FHI
Folkehelseinstituttet

RAPPORT

2022

SYSTEMATISK OVERSIKT

Foreldres bruk av mobile skjermer og samspill med barn 0-6 år

Utgitt av	Folkehelseinstituttet Område for helsetjenester
Tittel	Foreldres bruk av mobile skjermer og samspill med barn 0-6 år: en systematisk oversikt
English title	Parents' use of mobile screens and interaction with children 0-6 years old: a systematic review
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ISBN	978-82-8406-289-1
Publikasjonstype	Systematisk oversikt
Antall sider	57 (112 inklusiv vedlegg)
Oppdragsgiver	Helsedirektoratet
Emneord(MeSH)	Cell phone, parents, child, parent-child relation
Sitering	Nøkleby, H, Bidonde J, Langøien LJ, Kucuk B. Foreldres bruk av mobile skjermer og samspill med barn 0-6 år: en systematisk oversikt [Parents' use of mobile screens and interaction with children 0-6 years old: a systematic review]. Oslo: Folkehelseinstituttet, 2022.

Innhold

Hovedbudskap

Nesten alle unge og voksne i dag er hyppige brukere av smarttelefoner. Begrepet «technoference» beskriver teknologiens avbrytelser eller innblandinger i relasjoner. Folkehelseinstituttet fikk i oppdrag av Helsedirektoratet å systematisk oppsummere forskning om konsekvenser av foreldres bruk av mobile skjermer i samvær med barn 0-6 år, på utfall som foreldres sensitivitet, samspill med barnet, tilknytning og utvikling. Gjennom litteratursøk i databaser og en rekke andre kilder identifiserte vi ca. 10.000 referanser og gikk gjennom 83 studier i fulltekst. Vi inkluderte 15 eksperimentelle studier og 5 naturalistiske observasjonsstudier. Vi vurderte risiko for systematiske skjevheter og tillit til dokumentasjonen for de 15 eksperimentelle studiene.

- I fire eksperimentelle studier av ammesituasjoner rapporterte forfatterne varierte resultater og kunnskapsgrunnlaget er svært usikkert
- I ni eksperimentelle studier av ulike leke- og samspillsituasjoner rapporterte forfatterne mer enhetlige resultater, kunnskapsgrunnlaget antyder at på kort sikt kan det være negative konsekvenser på sensitivitet og responsivitet, i barnets stress og negative følelsesuttrykk og i samspillet generelt.
- I to studier av læringssituasjoner rapporterte forfatterne varierte resultater, og kunnskapsgrunnlaget er svært usikkert
- I fem naturalistiske observasjonsstudier av samspillsituasjoner på lekeplasser, kafeer og lignende rapporterte forfatterne noen sammenhenger mellom mobilbruk og dårligere responsivitet og minsket sannsynligheten for samspill, men her kan vi ikke utelukke at det er andre faktorer som påvirker både telefonbruk og samspill.

Selv om resultatene i denne oversikten viser noen mulige konsekvenser på kort sikt, er forskningsspørsmålet begrenset besvart. Det er behov for mer forskning med lenger tidsperspektiv.

Tittel:
Foreldres bruk av mobile skjermer og samspill med barn 0-6 år: en systematisk oversikt

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Hvem står bak denne publikasjonen?
Folkehelseinstituttet, på oppdrag fra Helsedirektoratet

Når ble litteratursøket avsluttet?
Januar 2022

Fagfellevurdering:
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Sammendrag

Innledning

De aller fleste unge og voksne i Norge i dag har tilgang på og er hyppige brukere av en smarttelefon i hverdagen. At foreldre bruker smarttelefon eller nettbrett i samvær med barn er dermed svært sannsynlig, og vi trenger kunnskap om hvorvidt bruken kan føre til endringer i samværet, i relasjonen eller i barns utvikling. Regjeringens opptrappingsplan for barn og unges psykiske helse 2019-2024 påpeker at utstrakt bruk av digitale verktøy (f.eks. smarttelefon) hos foreldre kan påvirke samspillet mellom foreldre og barn, et samspill som har «avgjørende betydning for barnets fysiske, psykiske, intellektuelle og psykososiale utvikling». Det tidlige samspillet med foreldrene former barnets tilknytning, ved at barnet får sine primære behov dekket og blir holdt og trøstet. Tilknytning er det psykologiske båndet mellom barnet og de primære omsorgspersonene og danner grunnlag for senere evne til å knytte seg til og være i relasjon med andre mennesker.

Hensikt

Nasjonale faglige retningslinjer for helsestasjon 0-5 år har en sterk anbefaling om at foreldre bør få veiledning om samspill generelt i alle konsultasjoner i helsestasjonsprogrammet. I helsestasjonsprogrammet er «mobil- og skjermbruk hos foreldre og bruk av sosiale medier» omtalt som tema for foreldreveiledning ved de faste konsultasjonene når barnet er 4 uker, 6 måneder, 2 år og 4 år. Kunnskapsgrunnlaget for dagens anbefaling er en oppsummerende fagartikkel fra 2017, som begrunner denne anbefalingen om foreldres mobil- og skjermbruk i en bred, psykologisk forståelse av samspill og tilknytning, men som også fant at det var mangel på kunnskap om hvorvidt foreldres mobilbruk gir mulige skadevirkninger for barnet. Helsedirektoratet ønsker derfor et grundig litteratursøk og en systematisk oppsummering av kunnskap om foreldres skjermbruk og samspill med barn på kort og lengre sikt.

Metode

Vi utførte en systematisk kunnskapsoppsummering om konsekvenser av foreldres skjermbruk for samspill med barn og barns tilknytning og utvikling. Inklusjonskriteriene var:

- Popluasjon: foreldre og barn 0-6 år
- Eksponering: foreldres bruk av mobile skjermer (smarttelefon, nettbrett) i samvær med barn
- Sammenligning: begrenset eller ingen bruk

- Utfall: stress hos barn, samspill mellom foreldre og barn, foreldres oppmerksomhet overfor barnet, felles oppmerksomhet hos foreldre og barn, respons fra forelder, emosjonell tilgjengelighet hos foreldre, tilknytning barn/foreldre samt emosjonell og kognitiv utvikling hos barn
- Studiedesign: studier med kontrollbetingelser, det vil si randomiserte eller ikke-randomiserte studier med kontrollgrupper, avbrutte tidsserier, longitudinelle/kohortstudier og innengruppestudier (studier som sammenligner deltakerne med seg selv ved å ha flere faser i eksperimentet)

Vi skulle først søke etter systematiske oversikter, og hvis ingen ble funnet skulle vi søke etter primærstudier.

Resultater

Gjennom litteratursøk i databaser og en rekke andre kilder identifiserte vi cirka 10.000 referanser og leste 83 studier i fulltekst. Vi inkluderte 20 studier; tre randomiserte kontrollerte studier, tolv innengruppestudier og fem naturalistiske observasjonsstudier (altså studier fra lekeplasser, kafeer og lignende der forskeren ikke manipulerer foreldres skjermbruk).

Av tidshensyn ble kun de 15 eksperimentelle studiene vurdert med relevante sjekklister for risiko for systematiske skjevheter. Vi vurderte at fem studier hadde lav risiko, seks hadde moderat risiko og fire studier hadde høy risiko for systematiske skjevheter. Vi brukte en tilpasset og beskrevet metode for å vurdere kunnskapsgrunnlaget (*Grading of Recommendation, Assessment, Development and Evaluation*) ettersom vi ikke kunne kombinere resultatene i metaanalyser og få sammenslåtte effektstørrelser.

Vi grupperte de inkluderte studiene etter typen situasjonen og hensikten med samværet: ammesituasjoner (fire studier), lekesituasjoner (ni studier) og læringstiasjoner (to studier). Alle disse 15 studiene ble gjennomført i et laboratorium eller hjemme under kontrollerte betingelser. I tillegg kom de fem naturalistiske studiene.

Alle 20 studiene målte konsekvenser på kort sikt, hva skjer i selve situasjonen når en forelder bruker mobiltelefonen under samvær med barn.

- I fire eksperimentelle studier av ammesituasjoner rapporterte forfatterne varierte resultater, og kunnskapsgrunnlaget er svært usikkert.
- I ni eksperimentelle studier av ulike leke- og samspillsituasjoner rapporterte forfatterne mer enhetlige resultater: kunnskapsgrunnlaget antyder at på kort sikt kan det være negative konsekvenser av foreldres bruk av mobile skjermer på foreldres sensitivitet og responsivitet, i barnets stress og negative følelsesuttrykk og i samspillet generelt.
- I to studier av læringssituasjoner rapporterte forfatterne varierte resultater, og kunnskapsgrunnlaget er svært usikkert
- I fem naturalistiske observasjonsstudier av samspillsituasjoner på lekeplasser, kafeer og lignende rapporterte forfatterne noen sammenhenger mellom foreldres bruk av mobiltelefon og dårligere responsivitet og minsket

sannsynligheten for samspill, men i disse studiene kan vi ikke utelukke at det er andre faktorer som påvirker både telefonbruk og samspill. (Vi har ikke vurdert den metodologiske kvaliteten på disse studiene, og kan ikke si noe om hvilken tillit vi kan ha til resultatene.)

Diskusjon

De 20 inkluderte studiene besvarer forskningsspørsmålet kun delvis. De viser i hovedsak øyeblikksbilder; det vil si hva som skjer i samspillet på svært kort sikt når en forelder eller omsorgsgiver bruker mobile skjermer i bestemte situasjoner. Utfallene som måles er knyttet til samspill her og nå, foreldres kommunikasjon og respons samt barnets kommunikasjon og følelsesuttrykk. Vi vet dermed svært lite om konsekvenser på lengre sikt, hvilken betydning foreldres skjermbruk har på barnets tilknytningsstil og den emosjonelle og kognitive utviklingen.

Det er foretatt noen oppsummeringer på dette forskningsspørsmålet tidligere, og disse oversiktene konkluderer i hovedsak med at det er sammenhenger mellom foreldres bruk av mobile skjermer og samspill med barn, men her er kunnskapsgrunnlaget svært usikkert fordi studiene primært er tverrsnittstudier eller kvalitative studier. To nye, nordiske tverrsnittstudier finner også sammenhenger mellom foreldres bruk av mobile skjermer og samspill med barn og barns kognitive og emosjonelle utvikling, men heller ikke her kan vi utelate at det finnes bakenforliggende faktorer (forvekslingsfaktorer) som påvirker både bruken av mobile skjermer og barnets atferd og utvikling – slik som foreldres generelle stil overfor barnet.

Konklusjon

Selv om resultatene kan sies å gi en viss støtte til å være forsiktig med skjermbruk i samvær med barn, er det vanskelig å konkludere om konsekvensene av skjermbruk. Forskningsspørsmålet besvares dermed kun i begrenset grad, og det er stort behov for videre forskning med et lengre tidsperspektiv. Det vil også kunne være verdifullt å systematisk oppsummere funn fra studier med andre typer design for å få en bredere forståelse av fenomenet.

Key messages

Most young people and adults are today frequent users of smart-phones. The term "technoference" describes how technology interferes with and interrupts relations. The Norwegian Institute of Public Health was commissioned by the Norwegian Directorate of Health to systematically review research on the consequences of parents' use of mobile screens (smart-phones, tablets) when interacting with children 0-6 years old, on outcomes such as parents' sensitivity, interaction with the child, attachment and development. Through searching for literature in databases and several other sources, we identified ca. 10 000 references, and reviewed 83 studies in full-text. We included 15 experimental studies and 5 naturalistic observational studies. We assessed risk of bias, and our confidence in the documentation in the 15 experimental.

- In four experimental studies of breastfeeding situations the authors reported varied results, and the evidence is very uncertain.
- In nine experimental studies of different play and interaction situations, the authors reported more consistent results and the evidence suggests negative short-term consequences on parents' sensitivity and responsivity, the child's stress and negative emotionality, and interaction in general.
- In two studies of learning situations the authors reported varied results, and the evidence is very uncertain.
- In five naturalistic observational studies of interplay on playgrounds, cafes and similar, authors reported some associations between parents' use of mobile screens and lower responsivity and lower probability of interaction, but in these studies, we cannot rule out that there are other factors that influence both phone use and interplay.

Even though the results in this review show some possible short-term consequences, the research question is answered to a limited degree only. There is a need for more research with a longer timeframe.

Title:
Parents' use of mobile screens and interaction with children 0-6 years old: a systematic review

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Publisher:
The Norwegian Institute of Public Health conducted the review based on a commission from The Norwegian Directorate of Health

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Updated:
Last search for studies: January 2022

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Executive summary (English)

Introduction

The vast majority of young people and adults in Norway today have access to and are frequent users of a smartphone. Parents' use of a smartphone or tablet when interacting with children is thus very likely. We need evidence about whether the use of these digital tools lead to changes in the relationship parent-child or in children's development. The Norwegian government's escalation plan for children and young people's mental health 2019-2024 points out that extensive use of digital tools (e.g., smartphones) by parents can affect the interaction between parents and children, an interaction that is «crucial for the child's physical, mental, intellectual and psychosocial development». Early interaction with parents shapes the child's attachment, in which the child has his or her primary needs covered and is held and comforted. Attachment is the psychological bond between the child and the primary caregivers and forms the basis for future relationships.

Purpose

The National guideline for child and youth health centers 0-5 years have a strong recommendation that parents should receive guidance on general parent-child interaction in all consultations in the child and youth health centers program. In the child and youth health centers program, «parents' use of mobile devices and social media» is mentioned as a topic for parent counselling at the regular meetings when the child is 4 weeks, 6 months, 2 years, and 4 years. The evidence to date came from a 2017 review article that supports the recommendation on parents' use of mobile devices with a broad, psychological understanding of interaction and attachment. The review also found that there was a lack of knowledge about whether parents' mobile phone use has possible harmful effects for the child. The Norwegian Directorate of Health therefore wants a thorough review of the literature about parents' use of digital technology and interaction with children in the short and long term.

Method

We performed a systematic review on the consequences of parents' use of digital devices on their interaction with children, children's attachment and children's development. The inclusion criteria were:

- Population: parents and children 0-6 years
- Exposure: parents' use of mobile devices (smartphone, tablet) when interacting with children
- Comparison: restricted or no use of mobile devices

- Outcomes: stress in children, interaction between parents and children, parents' attention to the child, joint attention in parents and children, parents' responsivity, parents' emotional availability, children's attachment and children's emotional and cognitive development
- Study design: studies with control conditions, that is, randomized or non-randomized studies with control group, interrupted time series, longituinal/ cohort studies and within subjects studies (studies that compare the participants with themselves by having several phases in the experiment)

We were to first search for systematic reviews, and if none was found, we were to search for primary studies.

Results

Through literature searches in databases and several other sources, we identified 10,000 references and read 83 studies in full text. We included a total of 20 studies: three randomized controlled trials, twelve within-subjects studies and five naturalistic observational studies (studies from playgrounds, cafes and such).

Due to limited time, we only performed risk of bias appraisals on 15 experimental studies. Of these, five studies had a low risk, six had a moderate risk and four studies had a high risk of bias. As we could not combine the results in meta-analyses, we used an adapted GRADE method (*Grading of Recommendation, Assessment, Development and Evaluation*) to assess the certainty of evidence.

We grouped the included studies according to the situation and purpose of the contact: breastfeeding situations (four studies), play situations (nine studies) and learning situations (two studies). These studies were conducted in a laboratory or at home under controlled conditions. In addition, there were the five naturalistic studies.

All 20 studies measured consequences in the short term, what happens in the situation itself when a parent uses the mobile phone while spending time with children.

- In four experimental studies of breastfeeding situations the authors reported varied results, and the evidence is very uncertain.
- In nine experimental studies of different play and interaction situations, the authors reported more consistent results and the evidence suggests negative short-term consequences on parents' sensitivity and responsivity, the child's stress and negative emotionality, and interaction in general.
- In two studies of learning situations the authors reported varied results, and the evidence is very uncertain.
- In five naturalistic observational studies of interplay on playgrounds, cafes and similar, the authors reported some associations between parents' use of mobile screens and lower responsivity and lower probability of interaction, but in these studies, we cannot rule out that there are other factors that influence both phone use and interplay. As we have not assessed the quality of these studies, we are unable to discuss the confidence in the results.

Discussion

The 20 included studies answer the research question only partially. The studies present snapshots, that is what happens in the interaction in the very short term when a parent or caregiver uses mobile screens in certain situations. The outcomes that are measured are related to interaction here and now, parents' communication and response as well as the child's communication and emotional expression. We thus know very little about the long-term consequences of parents' use of digital technology on the child's attachment and the emotional and cognitive development.

The literature (e.g., systematic reviews) conducted on this research question before, include cross sectional and qualitative designs and conclude that there are associations between parents' use of mobile screens and interaction with children. Two new, Nordic cross-sectional studies also found associations between parents' use of mobile screens and interaction with children and children's cognitive and emotional development, but here too we cannot rule out that there are underlying factors (confounding factors) that affect both the use of mobile screens and the child's behavior and development – as parents' general style towards the child. Inferences of a casual relation (the use of mobile phone causes X outcome) warrant further research.

Conclusion

Our results provide some support in guiding parent's cautious use of digital screens while in the presence of their children. Based on the evidence it is however difficult to conclude on the consequences of this habit. The research question is thus answered partially. There is a great need for further research with a longer time perspective. It may also be valuable to systematically summarize findings from studies with other types of designs to gain a broader understanding of the phenomenon of interest.

Forord

Område for helsetjenester, Folkehelseinstituttet (FHI), fikk i oktober 2021 i oppdrag av Helsedirektoratet å utføre en systematisk kunnskapsoppsummering om konsekvenser av foreldres skjermbruk og samspill med barn. Kunnskapsoppsummeringen er relevant for helsestasjonsansatte og andre som skal veilede foreldre om bruk av mobile skjermer i samvær med barn – samt foreldre selv.

Område for helsetjenester ved FHI følger en felles framgangsmåte i arbeidet med kunnskapsoppsummeringer, dokumentert i metodehåndboka «Slik oppsummerer vi forskning». Det innebærer blant annet at vi kan bruke standardformuleringer når vi beskriver metode, resultater og i diskusjon av funnene.

Bidragsytere
Prosjektleder: Heid Nøkleby
Interne prosjektmedarbeidere ved FHI: Julia Bidonde, Lars Jørun Langøien, Bahar Kucuk og Ingvild Kirkehei

Takk til eksterne fagfeller Ellen Solstad Olavesen (Regionsenter for barn og unges psykiske helse Øst og Sør) og Sabine Kaiser (Regionalt kunnskapssenter for barn og unge, Nord) samt intern fagfelle Rigmor Berg som har gjennomgått og gitt innspill til kunnskapsoppsummeringen.

Oppgitte interessekonflikter
Alle forfattere og fagfeller har fylt ut et skjema som kartlegger mulige interessekonflikter. Ingen oppgir interessekonflikter.

Folkehelseinstituttet tar det fulle ansvaret for innholdet i rapporten.

Kåre Birger Hagen	Hege Kornør	Heid Nøkleby
fagdirektør	*avdelingsdirektør*	*prosjektleder*

Innledning

Beskrivelse av problemet

De aller fleste unge og voksne i Norge i dag har tilgang på og er hyppige brukere av en smarttelefon i hverdagen. Tall fra Statistisk sentralbyrå viser at i 2020 hadde over 99 prosent av menn og kvinner i aldersgruppen 16-44 år tilgang på smarttelefon til privat bruk (1). Omtrent like mange (97-99 prosent) bruker internett flere ganger daglig og like mange bruker internett via smarttelefonen (1). I tillegg brukes telefonen til kommunikasjon på ulike sosiale medier, til tekstmeldinger og epost samt en rekke andre praktiske oppgaver. I økende grad kan også bruken av applikasjoner på mobile skjermer knyttes til familieliv og barneoppdragelse, for eksempel app'er der forelderen kan registrere amming eller søvn, eller app'er med programmer for foreldre rettet mot atferdsendring hos barnet. At foreldre bruker smarttelefon (eller nettbrett) i samvær med sine barn er dermed svært sannsynlig, og vi trenger kunnskap om hvorvidt en slik bruk kan føre til endringer i samværet, i relasjonen eller i barns utvikling.

Regjeringens opptrappingsplan for barn og unges psykiske helse 2019-2024 løfter frem den omfattende bruken av digital teknologi (2). Opptrappingsplanen beskriver forståelser av og tiltak for å fremme barns og unges psykiske helse og livskvalitet i kommende år, og kapittel 3.2 omhandler blant annet den digitale utviklingen og mulige konsekvenser dette kan ha for barn og foreldre. Det påpekes at utstrakt bruk av digitale verktøy (f.eks. smarttelefon) hos foreldre kan påvirke samspillet mellom foreldre og barn, et samspill som har «avgjørende betydning for barnets fysiske, psykiske, intellektuelle og psykososiale utvikling» ((2) side 23).

Det tidlige samspillet med foreldrene (omsorgspersonene) former også barnets tilknytning, ved at barnet får sine primære behov dekket og blir holdt og trøstet (3-5). Tilknytning er det psykologiske båndet mellom barnet og de (den) primære omsorgspersonene og danner grunnlag for senere evne til å knytte seg til og være i relasjon med andre mennesker (6). Et godt samspill inkluderer blant annet omsorgspersonens sensitivitet, speiling og bekreftelse av barnets uttrykk og gir barnet en økende forståelse av seg selv (3).

Barnets tilknytningsmønster påvirkes også av faktorer på flere nivåer, som sett i en utviklingsøkologisk eller sosioøkologisk modell (7;8). Viktige påvirkningsfaktorer finnes på individnivå (som barnets temperament), familienivå (som foreldres egen tilknyt-

ningsstil eller sosioøkonomiske bakgrunn), nærmiljø (som ressurser i nettverk og barnehage/skole) og samfunnsnivå (som økonomisk politikk eller likestilling mellom kjønnene) (9).

I en her-og-nå-situasjon vil bruk av smarttelefon eller nettbrett kunne avbryte eller påvirke en samtale eller svekke oppmerksomheten hos den ene parten. Slike avbrytelser eller innblandinger i menneskelige kommunikasjon av «tekniske hjelpemidler» er på engelsk blitt kalt *technoference* (10). Kan slike «brudd» påvirke interaksjonen og relasjonen mellom foreldre og barn? Og kan denne type brudd eller svekket oppmerksomhet/interesse få noen konsekvenser på lengre sikt for partene? Kan den påvirke den primære tilknytningen hos barnet eller den emosjonelle eller kognitive utviklingen?

Hva vi vet om forskningen

Det finnes tidligere oversikter over studier av konsekvenser av foreldres skjermbruk. En litteraturoversikt av Kildare & Middlemiss fra 2017 (11) inkluderte 27 studier av foreldre og barn 0-18 år. Oversiktsforfatterne rapporterte at foreldre som bruker smarttelefoner under samvær med barn er mindre sensitive og responsive både verbalt og non-verbalt for barnas søken etter oppmerksomhet, hvilket i sin tur kan føre til forringet kvalitet på samspillet. Imidlertid kan ikke oversikten, som primært er basert på tverrsnittstudier, kunne slå fast at det er mobilbruken i seg selv som fører til lavere sensitivitet eller om det (også) er påvirket av bakenforliggende faktorer (forvekslingsfaktorer), som for eksempel generelt mindre oppmerksomme foreldre.

En nyere oversikt er kartleggingsoversikten av Braune-Krickau og medarbeidere fra 2021 med studier av foreldre og deres barn i alderen 0-5 år (12). Oversiktsforfatterne konkluderer med at studiene antyder assosiasjoner mellom forelders bruk av smarttelefoner og respons overfor barnet. Forfatterne rapporterer at det er en sterkere sammenheng når forelderen er fordypet i skjermen, sammenlignet med kortere avbrytelser generelt.

Det er utfordrende å forske på konsekvenser av eksponering for foreldres skjermbruk. Tverrsnittstudier vil kunne si noe om assosiasjoner mellom skjermbruk og ulike utfall, men problemet med bakenforliggende faktorer gjør det vanskelig å si noe om årsakssammenheng. Kvalitative studier som etnografier eller intervjustudier kan belyse fenomenet og hvilke mekanismer som kan gjøre at foreldres skjermbruk får bestemte følger. Konsekvenser på kort sikt vil kunne studeres i ulike typer eksperimentelle studier, der kontrollbetingelser styrker sjansen for at det er konsekvenser av nettopp eksponeringen som studeres. Aktuelle eksperimentelle studiedesign er randomiserte kontrollerte studier som sammenligner to grupper, eller innengruppestudier som sammenligner deltakerne med seg selv ved flere måletidspunkter.

En type studier som har undersøkt samspill mer generelt mellom foreldre og barn er såkalte «still face»-studier. Dette var opprinnelig eksperimenter som ble utviklet på 1970-tallet for å undersøke hvordan spedbarn interagerer sosialt med forelderen, ved å avbryte et samspill (13;14). Studien gjennomføres ved at et barn og forelderen sitter

vis-a-vis hverandre og «snakker» sammen gjennom ansiktsmimikk, lyder og gester (lekefasen). Dette pågår i et bestemt tidsrom, for eksempel to minutter, deretter snur forelderen seg kort bort fra barnet og ved tilbakesnuing har forelderen ingen mimikk eller kommunikasjon med barn, forelderen ser bare direkte på barnet uten å reagere på barnets initiativ (still face-fasen). Dette pågår også i en bestemt tidsperiode, for eksempel to minutter, deretter snur forelderen seg igjen kort bort og tilbake, med den samme interaksjonen som i første fase (gjenforeningsfasen). Gjennom hele eksperimentet måles barnets mimikk, lyder, uttrykk, gester, kroppsbevegelser. Denne studien er gjentatt mange ganger de siste tiårene, og en oversikt som sammenfattet og metaanalyserte cirka 80 still face-studier, fant at still face-fasen reduserte positive følelsesuttrykk og økte negative følelsesuttrykk og at det var en delvis videreføring av disse effektene inn i fase tre (14). En modifisert type still face-studier, der still face erstattes med at foreldreren er konsentrert om mobiltelefonen, har blitt gjennomført for å undersøke hvordan dette kan påvirke samspillet mellom foreldre og barn.

Konsekvenser på lang sikt bør undersøkes i longitudinelle studier, der man følger en gruppe over tid og der gruppen kan deles i for eksempel foreldre som bruker mobile skjermer i samvær med barn i stor grad og foreldre som gjør dette i mindre grad. I slike studier må også utfall måles på flere tidspunkt, for å kunne se en utvikling, samt forsøke å kontrollere for andre faktorer.

Hvorfor det er viktig å utføre denne kunnskapsoppsummeringen

Kunnskapsgrunnlaget om foreldres bruk av mobile skjermer og eventuelle konsekvenser for barna er usikkert. I dag har Nasjonale faglige retningslinjer for helsestasjon 0-5 år en sterk anbefaling om at foreldre bør få veiledning om samspill i alle konsultasjoner i helsestasjonsprogrammet (15). Anbefalingen bygger på at «et inntonet samspill [fremmer] trygg tilknytning som innebærer at barnet opplever seg forstått og hjelpes til å bli i stand til å regulere sine emosjoner» ((15), digitalt kapittel om Samspill). I helsestasjonsprogrammet (vedlegg til retningslinjen) er «mobil- og skjermbruk hos foreldre og bruk av sosiale medier» omtalt som tema for foreldreveiledning ved de faste konsultasjonene når barnet er 4 uker, 6 måneder, 2 år og 4 år (16). Kunnskapsgrunnlaget er en oppsummerende fagartikkel publisert i tidsskriftet Sykepleien i 2017 (17). Fagartikkelen begrunner anbefalingen i en bred, psykologisk forståelse av samspill og tilknytning, men fant at det var mangel på kunnskap om hvorvidt foreldres mobilbruk gir mulige skadevirkninger for barnet.

Det er derfor behov for økt kunnskap på dette feltet, og Helsedirektoratet har fått ansvar for å følge opp regjeringens ønske om å «øke og spre kunnskapen om sosialt samspill mellom foreldre og barn, herunder betydningen av foreldres skjermbruk på tilknytning og psykisk helse» ((2), side 23.).

En systematisk gjennomgang av kunnskapsgrunnlaget vil bidra i en begrunnelse for faglige anbefalinger som gis i ulike deler av helsetjenesten. Helsedirektoratet ønsker derfor et grundig litteratursøk og en systematisk oppsummering av kunnskap om for-

eldres skjermbruk og samspill med barn på kort og lengre sikt. Det er ønskelig å systematisk oppsummere resultater fra studier som i størst mulig grad kan si noe om 'effekter' eller 'konsekvenser' av skjermbruken.

Forskningsspørsmål

Forskningsspørsmålet i denne systematiske kunnskapsoppsummeringen er:
Hva er konsekvenser av foreldres bruk av mobile skjermer (smarttelefoner, nettbrett) når de er sammen med barn 0-6 år, på samspill, tilknytning og utvikling?

Metode

Vi utførte en systematisk kunnskapsoppsummering om konsekvenser av foreldres skjermbruk for samspill med barn (0-6 år) og barns tilknytning og utvikling. Vi søkte først etter systematiske oversikter, og når ingen ble funnet som tilfredsstilte inklusjonskriteriene, søkte vi etter primærstudier. Vi fulgte anbefalingene fra Folkehelseinstituttets metodehåndbok (18) og Cochrane Handbook (19).

