from 6 weeks to school age, 48–52 weeks of the year, for 8–12 h per day.

for example, would be expected to reduce the variability in work resources reported in large-scale studies (e.g., Schreyer & Krause, 2016).

The aim of this research was to apply the JD-R model to a sample of high quality, well-resourced EC centres through the use of time-use diary (TUD) methodology, a unique method that allows for the repeated collection of educator ratings of job satisfaction and job demands in combination with information on time spent in various work activities (Harrison et al., 2019; Thompson et al., 2023).

Research questions

The research questions this paper seeks to address using TUD data collection are:

RQ1: To what extent do educators' self-rated feelings of job satisfaction and demands vary across their working day?
RQ2: Is work complexity (degree of task-rotation and multi-tasking) related to educators' ratings of job satisfaction and demands?
RQ3: What work activities/tasks do educators rate as more or less demanding and satisfying?
RQ4: To what extent are educators' ratings of job satisfaction and demands related to their qualifications, experience, work setting and responsibilities?

Materials and methods

'Intensive hour' time use diary method

This paper draws on data gathered from an 'Intensive Hour' time-use diary (TUD) (Bittman, 2016; Gershuny & Bittman, 2023), using one-hour random time sampling to collect data on the amount of time educators spend in specific work activities. Each hour of TUD data is reported as ten 6-min blocks of time, which provides information about the duration of activities, the changing sequence of activities (task-rotation), and the combination of activities (multi-tasking). The TUD technique also enabled a study of subjective experience by incorporating educators' responses to questions about job demands (feeling rushed and/or stressed) and their satisfaction.

Random time sampling software

Intensive hour data were collected using an electronic random time sampling (RTS) time-use diary application for smart phones and tablets (Gibson et al., 2023; Harrison et al., 2019). Participants were asked to download the time-use diary software onto their smartphone or tablet and complete a one-off set of questions to describe their work position (teacher, room leader, educator, assistant), work experience (number of years), qualifications (degree qualified teachers, Diploma and Certificate III qualified educators) and place of work (preschool, long day care centre). On 10 subsequent workdays, the software randomly selected two moments and sent a notification ('beep') that asked the participant to recall the activities they undertook in the last hour, recorded in ten 6-min blocks of time. When completed in full, each participant recorded a total of 20 h of TUD data.

Work activities

On receiving a randomly generated 'beep' educators use a pre-coded list to select their work activity and the amount of time spent in that activity using a nested 2-digit activity classification. The activity classification (see Table 1) plus more detailed descriptors and examples of each sub-class were developed in consultation with ECEC experts (Wong et al., 2015) and tested with practitioners (Harrison et al., 2019).

For each entry, educators recorded the time spent in the main activity and sub-class (primary activity) with the option to add another activity completed during the same period of time (secondary activity). Educators then responded to questions about where the activity took place (indoor, outdoor) and the number of children they were with using pre-coded responses. This sequence was repeated until 10 blocks of 6-min (one hour total) were completed. Educators then completed an additional question about other adults they were with during the hour (parent or family member, professional support workers or other visitors).

Job demands and satisfaction

After completing the one-hour record, educators rated their subjective experience of the sampled hour on a scale of 1–10 (1 = not at all and 10 = very) for four questions:

1. 'how rushed did you feel during the past hour?'
2. 'how stressed did you feel?'

Table 1 Nested activity classification of early childhood educators and carers

Domain	Sub-class of activity
1. Staff personal time	Scheduled break, other break, self-care activity
2. Intentional teaching	Problem-solving, literacy, numeracy, science/nature, social/cultural, art/craft, music/dance, media/technology, physical/self-help, health/wellbeing
3. Being with children	Watch/supervise, play with, listen/respond to children
4. Routine care/transitions	Hygiene, nutrition, health, sleep/rest, injury, organise transitions
5. Emotional support	Support positive behaviour, meditate conflict, comfort child, stop unsafe behaviour, encourage inclusion, support colleague
6.Family communication	Individual face-to-face, individual email/phone, group
7. Organise room/OH&S	Set-up, pack-up, food, clean/tidy, laundry, maintenance/OH&S compliance
8. Pan, assess, evaluate	Curriculum planning, observe/assess child document learning, evaluate
9. Administration	Record keeping/roll, answer phone/door, staff handover/communication, staff meeting
10. Professional learning	Self-educate, attend PD/in-service, support/mentor others, receive support/mentoring, pedagogical leadership, reflection

3. ‘were different things being demanded of you during this task?’
4. ‘how satisfied did you feel?’

