## *Supplementary Materials*

## SM 1.1 Demographic profile for participants across timepoints. Values show Mean (SD).

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Sample** | **N** | **Household Education1** | **Household Income2** | **Caregiver Occupation3** | **Neighbourhood deprivation4** |
| Original | 862 | 5.24 (1.24) | 4.90 (1.91) | 6.88 (1.60) | 6.86 (2.60) |
| With Spring 2020 video | 100 | 5.7 (1.2) | 5.1 (1.7) | 7.3 (1.3) | 7.26 (2.3) |
| With Winter 2020 video | 24 | 5.9 (0.9) | 5.2 (1.9) | 7.6 (1.2) | 6.6 (1.9) |
| With Spring 2021 video | 26 | 5.8 (1.0) | 4.7 (1.9) | 7.2 (1.1) | 6.9 (1.9) |

1 Categories of highest level of education completed: 1= Primary school, 2=Secondary school, 3=Sixth form or college, 4=Vocational college, 5=Undergraduate, 6=Postgraduate, 7=MBA, 8= Doctoral degree.

2 Household income brackets: 1=£0-£20k, 2=£21k-£30k, 3=£31k-£40k, 4=£41k-£50k, 5=£51k-£60k, 6=£61k-£70k, 7=£71k or over

3 Occupational prestige where 1 = lowest prestige, 9 = highest prestige (Hollingshead, 1975)

4 Index of Multiple Deprivation decile, where 1= most deprived, 10 = least deprived (Noble et al., 2019)

## SM 1.2 Modified Caregiver subscales from the Global Ratings Scale (GRS; Murray et al., 1996)

These scales rate the extent to which the caregiver responds to their child’s cues in a way that is appropriately adjusted to the child’s behaviour, responding to their agenda, and measures warmth and acceptance.

| **Subscale** | **Score** | **Description** |
| --- | --- | --- |
| ***Warmth*** |  |  |
|  | 5 | The caregiver makes many positive comments. Their face and voice express affection and endearment. With younger children, they may hold or touch the child in a supporting, caressing way. |
|  | 4 | The caregiver’s tone of voice is warm, and their expression is affectionate. They may make only a few positive comments about their child but make no negative comments. |
|  | 3 | A mixture of moderate affection and mild criticism. Or, no positive comments at all, and no, or very few, mildly negative ones (neutral). |
|  | 2 | A predominance of critical and/or cold comments, but with a few signs of affection. Or, an absence of any warmth or affection, but without overt criticism (neutral - cold). |
|  | 1 | No, or almost no, signs of affection and warmth, together with quite a few critical or cold comments. |
| ***Acceptance*** |  |  |
|  | 5 | The caregiver never criticises, ignores, dampens, or makes substitutions for the child’s expressions or behaviour. They follow their interests and reflect their states of excitement well. |
|  | 4 | For the majority of the interaction the caregiver behaves as in rating  no. 5, however, they may mildly criticise their child, OR cut gaze once or twice (with younger children), OR make 1 clear substitution, OR respond at a lower level of positive affect once. |
|  | 3 | The caregiver shows some mild disappointment or makes mildly negative comments two to three times, OR they make one substitution and 1 cut in gaze with some mild criticism. |
|  | 2 | The caregiver makes many critical comments, they may cut the child’s gaze (for younger children in particular), make substitutions, or respond at a lower level than the child. |
|  | 1 | The caregiver exhibits a complex of the behaviours described in rating no. 2 with much marked criticism of the child’s behaviour. |
| ***Responsiveness*** |  |  |
|  | 5 | The caregiver is very imitative and responsive, picking up and responding to all the child’s signals (facial expressions and noises, gestures and utterances and actions), even the very small ones. |
|  | 4 | The caregiver is responsive; however, they miss a few of their child’s expressions or behaviours/actions because they are too busy talking, engaging in an alternative activity or because the cues are very subtle (e.g., eyebrow raises, smiles etc.). |
|  | 3 | The caregiver responds to the most evident signals (yawns, vocalisations, statements, gestural requests) but not the subtle ones (raised eyebrows, quiet vocalisations or statements, quick state, or attentional changes); OR they are responsive for half the session and not for the other half. |
|  | 2 | Most of the child’s signals/behaviours are not responded to. The caregiver does not generally pick up on obvious signals like vocalisations, comments or marked state changes, activities, or mood; however, they may respond a few times. |
|  | 1 | The caregiver does not respond to, or ignores, almost all of the child’s signals and expressions, even those which are very obvious, throughout the interaction. |
| ***Sensitivity*** |  |  |
|  | 5 | Caregiver is aware of and tries to interpret even the most subtle signal from the child. |
|  | 4 | All but a few of the child’s signals are sensitively recognised. |
|  | 3 | Overall the caregiver is sensitive to the child’s needs for half of the interaction and insensitive for the remaining half, their behaviour is inconsistent. |
|  | 2 | The caregiver is generally insensitive towards their child- they may be either unresponsive or intrusive, with little empathy or acceptance of the child’s behaviour. |
|  | 1 | Does not try to interpret the majority of the child’s signals, the caregiver does not respect their attempts to communicate or engage with them or to identify with and respond appropriately to their intentions/motivations. They may mock or laugh at the child or have little or no sympathy for them. |