Prosjektplan og avvik fra prosjektplan

Vi publiserte en prosjektplan, denne finnes publisert på FHIs sider: https://www.fhi.no/cristin-prosjekter/aktiv/foreldres-skjermbruk-og-samspill-med-barn-0-6-ar-prosjektplan-for-en-system/

Vi avklarte prosjektplanen med oppdragsgiver Helsedirektoratet før vi utførte oppsummeringen. Underveis, og til dels etter diskusjon med oppdragsgiver, har vi gjort noen få endringer sammenlignet med prosjektplanen (også beskrevet i metodekapittelet):

- Vi endret hvilket verktøy vi brukte med hensyn til vurdering av risiko for skjevheter for innengruppedesign (*within-subjects design*)
- Vi inkluderte naturalistiske observasjonsstudier (f.eks. studier av foreldre og barn på en lekeplass), men prioriterte ikke å systematisk hente ut alle data eller vurdere risiko for skjevheter ved disse studiene
- Vi gikk av tidshensyn ikke gjennom referanselister i inkluderte studier for å søke etter ytterligere studier; vi gikk kun gjennom de identifiserte og relevante oversiktene som likevel ikke tilfredstillte inklusjonskriteriene

Inklusjons- og eksklusjonskriterier

Vi hadde følgende inklusjonskriterier:

Populasjon	Foreldre og barn 0-6 år (i studier som inkluderer eldre barn, må minst halvparten av barna være under 6 år og/eller gjennomsnittsalder er <6 år)
Eksponering/ tiltak	Foreldres (foresattes) bruk av mobile skjermer (smarttelefon, nettbrett) i samvær med barn
Sammenligning	Begrenset/ikke bruk av mobile skjermer i samvær med barn blant foreldre

	Eventuelt: begrenset/ikke bruk kan være et tiltak/eksponering som blir sammenlignet med økt bruk/bruk av mobile skjermer
Utfall	• Stress hos barn • Samspill mellom foreldre og barn • Foreldres oppmerksomhet overfor barnet • Felles oppmerksomhet hos foreldre og barn • Respons fra forelder • Emosjonell tilgjengelighet hos foreldre • Tilknytning barn/foreldre • Emosjonell og kognitiv utvikling hos barn
Studiedesign (se også ordliste bak)	1) Systematiske oversikter Systematiske oversikter over studier med design som beskrevet under (eventuelt subgruppe/egne analyser på slike studiedesign) som besvarer problemstillingen (inkludert utfall på kort og lang sikt) Ettersom vi ikke fant systematiske oversikter som tilfredsstilte inklusjonskriteriene, søkte vi også etter primærstudier. 2) Primærstudier (i prioritert rekkefølge etter styrken ved designet) • Randomiserte kontrollerte studier (≥ 2 grupper) • Kontrollerte studier (to grupper uten randomisering) • Avbrutte tidsserier (minst tre målinger før noe inntreffer og minst tre målinger etter) • Kohortstudier (en gruppe som kan deles etter eksposisjon) • Innengruppedesign (flere målinger av ett subjekt, laboratoriestudie eller naturalistisk studie)
Publikasjonsår	Systematiske oversikter: ingen tidsbegrensning Primærstudier: 2005
Land/Kontekst	Alle land
Språk	Vi vil inkludere studier på engelsk, spansk, norsk, svensk og dansk. Relevante studier på andre språk vil vi liste i et vedlegg.
Annet	Vi vil vurdere alle former for fagfellevurderte/vurderte publikasjoner (master/doktorgrader, rapporter, tidsskriftsartikler)

Vi ekskluderte følgende typer studier og publikasjoner:

- Ikke-systematiske oversikter (dvs. en oversikt som ikke tilfredsstiller følgende tre kriterier: klare inklusjonskriterier, vurdering av studienes interne validitet og en systematisk sammenstilling av resultater (18)), systematiske oversikter av lav metodisk kvalitet, tverrsnittstudier, før-og-etter-studier og kvalitative studier
- Studier som kun undersøker graden/frekvensen av foreldres bruk av mobile skjermer og/eller som ikke måler relevante utfall som beskrevet
- Konferanseabstrakter, redaksjonelle artikler, kommentarer og lignende

Litteratursøk

Søk i databaser

Bibliotekar Ingvild Kirkehei utarbeidet en søkestrategi i samarbeid med prosjektgruppen og utførte søkene. Søket inneholdt relevante kontrollerte emneord tilpasset de ulike databasene (f.eks. Medical Subject Headings), tekstord (ord tittel og sammendrag), og avgrensninger som gjenspeilet inklusjonskriteriene. Søket ble avsluttet i januar 2022 og inkluderte søk i følgende databaser:

- MEDLINE (Ovid)
- Embase (Ovid)
- PsycINFo (Ovid)
- Scopus
- Epistemonikos
- Cochrane Database of Systematic Reviews
- CINAHL (Ebsco)
- Cochrane CENTRAL

For fullstendig søkestrategi, se vedlegg 1.

Søk i andre kilder

En bibliotekar søkte etter pågående systematiske oversikter i Prospero og pågående primærstudier i ClinicalTrials.gov.

Bibliotekar/forskere søkte etter studier som ikke er indeksert i databasene, blant annet ved å søke i institusjonsarkiver som Cristin og Nora, publikasjonslister hos RKBU (Regionalt kunnskapssenter for barn og unge) og RBUP (Regionsenter for barn og unges psykiske helse samt hos relevante organisasjoner (Sykepleierforbundet, Landsgruppa for helsesykepleiere, Legeforeningen og Psykologforeningen). Det ble også søkt i OAister, WordlCat og i Google på norsk, dansk, svensk og engelsk. Søketermer og oversikt over alle søkte kilder finnes i vedlegg 1. I tillegg gjennomgikk vi referanselister i relevante oversikter.

Utvelging av studier

To prosjektmedarbeidere (HN, LJL eller JB) gjorde uavhengige vurderinger av tittel og sammendrag fra litteratursøket opp mot inklusjonskriteriene. Vi søkte først etter systematiske oversikter som kunne besvare forskningsspørsmålet, men identifiserte ingen. Deretter søkte vi etter primærstudier og screenet dette søket for relevante studier.

Vi brukte maskinlæringsfunksjoner for å hjelpe oss med å vurdere titler og sammendrag mer effektivt ved screening av primærstudiene. Enkelt sagt betyr maskinlæring at vi tar i bruk algoritmer som gjør at datamaskinen er i stand å lære fra og utvikle sin be-

slutningsstøtte basert på empiriske data. Vi benyttet *priority screening* som er en rangerende algoritme i programvaren EPPI der algoritmen lærer seg hvilke studier som er de mest relevante for inklusjon.

Studiene som vi var enige om var relevante innhentet vi i fulltekst. To prosjektmedarbeidere gjorde deretter uavhengige vurderinger av hvorvidt studiene skulle inkluderes. Uenighet om vurderingene av tittel/sammendrag og fulltekster løste vi ved diskusjon eller ved å trekke inn en tredje prosjektmedarbeider.

Vi lagde et flytdiagram av studier fra databasene og andre kilder til endelig inklusjon (se figur 1).

Uthenting av data

To medarbeidere per studie (JB og LJL eller BK og HN) hentet ut data uavhengig av hverandre og diskuterte deretter til enighet ble nådd. Vi hentet ut følgende data fra de inkluderte studiene:

- bibliografiske data om publikasjonen
- data om studien (studiedesign, studiens mål)
- data om populasjon (antall, bakgrunnsdata om barn og foreldre)
- data om intervensjon/eksponering (hvor mye/hvordan brukes mobile skjermer)
- data om sammenligning (ingen skjermbruk/begrenset skjermbruk)
- data om utfallsmål og resultater (hva og hvordan er resultatene målt, resultater)
- data om kontekst (land, den 'kulturelle' rammen om studien)
- variabler som ble justert for i analysene (ev. forvekslingsfaktorer og kovariater)[1]
- studienes forståelser av sammenhenger eller kausalitet

Studiedesign kategoriseres på ulike måter, avhengig av fagtradisjoner. Vi tok utgangspunkt i at dette er psykologiske studier og har brukt definisjoner fra American Psychological Association (20) og fagboken Psykologiens forskningsmetoder (21).

Vi hadde diskusjon om én studie der forfatterne beskrev designet som longitudinelt (22), men der en spørreundersøkelse ble gjentatt to ganger uten klare distinksjoner mellom gruppen som fikk eksponeringen (mødre som brukte mobiltelefon under amming) og gruppen som ikke fikk eksponeringen (mødre som ikke brukte mobiltelefon under amming). Vi valgte derfor å ekskludere denne og i stedet liste den som en tverrsnittstudie.

[1] Forvekslingsfaktorer er faktorer som kan påvirke både utfall og hvilket tiltak/eksponering deltakeren mottar (her: hvor mye skjerm som brukes), mens rene kovariater har kun effekt på utfallet (her: atferd hos barn eller forelder).

Vurdering av risiko for systematiske skjevheter

Vi vurderte risiko for systematiske skjevheter (intern validitet) i 15 av de 20 inkluderte studiene, det vil si de eksperimentelle, men ikke de naturalistiske observasjonsstudiene[2]. Vurderingene ble gjort på studienivå (RCTer ble vurdert med RoB-2 som har vurderinger per utfallsnivå i flere domener).

Verktøyet for RCTer, RoB-2 (23), ble brukt i sin helhet, men vurderingene ble sammenfattet for hvert domene (ikke enkeltspørsmål) i tabellene for hver studie i vedlegg 2.

Vi inkluderte 12 studier med innengruppedesign (*within-subjects design*). Innengruppedesign (også kalt repeterte målinger/*repeated measures design* (21)) er eksperimentelle studier der deltakerne mottar minst to tiltak eller eksponeringer hver, og det foretas flere målinger, før (eventuelt under) og etter tiltakene (24;25). Målingene for de enkelte deltakerne ses deretter i sammenheng. Studier med innengruppedesign utføres for eksempel innenfor psykologi og rehabilitering, der det kan være store individuelle forskjeller med hensyn til det utfallet som måles, eller der populasjonen er svært liten.

I studiene med et innengruppedesign planla vi å bruke verktøyet fra «Logans» (26), men denne viste seg å ha for smale kriterier for de ulike variantene av *innengruppedesign* vi fant. Vi valgte derfor i stedet å ta i bruk et norskutviklet verktøy for denne type design, som vi i forkant var blitt kjent med: «Sjekkliste for vurdering av studier med innendeltakerdesign (single-case experimental design)» (27). Dette verktøyet hadde på sin side ganske *vide* kriterier, så vi måtte gjøre noen valg og avgrensninger (hele verktøyet på norsk finnes i vedlegg 3):

- Vi brukte spørsmål 2-8 fra del B og spørsmål 10-12 (kun første halvdel av spørsmål 12) fra del C, det vil si totalt ni spørsmål. De øvrige spørsmålene gjaldt ikke vurdering av risiko for systematiske skjevheter.
- Der spørsmålene i originalen var åpne for tolkning (hadde vide kriterier) la vi inn spesifikasjoner rettet mot vårt aktuelle studiedesign, se kommentarer i bokser i vedlegg 3.
- Vi formulerte den samlede vurderingen av risiko for systematiske skjevheter som 'lav risiko for skjevheter', 'moderat risiko for skjevheter' eller 'høy risiko for skjevheter'.

I tabell 1 nedenfor beskrives hvilke verktøy som ble benyttet for de ulike studiedesignene vi inkluderte, samt hvilke områder verktøyene vurderer.

[2] En naturalistisk observasjonsstudie innebærer at forskeren studerer mennesker i sine naturlige miljøer. I denne sammenheng betyr at det at forskeren ikke manipulerer foreldres skjermbruk eller på andre måter påvirket samspillet mellom foreldre (omsorgsgivere) og barn.

Tabell 1. Studiedesign ved de inkluderte studiene og hvordan intern validitet er målt

Studiedesign	Verktøy/ sjekkliste	Områder som vurderes
Randomiserte kontrollerte studier (RCT)	ROB-2 (23)	• Randomiseringsprosessen • Analyse "intention to treat" vs. per protokoll • Manglende data • Måling av utfall • Rapportering av resultater
Innengruppedesign	Sjekkliste for vurdering av studier med innendeltakerdesign (27)	• Rekruttering og beskrivelse av deltakere • Blinding • Beskrivelse av tiltaket • Beskrivelse av utfall og målemetoder • Redegjørelse for analyser • Etiske vurderinger • Rapportering av resultatene

Analyser

På bakgrunn av studienes ulike fokus (situasjoner som er studert), utfall, utfallsmål og populasjon (som barnets alder) fant vi det ikke forsvarlig å kombinere resultatene statistisk i en eller flere metaanalyser. I stedet har vi sammenstilt resultatene narrativt i tabeller og tekst. Vi kategoriserte studiene og resultatene i henhold til type situasjon studiene var utført i, dvs. ammesituasjon, lekesituasjon og læringssituasjon.

Vi har i tabeller gjengitt resultatene slik de er rapportert i studiene, uten omregning og kun med begrenset tilpasning (på originalspråket engelsk). Vi gjengir forfatternes vurdering av statistisk signifikans. Bruk av statistisk signifikans som en veileder til hva som er vesentlige og uvesentlige resultater er imidlertid blitt kritisert den senere tid (19). Vi hadde ikke forhåndsdefinert bestemte effektmål (f.eks. gjennomsnittlig forskjell, relativ risiko eller odds ratio) eller presisjonsmål (f.eks. 95 % konfidensintervall, standardavvik eller annet) fordi vi var ikke kjente med hvilke målemetoder som var brukt i studiene og ikke ville begrense studietilfanget av den grunn, samt hadde en stram tidsramme. Andre variabler som studiene måtte ha inkludert, som for eksempel spørreskjemaer om daglig telefonbruk, er ikke inkludert i våre resultater. Under hver tabell er resultatene sammenfattet på enkelt vis (på norsk).

Vurdering av kunnskapsgrunnlaget

Vi brukte en tilpasset versjon av GRADE (*Grading of Recommendation, Assessment, Development and Evaluation* (28) som ikke baserer seg på at dataene er sammenstilt i metaanalyser. Den tilpassede fremgangsmåten er beskrevet i en artikkel av Murad og kolleger fra 2017 (29). For hver av de fire situasjonene der konsekvenser av foreldres skjermbruk er målt, vurderte vi studienes risiko for systematiske skjevheter (GRADE

risk of bias), i hvilken grad studienes forskningsspørsmål er i overenstemmelse med oversiktens forskningsspørsmål (GRADE *directness*), om det var flere og/eller større studier (GRADE *precision*), om resultatene peker i samme retning (GRADE *consistency*) og om vi mistenker at det er systematiske skjevheter med hensyn til hvilke studier som er publisert og ikke (GRADE *publication bias*).

Resultater

Litteratursøket og utvelgelse av studier

Søk etter systematiske oversikter

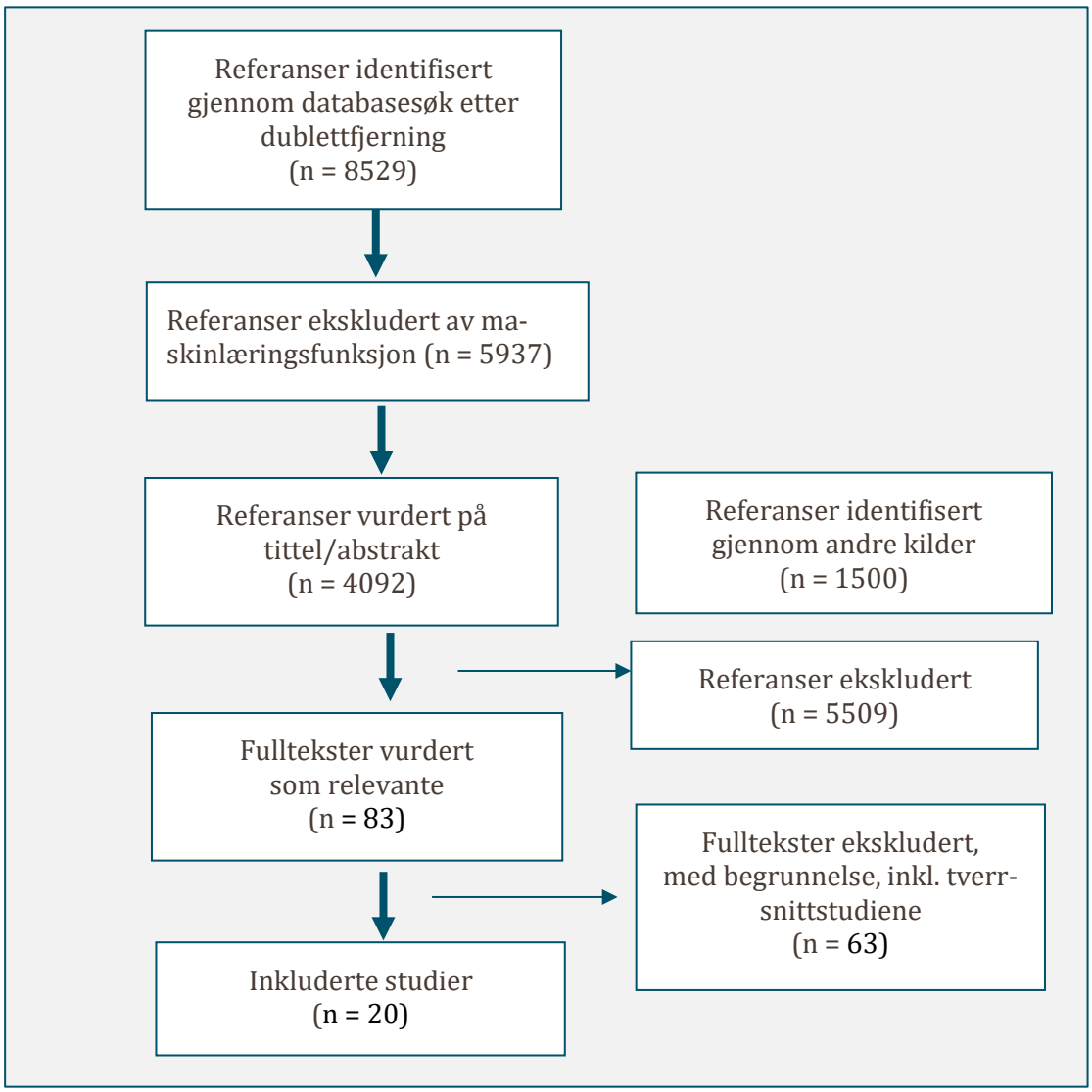
Databasesøket etter systematiske oversikter ga 776 treff etter fjerning av dubletter. Vi gjennomgikk alle referansene basert på tittel og sammendrag og identifiserte 13 oversikter som kunne være relevante. Disse gikk vi gjennom i fulltekst, og alle ble ekskludert. Listen over oversiktene med begrunnelse for eksklusjon finnes i vedlegg 4. De viktigste årsakene for eksklusjon var at det ikke var en *systematisk* oversikt (18) og/eller hadde et ikke tilstrekkelig presist forskningsspørsmål. Vi gjennomgikk oversiktene for å se etter referanser til aktuelle primærstudier (vi inkluderte tre studier).

Søk etter primærstudier

Databasesøket etter primærstudier ga 7346 treff etter fjerning av dubletter. Ved denne gjennomgangen av referanser (tittel og sammendrag) brukte vi maskinlæringsfunksjonen *priority screening*, som innebærer at dataprogrammet utvikler en algoritme som identifiserer hvilke studier som er de mest relevante for inklusjon og presenterer disse først. Vi leste 1409 referanser det vil si 19 prosent, før vi etter visuell inspeksjon kunne fastslå at det var svært liten sannsynlighet for at flere studier ville bli inkludert, og det var ingen inkluderte av de siste 400 referansene. Av disse 1409 referansene leste vi i fulltekst 50 studier som så ut til å kunne være relevante (vi inkluderte ytterligere 15). Bibliotekaren utførte et ekstra søk basert på særlig relevante termer (eks. *technoference*, *phubbing*, se vedlegg 1) som gav 407 referanser, hvorav vi leste 10 i fulltekst (én ble inkludert). Listen over primærstudier med begrunnelse for eksklusjon finnes også i vedlegg 4. De viktigste årsakene for eksklusjon var: ikke riktig eller tilstrekkelig presist forskningsspørsmål, kvalitativt studiedesign, deltakerne var større barn eller studien var ikke empirisk. Alle relevante studier som ble ekskludert på grunn av tverrsnittdesign er listet i vedlegg 5.

I tillegg ga søk etter grå litteratur cirka 1500 referanser som ble gjennomgått av bibliotekaren eller forskerne (tallet er omtrentlig fordi noen lister ble gjennomgått av bibliotekar direkte). Fra dette søket inkluderte vi ytterligere én studie.

Totalt inkluderte vi 20 primærstudier. Sammenslåtte tall for identifiserte referanser, screenede referanser, studier som er lest i fulltekst og inkluderte studier er illustrert i figur 1.



Figur 1: *Flytdiagram over utvelgelse av studier*

Av de 20 inkluderte studiene var det fem studier som bygget på observasjon av dagligdagse situasjoner, altså ikke-eksperimentelle studier. I denne typen studiedesign er det få muligheter til å kontrollere betingelsene, og resultatene vil være langt mer usikre. Av tidshensyn måtte vi foreta noen prioriteringer, og vi valgte ikke å inkludere disse studiene på samme nivå som de eksperimentelle, det vil si vi hentet ikke ut detaljerte data om studiene og vi vurderte ikke risiko for systematiske skjevheter. Forenklede resultater er imidlertid oppsummert til slutt i dette resultatkapittelet, fordi vi mener de kan belyse forskningsspørsmålet fra en annen vinkel ettersom studiene nettopp er hentet fra virkelige situasjoner.

Vi fant ingen relevante studier på andre språk enn engelsk. Vi fant ingen relevante pågående studier.

Beskrivelse av de inkluderte studiene

Vi inkluderte 20 unike studier i denne oversikten, beskrevet i like mange publikasjoner (22;30-49). Studiene ble publisert mellom 2015 og 2022 og ble utført i USA (n=10), Israel (n=3), Nederland, (n=2), Tyskland (n=2), Australia (n=1), Canada (n=1) og Japan (n=1). Tolv av studiene har innengruppedesign og tre studier er randomiserte kontrollerte studier (RCTer). Når det gjaldt to av RCTene hadde vi diskusjoner om hvordan vi skulle klassifisere studiedesignet ettersom disse studiene inkluderte både *mellom*-gruppe og *innen*gruppe elementer. Etter drøftinger av hvorvidt studiene kunne klassifiseres som et faktorielt design (50), mixed design (20;21) eller en RCT, landet vi på en beslutning om at klassifisering som RCT ville være mest hensiktsmessig her og vi behandlet studiene som dette.

Studiene er utført i ulike kontekstuelle situasjoner, med ulike rammer rundt situasjonen: amming, lek og læring. De 15 eksperimentelle foreldre-barn-situasjonene er fordelt på: amming (n=4), lek (n=9) og læring (n=2). Studiene av lekesituasjoner er delt i to underkategorier: 1) lekesituasjoner med still face-design (forklart i innledningskapitlet) og 2) lekesituasjoner med andre design. De naturalistiske observasjonsstudier er foretatt på lekeplasser/kafeer og lignende (n=5). Beskrivelser av studiene, vurdering av risiko for skjevheter, presentasjon av resultater samt vurdering av kunnskapsgrunnlaget tar utgangspunkt i disse kontekstuelle situasjonene. De 15 eksperimentelle studiene er grundigst analysert (som beskrevet i metodekapitlet).

De åtte inkluderte utfallene er på litt ulike nivåer; utfallet «samspill mellom foreldre og barn» er et mer overordnet utfall og kan romme noen av de andre syv første utfallene. Dette er viktig å ta i betraktning ved tabellene med oversikt over utfall og resultater.

Populasjonen i de 15 studiene kan beskrives som følger:

- Barna var i gjennomsnitt mellom 2 og 32 måneder (median 13,7 måneder), og det var cirka like mange jenter som gutter. Der det var oppgitt informasjon om barnas helsetilstand var de ved normal helse.
- Foreldrenene bestod av en stor majoritet av kvinner; i 11 studier var det kun kvinner (22;33-35;37-41;44;46;49), i tre studier var det minst 90 prosent kvinner (32;36;47), mens i én studie var det en liten overvekt av menn (45). Med hensyn til sosioøkonomisk bakgrunn (utdanning eller inntekt) og kulturell kontekst er det vanskeligere å si noe generelt om deltakerne. Mange studier hadde rekruttert på nettet, lokale tiltak/møtesteder og lignende, og flere studier hadde ingen ytterligere beskrivelse av deltakerne. I et par studier var det fremhevet at populasjonen hadde over gjennomsnittet høy utdanning eller inntekt.
- Studiene omfatter fra 7 til 227 foreldre-barn-par (dyader), i gjennomsnitt 57.

Flere detaljer om de 15 studiene er beskrevet i tabellene i vedlegg 2. I vedlegg 6 finnes en oversikt over alle studiene og hvilke utfall som er målt og hvilke som ikke er målt.

Ammesituasjoner

Fire studier målte samspill og reaksjoner i situasjoner der mor ammer et spedbarn, enten i et laboratorium eller hjemme (tabell 2). I disse innengruppestudiene består designet av faser der mødrene henholdsvis bruker og ikke bruker en mobil skjerm på samme tid som de ammer barna. For å måle utfall er situasjonen overvåket ved hjelp av videokamera, sensorer som fanger opp hvor mor ser, eller på andre måter.

Tabell 2: *Beskrivelse av de inkluderte studiene av ammesituasjoner (n=4)*

Studie	Studie-design	Land	Antall dyader	Barn alder	Foreldre alder	Eksperimentets struktur
Inoue (2021) B (33)	Innen-gruppe	USA	12	2-4 md	31-41 år	To besøk på lab'en: ett med tlf, ett uten
Nakagawa (2019) (40)	Innen-gruppe	Japan	7	(alder ikke opp-gitt)	(alder ikke opp-gitt)	Tre etterfølgende faser á 1,5 min: kun amming, amming mens leser på tlf, amming mens skriver på tlf
Nomkin (2021) (41)	Innen-gruppe	Israel	20	ca 5 md	Snitt 32 år	To betingelser: amming og ansikt-til-ansikt. Tre etterfølgende faser á 5 min: tlfbruk, tlf utenfor rekkevidde, tlf på mute.
Ventura (2019) (49)	Innen-gruppe	USA	25	1,5-7 md	25-40 år	To besøk på lab'en: ett med skjermbruk og ett med musikk
Totalt=4	Innen-gruppe=4	USA=2, Japan=1, Israel=1	64 (spenn 7-25)	Spenn 1-7 md	Spenn 25 til 44 år	

Utfallene er i hovedsak knyttet til mors oppmerksomhet på eventuell kommunikasjon fra barnet (tabell 3).

Tabell 3: *Utfall målt i studiene av ammesituasjoner (n=5)*

Utfall	Inoue (2021) B	Nakagawa (2019)	Nomkin (2021)	Ventura (2019)	Totalt
Stress hos barn					
Samspill	Ja				1
Foreldres oppmerksomhet	Ja	Ja	Ja	Ja	4
Felles oppmerksomhet					
Respons fra forelder				Ja	1
Emosjonell tilgjengelighet hos foreldre					
Tilknytning barn-foreldre					
Emosjonell /kognitiv utvikling hos barn					

Lekesituasjoner

Ni studier undersøkte ulike situasjoner der den overordnede hensikten i situasjonen var lek og/eller samspill. Fire av disse studiene var tilnærmet kopier av tidligere eksperimenter kalt «still face», der en samspillsituasjon avbrytes med at forelderen «tar på seg» et uttrykksløst ansikt (beskrevet i innledningskapitlet).

I de foreliggende studiene var forelderens uttrykksløse ansikt skiftet ut med forelderens fordypelse i eller stirring på telefonen. Disse fire studiene er så like at vi har valgt å analysere dem som en underkategori av lekestudiene. De øvrige fem studiene av lekesituasjoner har flere likheter med still face-studiene, men også noen viktige forskjeller. Noen av disse inkluderer flere grupper som parallelt har et still face-design med ulike typer avbrytelser, men andre kun omfatter én gruppe, men hvor de ulike fasene besto av ulike aktiviteter. Disse fem studiene er analysert som den andre underkategorien av lekestudiene.

Lekesituasjoner med still face-design

Fire studier undersøker barnets reaksjoner i modifiserte still face-eksperimenter (forelderen får et «still face» – uttrykksløst ansikt – når hen ser på telefonen) (tabell 4). Studiene har tre faser: 1) samspill mellom foreldre og barn, 2) forelder er instruert til å ta frem telefon/nettbrett og lese/skrive på denne, for eksempel besvare tekstmeldinger som kommer som en del av studien, og 3) på nytt samspill mellom foreldre og barn (gjenforening). Hver fase pågår i et bestemt antall minutter.

Tabell 4: *Beskrivelse av studiene av lekesituasjoner med still face-design (n=4)*

Studie	Studie-design	Land	Antall dyader	Barn alder	Foreldre alder	Eksperimentets struktur
Khourochvili (2017) (34)	Innen-gruppe	Canada	19	4-11 md	18-39 år	2 min – 5 min – 2 min
Kildare (2017) (35)	Innen-gruppe	USA	34	3-6 md	21-39 år	2 min – 2 min – 2 min
Myruski (2018) (39)	Innen-gruppe	USA	50	7-24 md	(alder ikke oppgitt)	5 min – 2 min – 1 min
Stockdale (2020) (47)	Innen-gruppe	USA	227	5-14 md	(alder ikke oppgitt)	2 min – 2 min – 2 min
Totalt=4	Innen-gruppe=4	USA=3, Canada=1	330 (spenn 19-227)	Spenn 3-24 md	Spenn 18-39 år	

Utfallene er knyttet til samspill og stressatferd hos barnet (tabell 5).