Recruitment context

For the purposes of the current study, recruitment was restricted to centre-based early childhood programs (preschools and long day care centres) that had achieved: (1) an overall rating of Exceeding NQS, and (2) a ranking of ‘Exceeding’ in each of the seven Quality Area standards and associated sub-elements on the most recent QRIS Assessment & Rating. After consultation with the Australian Children’s Education and Care Quality Authority (ACECQA),[2] eligible centres in all of Australia’s eight states and territories were invited to participate by letter or email. A staggered recruitment sequence was used, commencing with three states (New South Wales, Queensland, Western Australia) to provide greater flexibility in supporting recruitment of educators.

All eligible centres were approached by a direct email, with prior approvals sought from large ECEC service provider organisations. Ethics approval for the study was granted by the Charles Sturt University Human Research Ethics Committee, protocol number H17014.

Participants

A total of 321 educators and teachers working with children under the age of 5-years in Australian EC centres downloaded and completed the TUD. Of these, 304 completed the first set of questions about their place of work, qualifications, positional role/ responsibilities, and years of experience in an EC setting (summarised in Table 2). While the sample sizes were relatively similar (138 participants worked in preschools and 168 worked in long day care centres), staff profiles were markedly different, particularly in relation to personal resources. Just over half (52.2%) of the preschool participants were degree qualified, followed by 28.3% with Certificate and 19.6.% with Diploma qualifications. In contrast, only one-third (34.3%) of long day care participants were degree qualified. The majority held a Diploma (42.2%) and 23.5% held a Certificate qualification. Preschool participants were also better resourced in relation to their work experience: 50% had worked in EC for over 15 years compared to 29.9% for long day care. Leadership responsibilities, however, were held by similar proportions: 53.7% of preschool participants and 49.4% of long day care participants were employed as room leaders or teachers.

[2] The Australian Children’s Education and Care Quality Authority (ACECQA) (www.acecqa.gov.au) is the independent national authority that assists the Australian and state and territory governments in administering the National Quality Framework (NQF) and National Quality Standard (NQS) for children’s education and care.

Table 2 Participants: type of setting by educator qualifications and positions

	All n = 304 (%)	Preschool n = 138 (%)	Long day care n = 166 (%)
Qualifications			
Certificate	25.7	28.3	23.5
Diploma	31.9	19.6	42.2
Degree	42.4	52.2	34.3
Position/Role			
Assistant	15.1	13.8	16.3
Educator	33.6	32.6	34.3
Room leader	13.2	2.2	22.3
Teacher	38.2	51.5	27.1
Experience (years)			
0–2	8.6	7.3	9.6
3–5	17.1	12.3	21.1
6–10	20.1	18.1	21.7
11–15	15.8	12.3	18.7
16–20	9.2	8.0	10.2
21+	29.3	42.0	18.7

Analysis

The complete TUD data set consisted of 3,512 h of worktime records spread across the EC working week: Monday–Friday, 7 am–6 pm. Days of the week were evenly represented across submission hours (range 18–21%), but submission hours (7 am–6 pm) were not equally distributed throughout the day; therefore, hours were weighted to ensure that hours of the workday were evenly represented. TUD records were combined to create an 'average working day'.

Work complexity

Two measures of work complexity were computed for each hour of time-use diary data. 'Task rotation' was based on the number of 6-min episodes recorded per hour (range = 1–10). 'Multi-tasking' was based on the proportion of episodes that recorded a secondary activity in each hour (range = 0–100%).

Primary work activity

The average number of minutes per hour (mean) and proportion of time (as per cent) that educators spent in each of the 10 domains of work activity (as a primary activity) was calculated for each hour of work.

Work context

External features of educators' work context were described by the type of setting (preschool vs long day care centre), their positional responsibilities (teacher, room leader, educator, assistant) and the nature of the social context (whom educators were with) for each episode: number of children (none; 1 child only; 2–5 children; 6 or more children);, and for each hour: parent/family member, or a visitor.

Educator ratings

Educators' subjective ratings of feeling rushed, feeling stressed, having multiple demands, and feeling satisfied were explored using descriptive and correlation tests. Exploratory factor analysis (EFA) applied Bartlett test of sphericity, Kaiser–Meyer–Olkin (KMO) Measure of Sampling Adequacy, and Principal Components with Varimax Rotation to calculate shared variance across the four unique variables. EFA results justified the creation of a summary variable for job demands by combining ratings for stress, rushed, and multiple demands. Ratings of job demands were examined using an overall rating, as well as quintiles, to examine its distribution. Tempograms were created for 15-min blocks of time from 7 am to 6 pm to provide a visual illustration of the distribution of job demands and satisfaction ratings.

Comparing educator ratings of job demands and satisfaction by work complexity, activity, work context and personal resources.

