

**Relationships between families' use of Sure Start Children's Centres, changes in home learning environments, and preschool behavioural disorders**

**Authors:** James Hall<sup>1\*</sup>; Pam Sammons<sup>2</sup>; Rebecca Smees<sup>3</sup>, Kathy Sylva<sup>2</sup>; Maria Evangelou<sup>2</sup>; Jenny Goff<sup>2</sup>; Teresa Smith<sup>4</sup>; George Smith<sup>4</sup>

<sup>1</sup> Southampton Education School, University of Southampton

<sup>2</sup> Department of Education, University of Oxford

<sup>3</sup> Department of Psychology, University of Sussex

<sup>4</sup> Department of Social Policy and Intervention, University of Oxford

\* Corresponding Author

**Address for Correspondence:** Southampton Education School, University of Southampton, Southampton, United Kingdom, SO17 1BJ

**Telephone:** +44 (0)2380 593 472

**Fax:** +44 (0)2380 594 535

**Email:** J.E.Hall@Soton.ac.uk

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**Abstract**

UK Sure Start Children's Centres (SSCCs) aim to lessen behavioural disorders yet we lack evidence concerning how this is achieved. This study evaluates one possible mechanism: improved home learning environments (HLEs). Data come from a longitudinal study of 2,568 families and children recruited at mean age 14 months from 117 SSCCs in England in 2012. Behavioural disorders were measured at 38 months via the Strengths and Difficulties Questionnaire. HLEs were measured at 14 and 38 months via parental interview. Families' use of SSCCs were measured via parental interview at 14, 22, and 38 months. This study suggests that the use of SSCCs is associated with fewer preschool behavioural disorders via intermediate changes to the quality of home learning environments. Implications are discussed for social policies and for early years' professionals.

**Keywords:** Sure Start Children's Centres; home learning environment; behavioural disorders; internalising problems; externalising problems; early intervention

## **Introduction**

Sure Start Children's Centres began as area-based initiatives within the UK and are intended to reduce social inequalities by providing integrated and high quality services to socially disadvantaged families with young children (All Party Parliamentary Sure Start Group, 2013). They are the product of a series of central UK Government policies that began in 1999 (e.g. Cabinet Office, 1999; Department for Education, 2013) and are an example of evidence-based policy making that is designed to reduce social inequalities via early intervention (Eisenstadt, 2011). In an international context, Sure Start Children's Centres are also an example of the various policy initiatives that have been informed by the USA Head Start programme (Welshman, 2010) – other examples including Family Centres in Germany (Stöbe-Blossey, Mierau, & Tietze, 2009) and Dream Start in South Korea (Lee et al., 2015). In the UK, the stated remit of Sure Start Children's Centre policy is the provision of integrated high quality services to socially disadvantaged families – with services being tailored to meet the needs of families living in local communities (Department for Education, 2013).

Given that Sure Start Children's Centres provide services to socially disadvantaged families and young children and yet target services in response to the needs of local communities, the question, "Who uses Children's Centres?" has been a central concern of policy makers, researchers, and practitioners from the start (e.g. Tunstill, Allnock, Meadows, & McLeod, 2002). Between 1999 and 2003 Sure Start had a remit to offer services to all families living in socially disadvantaged areas – first as Sure Start Local Programmes (SSLPs; to 2002) and then under the label of Sure Start Children's Centres. Between 2004 and 2010 the mandate of Children's Centres changed. All families were then to be reached with the provision of services via a 'core offer' but with extra services for those in high need. In 2011, a 'revised

core purpose' was introduced to more strongly target services to families 'in greatest need' (Sammons, Hall et al., 2015). When coupled with the difficulties that Children's Centres can encounter in reaching these families (e.g. Eisenstadt, 2011), necessitates effective outreach work and effective and integrated multiagency working with professionals including health visitors and midwives (see Goff et al., 2013).

The services that are offered either by or through Sure Start Children's Centres (via sign posting and/or referral) are broad so as to match the varying needs of families who use them and the varying needs of the different communities in which Centres are located. Offered services commonly include: health advice, childcare and early education, employment advice, informal drop-in facilities, and specialist support on parenting (e.g. 4Children, 2015; Goff et al., 2013). However, following the 2011 and 2012 revisions to their core purpose (Department for Education, 2013) and the increasing impact of austerity budget cuts to Local Authorities (Torjesen, 2016), there is evidence that Children's Centres are shifting towards offering greater provision of outreach and targeted services at the expense of parent-support and universal provision (Hall et al., 2015).

Establishing the effectiveness of Sure Start Children's Centres has proven difficult because they are deliberately localised manifestations of a series of social policies dating back to 1999. This lack of consistency in policy (and arguably precision; Rutter, 2007) followed by deliberate localisation in implementation prevents the use of experimental research designs (e.g. RCTs and QEDs) for the effective evaluation of both Sure Start as a social policy and Sure Start as a nationwide programme (e.g. Eisenstadt, 2011; Hall et al., 2015). There has never been a single model of what a Sure Start Children's Centre should look like on the ground and the shifting policy directives have, over time, driven Centres to alter both their

structure and their offer to their local communities. For example, shifting from a stand-alone model of working where one Centre serves one neighbourhood to a hub and spoke model of working in which services are shared across multiple Centres located across multiple neighbourhoods (Sylva et al., 2015).

Many of the services that Children's Centres offer to families are 'evidence-based' in line with the UK Government definitions of this term (e.g. Field, 2010). Children's Centres (both the social policy and the services offered to families) are intended to promote positive change in outcomes for families, parents, and children. The range of services provided through Children's Centres is intended to support parents, and so parenting and early years' home learning environments, which may therefore have potential to improve behavioural outcomes for young children. For example, Nurse-Family Partnerships (NFP), Incredible Years, and the Positive Parenting Programme (Triple P) are all examples of 'well-evidenced' programmes that support both parenting and reduce the likelihood that children will develop behavioural disorders (e.g. De Graaf, Speetjens, Smit, De Wolff, & Tavecchio, 2008; Olds et al., 2004; Webster-Stratton & Reid, 2010). Furthermore, of the 'well-evidenced' programmes included on the long list produced by Allen (2011) these three programmes were found to be the most commonly used by families in Children's Centres between 2012 and 2013 (Evangelou et al., 2014).

The most comprehensive evidence of the impact of Sure Start Children's Centres is provided by the two UK national evaluations of Sure Start: The 2001-2012 National Evaluation of Sure Start (NESS; see Belsky, Melhuish, & Barnes, 2007) and the 2009-2017 Evaluation of Children's Centres in England (ECCE) Project (see Sammons, Hall, et al., 2015; Sylva et al., 2015). NESS used a quasi-experimental design (QED) to compare 6000 families living in

areas with an SSLP to 2000 families living in similarly-deprived non SSLP areas. This evaluation was not able to investigate effects on users of services directly as it did not collect information from users. In contrast, the ECCE Project used a prospective longitudinal design to follow a cohort of families over an average 14 month period. Recruited families were sampled on the basis that they had a child aged between 9-18 months at recruitment and that they were registered with a Children's Centre.

Both NESS and the ECCE Project investigated the associations that existed between Sure Start Children's Centres, families, home learning environments, and children's behavioural disorders. Furthermore, both studies measured home learning environments and children's behavioural disorders in the same manner: via use of the same home learning environment scale (see Sylva et al., 2010) and the Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997, 2001). NESS identified an association that families living in a socially disadvantaged area served by an SSLP had higher-quality home learning environments than families living in equally disadvantaged non-SSLP served areas. However, no difference between these two groups of families was identified in their children's behavioural disorders (Melhuish, Belsky, Leyland, Barnes, & National Evaluation of Sure Start Research Team, 2008). The ECCE Project also found an association between Children's Centres and home learning environments: greater use of Children's Centres and their services was associated with higher-quality home learning environments (Sammons, Hall et al., 2015).

In contrast to NESS, the ECCE Project also found a number of significant associations between the use of Children's Centres and children's behaviour. Significant associations were found that linked different types of use to both higher and lower scores for preschool behaviour problems. These findings were interpreted as evidence of two kinds of 'impact' as

a result of different associations being found for different types of use (e.g. of outreach services rather than stay and play sessions) and for families who were differentiated by level of social disadvantage. As a result, the ECCE Project concluded that Children's Centres were demonstrating the capability to both successfully reach the 'neediest' families (where preschool behavioural disorders are more likely) plus provide services to families that promote reductions in children's behavioural disorders (Sammons, Hall, et al, 2015). Taken together, the findings from NESS and ECCE Project suggest that the use of Sure Start Children's Centres may facilitate improvements to home learning environments and reduced occurrence of behavioural disorders in children. However, gaps remain in our understanding of *how* the use of Children's Centres can lead to such outcomes. This investigation addresses one of these gaps by exploring the possibility of secondary effects. That boosts to the quality of home learning environments may be associated with fewer children's behavioural disorders – a speculated possibility previously mooted by the NESS investigators (Eisenstadt, 2011). To the best of our knowledge, this is the first study to empirically test whether the use of Sure Start Children's Centres (or the use of similar services in other countries) might be linked with fewer preschool behavioural disorders via associations with improvements to the quality of home learning environments.

### ***Research Question***

Is the use of Sure Start Children's Centres associated with preschool behavioural disorders via associations with changes to home learning environments?