Tabell 5: *Utfall målt i studiene av lekesituasjoner med still face-design (n=4)*

Utfall	Khourochvili (2017)	Kildare (2017)	Myruski (2018)	Stockdale (2020)	Totalt
Stress hos barn		Ja	Ja	Ja	3
Samspill	Ja	Ja	Ja	Ja	4
Foreldres oppmerksomhet					
Felles oppmerksomhet					
Respons fra forelder					
Emosjonell tilgjengelighet hos foreldre					
Tilknytning barn-foreldre					
Emosjonell /kognitiv utvikling hos barn			Ja		1

Lekesituasjoner med ulike design

Fem studier målte ulike sider ved samspill mellom foreldre og barn i situasjoner der barn og foreldre leker og samspiller med barnet, mens forelderen på et tidspunkt blir avbrutt av en telefon eller skjermbruk på en eller annen måte (tabell 6). I alle studiene er det to eller tre faser i eksperimentet, der én fase er uforstyrret frilek, en annen fase har en avbrytelse med telefon og en eventuell tredje fase har en avbrytelse med skriving eller lesing.

Tabell 6: *Beskrivelse av studiene av lekesituasjoner med ulike design (n=5)*

Studie	Studie-design	Land	Antall dyader	Barn alder	Foreldre alder	Eksperimentets struktur
Cosottile (2021) (32)	Innen-gruppe	USA	51	30 md	(alder ikke oppgitt)	Tre etterfølgende faser á 7 min: avbrytelse med penn og papir, med telefon eller ingen avbrytelse
Konrad (2021) B (37)	RCT	Tyskland	54	22 md	24-42 år	Tre grupper i tre faser (tlf, penn og papir eller ingen avbrytelse) á tre faser: frilek – avbrytelse – frilek
Lederer (2021) (38)	Innen-gruppe	Israel	33	24-36 md	25-45 år	Tre etterfølgende faser á 15 min: tlf, blader, ingen avbrytelse
Rothstein (2018) (45)	Innen-gruppe	USA	39	13-51 md	Snitt 31 år,	To etterfølgende faser á 8 min: tlf på, tlf av
Rozenblatt-Perkal (2022) (46)	RCT	Israel	106	Ca 12 md	Snitt 32 år	Tre grupper i tre faser (tlf, samtale eller ingen avbrytelse) á tre faser: frilek – avbrytelse – frilek
Totalt=5	Innen-gruppe =3, RCT=2	USA=2, Israel=2, Tysk-land=1	283 (spenn 33-106)	Spenn 13-51 md	Spenn 24-42 år	

De målte utfallene er primært knyttet til samspill, men også respons fra forelder og stress hos barnet (tabell 7).

Tabell 7: *Utfall målt i studiene av lekesituasjoner med ulike design (n=5)*

Utfall	Cosottile (2021)	Konrad (2021) B	Lederer (2021)	Rothstein (2018)	Rozenblatt-Perkal (2022)	Totalt
Stress hos barn		Ja				1
Samspill	Ja	Ja	Ja	Ja	Ja	5
Foreldres oppmerksomhet	Ja					1
Felles oppmerksomhet						
Respons fra forelder			Ja	Ja		2
Emosjonell tilgjengelighet hos foreldre						
Tilknytning barn-foreldre						
Emosjonell /kognitiv utvikling hos barn		Ja				1

Læringssituasjoner

To studier undersøkte om det skjer endringer i barns læring når forelderen blir avbrutt av en telefon i løpet av læringsprosessen (tabell 8). I den ene studien skulle barnet lære av forelderen bygging av en enkel figur (imitasjonslæring), mens i den andre studien skulle barnet lære to nye (oppdiktede) ord.

Tabell 8: *Beskrivelse av de inkluderte studiene av læringssituasjoner (n=2)*

Studie	Studie-design	Land	Antall dyader	Barn alder	Mødre alder	Eksperimentets struktur
Konrad (2021) A (37)	RCT	Tyskland	90	18-20 md	Snitt 35 år	Tre eksperimentelle (m/avbrytelser) og to kontrollgrupper, imitasjonslæring
Reed (2017) (44)	Innen-gruppe	USA	38	Ca 24 md	29-47 år	To situasjoner, den ene avbrutt av tlfsamtale, læring av to nye ord
Totalt=2	RCT=1 Innen-gruppe=1	Tyskland=1, USA=1	128 (spenn 44-90)	18-24 md	Spenn 29-47 år	

Utfallene er primært knyttet til kognitiv utvikling hos barnet (tabell 9).

Tabell 9: *Utfall målt i studiene av læringssituasjoner (n=2)*

Utfall	Konrad (2021) A	Reed (2017)	Totalt
Stress hos barn			
Samspill	Ja		1
Foreldres oppmerksomhet			
Felles oppmerksomhet			
Respons fra forelder	Ja		1
Emosjonell tilgjengelighet hos foreldre			
Tilknytning barn-foreldre			
Emosjonell /kognitiv utvikling hos barn	Ja	Ja	2

Observasjonsstudier på lekeplasser og lignende

Fem studier undersøkte hva som skjer i kommunikasjonen mellom barn og foreldre når de befinner seg på en offentlig lekeplass, på en kafé, et venterom eller lignende og forelderen på en eller annen måte blir opptatt med telefonen (tabell 10). Alle studiene benyttet en form for kodeskjema for å systematisk fange opp telefonbruk, foreldreatferd og barns atferd. Flere av studiene intervjuet også foreldrene i etterkant, med et spørreskjema eller med åpne, kvalitative spørsmål.

Tabell 10: *Beskrivelse av de inkluderte studiene av observasjon på lekeplasser mm (n=5)*

Studie	Sted for observasjon	Land	Antall dyader	Barn alder	Mødre alder	Studiens struktur
Abeele (2020) (30)	Lekeplass og venterom	Nederland	53	0-5 år	-	Målt i intervaller: foreldres tlf-bruk, barns oppmerksomhetssøken, foreldres respons
Bury (2020) (31)	Lekeplass	Australia	85	0-5 år	-	Målt i intervaller: Foreldres tlf-bruk, foreldres overvåkning, forelder-barn-interaksjon, barnets skadepotensiale
Ochoa (2021) (42)	Parker, kafeer og handlesentre	USA	98	0-4 år	-	Målt i intervaller á maks 5 min: tlfbruk, felles oppmerksomhet, initiering av interaksjon, responsivitet og sensitivitet, snakk, emosjonell input
Radesky (2015) (43)	Måltid	USA	225	ca 6 år	-	Forelder kategorisert som ikke/lite bruker eller aktiv bruker av telefon. Måler forelders verbale og fysiske oppmuntringer ved servering av fire ulike matretter/matvarer
van Telgen (2017) (48)	Lekeplass og helsestasjon	Nederland	25	0-5 år	-	Målt i intervaller: tlfbruk, barns søken etter oppmerksomhet, foreldres responsivitet

Risiko for systematiske skjevheter i de inkluderte studiene

Vår vurdering av studienes risiko for systematiske skjevheter er presentert i fire tabeller, kategorisert etter type situasjon som er studert, slik også studiene ble presentert i forrige underkapittel (med unntak av observasjonsstudiene) (tabellene 11 til 14). Vi vurderte at fem studier hadde lav risiko, seks hadde moderat risiko og fire studier hadde høy risiko for systematiske skjevheter. Flere detaljer om vurderingene finnes i tabellene for de enkelte studiene, vedlegg 2.

Det som i disse studiene særlig øker risiko for systematiske skjevheter er spørsmål om:

- Blinding: Deltakerne er det ikke mulig å blinde, men formålet med (hypotesen i) studien kan være mer eller mindre åpen for deltakerne. Når det gjelder de som måler utfallene, varierer det om det er mulig å blinde, og hvorvidt det er gjort. Der utfallsmålerne ikke er blindet, vil det anses som en styrke hvis det er flere som har målt (kodet) parallelt.
- Rapporteringsskjevheter: Vi har ikke funnet publiserte forskningsprotokoller for de inkluderte studiene, og vi kan derfor ikke bekrefte eller avkrefte om alle utfall er rapportert eller om noen resultater er utelatt.

I tillegg er det visse begrensninger ved studiene:

- Beskrivelse av deltakerne: I en del studier var det begrensede beskrivelser av særlig foreldrene, slik at deres bakgrunn forble ukjent
- Etikk: Noen studier beskrev ikke hvorvidt deltakerne hadde gitt informert samtykke til deltakelse og/eller det oppgis ikke om studien er godkjent av en etisk komité

Ammesituasjoner

Tabell 11: *Risiko for systematiske skjevheter i studier av amming (n=4)*

Studie	Studiedesign	Vår vurdering av risiko
Inoue (2021) B	Innengruppedesign	Lav risiko
Nakagawa (2019)	Innengruppedesign	Høy risiko
Nomkin (2021)	Innengruppedesign	Moderat risiko
Ventura (2019)	Innengruppedesign	Lav risiko

Lekesituasjoner

Tabell 12: *Risiko for systematiske skjevheter i studier av lek med still face-design (n=4)*

Studie	Studiedesign	Vår vurdering av risiko
Khourochvili (2017)	Innengruppedesign	Moderat risiko
Kildare (2017)	Innengruppedesign	Lav risiko
Myruski (2018)	Innengruppedesign	Moderat risiko
Stockdale (2020)	Innengruppedesign	Lav risiko

Tabell 13: *Risiko for systematiske skjevheter i studier av lek med andre design (n=5)*

Studie	Studiedesign	Vår vurdering av risiko
Cosottile (2021)	Innengruppedesign	Høy risiko
Konrad (2021) B	RCT	Moderat risiko
Lederer (2021)	Innengruppedesign	Moderat risiko
Rothstein (2018)	Innengruppedesign	Lav risiko
Rozenblatt-Perkal (2022)	RCT	Moderat risiko

Læringssituasjoner

Tabell 14: *Risiko for systematiske skjevheter i studier av læring (n=2)*

Studie	Studiedesign	Vår vurdering av risiko
Konrad (2021) A	RCT	Høy risiko
Reed (2017)	Innengruppedesign	Høy risiko

Konsekvenser av eksponering for bruk av mobile skjermer

Vi har sammenstilt resultatene fra de inkluderte studiene kategorisert etter type situasjon der konsekvenser av skjermbruk er studert (som presentert i de forgående underkapitlene), det vil si ammesituasjon, lekesituasjon eller læringssituasjon. Resultatene er presentert i tabeller, med kort beskrivelse av studien og resultat for alle relevante utfallsmål slik de er rapportert i studiene og på originalspråket. Mer fullstendige resultater er presentert i tabellene for hver studie i vedlegg 2. Vi sammenfatter resultatene i tekst under hver tabell, altså for hver beskrevet situasjon på norsk.

Resultatene fra de naturalistiske observasjonsstudiene er sammenfattet på en enklere måte og kun i tekst, ettersom vi ikke systematisk har hentet ut data eller vurdert disse for risiko for skjevheter.

Basert på en tilpasning av GRADE-metoden (29) vurderte vi tillit til – eller kunnskapsgrunnlaget for – resultatene i de ulike eksperimentelle situasjonene. Vurderingen er lagt til oppsummeringene av resultatene. En utvidet beskrivelse av våre vurderinger finnes i diskusjonskapitlet og i vedlegg 7.

Konsekvenser av bruk av mobile skjermer i ammesituasjon

Tabell 15. Resultater fra studiene av ammesituasjoner (n=4)

Study (design)	Outcome	Results
Inoue (2021) B (33)	*Mother–infant interactions' quality (INTERACTION)*	*AMIS Scale, indicators of the quality of mother–infant interactions, showed no significant condition related differences (overall p = 0.388, subscale p = 0.754–1.000, sign test).*

Within-subjects		*AMIS Scale: 27 items, each with a possible score of 1–5 points, with total scores ranging from 27–135. Higher scores indicate greater sensitivity, suggesting that the mother is better able to sense and respond to the child's mental and physical needs. Of the 27 items, 15 items evaluate maternal behaviors, seven evaluate infant behaviors, and five evaluate dyadic interactions*
	Distracted feeding rate (PARENTS' ATTENTION)	*Distracted breastfeeding times were significantly longer ($p < 0.001$, sign test) and the distracted breastfeeding rate were likely to be higher ($p < 0.001$, sign test) in the smartphone condition.* *Authors measured this occurrence based on the amount of time the mothers' gaze redirected away from their children.*
Nakagawa (2019) (40) Within-subjects	*Time for mother to notice that baby stop Breastfeeding (PARENT'S ATTENTION)*	*It takes more time for the mother to notice that the baby has stopped drinking when she is using the smartphone (0.79 to 5.96 sec) than when she is not using the smartphone (0 sec). Authors concluded that it is possible that the change caused by smartphone operation during breast-feeding may affect the mother and infant.*
Nomkin (2021) (41) Within-subjects	*Maternal attention, gaze patterns (PARENT'S ATTENTION)*	*Authors reported that mothers' gaze toward their infants decreased when breastfeeding while using the smartphone compared to face-to-face interaction.* *During breastfeeding, mothers fixated on the smartphone for a longer duration than on their infant. An opposite maternal gaze pattern was found during face-to face interactions: fixation towards the infants was longer compared to the smartphone. The normalized dwell time towards the smartphone was highest during breastfeeding (M = 3.41e+6, SD = 1.27e+6) and lowest during face-to-face interactions (M = 681,587, SD = 210,648.)* *Tool: Mobile eye-tracking glasses (SMI) were fitted to the mothers to measure their gaze patterns throughout all following experimental conditions. The SMI head-mounted system includes two small cameras on the rim of the glasses capturing the eye movements of the wearer, and a front view camera that captures the participant's line of sight.*
Ventura (2019) (49) Within-subjects	*Maternal subscale: Sensitivity to Cues (INTERACTION)*	*No effect of condition (digital media vs control) was seen on this outcome (Intervention 14.4 (SE 0.3), Control 14.8 (SE 0.3) F-value 3.01 p-value.098).* *NCAFS Scale: 76 observable behaviors that are organized into six subscales, four of which describe the mother's contributions to the feeding interaction and two of which describe the infant's contribution.* *Sensitivity to Cues subscale possible score range = 0–16 with higher scores indicating greater sensitivity to infant cues*
	Maternal subscale: Response to Child's Distress (PARENTS' RESPONSIVENESS)	*No effect of condition (digital media vs control) was seen on this out-come (Intervention 10.1 (SE 0.3) Control 10.0 (SE 0.3) F-value 0.12 p-value.732).* *NCAFS Scale: Response to Child's Distress possible score range = 0–11 with higher scores indicating greater contingent responsiveness to infant distress*
	Maternal subscale: Social-Emotional Growth Fostering (INTERACTION)	*No effect of condition (digital media vs control) was seen on this out-come (Intervention 10.6 (SE 0.5), control 10.9 (SE 0.5) F-value 0.57 p-value .457).* *NCAFS Scale: Social-Emotional Growth Fostering possible score range = 0–14 with higher scores indicating greater engagement in behaviors that support infant social-emotional development*
	Maternal subscale: Cognitive Growth Fostering	*There was a significant effect of condition (digital media) on cognitive growth fostering (Intervention 5.1 (SE 0.4) Control 5.8 (SE 0.4) F-value*

	(INTERACTION)	*6.62 p-value .018) indicating that mothers engaged their infants in significantly less cognitive growth fostering when they used digital media versus when they did not.* *NCAFS Scale: Cognitive Growth Fostering: Possible score range = 0–9 with higher scores indicating greater engagement in behaviors that support infant cognitive development*
	Infant subscale: Clarity of Cues (INTERACTION)	*No effect of condition (digital media vs control) was seen on this outcome (Intervention 11.6 (SE 0.3) Control 12.1 (SE 0.3) F-value 1.40 p-value .250).* *NCAFS Scale: Infant subscale Clarity of Cues; possible score range = 0–15 with higher scores indicating greater clarity of cues*
	Infant subscale: Responsiveness to Caregiver (INTERACTION)	*No effect of condition (digital media vs control) was seen on this outcome (Intervention 5.5 (SE 0.5) Control 6.3 (SE 0.5) F-value 2.19 p-value .154). NCAFS Scale: Infant subscale Responsiveness to Caregiver; possible score range = 0–11 with higher scores indicating greater engagement with and responsiveness to the caregiver.*

AMIS Assessment of Mother-Infant Sensitivity scale; AOIs: areas of interest; MBIS J: Mother–Infant Bonding Scale: Japanese version; NCAFS scale: Nursing Child Assessment Parent-Child Interaction Feeding Scale; SMI: Senso Motoric Instruments; WSD: Within Subject Design.

De fire inkluderte studiene av amming målte i hovedsak hvorvidt mors bruk av telefon eller annen mobil skjerm påvirket hennes oppmerksomhet eller respons på barnets kommunikasjon eller atferd i ammesituasjonen. Andre målte utfall er samspillskvalitet og barnets respons. Alder på barna som ammes varierer fra seks uker til ni måneder.

Inoue (2021 B) inkluderte 12 mor-barn-par og her ble samspillet mellom mor og barn vurdert ved to besøk på laboratoriet, ett med telefonbruk og ett uten. Forfatterne rapporterte at kvaliteten på samspillet i ammesituasjonen ikke ble påvirket av mors telefonbruk.

En liten studie av Nakagawa (2019) av syv mor-barn-par undersøkte mors atferd i tre etterfølgende betingelser under ammingen: kun amming, amming mens mor leser på telefonen og amming mens mor skriver på telefonen. Forfatterne rapporterte (for kun tre mor-barn-par) at det tok lenger tid for mor å bli oppmerksom på at barnet hadde sluttet å drikke når hun brukte telefonen. Når hun ikke brukte telefonen, ble hun umiddelbart oppmerksom på at barnet hadde sluttet å drikke.

I en studie av Nomkin (2021) ble mors oppmerksomhet, det vil si hvordan hun brukte blikket, målt i tre etterfølgende betingelser under amming: telefonen innenfor rekkevidde og med lyden på, ha telefonen utenfor rekkevidde men med lyden på, samt ha telefonen utenfor rekkevidde og med lyden avslått. Forfatterne rapporterte at mødrenes blikk på barna ble svekket ved bruk av telefonen under amming, sammenlignet med ansikt-til-ansikt. I ammesituasjonen så mødrene mer på telefonen enn på barna, mens i ansikt-til-ansikt-situasjonen så mødrene mer på barna enn på telefonen.

I en studie av Ventura (2019) av 25 mor-barn-par ble både mors og barnets atferd målt under to besøk på laboratoriet: amming mens mor så på en mobil skjerm og amming mens mor lyttet til klassisk musikk. Forfatterne rapporterte ingen forskjeller med hensyn til mors sensitivitet til tegn fra barnet, respons på barnets stress, positive ytringer

til barnet, barnets tydelige signaler eller barnets respons til mor. Det var kun forskjeller når det gjaldt mors ytringer til barnet bestående av minst to ord.

I disse fire studiene av ammesituasjoner rapporterte forfatterne varierte resultater, og kunnskapsgrunnlaget er svært usikkert.

Konsekvenser av bruk av mobile skjermer i lekesituasjoner

Vi skiller også her mellom lekesituasjoner som er studert med et rent still face-design (tabell 16) og lekesituasjoner som er studert med andre design (tabell 17).

Lekesituasjoner med still face-design

Tabell 16. Resultater fra studiene av modifiserte «still face»-eksperimenter (n=4)

Study (design)	Outcome	Results
Khourochvili (2017) (34) Within-subjects	*Caregiver's disengagement behaviours (INTERACTION)*	*A statistically significant increase in the percentage of disengagement behaviours (negative or neutral affect and gaze away) from the typical face to face interaction phase with the caregiver (M = 2.27, SD = 5.49) to the phase with interruption of the caregiver by phone (M = 32.61, SD = 11.59), p < .001. No significant difference was found in the phase percentage of disengagement behaviours between the face to face interaction phase and re-engagement phase after the interruption (p = .99). ANOVA: F(1.47, 26.43) = 120.31, p < .001, ges = .79 --- significant effect of phase*
	Caregiver's engagement behaviours (INTERACTION)	*Caregiver's engagement behaviours were the ones coded as neutral or positive affect and gaze toward infant. ANOVA: F(1.47, 26.52) = 118.62, p < .001, ges = .79 --- significant effect of phase (no means presented)*
	Infant's disengagement behaviours (INTERACTION)	*A statistically significant increase in the percentage of disengagement behaviours (distressed or neutral affect and gaze away) from the typical face to face interaction phase (M = 20.56, SD = 15.05) to the phase with interruption of the caregiver by phone (M = 40.27, SD = 7.51), p < .001. No significant difference in the percentage of disengaging behaviours was noted between the face to face interaction phase and re-engagement phase after the interruption (p = .19). ANOVA: F(1.70, 30.61) = 26.56, p < .001, ges = .32 --- significant effect on phase*
	Infant's engagement behaviours (INTERACTION)	*A statistically significant decrease in the percentage of engagement behaviours (neutral or positive affect and gaze toward the mother's face or any other body parts of the mother) from the typical face to face interaction phase (M = 29.44, SD = 15.04) to the phase with interruption of the caregiver by phone (M = 9.58, SD = 7.52), p < .001. A statistically significant increase was found in the percentage of engagement behaviours from the phase with interruption of the caregiver by phone (M = 9.58, SD = 7.52) to re-engagement phase after interruption (M = 26.40, SD = 14.73), p < .001. No significant difference in the percentage of engagement behaviours was found between the typical face to face interaction phase and the phase with interruption of the caregiver by phone (p = .19). ANOVA: [F(1.70, 30.59) = 27.06, p < .001, ges = .33 --- significant effect of phase*
Kildare (2017) (35) Within-subjects	*Cortisol stress responses (STRESS)*	*There was no statistically significant effect for cortisol responses (Wilk's Lambda = .955, F (2, 32) = .75, p = .47, ηp2=.045) indicating no statistically significant change in cortisol levels between each phase (face to face, still face phase by phone and re-union after still face phases).*

	Infant Positive and Negative Affect (STRESS)	*Infant vocalizations and infant facial expressions were coded at 1-second intervals. Vocalizations were scored using the following scale: -3 screaming (loud sharp cry/screech), -2 crying (negative murmuring, louder fussing), -1 mild fussing (soft negative murmuring, whimper), 0 neutral (no vocalizations), 1 cooing (soft positive murmuring), 2 quiet chuckle (more intense cooing, louder positive murmuring), 3 delight (loud positive scream/squeal). Facial expressions were scored as: -3 large grimace (mouth open, furrowed brow, eyes may be closed), -2 frown (mouth slightly open, slight furrowed brow), -1 small frown (closed, downward turned mouth, pout) 0 neutral (no facial expressions), 1 half smile (upward turned mouth closed or slightly open/parted lips), 2 large smile (upward turned and open mouth), 3 wide smile (mouth open wide). There was a statistically significant main effects for positive affect and phase (Wilks' Lambda=.250, F (2, 32) = 47.99, p≤.0005, ηp 2= .750), as well as negative affect and phase (Wilks' Lambda = .324, F (2, 32) = 33.4, p≤.0005, ηp 2= .676).*
	Infant regulatory behaviours (STRESS, INTERACTION)	*Infant regulatory behaviors were coded as being present or absent at 1-second intervals using the COPE (Comforting, Object Orientation, Parent/Mother Orientation and Escape) scale (Braungart-Rieker et al., 1998; Braungart-Rieker et al., 2001). This scale included four aspects of coping behaviors: 1.Comforting behaviors (sucking their thumb/finger, rubbing their face/hair, and wringing hands), 2. Object orientation (gazing at an object other than their mother, lowering gaze without closing eyelids, looking at mobile device), 3. Mother orientation (gazings at mothers face), and 4. Escaping the situation (infant makes an attempt to remove herself/himself from the infant seat, arching/twisting of back, gesturing to be picked up, pulling seatbelt). Infants demonstrated expected changes between the face to face phase to the still face phase by phone with increased <u>self-comforting behaviors</u> (Wilks' Lambda = .581, F (2, 32) = 11.35, p ≤.0005, ηp 2 = .419), increased <u>object orientation</u> (Wilks' Lambda = .231, F (2, 32) = 53.38, p ≤.0005, ηp 2 = .769) and <u>escape behaviors</u> (Wilks' Lambda = .747, F (2, 32) = 5.42, p = .009, ηp 2=.253). Additionally, infants demonstrated the expected decrease in <u>maternal gaze</u> during the still face phase by phone(Wilks' Lambda = .127, F (2, 32) = 110.17, p ≤.0005, ηp2 = .873).*
Myruski (2018) (39) Within-subjects	*Engagement of infant with mother (INTERACTION)*	*Infants showed less engagement with mother during still face phase compared to free play phase [t(49) = −17.64, p < .001] and re-union after still face phase [t(49) = −11.37, p < .001; F (2, 96) = 117.83, p < .001, ηp 2 = .71].*
	Social bid use of infant (INTERACTION)	*Social bids were used more in still face phase compared to free play phase [t(49) = 6.76, p < .001] and re-union after still face phase [t(49) = 5.51, p < .001; F (2, 98) = 37.70, p < .001, ηp 2 = .44].*
	Toy engagement of infant (COGNITIVE DEVELOPMENT)	*Infants showed more toy engagement in free play phase compared to still face phase [t(49) = 3.37, p = .001] and re-union after still face phase [t(49) = 2.16, p < .001; F (2, 96) = 11.25, p < .001, ηp 2 = .19].*
	Infant's exploration of the room (COGNITIVE DEVELOPMENT)	*Infants explored the room less in re-union after still face phase compared to still face phase [t(49) = −3.50, p = .001; F (2, 98) = 6.89, p = .002, ηp 2 = .13.*

	Negative and positive affect of infant (STRESS)	*Mirroring the effects of the traditional still face paradigm, infants showed more negative affect during still face phase versus free play phase, [t(49) = 2.98, p = .004; F (2, 96) = 5.67, p = .005, ηp 2= .11]. In contrast, infants showed less positive affect during still face phase versus free play phase [t(49) = −7.14, p < .001] and re-union after still face phase [t(49) = −3.85, p < . 001; F (2, 96) = 23.11, p < .001, ηp 2 = .33]. Positive affect was also greater during free play phase in comparison to re-union after still face phase [t(49) = 2.64, p = .011].*
Stockdale (2020) (47) Within-subjects	*Infant Positive and Negative Affect (STRESS)*	*For positive affect (laughing, cooing) the main effect of phase was significant (F(2, 202) = 33.68, p <.001). Post hoc probing of the main effect of task displayed significant differences in positive affect for all three phases of the still face. Infants had more positive vocalizations in the free play phase (FP) than the still face phase (SF) (p < .001) or the re-union after still face (RU) (p < .001), and less positive vocalizations in the re-union after still face phase than the free play phase (p < .001); M_{FP} = 0.26 SD_{FP} = 0.24, M_{SF} = 0.12 SD_{SF} = 0.16, M_{Ru} = 0.19 SD_{Ru} = 0.23. For negative affect (screeching, screaming, crying), the main effect of phase was significant (F(2, 202) = 85.40, p< .001). Post hoc probing of the main effect of task displayed significant differences in negative affect between the FP and the SF (p < .001) and the reunion phases (p < .001) with infants displaying less negative affect during the FP than the SF or RU phases. There was no significant difference between the SF and the RU phases (p = .04; M_{FP} = 0.15 SDFP = 0.19, M_{SF} = 0.42 SD_{SF} = 0.31, M_{Ru} = 0.33 SD_{Ru} = 0.38).*
	Self-comforting behaviors (STRESS)	*For self-comforting behaviours (sucking thumb, rubbing face or head, holding ear), the main effect of phase was significant (F(2, 202) = 10.98, p < .001). Post hoc probing of the main effect of task displayed significant differences with infants displaying less self-comforting in the FP phase than the SF (p < .001) and less in the RU phase than the SF (p < .001, M_{FP} = 0.10 SD_{FP} = 0.13, M_{SF} = 0.15 SD_{SF} = 0.18, M_{Ru} = 0.10 SD_{Ru} = 0.14)*
	Parent orientation (INTERACTION)	*For parent orientation (gaze directed toward mother), the main effect of phase was significant (F(2, 202) = 176.83, p < .001). Post hoc probing of the main effect of task displayed significant differences with infants displaying more parent orientation in the FP and RU than the SF (p < .001, M_{FP} = 0.53 SD_{FP} = 0.23, M_{SF} = 0.16 SD_{SF} = 0.17, M_{Ru} = 0.46 SD_{Ru} = 0.34)*
	Object orientation (STRESS)	*For object orientation (gaze directed toward physical objects in the room), the main effect of phase was significant (F(2, 202) = 183.65, p < .001). Post hoc probing of the main effect of task displayed significant differences with infants displaying more object orientation in the SF than the FP phase (p < .001) and less in the RU phase than the FP or SF (p < .001, M_{FP} = 0.45 SD_{FP} = 0.23, M_{SF} = 0.78 SD_{SF} = 0.28, M_{Ru} = 0.32 SD_{Ru} = 0.25)*
	Escape behaviors (STRESS)	*For escape behaviours (arching, twisting back, gesturing to be picked up, pulling on highchair restraints, leaning forward), the main effect of phase was significant (F(2, 202) = 99.31, p < .001). Post hoc probing of the main effect of task displayed significant differences with infants displaying more escape behaviors during the SF than the FP or RU (p < .001) and more escape behaviors during the RU than during the FP phase (p < .001, M_{FP} = 0.002 SD_{FP} = 0.002, M_{SF} = 0.29 SD_{SF} = 0.26, M_{Ru} = 0.13 SD_{Ru} = 0.18)*

[S]=significant results, [NS]=not significant results

De fire inkluderte still face-studiene målte hvordan foreldres avbrudd i samspillet for å lese eller skrive på en mobiltelefon, påvirket barnets kommunikasjon, følelsesuttrykk og eventuelle stressreaksjoner. Barna var mellom 3 og 23 måneder. Studiene sammenligner de tre fasene i eksperimentet: 1. samspill (2-5 min), 2. avbrudd med telefon (2-5 min) og 3. gjenforening (1-2 min).