Comparison of means (*F*-tests) and correlation (*r*) analyses were used to assess the relationships between overall ratings of job demands and satisfaction, and job demand quintiles, and TUD data for task rotation, multi-tasking, work activity domain, and who the educator was with. Analyses also tested job demands and satisfaction ratings in relation to type of EC setting, educator qualifications and positional responsibility, and years of experience.

Table 3 Ratings of feeling rushed, stressed, having multiple demands, and satisfied

Aspec	Mean M (SD)	% Rated 1	% Rated 2–4	% Rated 5–7	% Rated 8–10
Feeling rushed	3.2 (2.6)	30.8	36.0	24.6	8.8
Feeling stressed	3.5 (2.4)	29.7	38.8	23.8	7.7
Having multiple demands	4.4 (2.8)	23.4	28.6	31.2	16.7
Feeling satisfied	7.2 (2.3)	1.6	10.7	36.9	50.7

Results

Educators' ratings

Educators' ratings for the full sample of 3512 h of work are presented as mean scores, standard deviations (SD) and distributions (range from 1 = not at all to 10 = very) in Table 3.

Educators' ratings of 'feeling rushed' were relatively low (M = 3.2, SD = 2.6) on a 10-point scale; 30.8% of work hours were rated 'not at all' (1) and two-thirds (66.8%) were below the mid-point (< 5). A similar pattern was seen for 'feeling stressed' (M = 3.5, SD = 2.4): 29.7% of work hours were rated 1; 68.5% were < 5, while 'having multiple demands' received somewhat higher ratings (M = 4.4; SD = 2.8), with half (52%) of work hours rated < 5; 31.2% between 5 and 7; and 16.7% rated > 8. In contrast, the distribution of responses to the question 'How satisfied did you feel?' showed the reverse pattern; the average rating was high (M = 7.2, SD = 2.3) with half (50.7%) of working hours rated from 8 to 10 (very satisfied).

Correlation analyses confirmed moderate to strong associations among the four ratings (see Table 4). Testing using Bartlett test of sphericity (p value < 0.05) and the Kaiser–Meyer–Olkin Measure of Sampling Adequacy (KMO = 0.744) indicated the educators' ratings data were suitable for factor analysis. Principal components analysis suggested a 1 factor solution for rushed, stressed and multitasking (Cronbach's alpha = 0.846), supporting the creation of a latent variable capturing 'job demands' through self-reported stress and time stress. The summary measure of job demands was then tested as an overall score (M = 3.8 SD = 2.3; range = 1–10), and also as quintiles (five increasing levels of job demand with similar numbers of one-hour TUD submissions).

Tempograms

Overall ratings of job demands and satisfaction recorded by educators for each 15-min period across the working day are presented in Fig. 1. While these graphic images suggest a relatively stable pattern of high satisfaction (Mean range = 6.9 to 7.7) and moderate-to-low job demands (Mean range = 3.4 to 4.3), they also confirmed expectations of nuance and variability in how educators felt about their work. Ratings of job demands (black circled line) were found to rise

Table 4 Ratings of job demands /satisfaction: means (SD) and correlations

Aspect	Mean M (SD)	Rushed *r*	Stressed *r*	Mult.Demands *r*	Satisfied *r*
Feeling rushed	3.6 (2.6)	1.0			
Feeling stressed	3.5 (2.4)	0.79***	1.0		
Having multiple demands	4.4 (2.8)	0.63***	0.58**	1.0	
Feeling satisfied	7.2 (2.3)	−0.39***	−0.42***	−0.25***	1.0