## **Materials and Method**

### ***Participants***

Data were collected as part of the prospective longitudinal Evaluation of Children's Centres in England (ECCE) project (see Sammons, Hall et al., 2015; Sylva et al., 2015). Families and

children participating in the project were recruited when their children were mean age 14 months and all families were registered at a Sure Start Children's Centres in England. Note that being registered did not imply the actual use of a Centre or its services but meant that a family had been in some form of contact with a local centre to be registered as a potential user. The data reported in this paper come from the three annual surveys carried out with 2,608 parents and children and staff at 117 Children's Centres from across England between 2012 and 2014 (Maisey et al., 2013, 2015). This sample of Sure Start Children's Centres was achieved from a multi-phase random stratified sampling process that is described in detail in Tanner et al (2012). Briefly, the achieved sample of Children's Centres was carefully selected so that it would be broadly representative of all Phase 1 and 2 Centres in England (Phases defined and differentiated in Eisenstadt, 2011; Hall et al., 2015) while including all of the limited number of Children's Centres that were then run by the UK National Health Service.

The 2,608 children (plus their families) who were subsequently sampled from within the 117 Children's Centres were of mean ages 14, 22, and 38 months respectively in each of the three years/waves of fieldwork (Sammons, Hall et al., 2015). This paper builds on and extends previous analyses of the impact of Children's Centres in the main evaluation (Sammons, Hall et al., 2015) by determining whether families' use of Children's Centres is related to lower scores for behavioural disorders in preschoolers by improving home learning environments.

Of the 2,608 families that participated in the final 2014 wave of fieldwork, productive information on behavioural disorders was achieved for 2,568 children (98%) with this constituting the sample of this investigation. Ethical Approval for the ECCE project was granted by the University of Oxford Research Ethics Committee, with Children's Centres and sampled families participating following opt-in consent. The sample is representative of both

Phase 1 and 2 Children’s Centres in England between 2012 and 2014, and of the families with infants, toddlers and preschoolers who used them during this period (for more information see Tanner et al., 2012).

### ***Measures***

*Families’ use of Children’s Centres between mean child ages 14 to 38 months.* The ECCE impact analysis used seventeen measures to record how families used Children’s Centres between 2012 and 2014. Previous publications showed that nine of these measures were significantly associated with either a child’s behavioural disorders (at mean age 38 months) or with improvements in home learning environments between 2012 and 2014 (Sammons, Hall et al., 2015). These nine measures therefore provided a starting point to answering the research question of this paper; they distinguish between families’ use of: children’s centres, centre services, and the most-commonly used services. Table 1 describes these nine measures and full details can be found in Sammons, Hall et al. (2015). The nine measures also distinguish between the use of a Centre at which a family was registered and the use of any Children’s Centre; an issue of increasing importance as Children’s Centres respond to austerity cuts (Hall et al., 2016) by altering their structure (Sammons, Smees et al., 2015) and services (Hall et al., 2015; Sylva et al., 2015). This is an important distinction as services could be used at other Centres or at other kinds of provider. Full data on the use of Children’s Centres was obtained from all 2,568 participating families. By testing all nine measures of families’ use of Children’s Centres and their services we avoid both cherry picking evidence (where strongest, weakest, or by theme) and the risk of drawing only partially informed conclusions that risk both type 1 and type 2 errors.

[Insert Table 1 here]

*Home Learning Environments (HLE; mean child ages 14 and 38 months).* Different measures were used at the first (in 2012) and third (in 2014) data collection sweeps in response to differences in what constitutes developmentally appropriate parenting practices. In 2012, a toddler period HLE measure was used as the sampled children were of mean age 14 months. This was created by the ECCE researchers as an adaptation of a pre-existing preschool period HLE measure (Sylva, Melhuish, Sammons, Siraj-Blatchford, & Taggart, 2010). The Toddler HLE (THLE) was comprised of eight 7-point ordinal items that were asked during parent interview at baseline to the evaluation. These items were summed to create an index (values ranging 0-56) and each item recorded the extent to which a child: 1. was taken on outings, 2. was taught the names of things, 3. was played with using blocks or shapes, 4. was taught about colours and shapes, 5. was sung songs/nursery rhymes, 6. was given the chance to engage in ‘messy’ play, 7. was read to, 8. the amount of books that they had for babies and toddlers (for more details see Maisey et al., 2013). The resulting THLE index (achieved for n=2,559 families) had minimum and maximum values of 12 and 56, a mean of 43.62, and a standard deviation of 7.12. A higher score was treated as indicative of a higher quality toddler-period home learning environment.

In 2014, a pre-existing measure of the preschool home learning environment was used by the ECCE project. This Preschool HLE (PHLE) was created by the EPPE Research Project (where it was termed the ‘early home learning environment’; see Sylva et al., 2010) from a list of 14 home activity questions asked via parent interview. Seven of these items were then summed by the EPPE researchers to form an index because the questions concerned parents provision of developmentally appropriate opportunities for their preschoolers to learn and because these measures were, “conceptually and statistically linked” to subsequent

educational progress (Sylva, Melhuish, Sammons, Siraj-Blatchford, & Taggart, 2008, p. 21). The ECCE team followed the coding procedure outlined by the EPPE researchers: Seven items were coded by frequency of occurrence in the home (0= “not occurring”; 7 = “very frequent”) and summed to form an index that ranged from 0-49. The resulting measure (achieved for n=2,564 families) had achieved minimum and maximum values of 0 and 49, a mean of 30.64 and a standard deviation of 9.05. A higher score was treated as indicative of a higher quality preschool-period home learning environment. The EPPE research found the early HLE to be a moderately strong statistical predictor of better child outcomes (cognitive and socio-emotional) from school entry onwards (see Sammons et al., 2004; 2008; Sammons, Toth, et al., 2015).

*Internalising and externalising behavioural disorders at mean age 38 months.*

Preschool behavioural disorders were measured via the parent-completed version of the Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997, 2001). Each area of child behavioural disorders was measured via its namesake ‘alternative’ SDQ subscale (Chiorri, Hall, Casely-Hayford, & Malmberg, 2016), justified as appropriate in this instance because the SDQ was being used to screen for behavioural disorders in a socially heterogeneous sample (Sammons, Hall et al., 2015). A measure of internalising behavioural disorders was constructed by summing the SDQ subscales of ‘emotional symptoms’ and ‘peer problems’ (higher score=more problems; achieved for n=2,566 children; range:0-20; min./max.= 0/17; mean=2.84; SD=2.45), while externalising problems was measured by summing ‘conduct problems’ and ‘hyperactivity-inattention’ (higher score=more problems; achieved for n=2,568 children; range:0-20; min./max.=0/20; mean=6.09; SD =3.37). The distribution of scores across these subscales suggested that the ECCE sample of preschoolers were broadly

in-line with contemporaneous national norms for internalising problems though slightly elevated for externalising problems (for details see Sammons, Hall et al., 2015).

*Potential Confounding Factors.* Fifteen background covariates were included in this investigation – all of which were measured at mean child age 14 months. The rationale for their inclusion is the same as the rationale for including the nine measures that recorded the use of Children’s Centres: they are measures identified by the ECCE Impact Report (Sammons, Hall et al., 2015) as measures that predicted child and family outcomes when identifying the impact of Children’s Centres on preschoolers’ behavioural disorders and/or their families’ PHLE. Supplementary Material 1 presents univariate descriptive statistics for these background covariates/potential confounds. Full information on each measure and on the contextual multilevel models is in the Evaluation of Children’s Centres in England (ECCE) Impact Report (Sammons, Hall et al., 2015). The inclusion of these measures in this investigation was used to control for background differences in the behavioural disorders of preschoolers that were linked to differences between children, mothers (biological, adopted, step, or foster), families, and neighbourhoods. Differentiated by ecological level and beginning with the most proximal to the child, the fifteen covariates related to:

1. ***The child.*** Two measures: gender; number of siblings
2. ***Parenting.*** Three measures: the Parenting Stress Index (PSI; Abidin, 2012) subscales ‘Difficult Child’ and ‘Dysfunctional Interaction’; chaotic home environments measured via the pre-existing Chaos, Hubbub, and Order Scale (CHAOS; Matheny, Wachs, Ludwig, & Phillips, 1995)
3. ***Household mothers.*** Five measures: age; highest level of academic qualifications; physical health; perception of relationship quality with partner; mental health measured via the pre-existing General Health Questionnaire (GHQ; Goldberg, 1992)

4. **Households.** Four measures: family financial disadvantage; parental cohabitation; presence of a younger sibling; occurrence of one or more stressful life events
5. **Neighbourhoods.** One measure: neighbourhood disadvantage measured via the pre-existing Income Deprivation Affecting Children Index (IDACI; Noble et al., 2008)

### ***Statistical Analysis***

All analyses were conducted using IBM SPSS Statistics (SPSS IBM, 2013) and Mplus version 6.1 (Muthén & Muthén, 2010). Nine saturated and aggregated multilevel Structural Equation Models (MLSEM; controlling for the consequences of families being statistically ‘nested’ within Children’s Centres) were used to estimate the impact of each of the nine measures that recorded the use of Children’s Centres upon children’s internalising and externalising problems (at mean age 38 months) and upon changing HLE between the toddler and preschool periods (see Figure 1). Saturated models were specified in order to fully test the research question with appropriate statistical controls. The appropriateness of the statistical controls was dictated by the purpose of this paper: To take two sets of independent multilevel multivariate regression equations that considered associations between SSCC use and changing HLE and associations between SSCC use and preschool behavioural disorders (Sammons, Hall et al., 2015) and to unify these in order to address this paper’s research question. This analytic approach meant that the results from this paper are able directly contribute to a wider body of knowledge - that generated by past publications from the prospective longitudinal ECCE project.