Khourochvili (2017) undersøkte omsorgsgivers og barnets engasjement og mangel på engasjement i situasjonen for 19 foreldre-barn-par. Forfatterne rapporterte endringer for alle fire utfallsmål fra fase 1 til 2 og tilbake igjen til fase 3.

Kildare (2017) undersøkte 34 foreldre-barn-par og målte barnets stress (kortisolnivå), positive og negative følelsesuttrykk og selvreguleringsatferd. Forfatterne rapporterte ingen endringer for kortisolnivå mellom de tre fasene. Forfatterne rapporterte endring i positive følelsesuttrykk fra fase 1 til 2 og tilbake igjen til fase 3. Negative følelsesuttrykk viste tilsvarende mønster. For selvreguleringsatferd rapporterte forfatterne endringer fra fase 1 til 2 for alle fire delutfall (selvtrøst, se bort fra mor, se på mor og forsøk på å komme vekk).

I en studie av Myruski (2018) ble barnets atferd undersøkt i 50 foreldre-barn-par: negative og positive følelsesuttrykk, involvering med leker, engasjement vis-á-vis mor, sosiale invitasjoner til mor (*social bids*) samt utforsking av rommet. Forfatterne rapporterte følgende mønster: 'negative følelsesuttrykk' økte fra fase 1 (samspill) til fase 2 (avbrudd) og var deretter stabilt i fase 3 (gjenforening). Positive følelsesuttrykk sank fra fase 1 til fase 2 og økte deretter igjen i fase 3. Det samme gjaldt 'engasjement vis-á-vis mor' og 'sosiale invitasjoner til mor'. Forfatterne rapporterte en nedgang i 'involvering med leker' fra fase 1 til 2 og ytterligere nedgang til fase 3, mens 'utforsking av rommet' var stabilt fra fase 1 til fase 2 og sank så i fase 3.

Studien av Stockdale (2020) undersøkte 227 foreldre-barn-par og målte barnets positive og negative følelsesuttrykk, selvtrøstende atferd, se på mor, se på fysiske objekter i rommet samt forsøk på å komme vekk (tilsvarende utfall som hos Kildare 2017). I tillegg rapporterte forfatterne endringer fra fase 1 til fase 2 for alle utfall. For 'positive og negative følelsesuttrykk' viste ikke fase 3 en tilbakegang til samme nivå som fase 1. 'Selvtrøstende atferd' gikk tilbake til samme nivå som i fase 1. Det samme gjaldt 'se på mor', 'se på fysiske objekter i rommet' men ikke 'forsøk på å komme vekk'.

I disse fire eksperimentelle studiene rapporterte forfatterne gjennomgående forskjeller mellom fase 1 (samspill) og fase 2 (still face/telefonbruk), med unntak av ett utfallsmål i én studie: kortisol. Forfatterne rapporterte også endringer fra fase 2 til fase 3 (gjenforening). Kunnskapsgrunnlaget antyder at det på kort sikt kan være negative konsekvenser av foreldres bruk av mobile skjermer på barnets stress («unnslippelsesatferd»/*escape behaviour*) og negative følelsesuttrykk og i samspillet generelt.

Lekesituasjoner med andre design

Tabell 17. Resultater fra studiene av lekesituasjoner (n=5)

Study (design)	Outcome	Results
Cosottile (2021) (32) Within-subjects	*Child engagement (INTERACTION)*	*An "engagement" was coded any time children made a vocalization about a hazard, reached for a hazard, or touched a hazard during the experiment. The total number of hazards engaged by children were more frequently when mothers were disrupted by phone than the no distraction condition, though this difference was only marginally significant (M difference=1.08, p=.09, CI [—0.17, 2.33]).*
	Caregiver vigilance (PARENTS' ATTENTION)	*Caregivers were coded on overall vigilance for each condition, indicating how well they attended to their child, ranging from 1 (lack of attention) to 5 (very diligently attending). Post hoc tests found that vigilance was significantly higher in the no distraction condition than the intervention condition where mothers were disrupted by phone (M difference=1.35, p<.000, CI [1.08, 1.62]).*

Konrad (2021) B (37) RCT*	*Maternal behaviour/responsiveness (interaction quality) (INTERACTION)*	*[Mothers were more responsive to their child in the no-interruption condition compared to the condition which they had an interruption by phone (M diff=1.67, p<0.001).*
	Positive social bids to the mother (INTERACTION)	*Children in the condition which the mothers were interrupted by phone displayed more positive social bids (the child tries to get the mother's attention physically or vocalically, in a positive or neutral way) towards their mother compared to the no interruption condition (M diff= −1.25, p=0.002).*
	Negative social bids to the mother (INTERACTION)	*There were no significant main effects of condition, F(2, 51) = 2.5, p = 0.089, ηp2 = 0.09 for the negative social bids to the mother. The child tries to get the mother's attention physically or vocalically in a negative way.*
	Prohibited behavior (STRESS)	*Overall rates of prohibited behavior (the child does something that the mother or the experimenter has forbidden beforehand, or something that the child knows is forbidden) were low. There were no significant main effects of condition, F(2, 51) = 0.9, p = 0.430, ηp2 = 0.3, and no interaction effect, F(4, 102) = 2.3, p = 0.065, ηp2 = 0.08.*
	Negative affect (STRESS)	*Negative effect (negative expression or vocalization; the child protests, withdraws herself/himself or cries) rated very low. There were no significant main effects of condition, F(2, 51) = 0.9, p = 0.424, ηp2 = 0.03, and no interaction effect, F(2.46, 62.60) = 0.8, p = 0.49, ηp2 = 0.03.*
	Toy engagement (COGNITIVE DEVELOPMENT)	*There was a significant main effect of condition meaning infants in the condition that the mothers were interrupted by phone were engaged with toys more compared to the no-interruption condition. F(2, 51)=15.2, p<0.001, ηp2=0.37.*
Lederer (2021) (38) Within-subjects	*Conversational turns (INTERACTION)*	*Conversational turns were defined as a pair of consecutive utterances produced by the mother and her child, with no more than a 5 seconds pause between the two. The amount of such pairs was counted. ANOVA test showed a significant result and post hoc tests with Sidak correction showed that turn taking in the condition where mothers were interrupted by phone (M = 7.83, SE = 0.68) was significantly less frequent than in the free-play condition (M = 14.36, SE = 0.85).*
	Maternal Input (INTERACTION)	*A one-way repeated measures ANOVA with interruption by phone as the independent variable and the number of maternal utterances as the dependent variable yielded a significant result, F(2, 64) = 285.01, p < .001, partial η2 = .90. Post hoc comparisons with Sidak correction demonstrated that mothers produced fewer utterances per minute when using a smartphone (M = 3.75, SE = 0.36) compared to uninterrupted free-play (M = 14.99, SE = 0.46).*
	Maternal Responsiveness and response type (PARENTS' RESPONSIVENESS)	*A 3 × 2 ANOVA with repeated measures showed that the main effect of experimental condition was significant, F(2, 64) = 156.66, p < .001, partial η2 = .83, as was the main effect of response type (expansion, affirmation), F(1, 32) = 19.98, p < .001, partial η2 = .38. Follow-up one-way repeated measures ANOVAs yielded a significant difference between the conditions in expansions, F(2, 64) = 67.49, p < .001, and affirmations, F(2, 64) = 23.84, p < .001. Post hoc comparisons with Sidak correction suggested that mothers provided fewer expansions and affirmations during periods they were interrupted with phone than during free-play.*
	Maternal nonresponsiveness and miss type (PARENTS' RESPONSIVESS)	*A 3 × 2 ANOVA with repeated measures on condition and miss type (nonresponsive, neutral) was conducted on maternal misses of child bids during the experiment. The analysis yielded significant main effects of condition, F(2, 64) = 28.64, p < .001, partial η2 = .47, and of miss type, F(1, 32) = 54.72, p < .001, partial η2 = .63. Follow-up one-way repeated measures ANOVAs yielded a significant difference between the conditions in nonresponsive misses, F(2, 64) = 26.55, p < .001, and neutral misses, F(2, 64) = 18.59, p < .001. Post hoc comparisons with*

		Sidak correction suggested that mothers exhibited more nonresponsive and neutral misses of child bids during periods with the interruption by phone compared to free-play. This difference was greater for neutral misses.
Rothstein (2018) (45) Within-subjects	*Parent's affection (INTERACTION)*	*The affection subscale measures the warmth, physical closeness, and positive expressions that the parent shows towards their child. This subscale measures the parent's tone of voice, level of engagement with the child, and their enjoyment towards the child. Scores for this subscale may range from 0-14. A significant difference was found in the scores for affection while the mother's phone was on (M=9.71, SD=2.86) and affection while the phone was off (M=10.79, SD=2.02), t(38)=2.80, p<.01.*
	Parent's encouragement (INTERACTION)	*A parent's ability to actively support exploration, self-help skills, inquisitiveness, creativity, and play are measured by the encouragement subscale. This subscale measures the parent's verbal and physical encouragement (i.e., scaffolding, offering toys). Scores for this subscale may range from 0-14. There was a significant difference in the scores for encouragement while the mother's phone was on (M=9.15, SD=3.52) and encouragement while the phone was off (M=10.41, SD=2.39), t(38)=2.10, p=.04.*
	Parent's teaching (INTERACTION)	*The parent-child dialogue and play, cognitive stimulation, answers, and question prompting are measured in the teaching subscale. This subscale measures parent's expansion on the child's words and the demonstration of an activity in a sequential order of steps. Scores for this subscale may range from 0-16. There was no significant difference in the scores for teaching while the mother's phone was on (M=8.62, SD=3.01) and teaching 30 while the phone was off (M=9.51, SD=2.51); t(38)=1.57, p=.12.*
	Parent's responsiveness (PARENTS' RESPONSIVENESS)	*The responsiveness subscale measures how the parent responds to the child's cues, emotions, words, interests, and behaviors. This subscale measures the parent's flexibility towards the child's activity, physical response (e.g., eye contact), and attentiveness. Scores for this subscale may range from 0-14. There was a significant difference in the scores for responsiveness while the mother's phone was on (M=9.72, SD=3.07) and responsiveness while the phone was off (M=11.28, SD=2.28), t(38)=3.58, p<.01.*
Rozenblatt-Perkal (2022) (46) RCT*	*Heartrate (STRESS)*	*Infants in the condition where mothers had mobile-phone-disruptions showed the highest increase in heart rate (M = 0.35, SD = 1.17 compared to undisrupted-play condition (M = -0.23, SD= 0.61) (p = .006).*
	Negative affect (STRESS)	*Infant's negative affect was rated on a second by-second basis, using a 5-point scale ranging from 0 to 4, with 0 = no distress (no distress expression); 1 = slight distress (visible distress manifested non-vocally through bodily postures or facial expressions); 2 =moderate distress (whimpering expressed vocally); 3 = pronounced distress (full-blown crying) and 4 = intense distress (intensive crying). Infants in the condition where mothers had mobile-phone disruptions (M = 0.67, SD = 1.43) showed the highest increase in negative affects compared to infants in the undisrupted-play condition (M = -0.44, SD = 0.19) (p < .001).*

* De rapporterte resultatene i tabellen er fra analysen mellom gruppene.

De fem siste studiene av lekesituasjoner (uten rent still face-design) målte også hvordan foreldres avbrudd i samspillet, enten med telefon eller på annen måte, fikk konsekvenser for samspill mellom foreldre og barn, respons fra forelder og stress hos barn. Barna var mellom 13 og 20 måneder. Alle studiene omfattet to eller tre faser, og to av studiene omfatter også tre grupper. Flere av studiene sammenligner ikke bare avbrudd per telefon med ingen avbrudd, men også avbrudd med penn og papir, med lesing av magasiner eller med vanlig samtale. Vi rapporterer kun resultater om telefonbruk. Først presenteres de tre studiene som kun omfatter én gruppe.

Cosottile (2021) undersøkte forelderens årvåkenhet og barnets engasjement i tre etterfølgende faser á syv minutter: avbrytelse med penn og papir, avbrytelse med telefon eller ingen avbrytelse. Utvalget besto av 51 foreldre-barn-par. Forfatterne rapporterte at foreldrene utviste større årvåkenhet i fasen uten avbrytelse, sammenlignet med fasen med avbrytelse. For barnets engasjement var det ingen forskjell.

Lederer (2021) undersøkte samspill og forelderens responsivitet i tre etterfølgende faser á 15 minutter: avbrytelse med telefon, avbrytelse med bladlesing og ingen avbrytelse. Utvalget besto av 33 foreldre-barn-par. Forfatterne rapporterte negative konsekvenser av telefonavbrytelser for turtaking, foreldrenes innspill og responsivitet.

Rothstein (2018) undersøkte foreldrenes følelser og engasjement overfor barna i to etterfølgende faser á åtte minutter: telefonen påskrudd og oppfordring til å bruke denne, og telefonen avskrudd. Utvalget besto av 39 foreldre-barn-par. Forfatterne rapporterte at telefonbruken ga negative konsekvenser på foreldrenes hengivenhet, deres engasjement og responsivitet. Det var ingen effekter på læringssamspillet mellom foreldre og barn, dvs. spørsmål, samtale og lek.

To studier var RCTer men gjorde analyser både mellom gruppene og mellom fasene (innengruppe). Konrad (2021 B) undersøkte tre grupper i tre faser (frilek–ev. avbrytelse–frilek). Avbrytelsen i de to gruppene var per telefon, penn og papir og siste gruppe hadde ingen avbrytelse. Utvalget besto av 54 foreldre-barn-par. Forfatterne rapporterte at i gruppene med avbrytelse økte barnets positive søken etter oppmerksomhet – når avbrytelsen pågikk, etterpå sank den ned på samme nivå som i gruppen uten avbrytelser. Det var ingen økning i negativ oppmerksomhetssøken. Det var heller ingen økning av «ulovlig» atferd hos barnet eller negative følelsesuttrykk, men begge disse typene atferd var svært sjelden totalt sett. Barnet viste økt interesse for lekene i gruppene med avbrytelser, også når avbrytelsen pågikk med en nedgang etterpå til samme nivå som i gruppene uten avbrytelser.

Rozenblatt-Perkal (2022) undersøkte også tre grupper i tre faser (frilek–ev. avbrytelse–frilek). Avbrytelsen i de to gruppene var per telefon og som en samtale og siste gruppe hadde ingen avbrytelse. Utvalget omfattet 106 mor-barn-par. Forfatterne rapporterte at barna i gruppen med telefonavbrytelse fikk økt hjertefrekvens, sammenlignet med barna i gruppen uten avbrytelse. Det var også økt negative følelsesuttrykk i gruppen med avbrytelse sammenlignet med gruppen uten.

Fem studier undersøkte lekesituasjoner med litt andre studiebetingelser: to studier hadde tre grupper og tre studier hadde faser med ulike typer avbrudd. Utfallene var knyttet til samspill, respons fra forelder og stress hos barnet. Kunnskapsgrunnlaget antyder at det på kort sikt kan være negative konsekvenser av foreldres bruk av mobile skjermer på foreldres responsivitet, i barnets stress og i samspillet generelt.

Konsekvenser av bruk av mobile skjermer i læringssituasjon

Tabell 18. Resultater fra studiene av læringssituasjoner (n=2)

Study (design)	Outcome	Results
Konrad (2021) A (36) RCT	*Parent's still face during texting (INTERACTION)*	*Parents in the interruption conditions displayed a still face for about 77 % (SD = 23 %) of the time while using the smartphone in front of their child. There was no significant difference in the amount of still face during smartphone use between interruption conditions, F(2, 51) = 0.90, p = .41, η2 = .03* *Coding scheme and test phase "parent still face" = parent dis-play no emotional reactions.*
	Child's imitation learning (COGNITIVE DEVELOPMENT)	*Thus, there was no immediate effect of texting during a learning episode on imitation learning. There was a significant effect of experimental condition on imitation score, F(4, 85) = 32.13, p < .001, η2 = .60. Infants in the conditions that received demonstrations, performed significantly more target actions than infants in the baseline control condition as indicated by pairwise comparisons with Bonferroni correction (all ps < .001). But, there was no significant difference between infants from the no-interruption condition and interruption conditions (all ps > .05). Furthermore, there was no difference in imitation scores between interruption conditions (all ps > .05).* *An imitation score was calculated for each infant by summing the number of target actions (range = 0–3) and by summing up the points for the correct order (range = 0–2)*
	Child's display of negative affect during texting (STRESS)	*There was no significant difference in the percentage of negative affect during interruption between interruption conditions and no interaction effect, F(2, 51) = 1.67, p = .20, η2 = .06. There was no significant association between the percentage of negative affect during interruption and parental still face, r = .14, p = .30, coding scheme and test phase "negative affect" = child displays negative affect or shows protest or withdrawal. Child has to show negative facial expression and/or negative vocalization.*
Reed (2017) (44) Within-subjects	*Learning of two new words (COGNITIVE DEVELOPMENT)*	*Test 1 (extension test): revealed only a significant effect of the experimental interruption manipulation, F (1, 34) 6.44, p .02, partial 2 0.16, meaning that children preferred the target scene— demonstrating comprehension—when the word was taught without interruption (M=0.63) but not when the teaching was interrupted (M=0.50).* *Test 2 (rigorous test): did not reveal a significant effect of trial type; children instead consistently maintained their visual attention on the target scene across trials (M-extension 0.66, M-mutual exclusivity 0.65, M-recovery 0.64).* *The Intermodal Preferential Looking Paradigm was used to assess children's comprehension of the novel action words. Given that the mother was not the actor in the videos, this was an immediate test of learning and extension as Sesame Street characters performed the actions. If children learned the new words, they should direct their visual attention more to the matching scene.*

Vi inkluderte to studier av læring hos barn i situasjoner der det skjer en avbrytelse på grunn av foreldres bruk av en mobil skjerm. Barna var mellom halvannet og to år.

Studien av Konrad (2021 A) var en RCT med 45 foreldre-barn-par fordelt på fem grupper: tre eksperimentelle grupper med avbrytelser og to kontrollgrupper uten avbrytelser. Utfallet som ble målt var barnets evne til å sette sammen en lekerangle bestående av flere deler, etter å ha sett forelderen gjøre det fire ganger (imitasjonslæring). Avbrytelsene bestod av at en forelder fikk en tekstmelding med spørsmål som skulle besvares. De tre ble avbrutt på litt ulikt vis: avbrytelse i 30 sek *før* forelderen demonstrerte

byggingen av ranglen, avbrytelse i 30 sek midt i demonstrasjonen (etter to ganger) eller avbrytelse 10 sek etter hver demonstrasjon. Gruppene ble sammenlignet med en gruppe uten noen avbrytelser (og en gruppe som kun ble testet ved oppstart). Forfatterne rapporterte at avbruddet med tekstmeldinger førte til «still face», altså et utrykksløst ansikt i 77 prosent av tilfellene i de tre eksperimentgruppene. Det var imidlertid ingen forskjeller mellom eksperimentgruppene og kontrollgruppen når det gjaldt barnets imitasjonslæring. For utfallet negative følelsesuttrykk rapporterte forfatterne en dobling av negative følelser under avbrytelsene, sammenlignet med demonstrasjonsfasene.

Studien av Reed (2017) undersøkte om et avbrudd med en telefon til mor fikk konsekvenser for barnets læring av to nye ord. Studien omfattet én gruppe og to faser: en fase med læring av et ord med 30 sekunders telefonavbrytelse og en fase med læring av annet ord uten avbrytelse. Hvilken fase som kom først var tilfeldig fordelt mellom deltakerne. Forfatterne rapporterte en negativ effekt av mobilavbrudd på læring av nye ord i den ene testen, men ikke den andre testen med strengere betingelser.

To studier av læringssituasjoner målte konsekvenser av at foreldrene ble avbrutt av en telefonsamtale eller tekstmelding på læring hos barn 18-24 måneder. I de to studiene rapporterte forfatterne varierte resultater når det gjaldt hvordan telefonbruk påvirket barnets læring i slike situasjoner, og kunnskapsgrunnlaget er svært usikkert.

Observasjonsstudier av foreldres skjermbruk på lekeplass og lignende

De fem observasjonsstudiene av par med foreldre/omsorgsgivere og barn 0-6 år (dyader) i naturlige situasjoner var i hovedsak hentet fra lekeplasser, parker og offentlige kontorer. De fleste studiene måler forholdet mellom foreldres skjermbruk og utfallet (foreldres oppmerksomhet/reaksjoner og barnas atferd/oppmerksomhetssøken) ved å kode voksne og barns atferd i intervaller á 5-20 minutter. Resultatene slik de er gjengitt i studiene er kort presentert nedenfor.

Abeele (2020) undersøkte 53 dyader på lekeplasser og i venterom og samspillet mellom foreldre og barn (30). Samspillet – foreldrenes telefonbruk, barnas oppmerksomhetssøken og foreldrenes respons på denne – ble kodet i intervaller. Forfatterne rapporterte at i intervaller med telefonbruk var foreldrene langt mindre oppmerksomme på henvendelser fra barna enn i intervall uten telefonbruk; det var fem ganger lavere sannsynlighet for respons på barnas oppmerksomhetssøken.

Bury (2020) undersøkte 85 dyader på lekeplass og samspill foreldre-barn i tillegg til hvorvidt barnas atferd utgjorde en skaderisiko og foreldrene overvåket denne (31). Foreldres telefonbruk, overvåking av barna, samspill med barna og barns skadepotensiale ble kodet i intervaller. Forfatterne rapporterte at telefonbruk sammenlignet med ingen mobilbruk økte sannsynlighet for ingen overvåking av barna (29 vs 5 %), minsket sannsynligheten for samspill (20 vs 40 %) og økte sannsynligheten for økte skadepotensiale blant barna (22 vs 6 %).

Ochoa (2021) studerte 98 dyader i parker, kafeer og handlesentra og målte telefonbruk og samspill i intervaller (42). Forfatterne rapporterte at ved samtidig telefonbruk var det nedganger i omsorgsgivers og barns felles oppmerksomhet, i omsorgsgivers initiering av samspill med barnet, i omsorgsgivers prat til barnet samt i omsorgsgivers uttrykk for positive følelser overfor barnet. Det var ingen sammenhenger mellom telefonbruk og omsorgsgivers responsivitet, barnas prat og barnas uttrykk for positive følelser.

Radesky (2015) undersøkte 225 dyader som smakte på kjente og ukjente mattyper (43). Studien var egentlig en eksperimentell undersøkelse av hvordan samspillet mellom foreldre og barn under et måltid påvirker barnets spiseatferd, mens i denne sammenheng ble foreldrenes spontane telefonbruk under eksperimentet sett i sammenheng med interaksjonen under måltidet. Forfatterne rapporterte at foreldre med aktiv bruk av telefon under måltidet hadde færre verbale interaksjoner med barnet, færre non-verbale interaksjoner, færre oppmuntrende utspill (*encouragments*) og flere «frarådende» utspill (*discouragements*). Disse mønstrene var særlig tydelige ved utprøving av ukjente mattyper. Kartlagt oppdragerstil var ikke utslagsgivende for resultatene.

Van Telgen (2017) studerte 25 dyader på lekeplasser og helsestasjoner og målte omsorgsgivers telefonbruk, kommunikasjon med barnet, barnets atferd, omsorgsgivers respons på barnets atferd og barnets følelsesuttrykk (48). Forfatterne rapporterte at telefonbruk sammenlignet med ikke telefonbruk var assosiert med lavere grad av responsivitet.

Diskusjon

Hovedfunn

Tyve studier belyste problemstillingen om konsekvenser for barn og foreldre av foreldres bruk av mobile skjermer i samvær med barn under seks år. Vi kategoriserte studiene etter type situasjon som var rammen for samværet mellom foreldre og barn. Resultatene nedenfor presenteres samlet for hver type situasjon, slik de er analysert, selv om det kan være litt ulike utfall, målemetoder og populasjoner.

- Fire studier av ammesituasjoner målte konsekvenser av mors skjermbruk under amming av barn 1-7 måneder. Utfallene var primært mors oppmerksomhet på eventuell kommunikasjon fra barnet. Forfatterne rapporterte varierte resultater; noen resultater viste negative konsekvenser, mens andre viste ingen vesentlige konsekvenser. Kunnskapsgrunnlaget er svært usikkert.
- Ni studier av lekesituasjoner målte konsekvenser av foreldres skjermbruk i ulike settinger med et samspill og/eller lek mellom foreldre og barn 3-51 måneder. I disse studiene rapporterte forfatterne mer enhetlige resultater, kunnskapsgrunnlaget antyder at på kort sikt kan det være negative konsekvenser av foreldres bruk av mobile skjermer på foreldres sensitivitet og responsivitet, i barnets stress og negative følelsesuttrykk og i samspillet generelt.
- To studier av læringssituasjoner målte konsekvenser av at foreldrene ble avbrutt av en telefonsamtale eller tekstmelding på læring hos barn 18-24 måneder. Forfatterne rapporterte varierte resultater når det gjaldt konsekvenser for læring i slike situasjoner. Kunnskapsgrunnlaget er svært usikkert.
- I tillegg inkluderte vi fem studier av naturlig samvær mellom foreldre og barn på lekeplasser, kafeer, venterom og kjøpesenter der dette samværet kan studeres uforstyrret. Disse studiene ble av tidshensyn ikke analysert på linje med de øvrige. Barna var i alderen 0-6 år, og trolig i gjennomsnitt eldre enn barna i de eksperimentelle studiene. Utfallene som ble målt var i hovedsak knyttet til foreldres oppmerksomhet og responsivitet overfor barna og samspill mellom foreldre og barn. Forfatterne rapporterte sammenhenger mellom foreldrenes telefonbruk og mindre oppmerksomhet, dårligere responsivitet og minsket sannsynlighet for samspill. Disse resultatene har vi ikke vurdert tilliten til. Studienes design og mangelen på mulighet for å undersøke om det var andre variabler som førte til eventuelle endringer i atferd, svekker imidlertid en slik tillit.

Er kunnskapsgrunnlaget dekkende og anvendelig?

De 20 inkluderte studiene belyser problemstillingen, men besvarer ikke alle deler av forskningsspørsmålet. Studiene viser i hovedsak øyeblikksbilder, det vil si hva som skjer i samspillet på svært kort sikt når en forelder eller omsorgsgiver bruker mobile skjermer i bestemte situasjoner. Utfallene som måles er knyttet til samspill her og nå, foreldres kommunikasjon og respons samt barnets kommunikasjon og følelsesuttrykk. Det var kun én studie som målte konsekvenser av skjermbruk på barn og foreldres felles oppmerksomhet og én studie som målte emosjonell tilgjengelighet hos foreldre. Vi vet dermed svært lite om konsekvenser på lengre sikt, hvilken betydning foreldres skjermbruk har på særlig barnets tilknytningsstil og den emosjonelle og kognitive utviklingen.

Femten av de 20 studiene er eksperimentelle studier og gjennomført under kontrollerte betingelser (laboratoriestudier og RCTer/innengruppedesign). Det styrker den interne validiteten, fordi vi vet i større grad hvilke variabler som fører til resultatene. Slike studier kan imidlertid gi begrensninger med hensyn til overføring til virkelige situasjoner, det vil si den eksterne validiteten. De fem naturalistiske observasjonsstudiene som undersøker virkelige samspillsituasjoner utvider kunnskapsgrunnlaget, men i disse studiene er det mer usikkert om det faktisk er skjermbruken som fører til dårligere samspill eller om det er andre egenskaper ved forelderen eller barnet. Det ville styrket kunnskapsgrunnlaget om vi hadde hatt tid til å inkludere flere studiedesign, for eksempel kvalitative studier.

I de eksperimentelle studiene er det overveiende de minste barna som er studert; i 14 av 15 studer var barna under 3 år. Vi får dermed lite kunnskap om de litt større barna, 3 til 6 år. I observasjonsstudiene fra lekeplasser og lignende er imidlertid aldersgruppen utvidet, men fordi forskerne ikke kjenner til barnas eksakte alder, men oppgir for eksempel 0 til 5 år, så gir det oss ikke informasjon om eventuelle forskjeller mellom mindre og større barn. I de fleste studiene rapporteres det at barna er 'friske.' (Ingen rapporterer om noe annet).