Note(s): ***$p < 0.001$

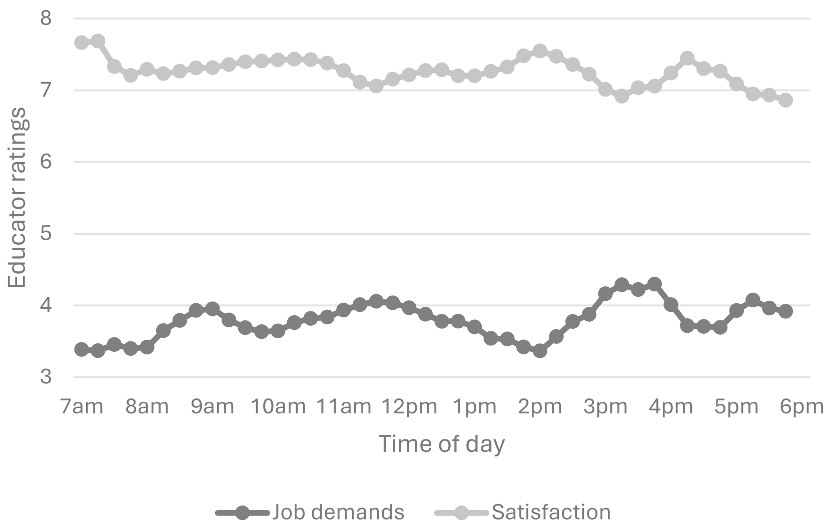

Fig. 1 Job demands and satisfaction by hour of the working day

rapidly during morning arrival time, reaching a peak at 9 am, followed by a second peak from 11 am to 12 noon. Ratings then dropped over the midday rest/sleep period and rose again rapidly from 2 to 3 pm with fluctuations for the rest of the afternoon. Hourly comparisons indicated that between 2 and 3 pm was the more demanding time of the day. On the other hand, overall ratings of job satisfaction showed only minor fluctuations, and a gradual decrease, across the day. There was some evidence of reverse pairing in ratings; for example, ratings of satisfaction decreased as job demands increased from 7 to 9 am, and again from 2 to 3 pm.

Table 5 Job demands (quintiles) by satisfaction, multi-tasking and task rotation: means and correlations

Job demands (JD)	Number of submissions	Satisfaction rating 1 (not at all) to 10 (very)	Multitasking mean (%) secondary activity	Task rotation mean number of episodes per hour
Quintiles (range)	n	M (SD)	M (SD)	M (SD)
1 (1.0–1.7)	868	8.6 (2.2)	34.6 (39.1)	2.1 (1.5)
2 (2.0–3.0)	694	7.4 (2.2)	50.4 (40.3)	2.8 (1.9)
3 (3.3–4.3)	637	7.1 (1.9)	57.8 (38.9)	3.0 (1.9)
4 (4.7–6.0)	709	6.4 (1.7)	58.1 (38.2)	3.1 (2.0)
5 (6.3–10.0)	604	6.1 (2.2)	60.8 (36.0)	3.0 (1.6)
Overall				
Total Means	3512	7.2 (2.3)	50.9 (39.9)	2.7 (1.8)
Correlations	3512	$r = -0.40$***	$r = 0.21$***	$r = 0.14$***

Note(s): ***$p < 0.001$

Relationships between job demands, satisfaction and work complexity

Increasing levels of job demands (JD, as quintiles) were compared with mean scores and correlation analysis for job satisfaction, multi-tasking and task rotation. Results presented in Table 5, Column 3, show a clear negative relationship between increasing job demands (JD quintile 1 to 5) and decreasing ratings of satisfaction, further supported by a significant negative correlation, $r = -0.40$, $p < 0.001$. Importantly, however, Table 5 also shows that satisfaction maintained moderately high ratings (between 5 and 7) despite high job demands (JD quintile 5, rating 6.3–10).

Results for multi-tasking show a positive relationship between increasing ratings of job demands (quintile 1 to 5) and increasing amounts of multi-tasking within the recorded hour of work: from 34.6% for JD quintile 1, to 50% and over for JD quintiles 2 to 4, and 60.8% in JD quintile 5, $r = 0.21$, $p < 0.001$. Results for task-rotation also show a positive relationship, increasing from M = 2.1 recorded episodes per hour for quintile 1 to M = 3.0 or higher for quintiles 3 to 5), $r = 0.14$, $p < 0.001$.

Relationships between job demands, satisfaction and educators' work activities

Figures presented in Table 6 present the average amount of time (mean minutes per TUD hour) recorded for each of the 10 domains of work activity by ratings of job demands (as quintiles, and overall means) and satisfaction (overall means). Results show distinct differences between different types of tasks completed and educators' ratings of job demand and satisfaction. Looking first at job demands, low ratings were recorded for longer periods of 'staff personal time' (column 3: JD quintile 1 (M = 15.4 min), but as time decreased JD ratings increased (JD quintile 3, M = 4.5 min; JD quintile 5, M = 2.6 min), generating a significant negative correlation ($r = -0.19$, $p < 0.001$). A similar, but weaker, negative correlation was seen for undertaking'professional development' (column 12; $r = -0.08$, $p < 0.001$), which also showed a pattern of more time being linked with lower demands (JD quintile 1 M = 2.9 min vs quintile 3 M = 1.1 min). Time spent 'Being with children' was correlated with lower ratings of job demands (column 5; $r = -0.04$, $p < 0.001$), but without a consistent linear pattern: mean time 'being with children' for JD quintiles 1, 3, 5 was 19.5, 22.1, 19.6 min, respectively.