The specification of saturated statistical models to integrate the two sets of past statistical associations meant that the common SEM global fit indices (e.g. CFI, RMSEA) were of no use in judging the suitability of the new statistical models to represent accurately the data to

which they were applied (model fit). This was because the saturated models (by their very nature) already perfectly reproduced the data to which they were applied. Why then were saturated models specified? Their specification was dictated by the purpose of this investigation – they provided a means to test empirically two independent sets of associations that had been previously obtained (Sammons, Hall et al., 2015). This is a conservative use of SEM that is also in keeping with past criticisms and historical misuses of SEM and SEM global fit indices (e.g. MacCallum & Austin, 2000; Barrett, 2007; Kenny, 2015). As a result, the appropriateness of the nine statistical models as a basis to produce answers to the research question were evaluated following the guidelines of Tomarken and Waller (2003). The appropriateness of the nine statistical models was evaluated by ‘lower-order components of fit’ - the percentages of variation ( $r^2$ ) that were explained in the preschool HLE (18%,  $p < 0.001$  in all nine SEM) and in the two measures of preschool behavioural disorders (in all nine SEM: 13%,  $p < 0.001$  for internalising disorders and 17%,  $p < 0.001$  for externalising disorders). These statistically significant percentages of variation that were explained would be labelled as, “medium” in size by application of the rule of thumb ( $r^2 \geq 0.13$ ) published by Cohen (1988).

[Insert Figure 1 here]

Within all nine Structural Equation Models, missing data (reported variable by variable in Supplementary Material 2) were estimated using multiple imputation and Robust Maximum Likelihood estimation was used to mitigate potentially spurious effects caused by non-normally distributed measures (Muthén & Muthén, 2010). Missing data occurred for only five variables and was largest for the THLE ( $n=9$ ; 0.35% of the analysed sample of 2,568 cases). The procedures of Hayes and Preacher (2014) were followed to estimate indirect

(mediating) effects for the eight non-continuous measures that recorded how families used Children's Centres and Centre services (measures 2-9 in Table 1). The inclusion of background covariates as predictors of PHLE and preschool behavioural disorders meant that all impacts were contextualised for known salient background effects, while the repeated measurement of Home Learning Environments meant that Children's Centre impacts on the PHLE can be referred to as a form of 'Contextual Value-Added' effect (Ray, McCormack, & Evans, 2009).

## **Results**

Table 2 reveals the associations shared between the nine measures recording families' use of Children's Centres (and Centre services) and the four measures recording families' household THLE, PHLE, and their child's behavioural disorders score at mean age 38 months. 21 of the 36 associations shown in Table 2 (58%) were statistically significant at  $\alpha=0.05$ . Further, eight of the nine measures recording families' use of Children's Centres (and Centre services) were related either to the two home learning environment measures or to children's behavioural disorders – the only exception occurring when considering families' use of Health Visitor Services through any Children's Centre (registered or otherwise).

The consistency with which the use of Children's Centres and Centre services were associated either with home learning environments or with children's behavioural disorders is partially a product of the criteria that was used to select the nine measures of Centre and service use for inclusion in this investigation. Each was included due to their significant association with the four measures of HLE and behaviour disorders in the ECCE Impact Report (Sammons, Hall et al., 2015). Although none of the associations shown in Table 2 could be described as larger than "small" by the criteria of Cohen (1988), these scene-setting

associations also ignored differences in centre use, home learning environments, and child behavioural disorders that were linked to the contexts within which the Children's Centres and services operated, and the contexts in which the children and families lived.

The snapshot of associations shown in Table 2 are complemented by four further associations between the THLE, PHLE and the two measures recording children's internalising and externalising behavioural disorders at mean age 38 months. The (bootstrapped) bivariate association between THLE and PHLE was  $r=0.36$  ( $p<0.001$ ) while the equivalent association between children's internalising and externalising behaviours was also  $r=0.36$  ( $p<0.001$ ). The equivalent association between the THLE and internalising behavioural disorders was  $r=-0.14$  ( $p<0.001$ ) whereas for externalising behaviours this was  $r=-0.11$  ( $p<0.001$ ). After an average period of 22 months, the association between the (now) PHLE and internalising behavioural disorders had slightly decreased to  $r=-0.10$  ( $p<0.001$ ) whereas for externalising behaviours the association had increased to  $r=-0.16$  ( $p<0.001$ ).

[Insert Table 2 here]

### ***Multilevel Structural Equation Models***

Tables 3 through 5 present results from the nine saturated Structural Equation Models that were tested in order to answer the research question of this investigation: *Is the use of Sure Start Children's Centres associated with preschool behavioural disorders via associations with changes to home learning environments?* Full results from the nine models are shown in Supplementary Material 3. Tables 3 and 4 present contextualised direct and indirect associations (via changing home learning environments) that linked families' reported use of Children's Centres (and Centre services) with children's internalising (Table 3) and

externalising (Table 4) behaviours at mean age 38 months. Table 5 presents the contextualised value-added impacts of Children's Centre use (between mean child ages 14 to 38 months) upon families' preschool home learning environments at mean child age 38 months.

The results shown in Tables 3 and 4 reveal that the use of Children's Centres and their services between the toddler and preschool period are associated with positive changes in home learning environments and lower scores for externalising disorders in preschool aged children. However, the same cannot be claimed for internalising behavioural disorders. Table 3 shows no statistically significant indirect impacts linking centre use to internalising problems via changing home learning environments whereas eight such relations are shown in Table 4.

Lower scores for externalising problems in preschool aged children due to changes in HLE were more likely when: 1. Families used a Sure Start Children's Centre for a longer period (regardless of their being registration there); 2. Families' longer-term use of Children's Centres was characterised by the greater use of multiple types of services (described in Hall et al., 2015); 3. 'Stay and Play' services were used consistently as opposed to not at all. Conversely, neither the use of health visitor nor outreach services were related to lower scores for preschool externalising behaviours that were linked to improvements in home learning environments between the toddler and preschool periods.

The statistical associations that are shown in Table 3 and 4 are in keeping with and elucidate upon a pattern of associations that was also found in the results of the ECCE Impact Report that this investigation builds upon (Sammons, Hall et al., 2015). In both investigations,

families' use of Children's Centres and their services was associated with preschool behavioural disorders in a manner that initially appears counter-intuitive. The results shown in Tables 3 and 4 illustrate that greater use of Children's Centres (and the services offered through them) was associated with higher levels of behavioural disorders in preschool aged children. Our interpretation of these associations is that they are indicative of Children's Centres carrying out successful outreach work with more disadvantaged families – an activity in keeping with their revised core purpose (Department for Education, 2013). This possibility is discussed below and it is supported by the findings of differential Centre (and service) use for more socially disadvantaged families reported elsewhere (Sammons, Hall et al., 2015; Smith et al., 2014).

[Insert Table 3 here]

[Insert Table 4 here]

The results in Table 5 extend those presented in Tables 3 and 4 by revealing the extent to which the use of Sure Start Children's Centres and their services was associated with the quality of preschool home learning environments. These results also extend findings in Table 2 as these earlier associations did not account for families' home learning environments in the toddler period, nor the contexts within which Children's Centres operated or the contexts within which families and children lived. Aside from the use of Health Visitor services, greater use of Children's Centres and their services (particularly 'Stay and Play' and outreach) was associated with improvements to the quality of families' home learning environments during the preschool period.

[Insert Table 5 here]

The indirect associations shared between the use of Children's Centres and preschoolers' behavioural disorders shown in Tables 3 and 4 are a product not only of associations between Centre use and home learning environments (Table 5) but also of associations between preschool home learning environments (PHLE) and children's behavioural disorders. The (contextualised) associations between PHLEs and children's behavioural disorders at outcome (mean age 38 months) were consistent across all nine statistical models (see Table 6). An increase in the quality of families' PHLE was associated with a lower scores for their children's externalising behaviours ( $b=-0.04$  standard deviations; standard error=0.01;  $p<0.001$ ). Likewise, an increase in PHLE quality was also associated with lower scores for internalising behaviours ( $b=-0.01$  standard deviations; standard error=0.01) though this effect was consistently statistically insignificant at  $\alpha=0.05$  ( $p$  values ranging from  $p=0.063$  to  $p=0.089$  across the nine SEM; see Table 6 and Supplementary Material 3 for full details). This consistent association between improvements in the quality of the home learning environments and lower scores for externalising behaviours also informs the interpretation of counter-intuitive associations shared between Children's Centre use and behavioural disorders and is returned to below.

[Insert Table 6 here]

## **Discussion**

There is mounting evidence that Sure Start Children's Centres 'worked'. As they existed between 2012 and 2014, Children's Centres had the potential to promote better outcomes for socially disadvantaged families and, to a lesser extent, better outcomes for socially

disadvantaged children and mothers. This was the conclusion reached by the impact evaluation of the ECCE project and a conclusion that was grounded in the research findings of 10 UK Department for Education research reports published between 2012 and 2016. The results of this investigation extend these findings by laying out evidence regarding one of the ways in which this impact of Children's Centres may be accomplished. It appears that Children's Centres (and their services) have the potential to reduce the occurrence of behavioural disorders in preschoolers indirectly when they boost the quality of home learning environments.