Når det gjelder utvalget foreldre eller omsorgsgivere er vi usikre på om vi dekker hele populasjonen. Det er en svært skjev kjønnsfordeling blant foreldrene i studiene. Over 95 prosent er kvinner, og selv tatt i betraktning av at 4 av 15 studier er om amming, er dette en sterk skjevfordeling. Utvalget av foreldre er dermed ikke representativt for den norske gruppen foreldre som har praktisk, daglig samvær med små barn. Ettersom ingen av studiene gjør analyser basert på kjønn, er det usikkert hva den skjeve fordelingen betyr for overføring av resultatene til en norsk kontekst. Studiene gir lite informasjon om foreldrenes sosioøkonomiske bakgrunn, og ingen studier sammenligner ulike grupper på tanke på dette.

Kan vi stole på kunnskapsgrunnlaget?

Vi foretok en vurdering av kunnskapsgrunnlaget (tillit til resultatene) basert på prinsippene i GRADE. Hovedtrekkene i våre vurderinger er disse:

- Metodiske begrensninger: En del av studiene har vi vurdert til å ha moderat eller høy risiko for systematiske skjevheter, dette svekker tilliten
- Direkthet: Studiene besvarer gjennomgående problemstillingen og inkluderer relevante utfall og populasjoner, og dette styrker tilliten. Selv om majoriteten av studiene ble foretatt i laboratorier, har vi vurdert at situasjonene likevel er tilstrekkelig i tråd med vår problemstilling
- Presisjon: De fleste studiene hadde et lavt antall deltakere og mange hadde brede konfidensintervaller; dette gir mer usikre resultater og svekker tilliten
- Konsistens: For noen situasjoner var resultatene gjenomgående varierte, det vil si at noen viste effekter og andre ikke. Dette svekker tilliten. For andre situasjoner pekte så å si alle resultatene i samme retning; dette styrker tilliten. Svært ulike effektstørrelser kan også svekke tilliten.
- Publiseringsskjevheter: Vi mistenkte i hovedsak ikke publiseringsskjevheter ettersom vi gjorde et omfattende litteratursøk, og samlet var det ikke ensrettede resultater

Forskningsspørsmålet i denne oversikten tilsier at det kan være store individuelle forskjeller på de målte utfallene, avhengig av blant annet foreldres oppdragerstil eller barnets temperament. Problemet med individuelle forvekslingsfaktorer er imidlertid langt mindre ved RCTer og innengruppedesign sammenlignet med observasjonelle studier, fordi det foretas enten en sammenligning med individet selv eller en tilfeldig fordeling på grupper (14;24). Forvekslingsfaktorer (*confounders*) er faktorer som påvirker både hvilket tiltak (eksponering) deltakerne mottar (her: bruk av mobile skjermer) og utfallet som måles. Tid kan imidlertid være en forvekslingsfaktor ved innengruppestudier, hvis eksperimentet pågår over lengre tid og deltakerne utvikler seg, lærer eller modnes. Blant annet med utgangspunkt i innengruppedesignet har vi hatt diskusjoner om vurderingen av tillit til resultatene.

Eksperimentelle studier der avhengig variabel følger etter uavhengig variabel med kort tidsrom, vil kunne vurderes som en studie av 'effekt' eller 'konsekvens', altså at det er kausale sammenhenger. Det er ulike tradisjoner innen de forskjellige fagdisiplinene for hvordan man forstår og omtaler noe som effekt av noe annet. I (kvantitativ) psykologisk forskningstradisjon omtales det ofte som 'virkning' eller 'respons' (24). Vi har hatt diskusjoner om dette i prosjektgruppa, men vi velger å bruke begrepet 'konsekvenser' om resultater som kan observeres etter svært kort tid og under svært kontrollerte betingelser. Vi inkluderer kun RCTer og studier med innengruppedesign som innenfor psykologisk forskning anses å studere kausale sammenhenger (21;24;25).

Vi har ikke vurdert tilliten til resultatene fra de fem naturalistiske observasjonsstudiene, ettersom vi ikke har vurdert risiko for systematiske skjevheter eller systematisk syntetisert resultatene. Det er en styrke ved studiene at studiene er utført i virkelige, dagligdagse situasjoner, men det er en svakhet at vi ikke vet om det er bruk av mobile

skjermer som fører til mindre oppmerksomhet eller samspill med barna, eller om skjermbruken er en manifestering av foreldrenes oppdragerstil (f.eks. en generelt begrenset oppmerksomhet overfor barna).

Styrker og svakheter ved denne systematiske oversikten

Denne systematiske oversiktens sterke sider er blant annet at vi har gjort et svært grundig litteratursøk både i ordinære databaser og i en rekke andre baser, arkiv og organisasjoner der relevante studier er publisert. Vi har inkludert 20 studier av ulike typer design som belyser problemstillingen, som vi har sortert, vurdert og sammenfattet i kategorier som viser aktuelle samspillsituasjoner mellom foreldre og barn. Til tross for store variasjoner ved studiene og manglende muligheter for metaanalyser, har vi sammenstilt resultater og vurdert tilliten til kunnskapsgrunnlaget. Prosjektlaget har vært tverrfaglig sammensatt, med ekspertise i bibliotekfag, metoder for systematiske oversikter, kritisk vurdering og samfunnsvitenskap/pedagogikk.

Det finnes også begrensninger ved oversikten. Vi har ikke inkludert tverrsnittstudier eller kvalitative studier, begrunnet i at disse studiene i mindre grad kan si noe om konsekvenser. Imidlertid ville en mer omfattende systematisk oversikt (med utvidet tidsramme) gitt åpning for å inkludere også andre typer studier, som ville ha gitt et bredere kunnskapsgrunnlag. Vi la også noen begrensninger på oversikten ved ikke å prioritere studiene fra naturlige settinger som lekeplasser og kafeer, på samme måte som de eksperimentelle studiene; dette kunne ha utdypet bildet noe mer.

Det er videre en begrensning ved oversikten at vi ikke hadde mulighet til å slå sammen resultater i metaanalyser eller omregne effektmålene i studiene til forhåndsbestemte, standardiserte effektmål for alle utfall. Dette ville gjort resultatene tydeligere og enklere å se opp mot hverandre. Vi gjengir i denne oversikten resultatene slik de er rapportert av studieforfatterne, inkludert forfatternes presentasjoner av statistisk signifikans som ikke nødvendigvis fremhever alle resultatene og den kliniske betydningen av endringen.

Ytterligere en begrensning ved resultatene er at disse eksperimentelle studiene vanskelig kan si noe om varige konsekvenser av foreldres skjermbruk, ettersom tilknytning og utvikling påvirkes over tid, utfra gjentatte og vedvarende samspillsmønstre.

Overensstemmelse med andre litteraturoversikter og primærstudier

Som beskrevet i innledningskapitlet har også andre oversikter undersøkt foreldres skjermbruk og samspill med barn. Imidlertid kan det være vanskelig å sammenligne disse direkte, på grunn av ulike inklusjonskriterier og ulikt fokus. I litteraturoversikten av Kildare & Middlemiss fra 2017 med 27 studier (én studie overlappende med vår oversikt) var fokus på å forstå forholdet mellom samspill foreldre-barn/ungdom og foreldres fordypning i mobile skjermer (11). Som i vår gjennomgang fant forfatterne at kunnskapsgrunnlaget var begrenset av små utvalg, mangel på longitudinelle data og

vansker med overførbarhet. I likhet med vår oversikt konkluderte forfatterne med at foreldrene hadde redusert responsivitet og sensitivitet overfor barn mens de var opptatt med skjermbruk.

Kartleggingsoversikten av Braune-Krickau (2021) undersøkte foreldrenes sensitivitet og responsivitet i samspillet mellom foreldre og barn i de første årene (12). I denne oversikten inkluderte forfatterne andre studiedesign, og – som i vår oversikt – hadde de 12 studiene (sju studier overlappende med vår oversikt) ulike metodiske tilnærminger. I likhet med resultatene våre, antydet forfatterne at foreldres smarttelefonbruk kan være assosiert med endringer i foreldrenes sensitivitet og responsivitet. Også her understreket forfatterne begrensningene ved kunnskapsgrunnlaget.

I litteratursøket identifiserte vi også nyere og relevante tverrsnittstudier som vi har listet i vedlegg 5 (noen av studiene kan inngå i oversiktene beskrevet ovenfor). Én av disse var helt ny og norsk og er referert til nedenfor; i tillegg gjengir vi resultater fra en svensk og en australsk studie som det også har vært vist til i norske medier.

Den norske studien av Vik og kolleger fra 2021(51) målte i en spørreundersøkelse foreldres telefonbruk under familiemåltider med barn på rundt etter år og eventuelle sammenhenger med hyppigheten av familiemåltider og med hvordan foreldrene matet eller la til rette for barnas spising (N=298 rekruttert via sosiale medier). Førti prosent av foreldrene rapporterte at de brukte telefonen ved matbordet. Foreldres telefonbruk var assosiert med minsket positiv måltidspraksis (f.eks. være god rollemodell) og økt negativ måltidspraksis (f.eks. presse barnet til å spise). Studien viste også assosiasjoner mellom foreldres telefonbruk og færre daglige frokoster og middager sammen i familien. Forfatterne konkluderer med at telefonbruken forstyrrer måltidene og kan føre til mindre positivt og mer negativt samspill mellom foreldre og barn under måltider. Vi vet likevel ikke noe om kausale sammenhenger, om det finnes forvekslingsfaktorer som påvirker både telefonbruk og måltider.

I et svensk prosjekt så Sundqvist og kolleger 2020-2021 på sammenhenger mellom foreldres bruk av digitale medier (som mobiltelefoner og nettbrett) i samvær med barn og henholdsvis atferdsproblemer ved 4-5 års alder (52) og barns språkutvikling ved toårsalder (53). I den første studien svarte 153 foreldre på en spørreundersøkelse via Internett om bruk av digitale medier, graden av «technoference», dvs. at samspill mellom foreldre og barn avbrytes av foreldres eller barns bruk av digitale medier, samt barnets atferd (52). Studien fant en sammenheng mellom foreldrenes og barnas «technoference» og økte internaliserte og eksternaliserte atferdsvansker hos barn samt minsket prososial atferd. Sosioøkonomisk bakgrunn viste ingen sammenheng med «technoference», men en negativ sammenheng med atferdsvansker og en positiv sammenheng med prososial atferd. I den andre svenske studien ble 92 foreldre med barn cirka to år undersøkt ved at det ble lydopptak av familien en typisk dag, i tillegg til at foreldrene svarte på spørreskjema om egen bruk av digitale medier og om barnas språklige utvikling (53). Resultatene viste en negativ sammenheng mellom foreldrenes bruk av digitale medier i daglige rutiner med barn og barnets vokabular og grammatikk, men heller ikke her kan vi slå fast at det er en årsakssammenheng.

I en stor australsk spørreundersøkelse (tverrsnittstudie) fra 2020 konkluderte forfatterne med at det kun var svake og sprikende sammenhenger mellom foreldres bruk av smarttelefon og atferd overfor barnet (54). Sammenheng mellom mobilbruk og foreldreatferd så ut til å være påvirket av graden av mobilbrukens innblanding i familietiden. Ved lav grad av «mobilinnblanding», altså at mobilbruk i begrenset grad fikk påvirke og erstatte tid med barna, så syntes økt mobilbruk å ha sammenheng med (selvrapportert) positiv foreldreatferd. Forfatterne gir ingen tolkning av dette funnet, men kan ikke utelukke bakenforliggende variabler.

De to nordiske tverrsnittstudiene finner noen sammenhenger mellom foreldres bruk av mobile skjermer og samspillet med barn. Vår oversikt finner en viss støtte for negative konsekvenser på kort sikt i leke- og samspillsituasjoner, mens de refererte nordiske studiene rapporterer negative konsekvenser på mer omfattende utfall, som daglige måltider, språkutvikling og mulige atferdsproblemer. Igjen er det viktig å bemerke at disse studiene viser assosiasjoner, vi vet ikke om det er andre bakenforliggende faktorer som påvirker både skjermbruken og barns utvikling. Noen av studiene rapporterte for eksempel sosioøkonomisk bakgrunn, og noen få gjør analyser som peker i retning av at det kan ha en selvstendig påvirkning på utfallene (se Sundqvist (52)). I tillegg er det en mulighet for en reversert sammenheng, altså at barnets atferd påvirker telefonbruken, for eksempel som en pause fra et svært krevende barn. Dette har vi imidlertid ikke sett på her. Den australske studien argumenterer for at en viss grad av mobilbruk har sammenheng med positiv foreldreatferd, men også dette er kun assosiasjoner og det kan finnes bakenforliggende variabler som påvirker både positiv foreldreatferd og begrenset grad av mobilbruk.

Resultatenes betydning for praksis

Vi har i denne oversikten analysert studier som belyser noen konsekvenser av foreldres bruk av mobile skjermer på kort sikt. Mange av disse studiene finner negative konsekvenser for samspillet med barn, foreldres responsivitet og oppmerksomhet, samt barnets følelsesuttrykk. Det mangler studier som kan si noe om konsekvenser på lengre sikt, og det er derfor vanskelig å gi klare anbefalinger til foreldre basert på foreliggende resultater. Vi har i tillegg begrenset tillit til mye av dokumentasjonen. Likevel gir resultatene en viss støtte til en forsiktighet med skjermbruk i samvær med barn, fordi særlig studiene av lek og samspill ser ut til å peke i samme retning, og teori og annen forskning om barns utvikling tilsier at kvaliteten på samspillet har betydning for barnets videre utvikling.

Kunnskapshull

Denne oversikten skulle svare på hvilke konsekvenser foreldres bruk av mobile skjermer har på barns utvikling og samspill med barn 0-6 år. De inkluderte studiene belyser et stykke på vei konsekvenser på helt kort sikt, hva som skjer umiddelbart i situasjonen. Oversikten har ikke identifisert studier som kan belyse konsekvenser på lengre

sikt, det vil si skjermbrukens betydning for tilknytning og emosjonelle og kognitiv utvikling hos barnet. Det er derfor behov for flere studier med et longitudinelt design, som undersøker foreldres mobilbruk og utfall hos barnet over lenger tid, og som forsøker å kontrollere for variabler som kan være forvekslingsfaktorer, som foreldres oppdragerstil eller barnets temperament. Det er foretatt noen kvalitative studier på dette feltet, og det kan også være verdifullt å oppsummere disse systematisk, eventuelt sett i sammenheng med studier med andre typer design.

Konklusjon

I denne systematiske oversikten, bestilt av Helsedirektoratet, stilte vi spørsmålet om hva som er konsekvensene av foreldres bruk av mobile skjermer når de er sammen med barn 0-6 år, på samspill, tilknytning og utvikling. Vi inkluderte 20 studier fra ulike situasjoner der samspill med små barn foregår: amming, lek og læring. Alle studiene målte konsekvenser på kort sikt, hva skjer i selve situasjonen når en forelder bruker mobiltelefonen under samvær med barn. Kunnskapsgrunnlaget for konsekvenser i lekesituasjoner antyder at det kan være negative konsekvenser av foreldres bruk av mobile skjermer på foreldres sensitivitet og responsivitet, i barnets stress og negative følelsesuttrykk og i samspillet mellom foreldre og barn mer generelt. Kunnskapsgrunnlaget gir ikke støtte for å si noe om konsekvenser på lengre sikt, og her må annen forskning, teori og klinisk erfaring tas med i betraktning når anbefalinger til foreldre skal utformes.

Selv om resultatene kan sies å gi en viss støtte til en forsiktighet med skjermbruk i samvær med barn, er det vanskelig å konkludere om konsekvensene av skjermbruk. Forskningsspørsmålet besvares dermed kun i begrenset grad, og det er stort behov for videre forskning med et lengre tidsperspektiv. Det vil også kunne være verdifullt å systematisk oppsummere funn fra studier med andre typer design for å få en bredere forståelse av fenomenet.

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Vedlegg 1: Søkestrategi

SØK ETTER SYSTEMATISKE OVERSIKTER

Søketreff totalt: 1498
Søketreff totalt etter dublettkontroll: 776

PsycINFO (Ovid)
1806 to November Week 3 2021
Søkedato: 19.11.2021
Søketreff: 204
1. screen time/ or "smartphone use"/ or exp mobile devices/
2. (screen or screens or screentime or phone* or telephone* or smartphone* or cellphone* or handphone* or ((mobile or handheld or hand held) adj4 device*) or tablet* or smartwatch* or smart watch*).ti,ab,bt.
3. 1 or 2
4. exp parents/ or exp parenting/
5. (parent* or mother* or father* or maternal or paternal).ti,ab,bt.
6. 4 or 5
7. (childhood birth 12 yrs or infancy 2 23 mo or preschool age 2 5 yrs or school age 6 12 yrs).ag. or daughters/ or sons/ or exp childhood development/
8. (baby or babies or child* or infant* or toddler* or newborn* or new* born* or pre-schooler*).ti,ab,bt.
9. 7 or 8
10. 3 and 6 and 9
11. exp parent child relations/ or exp parent child communication/
12. 3 and 11
13. 10 or 12
14. (((systematic* or evidence or scoping or umbrella or integrative or literature) adj2 (review* or synthes*)) or research synthes* or meta-anal* or ((systematic* or database or med-line or pubmed) adj2 search*) or overview of overviews or rapid review*).ti,ab,bt. or "system-atic review"/ or meta analysis/ or ("literature review" or meta analysis or "systematic re-view").md.
15. 13 and 14

MEDLINE (Ovid)
ALL 1946 to November 18, 2021
Søkedato: 19.11.2021
Søketreff: 443

1. screen time/ or exp Cell Phone/ or exp Computers, Handheld/
2. (screen or screens or screentime or phone* or telephone* or smartphone* or cellphone* or handphone* or ((mobile or handheld or hand held) adj4 device*) or tablet computer* or tab-letcomputer* or tablet machine* or tablet device* or smartwatch* or smart watch*).ti,ab,kf,bt.
3. 1 or 2
4. exp Parents/ or maternal behavior/ or parenting/ or paternal behavior/
5. (parent* or mother* or father* or maternal or paternal).ti,ab,kf,bt.
6. 4 or 5
7. exp child/ or exp infant/ or exp Child Behavior/ or Child Development/
8. (baby or babies or child* or infant* or toddler* or newborn* or new* born* or pre-schooler*).ti,ab,kf,bt.

9. 7 or 8
10. 3 and 6 and 9
11. exp Parent-Child Relations/
12. 3 and 11
13. 10 or 12
14. (((systematic* or evidence or scoping or umbrella or integrative or literature) adj2 (review* or synthes*)) or research synthes* or meta-anal* or ((systematic* or database or medline or pubmed) adj2 search*) or overview of overviews or rapid review*).tw,kf,id. or (systematic review or meta-analysis).pt. or systematic review/ or meta-analysis/
15. 13 and 14

Embase (Ovid)
1980 to 2021 Week 45
Søkedato: 19.11.2021
Søketreff: 300

1. screen time/ or handheld device/ or exp mobile phone/ or tablet machine/ or telephone/ or tablet computer/
2. (screen or screens or screentime or phone* or telephone* or smartphone* or cellphone* or handphone* or ((mobile or handheld or hand held) adj4 device*) or tablet computer* or tabletcomputer* or tablet machine* or tablet device* or smartwatch* or smart watch*).ti,ab,bt.
3. 1 or 2
4. exp parent/ or maternal behavior/ or paternal behavior/
5. (parent* or mother* or father* or maternal or paternal).ti,ab,bt.
6. 4 or 5
7. exp child/ or daughter/ or son/ or child behavior/ or child development/
8. (baby or babies or child* or infant* or toddler* or newborn* or new* born* or preschooler*).ti,ab,bt.
9. 7 or 8
10. 3 and 6 and 9
11. exp child parent relation/ or father child relation/ or mother child relation/
12. 3 and 11
13. 10 or 12
14. (((systematic* or evidence or scoping or umbrella or integrative or literature) adj2 (review* or synthes*)) or research synthes* or meta-anal* or ((systematic* or database or medline or pubmed) adj2 search*) or overview of overviews or rapid review*).ti,ab,bt. or "systematic review"/ or meta analysis/
15. 13 and 14
16. limit 15 to embase

CINAHL (Ebsco)
Søkedato: 19.11.2021
Søketreff: 120

S25 S20 AND S24
Exclude MEDLINE records
S24 S21 OR S22 OR S23
S23 TI (((systematic* or evidence or scoping or umbrella or integrative or literature) N2 (review* or synthes*)) or "research synthes*" or "meta-anal*" or ((systematic* or database or medline or pubmed) N2 search*) or "overview of overviews" or "rapid review*") OR AB (((systematic* or evidence or scoping or umbrella or integrative or literature) N2 (review* or synthes*)) or "research synthes*" or "meta-anal*" or ((systematic* or database or medline or pubmed) N2 search*) or "overview of overviews" or "rapid review*")
S22 (MH "Meta Analysis")
S21 (MH "Literature Review+")
S20 S17 OR S19
S19 S6 AND S18
S18 (MH "Parent-Child Relations+")
S17 S6 AND S11 AND S16
S16 S12 OR S13 OR S14 OR S15

S15 TI (baby or babies or child* or infant* or toddler* or newborn* or new* born* or preschooler*) OR AB (baby or babies or child* or infant* or toddler* or newborn* or new* born* or preschooler*)
S14 (MH "Child Behavior+")
S13 (MH "Child Development")
S12 (MH "Child+")
S11 S7 OR S8 OR S9 OR S10
S10 TI (parent* or mother* or father* or maternal or paternal) OR AB (parent* or mother* or father* or maternal or paternal)
S9 (MH "Parenting")
S8 (MH "Parental Behavior") OR (MH "Paternal Behavior") OR (MH "Maternal Behavior")
S7 (MH "Parents+")
S6 S1 OR S2 OR S3 OR S4 OR S5
S5 TI (screen or screens or screentime or phone* or telephone* or smartphone* or cellphone* or handphone* or ((mobile or handheld or hand held) N4 device*) or iphone* or ipad* or tablet computer* or tabletcomputer* or tablet machine*) OR AB (screen or screens or screentime or phone* or telephone* or smartphone* or cellpone* or handphone* or ((mobile or handheld or hand held) N4 device*) or iphone* or ipad* or "tablet computer*" or tabletcomputer* or "tablet machine*")
S4 (MH "Computers, Hand-Held+")
S3 (MH "Computers, Hand-Held+")
S2 (MH "Telephone+")
S1 (MH "Screen Time")

Epistemonikos
Søkedato: 19.11.2021
Søketreff: Systematic review 238**,** broad synthesis 23, structured symmary 2

Title/abstract: screen OR screens OR screentime OR phone* OR telephone* OR smartphone* OR cellphone* OR handphone* OR "mobile device" OR "mobile devices" OR "handheld device" OR "handheld devices" OR "hand held device" OR "hand held devices" OR "tablet computer" OR "tablet computers" OR tabletcomputer* OR "tablet machine" OR "tablet meachines" OR "tablet meachines" OR “tablet device” OR “tablet devices” OR smartwatch* OR “smart watches”
AND
Title/abstract: parent* OR mother* OR father* OR maternal OR paternal
AND
Title/abstract: baby OR babies OR child* OR infant* OR toddler* OR newborn* OR new* born* OR preschooler*

Scopus
Søkedato: 19.11.2021
Søketreff: 114

(TITLE-ABS-KEY (screen OR screens OR screentime OR phone* OR telephone* OR smartphone* OR cellphone* OR handphone* OR "mobile device" OR "mobile devices" OR "handheld device" OR "handheld devices" OR "hand held device" OR "hand held devices" OR "tablet computer" OR "tablet computers" OR tabletcomputer* OR "tablet machine" OR "tablet meachines" OR “tablet device” OR “tablet devices” OR smartwatch* OR “smart watches”) AND TITLE-ABS-KEY (parent* OR mother* OR father* OR maternal OR paternal) AND TITLE-ABS-KEY (baby OR babies OR child* OR infant* OR toddler* OR newborn* OR "newly born" OR preschooler*) AND TITLE-ABS-KEY ("systematic review" OR "systematically reviewed" OR "literature review" OR "scoping review" OR "rapid review" OR "evidence review" OR "research synthes*" OR "meta-anal*" OR "systematic search" OR "systematically searched" OR "overview of overviews")) AND NOT INDEX (medline)

Cochrane database of systematic reviews
Søkedato: 19.11.2021
Søketreff: 48

#1 MeSH descriptor: [Screen Time] explode all trees
#2 MeSH descriptor: [Cell Phone] explode all trees

#3 MeSH descriptor: [Computers, Handheld] explode all trees
#4 (screen or screens or screentime or phone* or telephone* or smartphone* or cellphone* or handphone* or ((mobile or handheld or "hand held") near/4 device*) or (tablet next computer*) or tabletcomputer* or (tablet next machine*)):ti,ab
#5 #1 or #2 or #3 or #4
#6 MeSH descriptor: [Parenting] explode all trees
#7 MeSH descriptor: [Maternal Behavior] explode all trees
#8 MeSH descriptor: [Paternal Behavior] explode all trees
#9 MeSH descriptor: [Parenting] explode all trees
#10 (parent* or mother* or father* or maternal or paternal):ti,ab
#11 #6 or #7 or #8 or #9 or #10
#12 MeSH descriptor: [Child] explode all trees
#13 MeSH descriptor: [Infant] explode all trees
#14 MeSH descriptor: [Child Behavior] explode all trees
#15 MeSH descriptor: [Child Development] explode all trees
#16 (baby or babies or child* or infant* or toddler* or newborn* or (new* next born*) or pre-schooler*):ti,ab
#17 #12 or #13 or #14 or #15 or #16
#18 #5 and #11 and #17
#19 MeSH descriptor: [Parent-Child Relations] explode all trees
#20 #5 and #19
#21 #18 or #20

SBU, Statens beredning för medicinsk och social utvärdering
Søkedato: 19.11.2021
Ingen relevante treff
Gjennomgang av rapporter under «Barn och Unga» - «Föräldraskap».

Socialstyrelsen Sverige
Søkedato: 19.11.2021
Ingen relevante treff
Gjennomgang av «Nationella kunskapsstöd».

Soscialstyrelsen Danmark
Søkedato: 19.11.2021
Ingen relevante treff
Gjennomgang av «Analyser og rapporter» - «Børn»

Sundhetssyrelsen
Søkedato: 19.11.2021
Ingen relevante treff
Gjennomgang av «Litteraturgennemganger».

NICE
Søkedato: 19.11.2021
Gjennomgang av rappoer under kategorien «Children and young people»

CADTH
Søkedato: 19.11.2021
Søk på parents, parent mother, mothers, father, fathers

Prospero
Søkedato: 19.11.2021
Søketreff: 6
Title: ((screen OR screens OR screentime OR phone* OR tablet*) AND (parent* OR mother* OR father*) AND (baby OR babies OR child* OR infant* OR toddler* OR newborn* OR new* born* OR preschooler*)):TI AND (Mental health and behavioural conditions):HA

(screen OR screens OR smartphone* OR phone* OR mobile) AND (parent* OR mother* OR father*):TI

SØK ETTER PRIMÆRSTUDIER
Søketreff totalt: 14446
Søketreff totalt etter dublettkontroll: 7753

PsycINFO (Ovid)
1806 to November Week 5 2021
Søkedato: 05.12.2021
Søketreff: 1797

1. screen time/ or "smartphone use"/ or exp mobile devices/
2. (((screen or screens or phone* or cellphone* or handphone* or mobile or touchscreen* or smartscreen*) adj4 ("use" or using or usage or time or distract* or view* or read* or watch* or overus* or addict*)) or screentime or ((mobile or handheld or hand held or tablet) adj4 device*) or tablet machine* or tablet screen* or touch tablet* or smartwatch* or smart watch* or (smartphone* or smart phone*)).ti,ab,bt,id. or (screen or screens or phone* or cellphone* or handphone* or mobile or touchscreen* or smartscreen*).ti.
3. 1 or 2
4. exp parents/ or exp parenting/
5. (parent* or mother* or father* or maternal or paternal).ti,ab,bt.
6. 4 or 5
7. (childhood birth 12 yrs or infancy 2 23 mo or preschool age 2 5 yrs or school age 6 12 yrs).ag. or daughters/ or sons/ or exp childhood development/
8. (baby or babies or child* or infant* or toddler* or newborn* or new* born* or preschooler*).ti,ab,bt.
9. 7 or 8
10. 3 and 6 and 9
11. exp parent child relations/ or exp parent child communication/
12. 3 and 11
13. 10 or 12
14. (comment reply or editorial or interview or letter or obituary or "review book").dt.
15. 13 not 14
16. limit 15 to yr="2005 -Current"

Ekstrasøk 07.01.2022
Søketreff: 149

17. (technoference* or ((technolog* or mobile* or screen* or phone*) adj3 (interfer* or intrus* or intrud* or interrupt*)) or phubbing*).tw. and (parent* or mother* or father* or maternal or paternal).tw,mp.

18. ((Parent* or mother* or father* or maternal or paternal) adj3 (availab* or responsive* or unavailab* or unresponsiv* or attentive* or unattentive* or distract* or attention*)).tw.
19. (screen or screens or phone* or cellphone* or handphone* or mobile or touchscreen* or smartscreen* or smartphone*).tw,bt.
20. 18 and 19
21. 17 or 20
22. limit 21 to yr="2005 -Current"
23. (comment reply or editorial or interview or letter or obituary or "review book").dt.
24. 22 not 23

MEDLINE (Ovid)
ALL 1946 to December 03, 2021
Søkedato: 05.12.2021
Søketreff: 3737

1. screen time/ or exp Cell Phone/ or exp Computers, Handheld/
2. (((screen or screens or phone* or cellphone* or handphone* or mobile or touchscreen* or smartscreen*) adj4 ("use" or using or usage or time or distract* or view* or read* or watch* or overus* or addict*)) or screentime or ((mobile or handheld or hand held or tablet) adj4 device*) or tablet machine* or tablet screen* or touch tablet* or smartwatch* or smart watch* or (smartphone* or smart phone*)).ti,ab,kf,bt. or (screen or screens or phone* or cellphone* or handphone* or mobile or touchscreen* or smartscreen*).ti.