The opposite pattern of job demands increasing as educators spent more time in specific work activities was more common, occurring for six of the 10 work activities. This was most evident for time spent in 'family contact' (column 8; $r = 0.12$, $p < 0.001$) and providing 'emotional support' (column 7; $r = 0.12$, $p < 0.001$), which showed a clear increase in time as job demands increased from quintile 1 to 5, as did 'routine care/transitions' (column 6; $r = 0.07$, $p < 0.001$). The weaker correlation for 'intentional teaching' (column 4; $r = 0.03$, $p < 0.05$) reflected an inconsistent pattern (JD quintiles 2 to 5 had means of 6.1, 6.5, 5.6, 6.6 min). A pattern of increasing demands was also evident for non-child-focused activities: 'administration' (column 11; $r = 0.08$, $p < 0.001$) and 'organisation/maintenance' (column 8; $r = 0.07$, $p < 0.001$). Time spent in 'planning and assessment' was the only work activity not to

Table 6 Job Demands (quintiles) and Satisfaction by time (minutes per hour) in work activity domains: means and correlations

1	2	3	4	5	6	7	8	9	10	11	12
Job demands	n	Staff Personal Time	Intentional Teaching	Being with children	Routine Care Transition	Emotional Support	Family Contact	Organisation Maintenance	Planning & Assessment	Administration	Profession-al Development
Quintiles		M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)
1 (1.0–1.7)	868	15.4 (24.7)	4.7 (12.1)	19.5 (23.7)	5.5 (12.8)	0.7 (3.7)	0.9 (4.5)	3.2 (10.0)	4.4 (14.2)	2.9 (11.9)	2.9 (12.3)
2 (2.0–3.0)	694	5.6 (14.6)	6.1 (13.0)	21.6 (23.2)	7.6 (14.3)	1.2 (4.7)	1.9 (6.6)	4.6 (11.7)	5.4 (15.0)	3.7 (11.7)	2.3 (11.0)
3 (3.3–4.3)	637	4.5 (12.9)	6.5 (12.9)	22.1 (22.3)	7.6 (13.2)	1.3 (4.4)	2.1 (5.9)	4.8 (11.3)	6.1 (14.8)	3.8 (11.9)	1.1 (6.9)
4 (4.7–6.0)	709	4.2 (13.1)	5.6 (11.8)	19.6 (21.6)	9.3 (15.4)	2.1 (6.6)	3.0 (8.5)	4.1 (10.0)	6.5 (15.0)	4.7 (13.5)	1.0 (6.4)
5 (6.3–10.0)	604	2.6 (9.9)	6.6 (13.1)	19.6 (21.6)	8.2 (14.6)	2.5 (7.3)	4.0 (8.9)	6.2 (12.4)	4.4 (12.4)	5.2 (13.9)	1.3 (7.2)
Overall											
Mean time	3512	7.2 (12.0)	5.9 (9.8)	20.3 (33.8)	7.5 (12.5)	1.5 (2.5)	2.2 (3.7)	4.4 (7.3)	5.3 (8.8)	5.9 (6.5)	1.8 (3.0)
Correlations											
Job Demands	3512	r = −0.19***	r = 0.03*	r = −0.04*	r = 0.07***	r = 0.12***	r = 0.12***	r = 0.07***	r = 0.01	r = 0.08***	r = −0.08***
Satisfaction	3512	r = 0.01	r = 0.05**	r = 0.08***	r = −0.07***	r = −0.09***	r = −0.03*	r = −0.01	r = −0.05**	r = −0.05**	r = 0.05**

Note(s): *$p<0.05$; **$p<0.01$; ***$p<0.001$

show a relationship with ratings of job demand (column 10; $r = 0.01$, *ns*); mean time in this work activity was steady across all five JD quintiles (M range = 4.4–6.4 min). For job satisfaction, correlation analyses showed that educators' ratings increased as they spent more time in 'intentional teaching' (column 2; $r = 0.05$, $p < 0.01$), 'being with children' (column 3; $r = 0.08$, $p < 0.001$) and 'professional development' (column 13; $r = 0.08$, $p < 0.001$). Ratings of satisfaction decreased as educators spent more time providing 'emotional support' (column 7; $r = -0.09$, $p < 0.001$) and engaged in 'routine care/transition' (column 6; $r = -0.07$, $p < 0.001$), 'family contact' (column 8; $r = -0.03$, $p < 0.05$), 'planning & evaluation' (column 10; $r = -0.05$, $p < 0.01$), and 'administration' (column 11; $r = -0.05$, $p < 0.01$). For the most part, correlation figures for job satisfaction were in the reverse direction to ratings for job demands, but this was not the case for 'intentional teaching', which was rated as demanding *and* satisfying. There was no association between ratings of satisfaction and time spent in 'staff personal time' (column 1; $r = 0.01$, *ns*) and organisation/maintenance' (column 9; $r = -0.01$, *ns*).