Our claim that Sure Start Centres worked is presented in the past tense due to the on-going UK cuts to expenditure on public services that are linked to austerity policies. Since 2010, UK Government policies have led to a reduction in both the number of Children's Centres across the UK via closure or amalgamation and to reductions in the services that are commonly offered (e.g. House of Commons, Debate, 20 May 2013, col 584; House of Commons Education Select Committee, March 11, 2015, Q9). The findings of this investigation are now discussed in this context and in the context of past research findings. This is followed by a discussion of the limitations of this paper, potential future research that can extend these findings, and a statement of the conclusions that might reasonably be drawn.

Our results suggest three sets of findings. First, that the use of Sure Start Children's Centres has the potential to reduce the occurrence of externalising behavioural disorders in preschoolers by improving the quality of their home learning environments. However, these results do not extend to internalising disorders. As discussed earlier, both NESS and the ECCE Project concluded that the use of Children's Centres was associated with improvements in the quality of early years home learning environments (Melhuish et al.,

2008; Sammons, Hall et al., 2015). The findings from this paper support the speculation from the NESS team that such boosts might lead to secondary effects on child outcomes (as reported in Eisenstadt, 2011). This speculation drew on existing UK evidence that high quality home learning environments in the early years are more pronounced drivers of a range of subsequent developmental and educational outcomes than are backgrounds characterised by social disadvantage (Sammons et al., 2004, 2008, Sammons, Toth, et al., 2015; Sylva et al., 2008, 2010). Our finding that the use of Children’s Centres have the potential to reduce behavioural disorders by improving home learning environments in children aged 3 years – even to a small extent – therefore raises the possibility of further and continuing indirect effects on child outcomes at later ages. However, it will be difficult for future research to test this hypothesis given the complexity of both Sure Start Children’s Centre policy and implementation (echoing Rutter, 2007) combined with the continuing changes to Children’s Centres that are a result of budgetary challenges faced by many UK Local Authorities (Hastings, Bailey, Bramley, & Gannon, 2017).

Second, the differential impact of Children’s Centre use on internalising and externalising behavioural disorders is partly explained by the two disorders being inconsistently associated with the quality of families’ home learning environments. In particular, improvements to the quality of home learning environments between the toddler and preschool periods were associated with lower scores for only externalising - not internalising - behavioural disorders. One interpretation of this disparity is that it may reflect the necessity for parents to engage more with a child’s externalising rather than internalising behaviours (e.g. “restless, overactive...” versus, “...often seems worried”) if they are to engage more frequently in the pedagogical parent-child activities that are measured in both the THLE and PHLE scales. Such a possibility is supported by a wide range of existing educational, psychological, and

psychiatric literature (e.g. Gridley, Hutchings, & Baker-Henningham, 2015; Johnston & Mash, 2001; Johnston, Murray, Hinshaw, Pelham, & Hoza, 2002).

Third, the findings of this investigation clarify the existing associations previously found between the long-term use of Children's Centres and higher scores for behavioural disorders in preschoolers. The ECCE project previously identified that the use of Children's Centres can prompt two types of association with outcome measures: 1. associations reflecting possible improvements in outcomes, and 2. associations reflecting possible needs driven service use and/or successful outreach work that is in line with the core purpose of Children's Centres (Department for Education, 2013). This latter effect we previously termed, "Impact as Reach" (Sammons, Hall et al., 2015; Sammons, Smees et al., 2015). The findings of this paper demonstrate that these two types of association need to be considered.

As in the ECCE Impact Report (Sammons, Hall et al., 2015) we found that children demonstrated greater behavioural disorders when their families were long-term users of Children's Centres (the "direct effects" shown in Tables 3 and 4). We also found that children demonstrated reduced externalising behavioural disorders when their families' use of Children's Centres was linked to improved home learning environments (the "indirect effects" shown in Tables 3 and 4). When both these types of association are considered at the same time (e.g. via the "total effects" in Tables 3 and 4) then they are at-risk of statistically cancelling one another out (e.g. the "total effect" in Table 4 linked to the total period in months that a family used a Children's Centre). In turn, this means that *researchers and those that rely upon them (e.g. local and national policy makers) are at-risk of failing to identify positive impacts that are associated with Sure Start Children's Centres*. This risk of researchers feeding false negative results (making type II errors) to policy makers is a serious

problem (relatively neglected compared to false positives; Fiedler, Kutzer, & Krueger, 2012) – especially in the context of evidence based policy making and current UK austerity policies promoting reductions in expenditure on public services.

### ***Limitations and Future Directions***

The findings of this investigation have a number of limitations that, in turn, suggest directions for future research. First, the use of a randomised control trial (RCT) design would have offered the ECCE project a stronger basis from which to establish claims of impact. However, the very nature of Sure Start Children's Centres as localised implementations of a national social policy precluded use of this design – as was also the case for NESS (Belsky, Melhuish, & Barnes, 2007). There was no single Children's Centre intervention and all families were encouraged to use services. Second, the data used in this investigation originated solely from interviews with parents. This introduces the possibility of inaccuracy due to bias – especially due the use of single informants in the measurement of children's behavioural disorders (Chiorri et al., 2016). Future research would benefit from the use of multiple informants and variations in the methods of used in measurement. Third, our results identified only small effect sizes linking the use of Sure Start Children's Centres to lower scores for externalising disorders via improvements to the quality of home learning environments. The biggest statistical associations were linked to markers of social disadvantage (particularly mother qualifications; see Supplementary Material 3). This serves to highlight the fact that Children's Centres cannot be viewed as a panacea for social inequalities in early childhood health and development (Pillas et al., 2014) but rather may help to partly ameliorate the adverse influence of social disadvantage.

Regarding future research, those examining either Sure Start Children's Centres or other implementations of social policies with a mandate to reach a group (here 'neediest' families) are advised to pay heed to our documentation of two types of impact: direct and 'impact-as-reach'. These have the potential to cancel one another out and so produce false negative results. Ofsted evaluation of centre quality could also benefit from recognition of such potential effects.

### ***Conclusions***

Children's Centres have a remit to target families whose children are at-risk of behavioural disorders. This investigation demonstrates one way in which this remit can be met: by improving the quality of home learning environments in the early years. This conclusion has consequences for social policy makers and those working in health, education and social work professions – consequences that are contextualised by current UK social policies linked to austerity. For social policy makers, the knowledge already exists that early interventions are the most effective (Allen, 2011; Field, 2010) and the most cost effective (Heckman, 2006). The findings of this paper and of the ECCE project therefore provide evidence of the importance of maintaining the Sure Start Children's Centre offer at a time when many UK public services are under pressure (e.g. All Party Parliamentary Sure Start Group, 2013). Moreover, Children's Centres should not be treated as a 'Cinderella Service' when compared to antenatal services and schools (Rallings, 2014). For those working in health, education, and social work professions, we expect that our findings provide evidence at scale to extend that which they have observed in practice. Our findings highlight the importance of effective outreach work and therefore the existence of effective integrated multiagency (and inter-profession) working practices.

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## References

- 4Children. (2015). *Children's Centre census 2015: A national overview of Children's Centres in 2015*. Retrieved from [http://cdn.basw.co.uk/upload/basw\\_23838-9.pdf](http://cdn.basw.co.uk/upload/basw_23838-9.pdf)
- Abidin, R. R. (2012). *Parenting stress index* (4th ed.). Lutz, FL: PAR.
- All Party Parliamentary Sure Start Group. (2013). *Best practice for a sure start: The way forward for Children's Centres*. London: 4Children.
- Allen, G. (2011). *Early intervention: The next steps. An independent report to HM Government*. London: HMSO.
- Barrett, P. (2007). Structural equation modelling: Adjudging model fit. *Personality and Individual Differences*, 42(5), 815-824. doi: 10.1016/j.paid.2006.09.018
- Belsky, J., Melhuish, E. C., & Barnes, J. (Eds.). (2007). *The national evaluation of Sure Start: Does area-based early intervention work?* Bristol, UK: Policy Press.
- Cabinet Office. (1999). *Modernising Government*. London: HMSO.
- Chiorri, C., Hall, J., Casely-Hayford, J., & Malmberg, L. E. (2016). Evaluating measurement invariance between parents using the strengths and difficulties questionnaire (SDQ). *Assessment*, 23(1), 63-74. doi:10.1177/1073191114568301
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences*: Routledge.
- De Graaf, I., Speetjens, P., Smit, F., De Wolff, M., & Tavecchio, L. (2008). Effectiveness of the Triple P Positive Parenting Program on parenting: A meta-analysis. *Family Relations*, 57(5), 553-566. doi:10.1177/0145445508317134
- Department for Education. (2013). *Sure Start Children's Centres: Guidance for local authorities*. (DFE-00314-2013). London: DfE.
- Eisenstadt, N. (2011). *Providing a sure start: How government discovered early childhood*. Bristol, UK: Policy Press.