3. 1 or 2
4. exp Parents/ or maternal behavior/ or parenting/ or paternal behavior/
5. (parent* or mother* or father* or maternal or paternal).ti,ab,kf,bt.
6. 4 or 5
7. exp child/ or exp infant/ or exp Child Behavior/ or Child Development/
8. (baby or babies or child* or infant* or toddler* or newborn* or new* born* or preschooler*).ti,ab,kf,bt.
9. 7 or 8
10. 3 and 6 and 9
11. exp Parent-Child Relations/
12. 3 and 11
13. 10 or 12
14. (case reports or comment or editorial or letter).pt.
15. 13 not 14
16. limit 15 to yr="2005 -Current"

Ekstrasøk 07.01.2022
Søketreff: 200

17. (technoference* or ((technolog* or mobile* or screen* or phone*) adj3 (interfer* or intrus* or intrud* or interrupt*)) or phubbing*).ti,ab,kf,bt. and (Parent* or mother* or father* or maternal or paternal).ti,ab,kf,bt,mp.
18. ((Parent* or mother* or father* or maternal or paternal) adj3 (availab* or responsive* or unavailab* or unresponsiv* or attentive* or unattentive* or distract* or attention*)).ti,ab,kf,bt.
19. (screen or screens or phone* or cellphone* or handphone* or mobile or touchscreen* or smartscreen* or smartphone*).ti,ab,kf,bt.

20. 18 and 19
21. 17 or 20
22. limit 21 to yr="2005 -Current"
23. (case reports or comment or editorial or letter).pt.
24. 22 not 23

Embase (Ovid)
1980 to 2021 Week 48
Søkedato: 02.12.2021
Søketreff: 2058

1. screen time/ or *handheld device/ or exp *mobile phone/ or *tablet machine/ or *tablet computer/
2. (((screen or screens or phone* or cellphone* or handphone* or mobile or touchscreen* or smartscreen*) adj4 ("use" or using or usage or time or distract* or view* or read* or watch* or overus* or addict*)) or screentime or ((mobile or handheld or hand held or tablet) adj4 device*) or tablet machine* or tablet screen* or touch tablet* or smartwatch* or smart watch* or (smartphone* or smart phone*)).ti,ab,bt. or (screen or screens or phone* or cellphone* or handphone* or mobile or touchscreen* or smartscreen*).ti.
3. 1 or 2
4. exp parent/ or maternal behavior/ or paternal behavior/
5. (parent* or mother* or father* or maternal or paternal).ti,ab,bt.
6. 4 or 5
7. exp child/ or daughter/ or son/ or child behavior/ or child development/
8. (baby or babies or child* or infant* or toddler* or newborn* or new* born* or preschooler*).ti,ab,bt.
9. 7 or 8
10. 3 and 6 and 9
11. exp child parent relation/ or father child relation/ or mother child relation/
12. 3 and 11
13. 10 or 12
14. (conference or conference abstract or conference paper or "conference review" or editorial or letter).pt.
15. 13 not 14

16. limit 15 to yr="2005 -Current"
17. limit 16 to embase

Ekstrasøk 07.01.2022
Søketreff: 137

18. (technoference* or ((technolog* or mobile* or screen* or phone*) adj3 (interfer* or intrus* or intrud* or interrupt*)) or phubbing*).ti,ab,bt,kw. and (Parent* or mother* or father* or maternal or paternal).ti,ab,bt,kw,mp.
19. ((Parent* or mother* or father* or maternal or paternal) adj3 (availab* or responsive* or unavailab* or unresponsiv* or attentive* or unattentive* or distract* or attention*)).ti,ab,bt,kw.

20. (screen or screens or phone* or cellphone* or handphone* or mobile or touchscreen* or smartscreen* or smartphone*).ti,ab,bt,kw.
21. 19 and 20
22. 18 or 21
23. limit 22 to yr="2005 -Current"
24. (conference or conference abstract or conference paper or "conference review" or editorial or letter).pt.
25. 23 not 24
26. limit 25 to embase

CINAHL (Ebsco)
Søkedato: 06.12.2021
Søketreff: 1757

S19 S16 OR S18 Limiters - Published Date: 20050101-20211231; Exclude MEDLINE records
S18 S5 AND S17
S17 (MH "Parent-Child Relations+")
S16 S5 AND S10 AND S15
S15 S11 OR S12 OR S13 OR S14
S14 TI (baby or babies or child* or infant* or toddler* or newborn* or new* born* or preschooler*) OR AB (baby or babies or child* or infant* or toddler* or newborn* or new* born* or preschooler*)
S13 (MH "Child Behavior+")
S12 (MH "Child Development")
S11 (MH "Child+")
S10 S6 OR S7 OR S8 OR S9
S9 TI (parent* or mother* or father* or maternal or paternal) OR AB (parent* or mother* or father* or maternal or paternal)
S8 (MH "Parenting")
S7 (MH "Parental Behavior") OR (MH "Paternal Behavior") OR (MH "Maternal Behavior")
S6 (MH "Parents+")
S5 S1 OR S2 OR S3 OR S4
S4 TI (((screen or screens or phone* or cellphone* or handphone* or mobile or touchscreen* or smartscreen*) N4 (use or using or usage or time or distract* or view* or read* or watch* or overus* or addict*)) or screentime or ((mobile or handheld or “hand held” or tablet) N4 device*) or tablet machine* or tablet screen* or touch tablet* or smartwatch* or smart watch* or (smartphone* or smart phone*))) OR AB (((screen or screens or phone* or cellphone* or handphone* or mobile or touchscreen* or smartscreen*) N4 (use or using or usage or time or distract* or view* or read* or watch* or overus* or addict*)) or screentime or ((mobile or handheld or “hand held” or tablet) N4 device*) or tablet machine* or tablet screen* or touch tablet* or smartwatch* or smart watch* or (smartphone* or smart phone*))) OR TI ((screen or screens or phone* or cellphone* or handphone* or mobile or touchscreen* or smartscreen*)
S3 (MH "Computers, Hand-Held+")
S2 (MH "Telephone+")
S1 (MH "Screen Time")

Ekstrasøk 07.01.2022
Søketreff: 87

S26 S22 OR S25 Limiters - Published Date: 20050101-20220131; Exclude MEDLINE records
S25 S23 AND S24
S24 TI (screen or screens or phone* or cellphone* or handphone* or mobile or touchscreen* or smartscreen* or smartphone*) OR AB (screen or screens or phone* or cellphone* or handphone* or mobile or touchscreen* or smartscreen* or smartphone*)
S23 TI ((Parent* or mother* or father* or maternal or paternal) N3 (availab* or responsive* or unavailab* or unresponsiv* or attentive* or unattentive* or distract* or attention*)) OR AB ((Parent* or mother* or father* or maternal or paternal) N3 (availab* or responsive* or unavailab* or unresponsiv* or attentive* or unattentive* or distract* or attention*))
S22 S20 AND S21
S21 TI (Parent* or mother* or father* or maternal or paternal) OR AB (Parent* or mother* or father* or maternal or paternal)
S20 TI (technoference* or ((technolog* or mobile* or screen* or phone*) N3 (interfer* or intrus* or intrud* or interrupt*)) or phubbing*) OR AB (technoference* or ((technolog* or mobile* or screen* or phone*) N3 (interfer* or intrus* or intrud* or interrupt*)) or phubbing*)

Scopus
Søkedato: 06.12.2021

Søk 1
Søketreff: 1618

(TITLE-ABS-KEY (((screen OR screens OR phone* OR cellphone* OR handphone* OR mobile OR touchscree* OR smartscreen*) W/4 (use OR using OR usage OR time OR distract* OR view* OR read* OR watch* OR overus* OR addict*)) OR screentime OR ((mobile OR handheld OR "hand held" OR tablet) W/4 device*) OR "tablet machine*" OR "tablet screen*" OR "touch tablet*" OR smartwatch* OR "smart watch*" OR smartphone* OR "smart phone*") AND TITLE-ABS-KEY (parent* OR mother* OR father* OR maternal OR paternal) AND TITLE-ABS-KEY (baby OR babies OR child* OR infant* OR toddler* OR newborn* OR "newly born" OR preschooler*)) AND NOT INDEX (medline) AND (LIMIT-TO (PUBYEAR , 2022) OR LIMIT-TO (PUBYEAR , 2021) OR LIMIT-TO (PUBYEAR , 2020) OR LIMIT-TO (PUBYEAR , 2019) OR LIMIT-TO (PUBYEAR , 2018) OR LIMIT-TO (PUBYEAR , 2017) OR LIMIT-TO (PUBYEAR , 2016) OR LIMIT-TO (PUBYEAR , 2015) OR LIMIT-TO (PUBYEAR , 2014) OR LIMIT-TO (PUBYEAR , 2013) OR LIMIT-TO (PUBYEAR , 2012) OR LIMIT-TO (PUBYEAR , 2011) OR LIMIT-TO (PUBYEAR , 2010) OR LIMIT-TO (PUBYEAR , 2009) OR LIMIT-TO (PUBYEAR , 2008) OR LIMIT-TO (PUBYEAR , 2007) OR LIMIT-TO (PUBYEAR , 2006) OR LIMIT-TO (PUBYEAR , 2005))

Søk 2
Søketreff: 1083

(TITLE (screen OR screens OR phone* OR cellphone* OR handphone* OR mobile OR touchscreen* OR smartscreen*) AND TITLE-ABS-KEY (parent* OR mother* OR father* OR maternal OR paternal) AND TITLE-ABS-KEY (baby OR babies OR child* OR infant* OR toddler* OR newborn* OR "newly born" OR preschooler*)) AND NOT INDEX (medline) AND (LIMIT-TO (PUBYEAR , 2022) OR LIMIT-TO (PUBYEAR , 2021) OR LIMIT-TO (PUBYEAR , 2020) OR LIMIT-TO (PUBYEAR , 2019) OR LIMIT-TO (PUBYEAR , 2018) OR LIMIT-TO (PUBYEAR , 2017) OR LIMIT-TO (PUBYEAR , 2016) OR LIMIT-TO (PUBYEAR , 2015) OR LIMIT-TO (PUBYEAR , 2014) OR LIMIT-TO (PUBYEAR , 2013) OR LIMIT-TO (PUBYEAR , 2012) OR LIMIT-TO (PUBYEAR , 2011) OR LIMIT-TO (PUBYEAR , 2010) OR LIMIT-TO (PUBYEAR , 2009) OR LIMIT-TO (PUBYEAR , 2008) OR LIMIT-TO (PUBYEAR , 2007) OR LIMIT-TO (PUBYEAR , 2006) OR LIMIT-TO (PUBYEAR , 2005))

Ekstrasøk 07.01.2022
Søketreff: 150

(TITLE-ABS-KEY ((parent* OR mother* OR father* OR maternal OR paternal) W/4 (availab* OR responsive* OR unavailab* OR unresponsiv* OR attentive* OR unattentive* OR

distract* OR attention*)) AND TITLE-ABS-KEY (screen OR screens OR phone* OR cell-phone* OR handphone* OR mobile OR touchscreen* OR smartscreen* OR smartphone*)) AND NOT INDEX (medline) AND (LIMIT-TO (PUBYEAR , 2021) OR LIMIT-TO (PUBYEAR , 2020) OR LIMIT-TO (PUBYEAR , 2019) OR LIMIT-TO (PUBYEAR , 2018) OR LIMIT-TO (PUBYEAR , 2017) OR LIMIT-TO (PUBYEAR , 2016) OR LIMIT-TO (PUBYEAR , 2015) OR LIMIT-TO (PUBYEAR , 2014) OR LIMIT-TO (PUBYEAR , 2013) OR LIMIT-TO (PUBYEAR , 2012) OR LIMIT-TO (PUBYEAR , 2011) OR LIMIT-TO (PUBYEAR , 2010) OR LIMIT-TO (PUBYEAR , 2009) OR LIMIT-TO (PUBYEAR , 2008) OR LIMIT-TO (PUBYEAR , 2007) OR LIMIT-TO (PUBYEAR , 2006) OR LIMIT-TO (PUBYEAR , 2005))

Søketreff: 351

(TITLE-ABS-KEY (technoference* OR ((technolog* OR mobile* OR screen* OR phone*) W/3 (interfer* OR intrus* OR intrud* OR interrupt*)) OR phubbing*) AND TITLE-ABS-KEY (parent* OR mother* OR father* OR maternal OR paternal)) AND (LIMIT-TO (PUBYEAR , 2022) OR LIMIT-TO (PUBYEAR , 2021) OR LIMIT-TO (PUBYEAR , 2020) OR LIMIT-TO (PUBYEAR , 2019) OR LIMIT-TO (PUBYEAR , 2018) OR LIMIT-TO (PUBYEAR , 2017) OR LIMIT-TO (PUBYEAR , 2016) OR LIMIT-TO (PUBYEAR , 2015) OR LIMIT-TO (PUBYEAR , 2014) OR LIMIT-TO (PUBYEAR , 2013) OR LIMIT-TO (PUBYEAR , 2012) OR LIMIT-TO (PUBYEAR , 2011) OR LIMIT-TO (PUBYEAR , 2010) OR LIMIT-TO (PUBYEAR , 2009) OR LIMIT-TO (PUBYEAR , 2008) OR LIMIT-TO (PUBYEAR , 2007) OR LIMIT-TO (PUBYEAR , 2006) OR LIMIT-TO (PUBYEAR , 2005))

Cochrane CENTRAL

Søkedato: 05.12.2021
Søketreff: 1244

#1 MeSH descriptor: [Screen Time] explode all trees
#2 MeSH descriptor: [Cell Phone] explode all trees
#3 MeSH descriptor: [Computers, Handheld] explode all trees
#4 (((screen or screens or phone* or cellphone* or handphone* or mobile or touchscreen* or smartscreen*) near/4 (use or using or usage or time or distract* or view* or read* or watch* or overus* or addict*)) or screentime or ((mobile or handheld or "hand held" or tablet) near/4 device*) or (tablet next machine*) or (tablet next screen*) or (touch next tablet*) or smartwatch* or (smart next watch*) or (smartphone* or (smart next phone*))):ti,ab or (screen or screens or phone* or cellphone* or handphone* or mobile or touchscreen* or smartscreen*):ti
#5 #1 or #2 or #3 or #4
#6 MeSH descriptor: [Parenting] explode all trees
#7 MeSH descriptor: [Maternal Behavior] explode all trees
#8 MeSH descriptor: [Paternal Behavior] explode all trees
#9 MeSH descriptor: [Parenting] explode all trees
#10 (parent* or mother* or father* or maternal or paternal):ti,ab
#11 #6 or #7 or #8 or #9 or #10
#12 MeSH descriptor: [Child] explode all trees
#13 MeSH descriptor: [Infant] explode all trees
#14 MeSH descriptor: [Child Behavior] explode all trees
#15 MeSH descriptor: [Child Development] explode all trees
#16 (baby or babies or child* or infant* or toddler* or newborn* or (new* next born*) or pre-schooler*):ti,ab
#17 #12 or #13 or #14 or #15 or #16
#18 #5 and #11 and #17
#19 MeSH descriptor: [Parent-Child Relations] explode all trees
#20 #5 and #19
#21 #18 or #20 with Publication Year from 2005 to 2021, in Trials

Ekstrasøk 07.01.2022
Søketreff: 78

#22 (technoference* or ((technolog* or mobile* or screen* or phone*) near/3 (interfer* or intrus* or intrud* or interrupt*)) or phubbing*):ti,ab,kw and (Parent* or mother* or father* or maternal or paternal):ti,ab,kw
#23 ((Parent* or mother* or father* or maternal or paternal) near/3 (availab* or responsive* or unavailab* or unresponsiv* or attentive* or unattentive* or distract* or attention*)):ti,ab,kw
#24 (screen or screens or phone* or cellphone* or handphone* or mobile or touchscreen* or smartscreen* or smartphone*):ti,ab,kw
#25 #23 and #24
#26 #22 or #25 with Publication Year from 2005 to 2022, in Trials

SØK ETTER PÅGÅENDE STUDIER

ClinicalTrials.gov
Title/acronym
(phone OR smartphone OR smart OR screen) AND (parent OR parents OR parental OR mother OR mothers OR father OR fathers)
Søketreff: 91

Tite/acronym
(attentive OR attentiveness OR unattentive OR unattentiveness OR responsive OR responsiveness OR distraction) AND (parent OR parents OR parental OR mother OR mothers OR father OR fathers)
Søketreff: 12

Other terms
(attentive OR attentiveness OR unattentive OR unattentiveness OR responsive OR responsiveness OR distraction) AND (parent OR parents OR parental OR mother OR mothers OR father OR fathers) AND (screen OR mobile OR phone OR smartphone OR smartphones)
Søketreff: 190

SØK ETTER GRÅ LITTERATUR

WorldCat
Advanced search
ti:(ti:mobile* OR ti:phone* OR ti:screen OR ti:screens OR ti:smartphone*) AND (ti:parent* OR ti:mother* OR father*)
Limits: Dissertations/thesis
Publication year: 2005-2021
Søketreff: 251

NDLTD - Networked Digital Library of Theses and Dissertations
(title:"mobile" OR title:"phone" OR title:"screen" OR title:"smartphone" OR title:”phubbing” OR title:”technoference”) AND (title:"parent" OR title:"parents" OR title:"mother" OR title:"mothers" OR title:"father" OR title:"fathers")
Publication year 2005-2021
Language Swe, Eng, En-us
Søketreff: 21

OAISTER
ti:(phone OR smartphone OR smart OR screen OR phubbing OR techoference) AND (parent OR parents OR parental OR mother OR mothers OR father OR fathers)
Søketreff: 323

CRISTIN
Skjermbruk, mobilbruk, mobil foreldre, mobilen foreldre

NORA
Skjermbruk, mobilbruk, mobil foreldre, skjerm foreldre, nettbrett foreldre.

Regionalt kunnskapssenter for barn og unge - psykisk helse og barnevern (RKBU Midt-Norge)
Søk i Oria

Skjermbruk, smarttelefon foreldre, skjerm foreldres bruk

RBUP
Søk på mobilbruk, skjermbruk

Norsk Sykepleierforbund – NSF https://www.nsf.no/
Inkluderer Landsgruppa for helsesykepleiere
Søk på mobilbruk, skjermbruk

Den norske legeforening
Søk på mobilbruk, skjermbruk

Norsk psykologofrening
Søk på mobilbruk, skjermbruk

Google norsk
"foreldres skjermbruk"|"foreldres mobilbruk" studie|master|phd|doktoravhandling
skjermbruk|mobilbruk foreldre file:pdf
33 søkeresultater

Google engelsk
parents "mobile use"|screen use"|"smartphone use" file:pdf study|master|thesis
6800 treff

phubbing|technoference parents|mothers|fathers file:pdf study|master|thesis
8200 treff

Google svensk
skärm|skärmanvändning|mobil|mobilanvändning föräldrar file:pdf site:se
74 søkeresultater

Google dansk
skærmbrug|"mobil brug"|mobil|skærm|skærme forældre site:dk file:pdf
studie|rapport|evaluering|master|phd|forskning
98 søkeresultate

DiVA Digitala Vetenskapliga Arkivet
Enkelt søk: (skärm OR skärmanvändning OR mobil OR mobilanvändning) AND föräldrar
Alle publikasjoner
Søketreff: 2

Bibliotek.dk
skærmbrug AND forelder
skærm AND foreldre
mobilbrug AND foreldre
Ingen søketreff

Vedlegg 2: Inkluderte studier – kjennetegn og risiko for skjevheter

Under er en (engelsk) presentasjon av de 16 inkluderte eksperimentelle studiene, med uthentede data slik de er rapportert av forskerne og vår vurdering av risiko for skjevheter. Studiene presenteres i alfabetisk rekkefølge.

Cosottile (2021) (32)

Data extraction	
Author, date, title	Cosottile (2021) Effects of Cell Phone Use on Caregiver Supervision and Child Injury Risk
Study design	Within-subjects design
Study aims	To examine whether caregiver cell phone use impacted caregiver vigilance of their child and child engagement with pseudo hazards.
Country	USA
Cultural context	Not specified
Study context	Laboratory: YMCA or midwestern university (area set as pseudo hazards room)
Number of dyads	51
Parents' age	Not specified
Parents' gender	90.2% female ; 9.8% male
Parents' ethnicity	White 82.4%, African American 7.8%, other 9.9%
Parents' socioeconomic status	The majority of caregivers reported being married or living with their partner (76.5%), had some college and/or completed college and/or graduate school (56.9%),and were employed full time (49.1%). More than half of the participants reported a gross annual income of $50,000 or higher (58.8%), with only 10% of the sample earning less than $20,000 per year.
Parents' mental health	Not specified
Children's age	Two and a half years old (M=2.52,SD=0.97)
Children's gender	49% male and 51% female
Other info on children	White 70.6%, biracial 23.5%, African-American 5.9%
Experiment or situation	Three conditions were counter balanced across participants. One condition was a pen-and-paper distraction: caregivers were asked to complete a demographic form as well as additional parenting measures. In the cell phone condition, caregivers were told that the researchers were interested in a new method of data collection by incorporating technology into research and were asked to engage in a texting conversation with a research assistant. Participants were given the option to use a prepaid smart phone or their own personal cellphone to communicate with the interviewer, who was an undergraduate research assistant (URA) located in a separate room. URA who texted scripted questions to the participants. The interviewer texted questions about the participant's relationship with their child, and the participant was instructed to respond via text message. The third condition was a no distraction condition, in which participants were asked to sit in the pseudo hazards room so the researcher could finish preparing materials. Each condition lasted 7 min, for a total of 21 min. Children and caregivers were alone in the pseudo hazards room except for when the researcher briefly entered to provide directions for the next condition. The duration of the session was video and audio recorded.
Intervention	Phone use
Comparison	No distraction
Outcome 1	Child engagement (INTERACTION)
Outcome 2	Caregiver vigilance (PARENTS' ATTENTION)

Result outcome 1	Caregiver education shared a moderate, negative correlation with total hazards engaged (r = −0.35, p=.01), such that greater education was associated with lower hazard engagement. Being a White child positively correlated with caregiver vigilance (r = 0.29, p=.04) such that caregivers of White children had higher vigilance scores than caregivers of children of color. Children's age negatively correlated with total hazards engaged (r = −0.32, p=.02), such that older children engaged with fewer hazards than younger children. There was a negative but non-significant correlation between caregiver vigilance and total hazards engaged (r = −0.10, p=.47). The total number of hazards engaged by children varied by condition, F(2, 100) = 3.22, p=.04, ηp2=0.06. Hazards were engaged most often in the pen-and-paper condition (M=4.29, SD=4.61), followed by the electronic condition (M=3.74, SD=4.00), and least in the no distraction condition (M=2.67, SD=3.87). More hazards were engaged in the pen-and-paper than the no distraction condition (M difference=1.63, p=.02, CI [0.25, 3.01]). Hazards were also engaged more frequently in the electronic condition than the no distraction condition, though this difference was only marginally significant (M difference=1.08, p=.09, CI [−0.17, 2.33]). The difference between hazards engaged in the electronic condition and pen-and-paper conditions was not statistically significant (M difference=0.55, p=.40, CI [−0.75, 1.85]).
Result outcome 2	Vigilance scores differed by condition, F(2, 100) = 117.06, p<.000, ηp2=0.70. Vigilance was highest in the no distraction condition (M=4.77, SD=0.47), followed by the electronic condition (M=3.41, SD=1.00), and was lowest in the pen-and-paper condition (M=2.71, SD=0.92). Post hoc tests found that vigilance was significantly higher in the no distraction condition than the pen-and-paper and electronic conditions (M difference=2.06, p<.000, CI [1.81, 2.31]; M difference=1.35, p<.000, CI [1.08, 1.62]). Vigilance was also higher in the electronic condition than the pen-and-paper condition (M difference=0.71, p<.000, CI [0.40, 1.01]).
Model/understanding of causality	The results of this study support our hypothesis that caregiver vigilance is highest, and child engagement with hazards lowest, in the absence of distractions. When caregivers were distracted by texting on cellphones, caregiver supervision was lower and children engaged with more hazards. These data suggest that any task that removes caregivers' attention from children may put their children at a greater risk for injury.
Other important information	Because this was a within-subjectss design, subjects served as their own controls; therefore, none of these measures were included or controlled for in our analyses

Internal validity

Questions (Checklist for assessment of studies with single-case experimental design)	*Our critical appraisal*	*Comments*
1) Were the participant(s) or unit(s) recruited and selected in a satisfactory manner? If participants were divided into groups, was this done in a satisfactory way?	Yes	Participants were 51 caregiver–child dyads who were recruited through flyers shared in the community and electronically on Facebook. To recruit participants, we posted flyers at local stores, businesses, day cares, preschools, and on the research assistants' Facebook accounts and local online parenting groups. Staff from a local YWCA childcare center also posted flyers at their center and provided flyers directly to their clients.
2) Were the participant(s) or unit(s), personnel and outcome measure satisfactorily masked (blinded)?	Unclear	No, not possible to blind assessor, participants were blinded to the aim to the research
3) Are the characteristics of the participants adequately described?	Yes	
4) Is the implementation of the intervention sufficiently described?	Yes	
5) What outcomes were measured and how were they measured?	–	An "engagement" was coded any time children made a vocalization about a hazard, reached for a hazard, or touched a hazard during the experiment. Caregivers were coded on overall vigilance for each condition, indicating how well they attended to their child, ranging from 1 (lack of attention) to 5 (very diligently attending).
6) Are analyzes accounted for?	Yes	
7) Is ethical assessment accounted for?	Unclear	In both locations, caregivers were first brought to a private office to review the informed consent. Caregivers were informed that the primary interest of the study

8) Are the effects of the interventions adequately reported?	Unclear	There was some skew present in our outcome variables, we proceeded with the planned analysis of variance (ANOVA) analyses because ANOVA is robust to departures from normality, and the variances of all of our outcome variables were similar (i.e., not more than five times the size of each other;
9) Is the accuracy of the effect estimates stated?	Unclear	Unclear as per data was skew to start with
Total appraisal	High risk of bias	

Inoue (2021) B (33)

Data extraction	
Author, date, title	Inoue (2021B) Smartphone use during breastfeeding and its impact on mother–infant interaction and maternal responsiveness: Within-subjects design
Study design	Within-subjects design
Study aims	This study investigated the association between maternal smartphone use during breastfeeding and the quality of mother–infant interactions and maternal visual responsiveness to the infant's bids for attention.
Country	Japan
Cultural context	Not specified
Study context	Laboratory
Number of dyads	13
Parents' age	Mean age ± SD was 35.9 ± 3.8 years (range: 31–41)
Parents' gender	Female
Parents' ethnicity	Not specified
Parents' socioeconomic status	Not specified
Parents' mental health	The mothers had no depressive symptoms (inclusion criteria)
Children's age	Mean age was 13.1 ± 3.5 weeks (range: 10–20)
Children's gender	7 (53.8%) were boys and 6 (46.2%) were girls
Other info on children	Full-term, healthy, ten (76.9%) infants were entirely breastfed and three (23.1%) were both breastfed and bottle-fed; however, all were breastfed during the day.
Experiment or situation	Each mother brought her child to the laboratory to breastfeed under observation on two separate days. To control for the variation in children's growth, the interval between the two observations was within 2 weeks. On average, the interval was 7 days. The participants completed a survey including information on the mother's age and number of children, the child's sex and age (in weeks), feeding method, and breastfeeding behaviors during the day in terms of smartphone use and mothers' observation of the infant. Further, they also completed the MIBS-J. For our observations, the mothers were required to breastfeed twice, once following the experimental condition and once following the control condition.
Intervention	During the experimental condition, participants were instructed to use their own smartphone while breastfeeding the infant as they would at home.
Comparison	For the control condition, participants were instructed to breastfeed the infant as if they were at home; however, smartphone use was restricted.
Outcome 1	(INTERACTION)To evaluate mother–infant interactions' quality, the study used the AMIS scale's revised Japanese version. The videos were evaluated by two trained individuals who were not participants of the experiment and were not informed about the study's hypotheses. The AMIS scale was developed by Price (1983) to assess the quality of early mother–infant interactions in a feeding context.
Outcome 2	(PARENT'S ATTENTION) Distracted feeding rate. Distracted breastfeeding refers to the loss of mothers' full attention while breastfeeding. We measured this occurrence based on the amount of time the mothers' gaze redirected away from their children.
Result outcome 1	Overall AMIS score: Non-significant result. (from table 1) Smartphone use condition: Mean (SD) 111.5 (6.7) Median (IQR) 115.0 (105.0–117.0) Control condition Mean (SD) 109.9 (6.1) Median (IQR) 111.0 (104.5–115.0) P-value 0.388 Spearman's rank correlation coefficient 0.572
Result outcome 2	Distracted breast feeding rate: Significant result. (from table 1) Smartphone use condition: Mean (SD) 19.5 (22.2)) Median (IQR) 9.9 (4.3–29.5) Control condition Mean (SD)0.5 (0.9) Median (IQR) 0.10 (0–0.9) P-value 0.001 Spearman's rank correlation coefficient 0.217