## SM 1.3 CLT Item Creation.

A bespoke caregiver checklist of receptive and expressive vocabulary was created to capture variance in child language development in Spring 2021 as participants reached the upper age limit of the O-CDI. The measure was based on the British English version of the Cross-Linguistic Lexical Task (CLT; Haman et al, 2013, Haman, E., Łuniewska, M., & Pomiechowska, B., 2015). We considered all four parts of the CLT (naming nouns, naming verbs, comprehension nouns, comprehension verbs), and identified items which did not overlap with the O-CDI and extended O-CDI. 78 additional words (27 nouns and 51 verbs), listed below, were included in our final vocabulary questionnaire.

**Nouns**

1. Snake
2. Kangaroo
3. Tail
4. Onion
5. Watermelon
6. Cap
7. Vest
8. Scarf
9. Lipstick
10. Drum
11. Guitar
12. Desk
13. Pencil
14. Paintbrush
15. Basket
16. Match
17. Lighter
18. Needle
19. Scale
20. Gate
21. Chain
22. Barrel
23. Ladder
24. Roof
25. Snowman
26. Rainbow
27. Heart

**Verbs**

1. Beg
2. Boil
3. Brush [teeth]
4. Burn
5. Build
6. Burst
7. Clap
8. Climb
9. Conduct [music]
10. Cook
11. Crawl
12. Dive
13. Drag
14. Drip
15. Drown
16. Fight
17. Hammer
18. Hatch
19. Hitchhike
20. Iron
21. Kiss
22. Knit
23. Laugh
24. Light
25. Listen
26. Marry
27. Massage
28. Melt
29. Mix
30. Mop
31. Paint
32. Peel
33. Plant
34. Roast
35. Row
36. Sail
37. Sharpen
38. Shave
39. Shear
40. Sit
41. Ski
42. Spin
43. Squeeze
44. Sting
45. Stir
46. Stroke
47. Sweat
48. Talk [on the phone]
49. Tear
50. Water
51. Whistle

## SM 1.4 Summary of AIC and predictors for base model (sensitivity, child age, child engagement) with additional demographic controls (education and IMD)

**+** indicates positive significant predictors (*p* <. 05)

- indicates negative significant predictors (*p* <. 05)

T1=Spring 2020, T2=Winter 2020, T3=Spring 2021

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Base Model**  **(AIC/ Sig Predictors)** | **with Education** | **with IMD** | **with Education/IMD** |
| Receptive Vocab T1 | AIC: 1269  +Age  +Sensitivity | AIC: 1271  +Age  +Sensitivity | AIC:1269  +Age  +Sensitivity | AIC:1271  +Age  +Sensitivity |
| Expressive Vocab T1 | AIC:1117  +Age  +Sensitivity  +Child | AIC: 1119  +Age  +Sensitivity  +Child | AIC: 1118  +Age  +Sensitivity  +Child | AIC: 1120  +Age  +Sensitivity  +Child |
| Receptive Growth T2 | AIC:665  -Age | AIC:668  -Age | AIC:668  -Age | AIC:670  -Age |
| Expressive Growth T2 | AIC:711  +Sensitivity | AIC:713  +Sensitivity | AIC:713  +Sensitivity | AIC:713  +Sensitivity |
| Receptive Growth T3 | AIC:763  -Age | AIC:765  -Age | AIC:765  -Age | AIC:767  -Age |
| Expressive Growth T3 | AIC:830  -Age | AIC:832  -Age | AIC:832  -Age | AIC:834  -Age |