- Evangelou, M., Goff, J., Hall, J., Sylva, K., Eisenstadt, N., Paget, C., . . . Parkin, T. (2014). *Evaluation of Children's Centres in England (ECCE), Strand 3: Parenting services in Children's Centres*. (DFE-RR368). London: DfE.
- Fiedler, K., Kutzer, F., & Krueger, J. I. (2012). The long way from  $\alpha$ -error control to validity proper. *Perspectives on Psychological Science*, 7(6), 661-669. doi:10.1177/1745691612462587
- Field, F. (2010). *The foundation years: Preventing poor children becoming poor adults. The report of the independent review on poverty and life chances*. London: HMSO.
- Goff, J., Hall, J., Sylva, K., Smith, T., Smees, R., Smith, G., . . . Evangelou, M. (2013). *Evaluation of Children's Centres in England (ECCE). Strand 3: Delivery of family services by Children's Centres*. (DFE-RR297). London: DfE.
- Goldberg, D. (1992). *General Health Questionnaire (GHQ-12)*. Windsor, UK: NFER-Nelson
- Goodman, R. (1997). The strengths & difficulties questionnaire: A research note. *Journal of Child Psychology & Psychiatry*(38), 581-586. doi:10.1111/j.1469-7610.1997.tb01545.x
- Goodman, R. (2001). Psychometric properties of the strengths and difficulties questionnaire (SDQ). *Journal of the American Academy of Child and Adolescent Psychiatry*, 40, 1337-1345. doi:10.1097/00004583-200111000-00015
- Gridley, N., Hutchings, J., & Baker-Henningham, H. (2015). The Incredible Years parent-toddler programme and parental language: A randomised controlled trial. *Child: Care, Health, and Development*, 41, 103–111. doi:10.1111/cch.12153
- Hall, J., Eisenstadt, N., Sylva, K., Smith, T., Sammons, P., Smith, G., . . . Hussey, D. (2015). A review of the services offered by English Sure Start Children's Centres in 2011 and 2012. *Oxford Review of Education*, 41(1), 89-104. doi:10.1080/03054985.2014.1001731

- Hall, J., Sammons, P., Sylva, K., Evangelou, M., Eisenstadt, N., Smith, T., & Smith, G. (2016). Disadvantaged families are at greatest risk from austerity cuts to children's centres. *British Medical Journal (Clinical research ed.)*, *352*(i897). doi:10.1136/bmj.i897
- Hastings, A., Bailey, N., Bramley, G., & Gannon, M. (2017). Austerity urbanism in England: The 'regressive redistribution' of local government services and the impact on the poor and marginalised. *Environment and Planning A*. doi:10.1177/0308518X17714797
- Hayes, A. F., & Preacher, K. J. (2014). Statistical mediation analysis with a multicategorical independent variable. *British Journal of Mathematical and Statistical Psychology*, *67*, 451-470. doi:10.1111/bmsp.12028
- Heckman, J. J. (2006). Skill formation and the economics of investing in disadvantaged children. *Science*, *132*(1900-1902).
- House of Commons: the United Kingdom Parliament, Hansard Volume House of Commons Debates, Session 2013–14 Vol. 563, 20 May 2013, col. 584. Available online at: <http://www.publications.parliament.uk/pa/cm201314/cmhansrd/cm130520/index/130520-x.htm>
- House of Commons, Education Select Committee, Session 2014–15, Oral Evidence, Foundation Years, 11 March 2015, Q9. Available online at: <http://data.parliament.uk/writtenevidence/committeeevidence.svc/evidencedocument/education-committee/sure-start-childrens-centres-follow-up/oral/18543.html>
- Kenny, D. (2015). *Measuring model fit*. Retrieved from <http://davidakenny.net/cm/fit.htm>
- Johnston, C., & Mash, E. J. (2001). Families of children With attention-deficit/hyperactivity disorder: Review and recommendations for future research. *Clinical Child and Family Psychology Review*, *4*(183). doi:10.1023/A:1017592030434

- Johnston, C., Murray, C., Hinshaw, S. P., Pelham, W. E., & Hoza, B. (2002). Responsiveness in interactions of mothers and sons with ADHD: Relations to maternal and child characteristics. *Journal of Abnormal Child Psychology*, 30(1), 77-88. doi:10.1023/A:1014235200174
- Lee, Y. J., Bahn, G. H., Lee, S. I., Kim, B., Bhang, S. Y., Sohn, S. H., . . . Hwang, J. W. (2015). The early childhood care and education policy in the United Kingdom and similar policies in Korea: A comparison of the Sure Start Children's Centres and Dream Start. *Journal of the Korean Academy of Child and Adolescent Psychiatry*, 26(1), 12-21. doi:10.5765/jkacap.2015.26.1.12
- MacCallum, R. C., & Austin, J. T. (2000). Applications of structural equation modeling in psychological research. *Annual Review of Psychology*, 51, 201-226. doi:10.1146/annurev.psych.51.1.201
- Maisey, R., Poole, E., Chanfreau, J., & Fry, A. (2015). *Children's Centres Evaluation in England (ECCE) Strand 2: Longitudinal survey of families using Children's Centres in the most disadvantaged areas*. (DFE-RR434). London: DfE.
- Maisey, R., Speight, S., Haywood, S., Hall, J., Sammons, P., Hussey, D., . . . Sylva, K. (2013). *Evaluation of Children's Centres in England (ECCE), Strand 2: Baseline survey of families using Children's Centres in the most disadvantaged areas*. (DFE-RR260). London: DfE.
- Matheny, A. P., Wachs, T. D., Ludwig, J. L., & Phillips, K. (1995). Bringing order out of chaos: Psychometric characteristics of the confusion, hubbub and order scale. *Journal of Applied Developmental Psychology*, 16, 429-444. doi:10.1016/0193-3973(95)90028-4
- Melhuish, E., Belsky, J., Leyland, A. H., Barnes, J., & National Evaluation of Sure Start Research Team. (2008). Effects of fully-established Sure Start Local Programmes on

- 3-year-old children and their families living in England: A quasi-experimental observational study. *The Lancet*, 372(9650), 1641-1647. doi:10.1016/S0140-6736(08)61687-6
- Muthén, L. K., & Muthén, B. O. (2010). *Mplus software (Version 6)*. Los Angeles, CA: Authors.
- Noble, M., McLennan, D., Wilkinson, K., Whitworth, A., Barnes, H., & Dibben, C. (2008). *The English Indices of Deprivation 2007*. London: Communities and Local Government.
- Olds, D. L., Kitzman, H., Cole, R., Robinson, J., Sidora, K., Luckey, D. W., . . . Holmberg, J. (2004). Effects of nurse home-visiting on maternal life course and child development: Age 6 follow-up results of a randomized trial. *Pediatrics*, 114(6), 1550-1559. doi:10.1542/peds.2004-0962
- Pillas, D., Marmot, M., Naicker, K., Goldblatt, P., Morrison, J., & Pikhart, H. (2014). Social inequalities in early childhood health and development: A European-wide systematic review. *Pediatric Research*, 76(5), 418-424. doi:10.1038/pr.2014.122
- Rallings, J. (2014). *What are Children's Centres for?* Essex, UK: Barnardos.
- Ray, A., McCormack, T., & Evans, H. (2009). Value added in English schools. *Education Finance and Policy*, 4(4), 415-438. doi:10.1162/edfp.2009.4.4.415
- Rutter, M. (2007). Sure Start Local Programmes: An outsider's perspective. In J. Belsky, J. Barnes, & E. Melhuish (Eds.), *The National Evaluation of Sure Start*. Bristol, UK: Policy Press.
- Sammons, P., Hall, J., Smees, R., Goff, J., Sylva, K., Smith, T., . . . Smith, G. (2015). *Evaluation of Children's Centres in England (ECCE). Strand 4: The Impact of Children's Centres: Studying the effects of Children's Centres in promoting better outcomes for young children and their families*. (DFE-RR495). London: DfE.

- Sammons, P., Smees, R., Hall, J., Goff, J., Sylva, K., Smith, T., . . . Smith, G. (2015). *Evaluation of Children's Centres in England (ECCE). Strand 4: Changes in recourcing and characteristics of Children's Centres.* (DfE-RR494). London: DfE.
- Sammons, P., Sylva, K., Melhuish, E., Siraj-Blatchford, I., Taggart, B., Elliot, K., & Marsh, A. (2004). *EPPE Technical Paper 11: The Continuing Effects of Pre-school Education at age 7 years.* London: DfES/Institute of Education.
- Sammons, P., Sylva, K., Melhuish, E., Siraj-Blatchford, I., Taggart, B., Hunt, S., & Jelcic, H. (2008). *Effective Pre-School and Primary Education 3-11 Project (EPPE 3-11), Influences on Children's Cognitive and Social Development in Year 6.* London: DfES/Institute of Education.
- Sammons, P., Toth, K., Sylva, K., Melhuish, E., Siraj, I., & Taggart, B. (2015). The long-term role of the home learning environment in shaping students' academic attainment in secondary school. *Journal of Children's Services*, 10(3), 189-201. doi: 10.1108/JCS-02-2015-0007
- Smith, G., Field, K., Smith, T., Noble, S., Smith, T., & Plunkett, E. (2014). *Evaluation of Chidlren's Centres in England (ECCE): The extent to which Centres 'reach' eligible families, their neighgourhood characteristics and levels of use.* (DFE-RB358). London: DfE.
- SPSS, IBM. (2013). *SPSS statistics for Windows.* Armonk, NY: IBM, Corp.
- Stöbe-Blossey, S., Mierau, S., & Tietze, W. (2009). Von der Kindertageseinrichtung zum Familienzentrum – Konzeption, Entwicklungen und Erprobung des Gütesiegels 'Familienzentrum NRW' [From the children's day-care centre to the family centre - Conception, development and testing of the seal of quality 'Family Centre NRW']. In H. G. Roßbach & H. P. Blossfeld (Eds.), *Frühpädagogische Förderung in Institutionen: Zeitschrift für Erziehungswissenschaft [Early education in institutions:*