Relationships among job demands, job satisfaction and educators' work context and resources

Educators' time use diary records provided new information about the social demands of their work with groups of children and family members or other visitors. For each episode of the TUD, educators recorded the number of children they had worked with (1; 2 to 5; 6 or more; not with children). Results for job demands (see Table 7) showed only minor variations in ratings when educators were not with children or were with a small group of 2 and 5 children (rs = − 0.03, *ns*). In contrast, job demands increased when educators spent more time with one child ($r = 0.07$, $p < 0.001$) and six or more children ($r = 0.13$, $p < 0.001$). Ratings for job satisfaction decreased as educators recorded more time 'not with children' ($r = -0.03$, $p < 0.05$), but did not vary as more time was spent with different-sized groups of children (rs = − 0.03, − 0.00, 0.01, *ns*).

Table 7 Job demands ratings by mean time (minutes/hour) with children

Job demands quintiles (range)	n	Not with children M (SD)	1 child only M (SD)	2 to 5 children M (SD)	6 or more children M (SD)
1 (1.0–1.7)	868	12.2 (22.4)	3.2 (10.4)	11.5 (20.5)	18.2 (24.8)
2 (2.0–3.0)	694	13.6 (22.2)	3.9 (10.9)	12.6 (20.5)	23.6 (25.7)
3 (3.3–4.3)	637	10.7 (19.4)	4.5 (11.3)	11.4 (18.6)	26.9 (24.8)
4 (4.7–6.0)	709	11.7 (20.9)	6.2 (13.2)	10.6 (17.7)	26.3 (25.2)
5 (6.3–10.0)	604	11.1 (19.9)	5.2 (12.3)	10.7 (17.2)	27.2 (25.0)
Total Mean time	3512	11.9 (21.2)	4.5 (11.6)	11.4 (19.1)	23.9 (25.3)
Correlations (r)					
Job Demands	3512	r = − 0.03	r = 0.07***	r = − 0.03	r = 0.13***
Satisfaction	3512	r = − 0.03*	r = − 0.03	r = 0.01	r = − 0.00

Table 8 Job demands by per cent time with parents or other visitors

Job demands Quintiles (range)	Parent/ Family member n = 793%	Other adult visitor n = 302%
1 (1.0–1.7)	11.9	5.2
2 (2.0–3.0)	21.2	8.6
3 (3.3–4.3)	30.8	5.3
4 (4.7–6.0)	32.5	9.8
5 (6.3–10.0)	35.5	10.1

Educators' TUD entries for each hour also recorded if they were with a parent or family member, or another visitor to the centre. The presence of other adults was recorded for 1905 h (31% of the total hours). Results for job demands quintile presented in Table 8 suggested that as time with a family member increased from 11.9 to 35.5% of the hour, job demands increased from low (quintile 1) to high ratings (quintile 5). A similar pattern was also evident for time spent with other visitors: as time with other visitors increased from 5.2 to 10.1% of the hour, educators reported increasing levels of job demands (from quintile 1 to quintiles 4 and 5).

Educators' work context was also defined by our recruitment criterion of being a high quality centre, which is posited to reflect well-resourced EC settings (Nislin et al., 2015). Previous research had suggested that personal resources such as qualifications or years of experience might mitigate job demands (Gu et al., 2020; Schaack et al., 2020). In the present study, participants working in preschool settings were more likely to hold a degree qualification and have more years of experience than participants who worked in long daycare (see Table 2). For this reason, we tested Gu et al. and Schaack et al.'s proposition by comparing mean ratings of job demands and satisfaction for different levels of educator qualifications, positional responsibility, and experience, using separate tests for educators working in preschool and long day care settings.

Results, presented in Table 9, were contrary to this hypothesis, and differed by type of EC setting. Job demands reported by teachers/degree qualified working in preschools (M = 4.8) were significantly higher than for educators/assistants and diploma/certificate qualified staff (Ms = 3.5, 3.6). Similarly, for long day care settings, room leaders and diploma qualified staff had higher ratings (Ms = 4.2, 3.8) than educators/assistants and certificate qualified staff (Ms = 3.1, 2.7). For preschool, more years of experience was associated with higher ratings for job demands ($r = 0.19$, $p < 0.001$), but the opposite was reported in long day care, more experience was associated with lower ratings for job demands ($r = -0.05$, $p < 0.05$). Findings for job satisfaction were mixed. While there was no overall difference for type of setting (both groups rated satisfaction as moderately high, Ms = 7.2 and 7.3), sub-group analyses showed significant differences. For preschools, ratings differed by qualification, were lower for teachers (M = 7.0) versus educators/assistants (M = 7.6), and lower for staff with more years of experience ($r = -0.10$, $p < 0.001$). For long day care, there were no differences in ratings of