Model/understanding of causality	"In this study, although smartphone use clearly increased the distracted feeding time, no significant associations were found between maternal smartphone use and the quality of mother–infant interactions or bonding during breastfeeding. However, smartphone use during breastfeeding interfered with the mother's ability to respond visually to the infant's bids for her attention. Despite the fact that some infants attempted to interact with their mothers while they used their smartphones, the mothers' responses were hampered because of prolonged smartphone use or sending messages. As time passes after childbirth, mothers tend to spend more time on their smartphones; further, their smartphone use during breastfeeding might continually affect maternal responsiveness."
Other important information	Covariates: - Mother-to-Infant Bonding Scale (MIBS-J) - mother's sensitivity and appropriate response

Internal validity

Questions (Checklist for assessment of studies with single-case experimental design)	*Our critical appraisal*	*Comments*
1) Were the participant(s) or unit(s) recruited and selected in a satisfactory manner? If participants were divided into groups, was this done in a satisfactory way?	Yes	The study sought participants through open recruitment and network sampling. Recruitment forms were distributed in a mother–infant class. The eligibility criteria were: (1) full-term pregnancy; (2) post birth, both mother and child were healthy and did not require additional hospitalization for medical treatment; (3) the mother had no depressive symptoms; (4) the infant was between 2–6 months old (i.e., 8–30 weeks); (5) the mother breastfed the infant directly during the day; and (6) the mother habitually used her smartphone during breastfeeding. The eligible age for participating infants was the attachment stage of development at which they spontaneously exhibited social response behaviors, such as following the mother's gaze, reaching out, grabbing, smiling, and babbling.
2) Were the participant(s) or unit(s), personnel and outcome measure satisfactorily masked (blinded)?	Yes	To control for behavioral bias, candidates were not informed of the study's analytical perspective. They were informed that the study aimed to examine the characteristics of mother–infant interactions during breastfeeding using different perspectives. The video recording from the gaze tracking camera displayed gaze movements and the length of time the gaze was held. The videos were evaluated by two trained individuals who were not participants of the experiment and were not informed about the study's hypotheses. All videos were independently evaluated by both evaluators.
3) Are the characteristics of the participants adequately described?	Yes	The publication reports parents' age and gender, and children's age, gender, whether they were fully breastfed and the mother-child bonding.
4) Is the implementation of the intervention sufficiently described?	Yes	It is stated with all the details under the title 'Research process'.
5) What outcomes were measured and how were they measured?	–	Two relevant outcomes: mother-infant-interaction's quality and distracted breastfeeding. To evaluate mother–infant interactions' quality, the AMIS scale's revised Japanese version was used. Distracted breastfeeding refers to the loss of mothers' full attention while breastfeeding. They measured this occurrence based on the amount of time the mothers' gaze redirected away from their children. In this study, they focused on the mother's perception of the infant's signals and needs as well as the infant's bids for the mother's attention when she turned her gaze away (e.g., vocalizations and eye contact). Further, the mother's reactions of turning her gaze back to the child were classified as either "non-simultaneously responsive" or "simultaneously responsive."
6) Are analyzes accounted for?	Yes	Analyses are well described. No graphs are presented.
7) Is ethical assessment accounted for?	Yes	The study was granted ethical approval from the University of Shimane, Nursing Research Ethics Review Board, application number: 266. Participants were provided thorough verbal and written explanations about the research contents and protection of personal information, before obtaining their informed consent. The mothers' consent was obtained to collect their child's data

8) Are the effects of the interventions adequately reported?	Yes	Reporting seems sufficient and adequate enough.
9) Is the accuracy of the effect estimates stated?	Yes	The accuracy of the effect estimates were stated.
Total appraisal	Low risk of bias	

Khourochvili (2017) (34)

Data extraction	
Author, date, title	Khourochvili (2017) Technology and Caregiver-Child Interaction: The effects of parental mobile device use on infants
Study design	Within-subjects design
Study aims	To examine whether digital media use adversely affects caregiver-child interaction.
Country	Canada
Cultural context	Not specified
Study context	Participant's homes, their friend's homes or laboratory
Number of dyads	19
Parents' age	18 to 39 years old (M = 31.4 years)
Parents' gender	All females
Parents' ethnicity	Seven were of European descent, three were East Asians/Pacific Islanders, two were South Asians, one was Southeast Asian, one was South American, and five were of mixed ethnicity;
Parents' socioeconomic status	Two had completed some college/university, twelve held a college or university degree, and five held a graduate degree
Parents' mental health	Twelve of these nineteen caregivers were assessed for their attentional capacity
Children's age	4 to 11 months of age (M = 8.1 months)
Children's gender	13 females and 6 males
Other info on children	Not specified
Experiment or situation	A modified version of the FFSF paradigm (Face to Face Still Face) was administered in a quasi-experimental setting, consisting of three phases: a "typical face-to-face" interaction (dyadic engagement) with the caregiver (2 minutes); a "caregiver divided attention" interaction with the caregiver engaged in answering text messages sent by the researcher while in the presence of her infant (5 minutes); a dyadic interaction without interference from a mobile device (caregiver re-engagement) (2 minutes). Infants' and caregivers' behaviours were coded at 2-second intervals based on a modified classification of the behaviour categories.
Intervention	Caregiver divided attention" interaction with the caregiver engaged in answering text messages sent by the researcher
Comparison	No interference from a mobile device
Outcome 1	All the outcomes were combinations of 16 single outcomes measured (table 1, page 25). (INTERACTION) Caregiver's disengagement behaviours (coded by "negative affect and gaze away" and "neutral affect and gaze away")
Outcome 2	(INTERACTION) Caregiver's engagement behaviours (coded by "neutral affect and gaze toward infant" and "positive affect and gaze toward infant")
Outcome 3	(INTERACTION) Infant's disengagement behaviours (coded by "distressed affect and gaze away" and "neutral affect and gaze away")
Outcome 4	(INTERACTION) Infant's engagement behaviours (coded by "neutral affect and gaze toward the mother's face or any other body parts of the mother" and "positive affect and gaze toward the mother's face or any other body parts of the mother")
Result outcome 1	CAREGIVER DISENGAGEMENT There was a statistically significant increase in the percentage of disengagement behaviours from phase 1 (M = 2.27, SD = 5.49) to the phase 2 (M = 32.61, SD = 11.59), $p < .001$. No significant difference was found in the phase percentage of disengagement behaviours between phase 1 and phase 3 ($p = .99$). ANOVA: $F(1.47, 26.43) = 120.31$, $p < .001$, ges = .79 --- significant effect of phase
Result outcome 2	CAREGIVER ENGAGEMENT (no means presented…?) ANOVA: $F(1.47, 26.52) = 118.62$, $p < .001$, ges = .79 --- significant effect of phase
Result outcome 3	INFANT DISENGAGEMENT There was a statistically significant increase in the percentage of disengagement behaviours from phase 1 (M = 20.56, SD = 15.05) to phase 2 (M = 40.27, SD = 7.51), $p < .001$. No significant difference in the percentage of disengaging behaviours was noted between phase 1 and phase 3 ($p = .19$). ANOVA: $F(1.70, 30.61) = 26.56$, $p < .001$, ges = .32 --- significant effect on phase
Result outcome 4	INFANT ENGAGEMENT There was a statistically significant decrease in the percentage of engagement behaviours from phase 1 (M = 29.44, SD = 15.04) to phase 2 (M = 9.58, SD = 7.52),

	p < .001. A statistically significant increase was found in the percentage of engagement behaviours from phase 2 (M = 9.58, SD = 7.52) to phase 3 (M = 26.40, SD = 14.73), p < .001. No significant difference in the percentage of engagement behaviours was found between phase 1 and phase 2 (p = .19). ANOVA: [F(1.70, 30.59) = 27.06, p < .001, ges = .33 --- significant effect of phase
Model/understanding of causality	In the study, it is hypothesized that caregiver's sensitivity would be impaired as they disengaged from their infants during the cell phone engagement protocol and the findings confirmed the hypothesis.
Other important information	(covariates) Media and Technology Usage and Attitudes Scale, Adult ADHD Self-Report Scale and (for 12 out pf 19) a test for attentional capacity (PASAT)

Internal validity

Questions (Checklist for assessment of studies with single-case experimental design)	*Our critical appraisal*	*Comments*
1) Were the participant(s) or unit(s) recruited and selected in a satisfactory manner? If participants were divided into groups, was this done in a satisfactory way?	Unclear	Participants were recruited from Toronto, Ontario and the Greater Toronto Area through social media postings (on Facebook, Kijiji, and the BUNZ phone app), community postings (flyers put up at local cafés and Ontario Early Years Centres), and snowball sampling but there are no details about inclusion and exclusion criteria
2) Were the participant(s) or unit(s), personnel and outcome measure satisfactorily masked (blinded)?	Unclear	Participants were blinded; however, the outcome measure was not. Following the protocol, the caregivers completed the questionnaire and scales. After then, the researchers debriefed the caregivers and explained the objectives of the research study.
3) Are the characteristics of the participants adequately described?	Yes	Parents' age, gender, ethnicity and education is reported, slong with and children's age and gender.
4) Is the implementation of the intervention sufficiently described?	Yes	The intervention is described under the title 'Procedure'.
5) What outcomes were measured and how were they measured?	-	Two reliable coders double-coded every fourth video for inter-rater reliability. Caregiver and infant behaviours were coded at 2-second intervals throughout each of the three phases of the cell phone engagement protocol, based on a modified classification of the behaviour categories identified by Mesman, van Ijzendoorn and Bakermans-Kranenburg (2009) in their meta-analysis (...). Both caregiver and infant behaviours were coded, by trained and reliable coders, for each of the nineteen dyadic interaction videos (IRR = 0.827).
6) Are analyzes accounted for?	Yes	The study had originally 16 outcomes (8 infant, 8 mother) (page 25). These outcomes were grouped into four umbrella categories (for infant and mother separate) of gaze and affect, representing a range from most negative engagement between infant and caregiver to the most positive engagement. At every one-second interval of the cell phone engagement protocol, a numerical value between 1 to 4 (representing the labeled categories above) was assigned to both infant and caregiver coded behaviours, resulting in paired coordinates of dyadic behaviour. Then Caregiver and infant behaviours were plotted using modified dynamic systems state space grids using a Gridware sofware. Grids are two dimensional and each axis represents a member of the dyad, and respective behavioural states for each. This is presented in a scatter plot (page 31, figure 1). The study also performs a repeated measures ANOVA, combining the categories (presented above) into four 'variables': infant engagement, infant disengangment, caregiver engagement and caregiver disengagement. The ANOVA results are presented in the text (page 30), as is the means and SDs (later pages). The means between the different pages are also presented in graphs (e.g. page 32, figure 2). The results for 'self-soothing' and ‘mothers contact without gaze (verbal or physical)’ were not included in the combined outcomes and not presented separately in the article.

7) Is ethical assessment accounted for?	Yes	This study was reviewed and approved by the Human Participants Review SubCommittee, York University's Ethics Review Board and conformed to the standards of the Canadian Tri-Council Research Ethics guidelines. The researchers provided a brief verbal overview of the procedure and then obtained written consent from the caregivers.
8) Are the effects of the interventions adequately reported?	Yes	(see question on measurement above). P-values are reported for both the ANOVA and the descriptive statistics. Although the mean values for caregiver's engagement behaviours were not given the test statistics were presented.
9) Is the accuracy of the effect estimates stated?	Yes	The accuracy of the effect estimates were stated.
Total appraisal	Moderate risk of bias	

Kildare (2017) (35)

Data extraction	
Author, date, title	Kildare (2017) Infants' Perceptions of Mothers' Phone Use: Is Mothers' Phone Use Generating the Still Face Effect?
Study design	Within-subjects design
Study aims	Explores 3-6-month-old infants' behavioral and physiological responses to mothers' screen distractions during mother-infant interactions
Country	USA
Cultural context	Not specified
Study context	University or center laboratory settings
Number of dyads	34
Parents' age	29 year (average) (21 to 39), SD 4.4
Parents' gender	All females
Parents' ethnicity	77% were White; 21%, Hispanic; and 3%, African American.
Parents' socioeconomic status	All mothers had earned at least a high school diploma with 39% having earned a bachelor's degree and 25% a graduate degree. In regard to employment, 39% of mother's identified as being stay at home mothers and 49% worked outside the home.
Parents' mental health	Not specified
Children's age	3-6 months (4.4 months average) SD 1.13
Children's gender	18 (25.9%) male; 16 (47.1%) female
Other info on children	Healthy children
Experiment or situation	Modified still face procedure (the neutral face was replaced with mother's texting on their phones). Each 2-minute phase occurred sequentially, with phase changes prompted by the researcher who was not visible to the infant.
Intervention	Mother's texting
Comparison	Not texting
Outcome 1	(STRESS) Cortisol stress responses
Outcome 2	(STRESS) Infant Positive and Negative Affect
Outcome 3	(STRESS, INTERACTION) Infant regulation (COPE: Comforting, Object Orientation, Parent/Mother Orientation and Escape)
Result outcome 1	(no sign) There was no statistically significant effect for cortisol responses (Wilk's Lambda = .955, F (2, 32) = .75, p = .47, $\eta p2$=.045) indicating no statistically significant change in cortisol levels between each phase.
Result outcome 2	(sign) There was a statistically significant main effects for positive affect and phase (Wilks' Lambda=.250, F (2, 32) = 47.99, p≤.0005, $\eta p2$= .750), as well as negative affect and phase (Wilks' Lambda = .324, F (2, 32) = 33.4, p≤.0005, $\eta p2$= .676).
Result outcome 3	(sign) Infants demonstrated expected changes between the FF to the PSF phase with increased <u>self-comforting behaviors</u> (Wilks' Lambda = .581, F (2, 32) = 11.35, p ≤.0005, $\eta p2$ = .419), increased <u>object orientation</u> (Wilks' Lambda = .231, F (2, 32) = 53.38, p ≤.0005, $\eta p2$ = .769) and <u>escape behaviors</u> (Wilks' Lambda = .747, F (2, 32) = 5.42, p = .009, $\eta p2$=.253). Additionally, infants demonstrated the expected decrease in <u>maternal gaze</u> during the PSF phase (Wilks' Lambda = .127, F (2, 32) = 110.17, p ≤.0005, ηp2 = .873).
Model/understanding of causality	-
Other important information	-
Internal validity	

Questions (Checklist for assessment of studies with single-case experimental design)	*Our critical appraisal*	*Comments*
1) Were the participant(s) or unit(s) recruited and selected in a satisfactory manner? If participants were divided into groups, was this done in a satisfactory way?	Yes	Mothers were recruited from physical and virtual locations frequented by mothers of infants, using flyers/advertisements with a link and QR code to the study's website and contact information. Inclusion and exclusion criteria was also stated
2) Were the participant(s) or unit(s), personnel and outcome measure satisfactorily masked (blinded)?	Unclear	The only statement they had was to evaluate the interrater reliability (IRR), video coding was performed by two independent coders. Disagreements were discussed and resolved until a 90% agreement was reached for each coded behavior.
3) Are the characteristics of the participants adequately described?	Yes	Tables with info on mother and child
4) Is the implementation of the intervention sufficiently described?	Yes	
5) What outcomes were measured and how were they measured?	–	Three saliva samples were collected from each infant to capture their responses to the procedure. Saliva was collected using a swab specifically designed for infants. No saliva stimulants were used, and mothers were instructed not to feed their infant 30 minutes prior to the procedure in order to avoid sample contamination. Following collection, the saturated swab was immediately placed in a cryogenic vial and stored at -80ºC until the time of shipping to Salimetrics in Carlsbad, CA, for assay. Infant vocalizations and infant facial expressions were coded at 1-second intervals. Vocalizations were scored using the following scale: -3 screaming (loud sharp cry/screech), -2 crying (negative murmuring, louder fussing), -1 mild fussing (soft negative murmuring, whimper), 0 neutral (no vocalizations), 1 cooing (soft positive murmuring), 2 quiet chuckle (more intense cooing, louder positive murmuring), 3 delight (loud positive scream/squeal). Facial expressions were scored as: -3 large grimace (mouth open, furrowed brow, eyes may be closed), -2 frown (mouth slightly open, slight furrowed brow), -1 small frown (closed, downward turned mouth, pout) 0 neutral (no facial expressions), 1 half smile (upward turned mouth closed or slightly open/parted lips), 2 large smile (upward turned and open mouth), 3 wide smile (mouth open wide). Infant regulatory behaviors were coded as being present or absent at 1-second intervals using the COPE (Comforting, Object Orientation, Parent/Mother Orientation and Escape) scale (Braungart-Rieker et al., 1998; Braungart-Rieker et al., 2001).
6) Are analyzes accounted for?	Yes	
7) Is ethical assessment accounted for?	Unclear	Study procedures were reviewed and consent forms were signed. No mention of ethic's board or approval
8) Are the effects of the interventions adequately reported?	Yes	
9) Is the accuracy of the effect estimates stated?	Yes	
Total appraisal	Low risk of bias	

Konrad (2021) A (36)

Data extraction	
Author, date, title	Konrad (2021) Does texting interrupt imitation learning in 19-month-old infants?
Study design	Randomized controlled trial (RCT), five arms
Study aims	The present study seek to investigate the impact of texting during a teaching phase on infant behavior and subsequent infant learning
Country	Germany
Cultural context	Families were recruited using birth registers from the city of Bochum
Study context	Laboratory
Number of dyads	90

Parents' age	Mean age of 35 years (SD = 4 years)
Parents' gender	81 females, 9 males
Parents' ethnicity	Almost all parents reported to have German nationality (94.4 %, n = 84 reporting) and being born in Germany (91.7 %, n = 84 reporting).
Parents' socioeconomic status	12 % secondary school diploma, 27 % A-levels, 61 % university degree
Parents' mental health	Not specified
Children's age	18− 20-months-old (Mean = 582 days, SD = 16 days)
Children's gender	45 females, 45 males
Other info on children	Full-term, “healthy”
Experiment or situation	The study had two phases (demonstration phase and testing phase), and three experimental conditions and two control conditions. During the demonstration phase, parents in the experimental conditions demonstrated the target actions to make the rattle four times to their infants.In the no-interruptions condition, the parents were not interrupted by the phone during the demonstration phase. In the interruption-first-condition, parents were interrupted for 30-sec before the four demonstrations. In the one-interruption-condition, parents were interrupted for 30-sec in the middle of the learning phase after two demonstrations. In the three-interruption-condition, parents were interrupted after each demonstration for 10-sec. Parents received a text and responded to questions on the phone during the interruption period. (Furthermore, in order to have the same procedure for all infants, we chose to only interrupt after one full demonstration and not during an ongoing demonstration.) Immediately after the demonstration, during the test phase, infants had 60-sec to reproduce any target actions. Infants in the baseline-control condition only participated in the test session to examine spontaneous production of any target actions.
Intervention	Interruption of the learning period with text messages to mother
Comparison	No or less interruption by text messages
Outcome 1	(COGNITIVE DEVELOPMENT) Child's imitation learning
Outcome 2	(INTERACTION) Parent's still face during texting
Outcome 3	(STRESS) Child's display of negative effect during texting
Result outcome 1	There was no significant difference between infants from the no-interruption condition and interruption conditions (all ps > .05). Furthermore, there was no difference in imitation scores between interruption conditions (all ps > .05).
Result outcome 2	Parents in the interruption conditions displayed a still face for about 77 % (SD = 23 %) of the time while using the smartphone in front of their child. There was no significant difference in the amount of still face during smartphone use between interruption conditions, $F(2, 51) = 0.90$, $p = .41$, $\eta 2 = .03$
Result outcome 3	The percentage of negative affect during the interruption was significantly greater than during the demonstration phase, $F(1, 51) = 14.96$, $p < .001$, $\eta 2 = .23$.
Confounders	Not specified
Model/understanding of causality	Contrary to the study by Reed et al. (2017) and to our expectation, smartphone use did not disrupt learning of the target actions. This could be due to several reasons. First, teaching itself was not interrupted - the interruption occurred after one or several full presentations of the target actions. It could be that smartphone use is only disruptive when the teaching itself is interrupted and the parent cannot finish demonstrating all the target actions. Furthermore, it is possible that a disruptive effect is only visible after a delay and not in immediate learning. The task might be too easy. However, it is also possible that infants react to the interruption but that there is no effect on imitation learning. Third, this was a non-verbal task and there was no verbal interaction during the texting. In the Reed and colleagues study, they examined a verbal learning task that was interrupted by conversation during the call with the experimenter. It is possible that 18-month-olds learned the target actions after only a few demonstration and that the interruption did not have an effect with four demonstrations (Barr & Hayne, 1999). That is, although a null effect was observed here, this may have been due to a ceiling effect on a simple learning task. For the infants in the no interruption condition negative affect increased across the course of the four demonstrations, likely due to not being able to touch the toys. That is, technoference may not always interfere with learning but rather infants may tolerate brief intermittent interruptions to parental attention in the context of an otherwise contingent and engaging interaction.
Other important information	Other outcomes/covariates: Parental report on smartphone use

Internal validity		
Domains (RoB-2)	*Our critical*	*Comments*

	appraisal	
Domain 1: Risk of bias arising from the randomization process	High concerns	No random allocation sequence. No information on allocation sequence concealed. No baseline report
Domain 2: Risk of bias due to deviations from the intended interventions (effect of adhering to intervention)	Some concerns	Participants were not aware of the aims but the deliverers were aware of the participant's group. No information on non-protocol interventions. Probably no failures in implementing the intervention. Probably no non-adherence to the assigned intervention.
Domain 3: Missing outcome data	Some concerns	No information on missing data. Probably no evidence that the result was not biased by missing outcome data. Missingness in the outcome depended on its true value is possible but not likely. 15 out of 105 were excluded before the analysis, reasons given.
Domain 4: Risk of bias in measurement of the outcome	Low concerns for imitation learning, some concerns for others	The method of measuring the outcome was not inappropriate for imitation learning and probably not for others. Measurement or ascertainment of the outcomes could not have differed between intervention groups. The outcome assessors were aware of the intervention. The assessment of imitation learning could not have been influenced by knowledge of intervention received, but it could probably – though not likely – for other outcomes.
Domain 5: Risk of bias in selection of the reported result	Some concerns	No information of whether the data that produced this result analysed in accordance with a pre-specified analysis plan that was finalized before unblinded outcome data were available for analysis. The numerical results being assessed were probably not likely to have been selected, on the basis of the results, from multiple eligible outcome measurements or multiple eligible analyses of the data.
Total appraisal	High risk of bias	

Konrad (2021) B (37)

Data extraction	
Author, date, title	Konrad (2021) Quality of Mother-Child Interaction Before, During, and After Smartphone Use
Study design	Randomized controlled trial (RCT), this study used a 3X3 mixed-design, with condition as a between-participants factor and phase as a within-participants factor
Study aims	We explored changes to mother-child interactions that occur before, during and after interruptions due to texting using an adapted naturalistic still face paradigm.
Country	Germany
Cultural context	Not specified
Study context	Laboratory
Number of dyads	54
Parents' age	33.8 years (SD 3.6, range 24-42)
Parents' gender	All females
Parents' ethnicity	German nationals (88.7%were of German nationality, 3.8% had a nationality different from German, and 7.5% had a German and another nationality ,53 mothers reporting)
Parents' socioeconomic status	Well-educated (62% had a university degree as the highest educational qualification), Mothers also reported family's yearly income before taxes (44 reporting). 2.3% had<10.000euro, 18.2% had 20.000e to 39.000e, 25% had 40.000–59.000e, 27.2% had 60.000–80.000e, 15.9% had more than 80.000e, 11.4% preferred not to answer the question
Parents' mental health	Not specified
Children's age	22 months old (Mean 20.8 SD 0.5 months)
Children's gender	27 female; 26 male
Other info on children	Full term health
Experiment or situation	Mothers were instructed to play with a standard set of toys. Analogous to the standard phases of a still face procedure, there were three phases of the study for the smart-phone and paper and-pencil interruption conditions. There was an initial 3 min free play period, followed by a 2 min interruption phase and a second 3 min free play period. The no-interruption group had an 8 min uninterrupted free play period.
Intervention	We examined the effect of an interruption due to either maternal smartphone use or use of an analog medium
Comparison	Interactional quality was compared between free-play and interruption phases and to a no-interruption control group.
Outcome 1	(INTERACTION) Maternal behaviour/responsiveness (interaction quality)

Outcome 2	(INTERACTION) Positive social bids to the mother
Outcome 3	(INTERACTION) Negative social bids to the mother
Outcome 4	(STRESS) Prohibited behavior (the child does something that the mother or the experimenter has forbidden beforehand, or something that the child knows is forbidden)
Outcome 5	(STRESS) Negative affect
Outcome 6	(COGNITIVE DEVELOPMENT) Toy engagement
Result outcome 1	Maternal responsiveness/significant main effects for phase, F(2, 102)=111.4, p<0.001, ηp2=0.67, and condition, F(2, 51)=7.3, p=0.002, ηp2=0.22. The main effects were qualified by a significant interaction between condition and phase on maternal responsiveness, F(4, 102)=26.1.4, p<0.001, ηp2=0.51. Mothers were more responsive to their child in the no-interruption condition compared to the smart phone (M diff=1.67, p<0.001) and paper-pencil conditions (M diff=2.01, p<0.001 (but responsiveness did not differ between the paper-pencil and smart phone conditions, M diff=0.34, p=0.42
Result outcome 2	NS difference between conditions in positive social bids before and after interruption. Conditions differed during the interruption and Bonferroni post hoc indicated that children in smart phone and paper pencil conditions displayed more positive social bids towards their mother compared to the no interruption condition (M diff=−0.92, p=0.026 in paper-pencil, M diff= −1.25, p=0.002 in smartphone). Those in the smartphone and paper and pencil conditions attempted to re-engage the caregiver using positive bids during the interruption phase.
Result outcome 3	Bonferroni post-hoc t-tests indicated that children displayed marginally more negative social bids toward their mother during the interruption phase compared to first free play phase (Mdiff= −0.15, p=0.06) and significantly more negative social bids during the interruption compared to the 2nd free play phase (Mdiff=0.17, p=0.028) A mixed-ANOVA on negative social bids with phase (play, interruption, play) as a within-subjects factor and condition (smartphone, paper-pencil, no-interruption) as a between-subject factor revealed a significant main effects of phase, F(1.30, 66.45) = 4.2, p = 0.011, ηp2 = 0.11, no significant main effect of condition, F(2, 51) = 2.5, p = 0.089, ηp2 = 0.09, and no significant interaction effect, F(2.61, 66.45) = 2.0, p = 0.16, ηp2 =0.07.
Result outcome 4	Overall rates of prohibited behavior (the child does something that the mother or the experimenter has forbidden beforehand, or something that the child knows is forbidden) were low. There were no significant main effects of condition, F(2, 51) = 0.9, p = 0.430, ηp2 = 0.3, and no interaction effect, F(4, 102) = 2.3, p = 0.065, ηp2 = 0.08.
Result outcome 5	Negative effect rated very low. Bonferroni post-hoc t-tests indicated that children displayed marginally more negative affect during the interruption phase compared to the first free play phase (Mdiff=0.02, p=0.059), but there was no significant difference between negative affect during the interruption compared to the 2nd free play phase (Mdiff=0.02, p=0.096). There were no significant main effects of condition, F(2, 51)=0.9,p=0.424,ηp2=0.03, and no interaction effect, F(2.46, 62.60)=0.8, p=0.49, ηp2=0.03. The overall low levels of negative affect make this pattern of results difficult to interpret.
Result outcome 6	There was a significant main effect of condition meaning infants in the condition that the mothers were interrupted by phone were engaged with toys more compared to the no-interruption condition. F(2, 51)=15.2, p<0.001, ηp2=0.37.
Model/understanding of causality	-
Other important information	Toy engagement and relations between maternal and child behaviors were also analyzed. The families were recruited via the local birth register of the city of Bochum. Mother and child participated in a demonstration phase where the mother demonstrated novel actions to her child. These results are not reported here

Internal validity

Domains (RoB-2)	*Our critical appraisal*	*Comments*
Domain 1: Risk of bias arising from the randomization process	Some concerns	No information on the random allocation sequence or on allocation sequence concealed. No baseline report.
Domain 2: Risk of bias due to deviations from the intended interventions (effect of adhering to intervention)	Moderate concerns	The mothers were aware of the intervention group but unaware of the reasons for the interruption and hypotheses of the study. Coders of maternal behaviour: coded by a primary coder and a second independent rater who as a trained masters student blind to the hypotheses. Coders of child behaviour: coded by one author; a second rater who was another author coded 20.4% of the videos.
Domain 3: Missing outcome data	Some concerns	“Three additional families participated but had to be excluded from analysis due to technical difficulties (n=1) or the interruption being

		too long (n=2). Only variables were included in the factor analysis where at least 20% of mothers had some scores/values in any of the phases. Overall, maternal negative behavior was very low (often only visible in one or two mothers) and therefore five variables were excluded from the factor analysis (verbal threat, anger, flat affect, impatience, excessive control). We then used several well-recognized protocols to conduct a factor analysis with the remaining 11 items."
Domain 4: Risk of bias in measurement of the outcome	Some concerns	The method of measuring the outcome was not inappropriate for maternal interaction quality or child behaviour (coding from video, based on existing coding schemes). No information whether measurement or ascertainment of the outcomes have differed between intervention groups. Two persons coded the maternal behaviour, one person and another 20.4% coded the child behaviour. The coding could probably – though probably not likely – have influenced by knowledge of intervention received.
Domain 5: Risk of bias in selection of the reported result	Some concerns	No project plan or trial registry available. No information of whether the data that produced this result analysed in accordance with a prespecified analysis plan that was finalized before unblinded outcome data were available for analysis. The numerical results being assessed were probably not likely to have been selected, on the basis of the results, from multiple eligible outcome measurements or multiple eligible analyses of the data.
Total appraisal	Moderate risk of bias / some concerns	