- Journal of Educational Science]* (pp. 105-122). Wiesbaden: VS Verlag für Sozialwissenschaften.
- Sylva, K., Goff, J., Hall, J., Eisenstadt, N., Smith, T., Evangelou, M., . . . Sammons, P. (2015). *Evaluation of Children's Centres in England (ECCE). Strand 3: The organisation, services and reach of Children's Centres in England.* (DFE-RR433). London: DfE.
- Sylva, K., Melhuish, E., Sammons, P., Siraj-Blatchford, I., & Taggart, B. (2008). *Final report from the primary phase: Pre-school, school and family influences on children's development during Key Stage 2 (Age 7-11).* London: DCSF/Institute of Education.
- Sylva, K., Melhuish, E., Sammons, P., Siraj-Blatchford, I., & Taggart, B. (2010). *Early childhood matters: Evidence from the Effective Pre-school and Primary Education project.* Abingdon: Routledge.
- Tanner, E., Agur, M., Hussey, D., & Hall, J. (2012). *Evaluation of Children's Centres in England (ECCE) Strand 1: First survey of Children's Centre leaders in the most deprived areas.* (DFE-RR230). London: DfE.
- Tomarken, A. J., & Waller, N. G. (2003). Potential problems with "well fitting" models. *Journal of abnormal psychology, 112*(4), 578. doi: 10.1037/0021-843X.112.4.578
- Torjesen, I. (2016). Austerity cuts are eroding benefits of Sure Start Children's Centres. *British Medical Journal (Clinical research ed.), 352*(i335). doi:10.1136/bmj.i335
- Tunstall, J., Allnock, D., Meadows, P., & McLeod, A. (2002). *Early experiences of implementing Sure Start.* London.
- Webster-Stratton, C., & Reid, M. J. (2010). The Incredible Years parents, teachers, and children training series: A multifaceted treatment approach for young children with conduct disorders. In J. R. Weisz & A. E. Kazdin (Eds.), *Evidence-based*

*psychotherapies for children and adolescents* (2nd ed., pp. 194-210). New York: Guilford Press.

Welshman, J. (2010). From Head Start to Sure Start: Reflections on policy transfer. *Children & Society*, 24, 89–99. doi:10.1111/j.1099-0860.2008.00201.x

**Table 1.** Nine measures recording the use of Children’s Centres. All statistically significant predictors of either child behavioural disorders at mean age 38 months, or of improvements to home learning environments from 2012 to 2014 (n=2,568; see Sammons, Hall et al., 2015)

<b>Measure</b>	<b>Categories</b>	<b>n</b>	<b>% or mean±SD</b>
1. Use of a registered Children's Centre: Total Period used (in months; breaks possible; z-scored before analysis)		2568	20.2±16.3
2. Use of a registered Children's Centre: Distinct Patterns evident from Cluster Analysis	1. <i>Stoppers after wave 1</i>	840	32.7%
	2. <i>Stoppers after wave 2</i>	703	27.4%
	3*. <i>Consistent users</i>	810	31.5%
	4. <i>No use of any services at registered centre</i>	215	8.4%
3. Use of any services at a family's registered Children's Centre: Distinct Patterns evident from Cluster Analysis	1. <i>Limited to no use. Use limited to baseline health visitor and/or stay and play</i>	1508	58.7%
	2. <i>Long-term use of multiple service types</i>	717	27.9%
	3*. <i>No use of registered Centre</i>	343	13.4%
4. Use of any services at any Children's Centre: Distinct Patterns evident from Cluster Analysis	1. <i>Early-starters long term users of registered Centre</i>	577	22.5%
	2*. <i>Inconsistent users, at registered or other Centre</i>	1126	43.8%
	3. <i>Early-starters long term users of non-registered Centre</i>	865	33.7%
5. Use of Health Visitor services: As associated with a family's registered Children's Centre	1*. <i>never</i>	1035	40.3%
	2. <i>at one wave (of fieldwork)</i>	905	35.2%
	3. <i>at two waves</i>	449	17.5%
	4. <i>at all 3 waves</i>	179	7.0%
6. Use of Health Visitor services: As associated with any Children's Centre	1*. <i>never</i>	295	11.5%
	2. <i>at one wave</i>	1065	41.5%
	3. <i>at two waves</i>	818	31.9%
	4. <i>at all 3 waves</i>	390	15.2%
7. Use of Stay and Play Services: At a family's registered Children's Centre	1*. <i>never</i>	959	37.3%
	2. <i>at one wave</i>	754	29.4%
	3. <i>at two waves</i>	464	18.1%
	4. <i>at all 3 waves</i>	391	15.2%
8. Use of Stay and Play Services: At any Children's Centre	1*. <i>never</i>	389	15.1%
	2. <i>at one wave</i>	598	23.3%
	3. <i>at two waves</i>	791	30.8%
	4. <i>at all 3 waves</i>	790	30.8%
9. Use of Outreach services: At a family's registered Children's Centre	1*. <i>never</i>	1382	53.8%
	2. <i>at one wave</i>	744	29.0%
	3. <i>at two waves</i>	357	13.9%
	4. <i>at all 3 waves</i>	85	3.3%

Notes: \*Reference category when the measure was subsequently represented with dummy-coded binary measures

**Table 2.** The bivariate (bootstrapped) associations shared between 2,568 families' use of 117 Children's Centres, their households' home learning environments, and the behavioural disorders of their children at mean age 38 months

Measure of the Use of a Children's Centre (between mean child ages: 14 to 38 months)	THLE		PHLE		Internalising Problems (at mean age 38 months)		Externalising Problems (at mean age 38 months)	
	E.S. (r)	p	E.S. (r)	p	E.S. (r)	p	E.S. (r)	p
1. Use of a registered Children's Centre: Total Period used (in months; breaks possible; z-scored before analysis)*	0.01	0.639	0.03	0.167	<b>0.05</b>	<b>0.023</b>	0.03	0.107
2. Use of a registered Children's Centre: Distinct Patterns evident from Cluster Analysis**	0.03	0.434	<b>0.06</b>	<b>0.033</b>	<b>0.08</b>	<b>0.006</b>	0.03	0.348
3. Use of any services at a family's registered Children's Centre: Distinct Patterns evident from Cluster Analysis**	<b>0.08</b>	<b>0.001</b>	<b>0.09</b>	<b>&lt;0.001</b>	<b>0.06</b>	<b>0.004</b>	<b>0.08</b>	<b>&lt;0.001</b>
4. Use of any services at any Children's Centre: Distinct Patterns evident from Cluster Analysis**	<b>0.06</b>	<b>0.005</b>	<b>0.07</b>	<b>0.001</b>	<b>0.06</b>	<b>0.003</b>	<b>0.09</b>	<b>&lt;0.001</b>
5. Use of Health Visitor services: As associated with a family's registered Children's Centre**	<b>0.13</b>	<b>&lt;0.001</b>	<b>0.09</b>	<b>&lt;0.001</b>	0.04	0.122	0.04	0.128
6. Use of Health Visitor services: As associated with any Children's Centre**	0.04	0.145	0.03	0.438	<0.01	0.951	0.04	0.096
7. Use of Stay and Play Services: At a family's registered Children's Centre**	<b>0.17</b>	<b>&lt;0.001</b>	<b>0.14</b>	<b>&lt;0.001</b>	0.03	0.450	0.04	0.185
8. Use of Stay and Play Services: At any Children's Centre**	<b>0.08</b>	<b>0.001</b>	<b>0.07</b>	<b>0.003</b>	<b>0.06</b>	<b>0.019</b>	0.04	0.198
9. Use of Outreach services: At a family's registered Children's Centre**	<b>0.14</b>	<b>&lt;0.001</b>	0.03	0.467	<b>0.11</b>	<b>&lt;0.001</b>	<b>0.11</b>	<b>&lt;0.001</b>

*Notes: THLE= Toddler Home Learning Environment (at mean child age 14 months); PHLE=Preschoolr Home Learning Environment (at mean child age 38 months); E.S.(r)=[point estimate] Effect Size (Pearson r) where  $r < 0.30$  can be deemed, “small” (Cohen, 1988); \* Associations estimated via bootstrapped Pearson correlation coefficients; \*\*=Associations estimated via bootstrapped ANOVAs*

**Table 3.** The contextualised direct and indirect impacts (via changing home learning environments) upon children’s internalising behaviour that are associated with how families used of Children’s Centres between 2012 and 2014 (mean child ages 14-38 months)