Table 9 Job demands and satisfaction by EC setting, qualifications and work responsibility

	Number of submissions n	Job demands M (SD)	Satisfaction M (SD)
EC Setting			
Pre-school	1511	4.2 (2.4)	7.3 (2.2)
Long day care	2001	3.5 (2.2)	7.2 (2.3)
F-test (1,303)		$F=8.15$**	$F=0.04$ (*ns*)
Preschool			
Qualifications			
Certificate	369	3.5 (2.3)	7.5 (2.2)
Diploma	381	3.6 (2.3)	7.8 (2.2)
Degree	761	4.8 (2.3)**	6.9 (2.2)
F-test (2,136)		$F=5.9$**	$F=3.9$*
Position/Role			
Educator/Assistant	699	3.5 (2.2)	7.6 (2.2)
Room leader	41	5.9 (2.7)	6.8 (2.7)
Teacher	771	4.8 (2.2)***	7.0 (2.1)*
F-test (2,136)		$F=7.6$***	$F=2.5$ (*ns*)
Years of experience			
Correlation	1511	$r=0.19$***	$r=-0.10$***
Long day care			
Qualifications			
Certificate	396	2.7 (2.1)	7.4 (2.3)
Diploma	873	3.8 (2.2)**	7.4 (2.3)
Degree	732	3.7 (2.2)*	6.9 (2.3)
F-test (2,164)		$F=5.2$**	$F=1.4$ (*ns*)
Position/Role			
Educator/Assistant	960	3.1 (2.1)	7.6 (2.3)
Room leader	507	4.2 (2.2)**	6.6 (2.3)*
Teacher	534	3.7 (2.2)	7.1 (2.3)
F-test (2,164)		$F=5.8$*	$F=3.2$*
Years of experience			
Correlation	1511	$r=-0.05$*	$r=-0.01$ (*ns*)

Note(s): ***$p<0.001$; **$p<0.01$; *$p<0.05$

satisfaction by qualification or years of experience, but room leaders reported lower satisfaction (M = 6.6) than educators (M = 7.6).

Discussion

Overall, the results from our collection and analysis of TUD records showed a more nuanced understanding of the relationship between job satisfaction and job demands (self-reported feeling stressed, rushed and having multiple demands) than previously reported in JD-R studies of EC work (Farewell et al., 2022; Kusma et al., 2012). Prior research has relied on one-time, generalised survey questions to gather subjective ratings of work demand. Our TUD records generated 3512 one-hour samples of educators' ratings of job experience across a two-week period of work. The granularity of these data markedly improves previous understandings of educators' work, by illustrating the variations—peaks and troughs—in job demands over the day. Our results showed, for example, that 9 am, 11 am, and between 2 and 3 pm were the more demanding times of the day. Similarly, Mitchell et al. (2019), using the same time use diary method and taxonomy of work activities as in our study, found 'hot spots' of high multi-tasking between 9–11 am and 1–2 pm for educators in New Zealand ECE settings. Variations between our results and those of Mitchell et al. might be explained by QRIS ratings for the participating EC settings, or differing staff:child ratios required in each regulatory context. Across all settings, identifying 'hot spot' times of increased demands is valuable in considering how to allocate staff to best support teams across the workday.

The granularity of TUD data was most evident in the tempograms generated from each 15-min block of time across the working day (Fig. 1). These graphs showed that satisfaction ratings were relatively stable, compared with job demands, and remained moderately high (> 6 on a 10-point scale) even when job demands increased to the highest ratings (JD quintile 5). The context of these findings—high quality EC settings—suggests that the experience of working in a well-resourced work environment supports Farewell et al.'s (2022) hypothesis that 'bolstering job-related resources may translate to increased job satisfaction' (p. 198).

Further, our results show distinct differences between different types of work activities and educators' ratings of their sense of job demand and satisfaction. The finding that staff experienced lower demand when they had personal time or undertook professional development indicates the necessity of balancing job demands with work resources—such as time to recover from demanding tasks (Gu et al., 2020)—or to '…stimulate personal growth, learning and development' (Bakker & Demerouti, 2007, p. 312). As Lipscomb et al. (2022) also note, having the opportunity for professional development contributes to educators' self-efficacy. However, in the context of widespread workforce shortages, and little funding or time to undertake professional development (Thorpe et al., 2020), these potential resources have been limited, and may explain the persistent turnover of educators (Bassok et al., 2021).