Measure of Children's Centre Use (all measures z-scored before analysis)	Categories of Use	A. Direct Impact (Unstandardised)			B. Total Indirect Impact (Unstandardised)			A+B. Total Impact (Unstandardised)			
		Est.	S.E.	p	Est.	S.E.	p	Est.	S.E.	p	r <sup>2</sup>
1. Use of a registered Children's Centre: Total Period used (in months; breaks possible)		0.04	0.05	0.372	0.00	0.00	0.153	0.04	0.05	0.421	0.13
2. Use of a registered Children's Centre. Effects versus "Consistent users"	Stoppers after wave 1	-0.15	0.11	0.185	0.01	0.01	0.184	-0.14	0.11	0.216	0.13
	Stoppers after wave 2	-0.21	0.12	0.086	0.01	0.01	0.182	-0.20	0.12	0.096	
	No use of any services	<b>-0.44</b>	<b>0.18</b>	<b>0.015</b>	0.01	0.01	0.227	<b>-0.43</b>	<b>0.18</b>	<b>0.017</b>	
3. Use of any services at a family's registered Children's Centre. Effects versus "No use of registered Centre"	Limited to no use. Use limited to baseline health visitor and/or stay and play	0.19	0.13	0.134	0.00	0.01	0.828	0.19	0.13	0.135	0.13
	Long-term use of multiple service types	0.26	0.15	0.086	-0.02	0.01	0.116	0.25	0.15	0.105	
4. Use of any services at any Children's Centre. Effects versus "Inconsistent users at registered or other Centre"	Early-starters long term users of registered Centre	0.13	0.13	0.309	-0.02	0.01	0.116	0.11	0.13	0.382	0.13
	Early-starters long term users of non-registered Centre	0.00	0.04	0.970	-0.01	0.01	0.171	-0.01	0.10	0.899	
5. Use of Health Visitor services: As associated with a family's registered Children's Centre. Effects versus "never"	At one wave (of fieldwork)	0.02	0.11	0.836	0.00	0.00	0.603	0.02	0.11	0.848	0.13
	At two waves	-0.03	0.12	0.815	-0.01	0.01	0.255	-0.04	0.13	0.777	
	At all 3 waves	0.02	0.18	0.913	-0.01	0.01	0.424	0.01	0.18	0.940	
6. Use of Health Visitor services:	At one wave	-0.03	0.16	0.874	-0.01	0.01	0.294	-0.03	0.16	0.834	0.13

As associated with any Children's Centre. Effects versus "never"	At two waves	0.06	0.18	0.737	0.01	0.01	0.260	0.05	0.18	0.783	
	At all 3 waves	0.27	0.18	0.135	0.02	0.01	0.210	0.25	0.18	0.164	
7. Use of Stay and Play Services: As associated with a family's registered Children's Centre. Effects versus "never"	At one wave	<b>0.20</b>	<b>0.10</b>	<b>0.044</b>	-0.01	0.01	0.356	<b>0.20</b>	<b>0.10</b>	<b>0.048</b>	0.13
	At two waves	<b>0.31</b>	<b>0.12</b>	<b>0.007</b>	-0.01	0.01	0.269	<b>0.30</b>	<b>0.12</b>	<b>0.009</b>	
	At all 3 waves	0.22	0.14	0.104	-0.01	0.01	0.134	0.21	0.14	0.125	
8. Use of Stay and Play Services: As associated with any Children's Centre. Effects versus "never"	At one wave	0.18	0.15	0.248	-0.01	0.01	0.453	0.17	0.15	0.261	0.13
	At two waves	<b>0.35</b>	<b>0.14</b>	<b>0.011</b>	-0.01	0.01	0.221	<b>0.34</b>	<b>0.14</b>	<b>0.013</b>	
	At all 3 waves	<b>0.33</b>	<b>0.14</b>	<b>0.016</b>	-0.02	0.01	0.099	<b>0.32</b>	<b>0.14</b>	<b>0.022</b>	
9. Use of Outreach services: At a family's registered Children's Centre. Effects versus "never"	At one wave	0.10	0.12	0.405	-0.01	0.01	0.196	0.09	0.12	0.437	0.13
	At two waves	<b>0.31</b>	<b>0.15</b>	<b>0.036</b>	-0.01	0.01	0.183	<b>0.30</b>	<b>0.15</b>	<b>0.046</b>	
	At all 3 waves	0.31	0.28	0.269	-0.01	0.01	0.403	0.30	0.28	0.285	

*Notes: Est. = Estimated Unstandardised Regression Coefficient in the metric of standard deviations; S.E.= Standard Error;  $r^2$ =proportion*

*of the variation in internalising behavioural disorders explained by all statistical predictors (see Figure 1)*

**Table 4.** The contextualised direct and indirect impacts (via changing home learning environments) upon children’s externalising behaviour that are associated with how families used of Children’s Centres between 2012 and 2014 (mean child ages 14-38 months)

Measure of Children's Centre Use (all measures z-scored before analysis)	Categories	A. Direct Impact (Unstandardised)			B. Total Indirect Impact (Unstandardised)			A+B. Total Impact (Unstandardised)			
		Est.	S.E.	p	Est.	S.E.	p	Est.	S.E.	p	r <sup>2</sup>
1. Use of a registered Children's Centre: Total Period used (in months; breaks possible)		0.08	0.06	0.213	<b>-0.01</b>	<b>0.01</b>	<b>0.043</b>	0.06	0.06	0.298	0.17
2. Use of a registered Children's Centre. Effects versus "Consistent users"	Stoppers after wave 1	-0.14	0.16	0.367	<b>0.03</b>	<b>0.02</b>	<b>0.050</b>	-0.11	0.16	0.479	0.17
	Stoppers after wave 2	<b>-0.37</b>	<b>0.15</b>	<b>0.015</b>	<b>0.03</b>	<b>0.02</b>	<b>0.040</b>	<b>-0.34</b>	<b>0.15</b>	<b>0.025</b>	
	No use of any services	-0.19	0.25	0.438	0.04	0.02	0.150	-0.16	0.25	0.518	
3. Use of any services at a family's registered Children's Centre. Effects versus "No use of registered Centre"	Limited to no use. Use limited to baseline health visitor and/or stay and play	-0.24	0.19	0.199	0.00	0.02	0.828	-0.25	0.19	0.186	0.17
	Long-term use of multiple service types	0.14	0.20	0.488	<b>-0.06</b>	<b>0.02</b>	<b>0.008</b>	0.08	0.20	0.687	
4. Use of any services at any Children's Centre. Effects versus "Inconsistent users at registered or other Centre"	Early-starters long term users of registered Centre	<b>0.43</b>	<b>0.18</b>	<b>0.014</b>	<b>-0.07</b>	<b>0.02</b>	<b>0.001</b>	<b>0.37</b>	<b>0.18</b>	<b>0.038</b>	0.17
	Early-starters long term users of non-registered Centre	0.16	0.14	0.255	<b>-0.03</b>	<b>0.01</b>	<b>0.029</b>	0.13	0.15	0.361	
5. Use of Health Visitor services: As associated with a family's registered Children's Centre. Effects versus "never"	At one wave (of fieldwork)	-0.08	0.14	0.571	-0.01	0.01	0.598	-0.09	0.14	0.539	0.17
	At two waves	0.14	0.15	0.341	-0.02	0.02	0.169	0.12	0.15	0.432	
	At all 3 waves	<b>0.46</b>	<b>0.22</b>	<b>0.037</b>	-0.03	0.03	0.364	<b>0.44</b>	<b>0.22</b>	<b>0.047</b>	
6. Use of Health Visitor services: As associated with any Children's	At one wave	-0.02	0.21	0.933	-0.03	0.02	0.197	-0.06	0.21	0.819	0.17
	At two waves	0.01	0.21	0.947	-0.03	0.03	0.169	-0.02	0.21	0.919	

Centre. Effects versus "never"	At all 3 waves	0.38	0.26	0.144	-0.06	0.03	0.069	0.32	0.26	0.217	
7. Use of Stay and Play Services: As associated with a family's registered Children's Centre. Effects versus "never"	At one wave	-0.17	0.14	0.217	-0.02	0.01	0.282	-0.18	0.14	0.182	0.17
	At two waves	-0.02	0.19	0.935	-0.02	0.02	0.183	-0.04	0.19	0.848	
	At all 3 waves	0.19	0.19	0.303	<b>-0.04</b>	<b>0.02</b>	<b>0.027</b>	0.15	0.19	0.418	
8. Use of Stay and Play Services: As associated with any Children's Centre. Effects versus "never"	At one wave	-0.23	0.21	0.260	-0.02	0.02	0.406	-0.25	0.21	0.239	0.17
	At two waves	-0.07	0.20	0.740	-0.03	0.02	0.139	-0.10	0.20	0.629	
	At all 3 waves	-0.07	0.20	0.720	<b>-0.06</b>	<b>0.02</b>	<b>0.010</b>	-0.13	0.20	0.512	
9. Use of Outreach services: At a family's registered Children's Centre. Effects versus "never"	At one wave	0.01	0.13	0.953	-0.02	0.02	0.122	-0.02	0.13	0.903	0.17
	At two waves	<b>0.64</b>	<b>0.18</b>	<b>&lt;0.001</b>	-0.04	0.02	0.064	<b>0.60</b>	<b>0.19</b>	<b>0.001</b>	
	At all 3 waves	0.45	0.32	0.157	-0.04	0.04	0.319	0.42	0.32	0.191	

Notes: Est. = Estimated Unstandardised Regression Coefficient in the metric of standard deviations; S.E.= Standard Error;  $r^2$ =proportion

of the variation in externalising behavioural disorders explained by all statistical predictors (see Figure 1)