Our results also showed that job demand increased when educators spent time with family members or visitors, and when doing administration or organisation and maintenance. International researchers who have used JD-R have also noted the potential for contact with families to be challenging, for example, due to cultural expectations (Li et al., 2021) or high family needs (Farewell et al., 2022). The demands of administration on educators are also well-documented (Heilala et al., 2024; Li et al., 2021). Our finding that educators in this Australian study also reported contact with families and administration as more demanding, indicates the need for further research and intervention to support these aspects of their work.

By contrast, although reported job demands for 'being with children' was moderately high, satisfaction increased during these times. Satisfaction decreased with more time spent in 'routine care/transition' and providing 'emotional support', but also when an educator was not with children. Interestingly, educators rated time spent in 'intentional teaching' as both demanding and satisfying. These findings again illustrate the value of time-use data to illuminate fine-grained distinctions in educators' tasks. By having time to 'be with children' or to support children's learning through intentional teaching, the educators in these well-resourced centres may have been avoiding the 'moral stress' that can happen in educators' work when they cannot 'perform their jobs in accordance with their own ethics' (Heilala et al., 2024, p. 489). These findings are further illustrated in examples from the qualitative data collected in Phase 2 of the EECEW study (Cumming et al., 2024) in which participants reported feeling: 'frustrated because [we] can't spend quality time where [we] want to' or always '... saying to one child 'I will be right back'' (p. 8). Additionally, while research has suggested that educators' stress can vary depending on the age group of children (Schaack et al., 2020) and/or their particular needs (Jeon et al., 2022), the present study is one of the first to study this in relationship to group size. Results indicated job demands increased when spending more time with one child only and with groups of 6 children or more, but not when with a group of 2 to 5 children.

Our inclusion of measures of multi-tasking and task rotation also provide more nuanced insights into daily variations of job demands than could be gained from one-off surveys. Our results indicate that as job demands increase, multi-tasking is also elevated, task rotation is increasing (though at a lower variance than multi-tasking), and satisfaction falls. Despite reports that multi-tasking is considered 'just part of the job' (Cumming et al., 2024), the relationship of increasing demands in the form of work complexity (i.e., multi-tasking and task rotation) and falling satisfaction suggests that multi-tasking is experienced as a 'demand' by educators, and the known challenges of these phenomena (Monsellet al., 2000) are likely playing out in their work. Ways of supporting educators and leaders concerning multi-tasking then is another area that could receive further research attention and intervention.

Our results also highlight that greater positional responsibility (as teachers and room leaders) was associated with higher levels of overall job demands and lower job satisfaction than for educators and assistants. Extant literature has variously considered educator qualifications and years of experience as mediating variables in analyses using JD-R (Gu et al., 2020; McMullen et al., 2020) but has not explored associations between job role and JD-R specifically. It is also more usual for educators' ratings of their relationship with leaders to be reported (see for example Gu et al., 2020; Heilala et al., 2024), than for ratings of JD-R to be gathered from leaders themselves. We note that a number of researchers mentioned the importance of social support as a means of mediating job demands (Heilala et al., 2021; Nislin et al., 2015; Schaack et al., 2020), but again, no specific research has considered this potential resource in relation to those in EC leadership positions. These gaps indicate that more research is required to understand the nature of leaders' experiences of JD-R, and that this may also inform efforts to better support and retain leaders in the EC workforce.

Conclusion

As results from our analysis of TUD data indicate, EC educators' and leaders' work is complex and varied. The use of TUD methodology with a sample of well-resourced preschool and long day care centres has provided a fresh perspective on job demands, which has been characterised by research using cross-sectional designs and a 'global' view of educators' experiences. Gathering multiple ratings using TUD methodology allowed for more nuanced insights into the tasks, time use patterns and aspects of EC educators' and leaders' work, about which little is known. Notably, we uncovered experiences of high ratings of job satisfaction despite high demands; differences in educators' and leaders' experiences of job demands overall and between different tasks; times of day posing the greatest 'demand'; and further evidence of the demands of multitasking. We also highlighted a number of areas that provide promising insights for future research, these include: the nature of leaders' experiences of JD-R; the mediating role of taking breaks and undertaking professional development; the demands of contact with families; the aspects of educators' work that are most satisfying, and which might act as bolstering resources in the face of job demands; the demands of working with larger group sizes, and ways of better supporting educators with multi-tasking. With EC contexts across the globe characterised by workforce shortages and compromises to educators' wellbeing, learning more about these demands and resources of educators' work, and using these insights to inform interventions may enable policymakers, employers and EC leaders to provide the resources to re-balance the currently imbalanced job/demand equation.

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