**Table 5.** The contextualised value-added (CVA) impacts of Children’s Centre use

(between mean child ages 14 to 38 months) upon preschool home learning

environments measured at mean child age 38 months

Measure of Children's Centre Use ( <i>all measures z-scored before analysis</i> )	Categories	CVA impacts on preschool home learning environments ( <i>unstandardised</i> )			
		Est.	S.E.	p	r <sup>2</sup>
1. Use of a registered Children's Centre: Total Period used (in months; breaks possible)		<b>0.37</b>	<b>0.18</b>	<b>0.035</b>	0.18
2. Use of a registered Children's Centre. Effects versus "Consistent users"	Stoppers after wave 1	<b>-0.84</b>	<b>0.43</b>	<b>0.050</b>	0.18
	Stoppers after wave 2	<b>-0.93</b>	<b>0.42</b>	<b>0.028</b>	
	No use of any services	-0.98	0.65	0.133	
3. Use of any services at a family's registered Children's Centre. Effects versus "No use of registered Centre"	Limited to no use.	0.14	0.47	0.771	0.18
	Use limited to baseline health visitor and/or stay and play				
	Long-term use of multiple service types	<b>1.63</b>	<b>0.53</b>	<b>0.002</b>	
4. Use of any services at any Children's Centre. Effects versus "Inconsistent users at registered or other Centre"	Early-starters long term users of registered Centre	<b>1.79</b>	<b>0.40</b>	<b>&lt;0.001</b>	0.18
	Early-starters long term users of non-registered Centre	<b>0.84</b>	<b>0.35</b>	<b>0.016</b>	
5. Use of Health Visitor services: As associated with a family's registered Children's Centre. Effects versus "never"	At one wave (of fieldwork)	0.18	0.39	0.634	0.18
	At two waves	0.66	0.49	0.180	
	At all 3 waves	0.63	0.83	0.448	
6. Use of Health Visitor services: As associated with any Children's Centre. Effects versus "never"	At one wave	0.85	0.61	0.162	0.18
	At two waves	0.98	0.64	0.129	
	At all 3 waves	1.54	0.84	0.066	
7. Use of Stay and Play Services: As associated with a family's registered Children's Centre. Effects versus "never"	At one wave	0.45	0.40	0.264	0.18
	At two waves	0.59	0.45	0.189	
	At all 3 waves	<b>1.15</b>	<b>0.52</b>	<b>0.028</b>	
8. Use of Stay and Play Services: As associated with any Children's Centre. Effects versus "never"	At one wave	0.43	0.53	0.417	0.18
	At two waves	0.87	0.57	0.125	
	At all 3 waves	<b>1.69</b>	<b>0.59</b>	<b>0.004</b>	

9. Use of Outreach services:	At one wave	0.67	0.40	0.093	0.18
At a family's registered	At two waves	<b>1.06</b>	<b>0.53</b>	<b>0.045</b>	
Children's Centre. Effects	At all 3 waves	1.03	1.01	0.311	
versus "never"					

*Notes: Est. = Estimated Unstandardised Regression Coefficient in the metric of standard deviations; S.E.= Standard Error;  $r^2$ =proportion of the variation in externalising behavioural disorders explained by all statistical predictors (see Figure*

*1)*

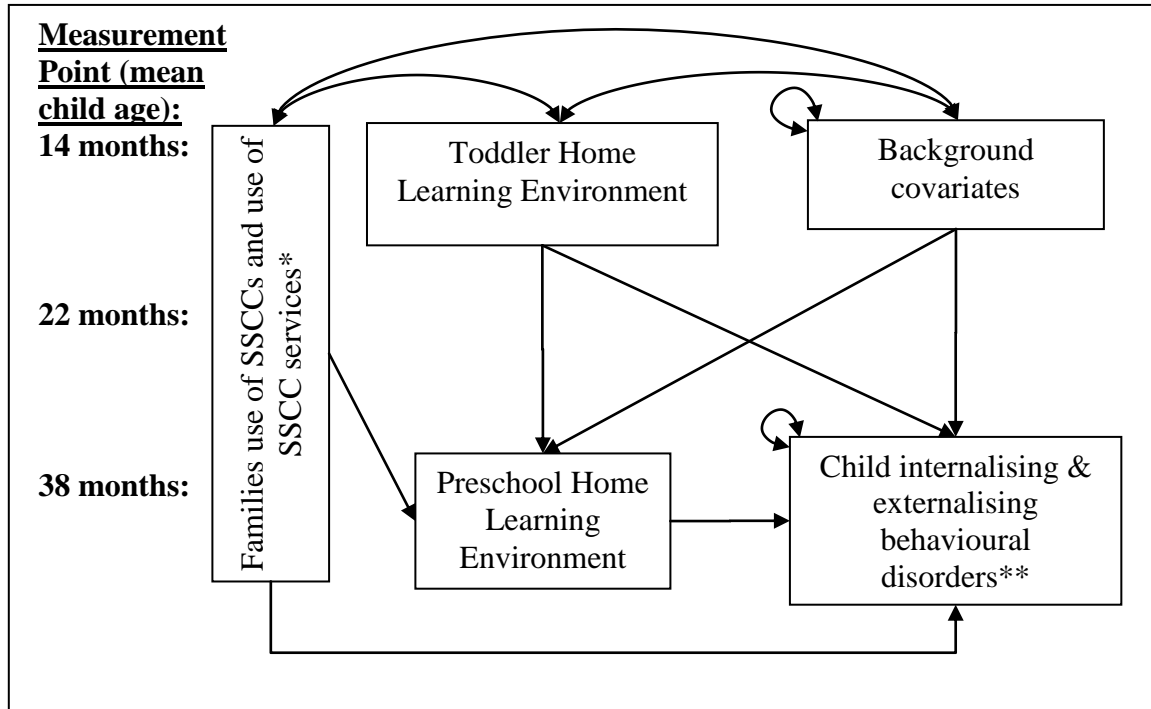
**Table 6.** The consistent sized associations between toddler home learning environments (THLE) and preschool home learning environments (PHLE) with scores for the internalising and externalising behaviours of preschoolers as measured by the Strengths and Difficulties Questionnaire (SDQ)

Statistical Model	Statistic	Preschool Internalising Behaviour scores regressed on:		Preschool Externalising Behaviour scores regressed on:	
		PHLE scores	THLE scores	PHLE scores	THLE scores
Model 1	Est.	-0.01	-0.01	<b>-0.04</b>	0.00
	S.E.	0.01	0.01	<b>0.01</b>	0.01
	p	0.071	0.295	<b>&lt;0.001</b>	0.891
Model 2	Est.	-0.01	-0.01	<b>-0.04</b>	0.00
	S.E.	0.01	0.01	<b>0.01</b>	0.01
	p	0.072	0.309	<b>&lt;0.001</b>	0.889
Model 3	Est.	-0.01	-0.01	<b>-0.04</b>	0.00
	S.E.	0.01	0.01	<b>0.01</b>	0.01
	p	0.076	0.265	<b>&lt;0.001</b>	0.911
Model 4	Est.	-0.01	-0.01	<b>-0.04</b>	0.00
	S.E.	0.01	0.01	<b>0.01</b>	0.01
	p	0.081	0.277	<b>&lt;0.001</b>	0.972
Model 5	Est.	-0.01	-0.01	<b>-0.04</b>	0.00
	S.E.	0.01	0.01	<b>0.01</b>	0.01
	p	0.089	0.320	<b>&lt;0.001</b>	0.901
Model 6	Est.	-0.01	-0.01	<b>-0.04</b>	0.00
	S.E.	0.01	0.01	<b>0.01</b>	0.01
	p	0.078	0.324	<b>&lt;0.001</b>	0.872
Model 7	Est.	-0.01	-0.01	<b>-0.04</b>	0.00
	S.E.	0.01	0.01	<b>0.01</b>	0.01
	p	0.072	0.266	<b>&lt;0.001</b>	0.929
Model 8	Est.	-0.01	-0.01	<b>-0.04</b>	0.00
	S.E.	0.01	0.01	<b>0.01</b>	0.01
	p	0.063	0.212	<b>&lt;0.001</b>	0.859
Model 9	Est.	-0.01	-0.01	<b>-0.04</b>	0.00
	S.E.	0.01	0.01	<b>0.01</b>	0.01
	p	0.072	0.388	<b>&lt;0.001</b>	0.805

*Notes: The nine models are those statistical models that estimated the impact of each of the nine measures that recorded the use of Children's' Centres upon children's HLEs and behavioural disorders; There is one-to-one matching between the*

*numerals of the statistical models and the measures that recorded the use of Children's Centres as described in Table 1; Full results for these statistical models can be found in Supplementary Material 3; Est. = Estimated Unstandardised Regression Coefficient in the metric of standard deviations; S.E.= Standard Error.*

**Figure 1.** Stylised illustration of the nine aggregated multilevel Structural Equation Models that estimated associations between Children’s Centre (and Centre service) use, behavioural disorders at mean age 38 months, and changes to home learning environments



*Notes: \*Associations with just one longitudinal measure (of nine) recording families’ use of Sure Start Children’s Centres (SSCC) and SSCC Services featured in each of the nine statistical models; \*\*As measured by the Strengths and Difficulties Questionnaire (Goodman, 1997, 2001)*