Lederer (2021) (38)

Data extraction	
Author, date, title	Lederer (2021) The effects of maternal smartphone use on mother–child interaction
Study design	Within-subjects design
Study aims	Given the fundamental role of early mother–child interaction in the child's cognitive, emotional and language development, the current research was devised to investigate how it is affected by maternal smartphone use.
Country	Israel
Cultural context	A high SES neighborhoods of Kfar Sava, a city in the center of Israel.
Study context	Designed playroom (laboratory)
Number of dyads	33
Parents' age	25–45 years (M = 35, SD = 4.05)
Parents' gender	All females (mothers)
Parents' ethnicity	All fluent Hebrew speakers
Parents' socioeconomic status	They were all married. All but two of the mothers had postsecondary education (M = 16.08, SD = 1.66) and lived in high SES neighborhoods of Kfar Sava (according to the Israel Central Bureau of Statistics, 2019), a city in the center of Israel. Based on these data, the sample included mostly middle/high SES mothers.
Parents' mental health	No known attention deficit hyperactivity disorder (ADHD)
Children's age	24–36 months old (M = 28.8, SD = 3.6)
Children's gender	16 boys and 17 girls
Other info on children	Based on mother's reports the children had normal development, no history of otitis media, reached major speech milestones on time, and were exposed to Hebrew at least 50% of the time. 30 of the children went to a day childcare, and three were homeschooled. All children obtained age-matched scores on Tavor vocabulary test, except four children, of whom one was excluded and three were estimated age-appropriate by an experienced speech-language pathologist.
Experiment or situation	The experiment had three conditions, with each condition lasting approximately 15 min. During the smartphone condition, the mothers were asked to use their smartphone to view a designated Facebook page that was created for the experiment. During the print magazines condition, the mothers were offered a selection of 17 popular magazines covering different areas of interest (e.g., nature, traveling, fashion, and history). In both conditions the mothers were told that there was to be a short quiz on the content (Facebook or magazines) at the end of the experiment. During the third condition, the uninterrupted freeplay, the mothers were instructed to "Play with your child as you would at home". The conditions were delivered in a pseudo-random order.
Intervention	Using a smartphone while playing with the children

Comparison	Uninterrupted free-play
Outcome 1	(INTERACTION) Conversational turns
Outcome 2	(RESPONSIVENESS) Maternal Responsiveness and response type (expansion, affirmation)
Outcome 3	(RESPONSIVENESS) Maternal nonresponsiveness and miss type (nonresponsive, neutral)
Outcome 4	INTERACTION Maternal Input
Result outcome 1	Turn taking in the smartphone conditions (M = 7.83, SE = 0.68) was significantly less frequent than in the free-play condition (M = 14.36, SE = 0.85). ANOVA also showed sign differences.
Result outcome 2	The mothers were less responsive when using a smartphone (M = 2.77, SE = 0.24) than during uninterrupted free-play (M = 5.32, SE = 0.26). ANOVA (also) showed sign differences. Split up in results per Expansion and Affirmation, the results were significant for both, but largest for Expansion.
Result outcome 3	The number of misses per minute was significantly greater in the smartphone condition (M= 2.58, SE= 0.26) compared to the number of misses in the free-play condition (M = 1.23, SE = 0.15). ANOVA also showed sign differences.
Result outcome 4	The mothers produced fewer utterances per minute in the smartphone (M = 7.37, SE = 0.60) condition compared to the uninterrupted free-play condition (M = 14.99, SE = 0.46). ANOVA also showed sign differences.
Model/understanding of causality	This study demonstrated a causal role of maternal smartphone use in decreasing the quantity and the quality of mother–child interaction.
Other important information	Other outcomes/covariates: The effects of maternal absorption in media on mother-child interaction, the mere presence of a smartphone on mother-child interaction, mother's media use on a typical day (self-reported)

Internal validity

Questions (Checklist for assessment of studies with single-case experimental design)	*Our critical appraisal*	*Comments*
1) Were the participant(s) or unit(s) recruited and selected in a satisfactory manner? If participants were divided into groups, was this done in a satisfactory way?	Unclear	The initial sample included 40 dyads of toddlers and their mothers, who were recruited via advertisement on popular social media (Whatsapp and Facebook). Of the 40 dyads, 33 were included in the final sample. Three dyads were excluded because the mothers did not perform the experimental task in one or more condition, thus failing to follow the instructions. Data from one dyad were omitted because the child did not produce any utterance throughout the entire experiment. Three additional dyads were excluded because of technical issues with the recording. The inclusion criteria is not reported. Only it was stated that they were interested in mothers with no pre-existing conditions potentially exacerbating smartphone use effects. This statement was also not clear enough.
2) Were the participant(s) or unit(s), personnel and outcome measure satisfactorily masked (blinded)?	Unclear	For the participants, it was explained that the purpose of the study was to investigate the association between the mother's and her child's areas of interest. The true purpose of the study was revealed by email later, after data collection was completed. The outcome assessment was blinded as well to some extent; nine of the video recordings, which comprises 27% of the recordings included in the statistical analyses, were coded by two independent coders to assess inter-coder reliability, which was calculated using two-way mixed, consistency, average-measures intraclass correlations. Correlation coefficients ranged between r = .75 and r = .88. We also calculated point-bypoint percent agreement between coders, which ranged from 72% to 96% across the variables.
3) Are the characteristics of the participants adequately described?	Yes	Age, gender, married status and SES are reported for the mothers, and age, gender, development (according to mother) and kindergarden/home are reported for the children.
4) Is the implementation of the intervention sufficiently described?	Yes	It is described well under the title 'Procedure'.
5) What outcomes were measured and how were they measured?	-	For the relevant outcomes, coding was conducted offline with the ELAN Linguistic Annotator software, which allows creating annotations on the timeline of video files. After the experiment completed, the experimenter tested the children's expressive vocabulary knowledge using experienced speech language pathologist and the Tavor vocabulary test which is commonly used in Israel to estimate expressive vocabulary knowledge and is norm-referenced, while the mothers filled out the media use ques-

		tionnaire using a tablet. For the inter-coding reliability, correlation coefficients ranged between r = .75 and r = .88. We also calculated point-by-point percent agreement between coders, which ranged from 72% to 96% across the variables. It is satisfactory.
6) Are analyzes accounted for?	Yes	Repeated measures ANOVA was used in the analysis, and post hoc comparison with Sidhak correction, yealding means and SEs. In the analysis that only compare the phone and no-interruption conditions (not the magazine condition), mean and SE scores are reported. Some of the results are visualized in graphs.
7) Is ethical assessment accounted for?	Yes	The study was approved by the Ethics Committee of Tel Aviv University. The mothers received instructions and signed the consent form.
8) Are the effects of the interventions adequately reported?	Yes	It is adequate. The effects are mostly described well in the text, only some of the effects are visualized in graphs. Descriptive statistics are (briefly) presented in the text.
9) Is the accuracy of the effect estimates stated?	Yes	The accuracy of the effect estimates are stated.
Total appraisal	Moderate risk of bias	

Myruski (2018) (39)

Data extraction	
Author, date, title	Myruski (2018) Digital disruption?: Maternal mobile device use is related to infant social-emotional functioning
Study design	Within-subjects design
Study aims	The first aim of the current study is to establish whether a modified still face paradigm that incorporates maternal mobile device use could serve as an analog to the original still face paradigm, probing the impact of distracted or unresponsive parents on child socioemotional behavior.
Country	USA
Cultural context	Rural community (from the previous studies using the same sample)
Study context	Laboratory
Number of dyads	50
Parents' age	Not specified
Parents' gender	All females
Parents' ethnicity	Not specified
Parents' socioeconomic status	Not specified
Parents' mental health	Not specified
Children's age	7.20 to 23.60 months (M = 15.40, SD = 4.74)
Children's gender	25 females, 25 males
Other info on children	Forty-five (90.0%) parents reported their infant's ethnicity as White/Non-Hispanic, 3 (6.0 %) reported Hispanic, 3 (6.0 %) reported Asian/Pacific Islander, 1 (2.0 %) reported African-American, and 1 (2.0 %) reported Native American. All infants were born within two-weeks of their due date, reported no major health complications, and were within normal birthweight ranges (M = 7.53 lbs, SD = 1.14).
Experiment or situation	Infants and their mothers participated in a modified SFP (Still Face Paradigm), which consisted of three phases: a free play phase (FP; 5 minutes), during which mother and infant interacted as they naturally would during play time; a still face phase (SF; 2 minutes), during which an alarm signaled the mother to pick up a mobile device (iPod touch), interact only with the device, withdraw attention from their infant, become unresponsive, and allow their infant to play on their own; and a reunion phase (RU; 1 minute; signaled by a knock on a window), during which the mothers stopped using the device and resumed interacting with their infant as they did during FP.
Intervention	(the still face phase) Mother is interacting only with her cell phone, is unresponsive to the child
Comparison	The free play phase + the reunion phase
Outcome 1	(STRESS) Negative and positive affect of infant
Outcome 2	(COGNITIVE DEVELOPMENT) Toy engagement of infant
Outcome 3	(INTERACTION) Engagement of infant with mother
Outcome 4	(INTERACTION) Social bid use of infant
Outcome 5	(COGNITIVE DEVELOPMENT) Infant's exploration of the room

Result outcome 1	Mirroring the effects of the traditional SFP, infants showed more negative affect during SF versus FP, [t(49) = 2.98, p = .004; F (2, 96) = 5.67, p = .005, ηp 2= .11]. In contrast, infants showed less positive affect during SF versus FP [t(49) = −7.14, p < .001] and RU [t(49) = −3.85, p < . 001; F (2, 96) = 23.11, p < .001, ηp 2 = .33]. Positive affect was also greater during FP in comparison to RU [t(49) = 2.64, p = .011].
Result outcome 2	Infants showed more toy engagement in FP compared to SF [t(49) = 3.37, p = .001] and RU [t(49) = 2.16, p < .001; F (2, 96) = 11.25, p < .001, ηp 2 = .19].
Result outcome 3	Infants also showed less engagement with mother during SF compared to FP [t(49) = −17.64, p < .001] and RU [t(49) = −11.37, p < .001; F (2, 96) = 117.83, p < .001, ηp 2 = .71].
Result outcome 4	Social bids were used more in SF compared to FP [t(49) = 6.76, p < .001] and RU [t(49) = 5.51, p < .001; F (2, 98) = 37.70, p < .001, ηp 2 = .44].
Result outcome 5	Finally, infants explored the room less in RU compared to SF [t(49) = −3.50, p = .001; F (2, 98) = 6.89, p = .002, ηp 2 = .13.
Model/understanding of causality	Results suggest that parental device use influences the quality of parent-infant interactions
Other important information	(covariates) Parents self-reported their mobile device use including habitual device use frequency per day, use in front of family, and use in front of infant, as well as the total number of communication types used.Participants also completed the Revised Infant Behavior Questionnaire Short Form (4-12 months) or the Toddler Behavior Assessment Questionnaire (12-24 months).

Internal validity

Questions (Checklist for assessment of studies with single-case experimental design)	*Our critical appraisal*	*Comments*
1) Were the participant(s) or unit(s) recruited and selected in a satisfactory manner? If participants were divided into groups, was this done in a satisfactory way?	Unclear	No inclusion and exclusion criteria were mentioned, including the previous studies that have used the same sample.
2) Were the participant(s) or unit(s), personnel and outcome measure satisfactorily masked (blinded)?	Unclear	No statement of blinding.
3) Are the characteristics of the participants adequately described?	Unclear	No information about parents besides gender. There are more information on children.
4) Is the implementation of the intervention sufficiently described?	Yes	It is described under the title 'Materials'.
5) What outcomes were measured and how were they measured?	-	Infant behaviours was video-recorded and scored by three reliable raters. Presence or absence of each behavior (0, 1) was coded in 15 second epochs. Average scores were computed (number of epochs each behavior was performed divided by total number of behaviors) for each phase (FP, SF, RU) to account for individual differences between children who showed generally higher and lower behavioral frequencies overall. Behaviors performed by at least 25% of infants in at least one phase were selected for analyses. Reliability was computed across 20% of participants using Cohen's kappa, and ranged from .71 to .98 (M = .85, SD = .03).
6) Are analyzes accounted for?	Yes	Pearson correlations were conducted to examine associations between infant age and sex relative to other study variables. Age was included as a covariate in subsequent analyses to control for the potential influence of developmental stage on observed behaviors. First, as a manipulation check, they examined within-subjects differences in behaviors across the three phases of the SFP to confirm that the parameters of the task elicited varying levels of child behaviors. To examine differences across the phases of the SFP, repeated-measures ANCOVAs were conducted separately for each behavior. Bonferroni's correction was used to control for multiple comparisons in post-hoc paired-samples t-tests (adjusted p = .017).

7) Is ethical assessment accounted for?	Yes	This study was approved by the institutional review board of The Pennsylvania State University. Parents filled out an informed consent.
8) Are the effects of the interventions adequately reported?	Yes	The results are reported adequately. All the results for the statistical analyses were presented.
9) Is the accuracy of the effect estimates stated?	Yes	The accuracy of the effect estimates were present in general. In figure1, there were no information on whether the graph has standard deviations or standard error values, however, it can be checked from the decriptive statistics table.
Total appraisal	Moderate risk of bias	

Nakagawa (2019) (40)

Data extraction	
Author, date, title	Nakagawa (2019) Effect of using smartphone during breast-feeding
Study design	Within-subjects design
Study aims	We investigate whether there is a difference in a mother's posture and communication with their baby depending on the presence or absence of smartphone operation during lactation.
Country	Japan
Cultural context	Not specified
Study context	Laboratory
Number of dyads	7
Parents' age	Not specified
Parents' gender	All females
Parents' ethnicity	Not specified
Parents' socioeconomic status	Not specified
Parents' mental health	Not specified
Children's age	3 to 6 months
Children's gender	Not specified
Other info on children	Not specified
Experiment or situation	In the experiment, the subjects took three types of breast-feeding postures: breast-feeding only, breast-feeding while reading news on a smartphone, and breastfeeding while typing characters on a smartphone. The posture was measured for 1 minute and 30 seconds each. The mother's posture was uniform as Figure 1.
Intervention	Breastfeeding and looking at the phone - 3 types of BF posture, reading the news and typing characters on the smartphone
Comparison	Not looking at the phone
Outcome 1	(PARENT'S ATTENTION) Time for mother to notice that baby stop breastfeeding
Result outcome 1	Most of the subjects looked at the baby's face while not operating the smartphone. As a result, the time it took for the mother to notice all three of them resulted in 0 seconds. This result indicates that **it takes more time for the mother to notice that the baby has stopped drinking when she is using the smartphone (0.79 to 5.96 sec) than when she is not using the smartphone (0 sec).**
Model/understanding of causality	-
Other important information	-

Internal validity		
Questions (Checklist for assessment of studies with single-case experimental design)	*Our critical appraisal*	*Comments*
1) Were the participant(s) or unit(s) recruited and selected in a satisfactory manner? If participants were divided into groups, was this done in a satisfactory way?	Unclear	No information
2) Were the participant(s) or unit(s), personnel and outcome measure satisfactorily masked (blinded)?	Unclear	No statement of blinding

3) Are the characteristics of the participants adequately described?	No	
4) Is the implementation of the intervention sufficiently described?	Unclear	
5) What outcomes were measured and how were they measured?	–	Time for mother to notice that baby stop breastfeeding
6) Are analyzes accounted for?	Unclear	
7) Is ethical assessment accounted for?	Unclear	Experiment was conducted with the approval of an ethics committee
8) Are the effects of the interventions adequately reported?	No	Detailed analysis was not reported because there was not enough space
9) Is the accuracy of the effect estimates stated?	No	
Total appraisal	High risk of bias	

Nomkin (2021) (41)

Data extraction	
Author, date, title	Nomkin (2021) The relationship between maternal smartphone use, physiological responses, and gaze patterns during breastfeeding and face-to-face interactions with infant
Study design	Within-subjects design
Study aims	To explore the effects of smart phone use and smart phone distractions on maternal attention and physiological function during two types of interactions with her infant: breastfeeding and face-to-face interaction
Country	Israel
Cultural context	Not specified
Study context	Home and laboratory
Number of dyads	20 (not all included in analysis)
Parents' age	Mean 30.2 years (3.85)
Parents' gender	All females
Parents' ethnicity	Not specified
Parents' socioeconomic status	Academic education 85%, above and average national wage 45%, receiving help with infant care 65%
Parents' mental health	Not specified
Children's age	(months postpartum) 5.05 (SD 0.72)
Children's gender	8 boys; 12 girls
Other info on children	65% were firstborns, 30% were second born, 5% were third born
Experiment or situation	Three conditions and two phases, the phases were breastfeeding and face to face interaction, starting with breastfeeding. The conditions were 1) smartphone use, 2) smartphone sound on but unavailable to mothers, 3) smartphone on mute and unavailable to mothers. The experiment started with participants being asked to pace their phone (sound on) on the table next to them and with the assistance of the experimenter to wear the eye tracking glasses. Next, participants were instructed to take their baby in their arms and engage in breastfeeding for 5 minutes. During this condition, five whatsApp messages were sent to the participants' smartphone by the experimenter. Some text messages with questions for mothers to answer, and some messages with further instructions as well as short situational anxiety questionnaire. In the next condition (breastfeeding while smartphone in the bag) participants were asked to place their phone in their bag, sound on, and were instructed not to respond to any received alerts while breastfeeding for another five minutes. In this condition 5 messages were sent by the experimenter. In the final phase (breastfeeding/smartphone mute), mothers were asked to mute their phone and to place it back in their bags for another 5 minutes. Participants were given time to end breastfeeding as they saw fit. The face-to-face interaction was conducted similarly to the previous one with the three phone conditions.
Intervention	Phone during breastfeeding and face to face interaction
Comparison	Phone muted
Outcome 1	(PARENT'S ATTENTION) Maternal attention, gaze patterns
Result outcome 1	The analysis revealed a significant interaction effect between experimental phases (breastfeeding versus face-to-face) and AOIs (Area of Interest: infant face and body or smartphone)

	in predicting the amount of the normalized dwell time (ms/coverage) mothers' directed to each AOI [F(1,17) = 80.42, p < .001, partial eta2 = .83]. As can be seen in Fig 2, the normalized dwell time towards the smartphone was highest during breastfeeding (M = 3.41e+6, SD = 1.27e+6) and lowest during face-to-face interactions (M = 681,587, SD = 210,648). An opposite pattern was observed for the normalized dwell towards the infant–it was highest during face-to-face interactions (M = 3.19e+6, SD = 1.86e+6) and lowest during breastfeeding (M = 939,495, SD = 518,675). No significant main effects were revealed for either the experimental phase [F(1,17) = .60, p = .45, partial eta2 = .03] or for the AOIs [F(1,17) = .01, p < .95, partial eta2 = .00].
Model/understanding of causality	-
Other important information	Other variables studied: Home online questionnaires regarding their smartphone use, perceptions of their bond with the infant, ratings of their infant's temperament, and demographic information. At the lab, mothers reported their baseline situational anxiety via a short questionnaire.

Internal validity

Questions (Checklist for assessment of studies with single-case experimental design)	*Our critical appraisal*	*Comments*
1) Were the participant(s) or unit(s) recruited and selected in a satisfactory manner? If participants were divided into groups, was this done in a satisfactory way?	Unclear	Not reported
2) Were the participant(s) or unit(s), personnel and outcome measure satisfactorily masked (blinded)?	Unclear	Blinding not reported
3) Are the characteristics of the participants adequately described?	Yes	
4) Is the implementation of the intervention sufficiently described?	Yes	
5) What outcomes were measured and how were they measured?		Outcomes of mother physiological response during breasfeeding or face to face response while with the phone or when not able to answer it. Mobile eye-tracking glasses (SMI) were fitted to the mothers to measure their gaze patterns throughout all following experimental conditions. The SMI head-mounted system includes two small cameras on the rim of the glasses capturing the eye movements of the wearer, and a front view camera that captures the participant's line of sight.
6) Are analyzes accounted for?	Yes	
7) Is ethical assessment accounted for?	Yes	The study's protocol was approved by the Psychology Department's Ethics Committee at Barllan University, Israel. Participants were informed that the purpose of the experiment was to examine maternal physiological processes during breastfeeding and how they relate to using as smartphone. All mothers provided informed consent at the onset of the study and all procedures are in line with the ethical approval obtained.
8) Are the effects of the interventions adequately reported?	Yes	
9) Is the accuracy of the effect estimates stated?	Yes	
Total appraisal	Moderate risk of bias	

Reed 2017 (44)

Data extraction	
Author, date, title	Reed 2017, Learning on Hold: Cell Phones Sidetrack Parent-Child Interactions
Study design	Within-subjectss design
Study aims	To examine whether 2-year olds are sensitive to disruptions within the dynamic flow of a word-learning task.

Country	USA
Cultural context	Suburban communities surrounding Philadelphia, PA
Study context	Laboratory
Number of dyads	38
Parents' age	Mean age 35.26 years, age range: 29.53 –47.10 years. 19 mothers did not report their age.
Parents' gender	Female
Parents' ethnicity	Primarily Caucasian (9.10% of families self-identified as Hispanic, Pacific Islander, African American, or multiethnic
Parents' socioeconomic status	Not specified
Parents' mental health	Not specified
Children's age	2-year olds, mean age 27.05 months, SD = 2.89
Children's gender	22 female, 22 male
Other info on children	"Typically developing children"
Experiment or situation	Word learning across an interrupted teaching period. Mothers taught two novel words to their children, one at a time, counterbalanced for order of presentation. Random assignment determined whether the first or second teaching period would be interrupted by a brief (30 second) phone call with the experimenter. Intervention has several phases: Maternal training, Salience video, Test video, Extension trial, Mutual exclusivity and recovery trial.
Intervention	Interruption of the teaching periode with a phonecall to mother (30 sec)
Comparison	No interruption of the teaching periode by phone call
Outcome 1	(COGNITIVE DEVELOPMENT) Learning of two new words, measured by the proportion of time attended to the matching scene during test trials (The Intermodal Preferential Looking Paradigm)
Result outcome 1	*Test 1* (extension test): It revealed only a significant effect of the experimental interruption manipulation, F (1, 34) 6.44, p .02, partial 2 0.16, meaning that children preferred the target scene— demonstrating comprehension—when the word was taught without interruption (M 0.63) but not when the teaching was interrupted (M 0.50). *Test 2* (rigorous test): did not reveal a significant effect of trial type; children instead consistently maintained their visual attention on the target scene across trials (M-extension 0.66, M-mutual exclusivity 0.65, M-recovery 0.64).
Model/understanding of causality	"Although the social responsiveness between mother-child dyads was momentarily disrupted by the interruption, the current study cannot tease apart the various causal mechanisms that may be at work. Our findings suggest that not only do children notice interruptions during face-to-face interactions with their parents, but also that these interruptions have cognitive consequences, at least for young word learners. They sidetrack language learning."
Other important information	Other outcomes/covariates: maternal daily cell phone use, Maternal reactions to interruption, children's reaction to interruption

Internal validity

Questions (Checklist for assessment of studies with single-case experimental design)	*Our critical appraisal*	*Comments*
1) Were the participant(s) or unit(s) recruited and selected in a satisfactory manner? If participants were divided into groups, was this done in a satisfactory way?	Unclear	Participants were recruited from a purchased list of area births; drawn from suburban communities surrounding Philadelphia, PA. The article gives no more information about the recruiting process. The participants are divided in two groups for the order of intervention and control; the randomisation process is not described..
2) Were the participant(s) or unit(s), personnel and outcome measure satisfactorily masked (blinded)?	Unclear	Data were coded by researchers blind to teaching condition and for the personnel (and participants) who gave the intervention, masking was not applicable. However, the only statement for the masking of participants is "Parents were told the purpose of the cell phone, explained as a way for the experimenter to share directions with the mother, such as when it was time to move from one word to the other, and so that the experimenter could call and 'chit chat with you, like we're friends in real life'." This might seem that participants were not aware of the actual aims of the study, but still it is unclear.
3) Are the characteristics of the participants adequately described?	Yes	A measure of socio-economic status would have been useful.
4) Is the implementation of the intervention sufficiently described?	Yes	Detailed description of experiment, phases, and intervention (under "Procedure").

5) What outcomes were measured and how were they measured?	–	Relevant outcome: learning of new words, measured in two tests according to the proportion of time the child gaze at the correct picture. The Intermodal Preferential Looking Paradigm was used to assess children's comprehension of the novel action words. Given that the mother was not the actor in the videos, this was an immediate test of learning and extension as Sesame Street characters performed the actions. If children learned the new words, they should direct their visual attention more to the matching scene. They use a softwareprogram, Supercoder, a program for coding preferential looking, in "slots"/frames of 29,97 seconds throughout the experiment.
6) Are analyzes accounted for?	Yes	Analyses are well described (ANOVA, graphs).
7) Is ethical assessment accounted for?	No	No mention of ethics
8) Are the effects of the interventions adequately reported?	Yes	There could have been more visualizations but the reporting is sufficient and adequate enough.
9) Is the accuracy of the effect estimates stated?	Yes	The accuracy of the effect estimates were clearly stated.
Total appraisal	High risk of bias	

Rothstein (2018) (45)

Data extraction	
Author, date, title	Rothstein (2018) The presence of smartphones and their impact on the quality of parent-child interactions
Study design	Within-subjects design, part of a larger study on technology and reading
Study aims	The purpose of the present study is to investigate how the presence of a smartphone impacts the quality of the parent-child interactions.
Country	USA
Cultural context	Local community
Study context	Laboratory
Number of dyads	39
Parents' age	18 years or older (M=31.23, SD=4.614)
Parents' gender	17 females and 22 males
Parents' ethnicity	Parents described themselves, as indicated in the archival data's demographic form, as White (61.5%), Hispanic/Latino (28.2%), Asian / Asian Indian / Pacific Islander (5.1%), Black or African-American (2.6%), and Other (2.6%).
Parents' socioeconomic status	Participants predominantly described themselves as stay-at-home caregivers (43.6%) or employed full-time (30.8%). Additionally, the majority of participants described themselves as having some college (41%) or as college graduates (38.5%). The majority of participants (79.5%) reported being married.
Parents' mental health	Not specified
Children's age	13-51 months old (M=32.27, SD=10.517)
Children's gender	Not specified
Other info on children	Not specified
Experiment or situation	The first half of the study included an 8-minute session. Half of the parent-child dyads were randomly assigned to start with session A ("Phone off"), and half of the parent-child dyads were randomly assigned to begin with session B ("Phone on"). For session A ("Phone off"), the researcher, told the parent-child dyad that they would return shortly with a book or e-reader, but while waiting that the parent must turn off their smartphone. For session B ("Phone on"), the researcher told the parent-child dyad that they would return shortly with a book or e-reader, however the parent was told they could use their smartphone if they wanted to. After the first 8-minute session was over, a second 8-minute session began in which parents were made to wait again, but this time, parents who began with session A then participated in session B (or vice versa).
Intervention	Parents were allowed - and encouraged to - use their phone.
Comparison	Use of phone was not allowed.
Outcome 1	(INTERACTION) Subscale of the coding tool PICCOLO: Parent's affection
Outcome 2	(RESPONSIVENESS) Subscale of the coding tool PICCOLO: Parent's responsiveness
Outcome 3	(INTERACTION) Subscale of the coding tool PICCOLO: Parent's encouragement
Outcome 4	(INTERACTION) Subscale of the coding tool PICCOLO: Parent's teaching

Result outcome 1	A significant difference was found in the scores for affection while the phone was on (M=9.71, SD=2.86) and affection while the phone was off (M=10.79, SD=2.02), t(38)=2.80, p<.01.
Result outcome 2	There was a significant difference in the scores for responsiveness while the phone was on (M=9.72, SD=3.07) and responsiveness while the phone was off (M=11.28, SD=2.28), t(38)=3.58, p<.01.
Result outcome 3	There was a significant difference in the scores for encouragement while the phone was on (M=9.15, SD=3.52) and encouragement while the phone was off (M=10.41, SD=2.39), t(38)=2.10, p=.04
Result outcome 4	There was no significant difference in the scores for teaching while the phone was on (M=8.62, SD=3.01) and teaching 30 while the phone was off (M=9.51, SD=2.51); t(38)=1.57, p=.12
Model/understanding of causality	The current study suggests when smartphones are turned on (versus off), they may impact the quality of a parent's affection, responsiveness, and encouraging behavior towards their child. A significant decrease was present for these behaviors. Overall, results indicated that when a smartphone is turned on, the quality of the parent-child interaction was lower than when it was on. Unlike the other parental behaviors, teaching may not require a bi-directional interaction; parents are in control of deciding whether or not they want to engage with their child, unlike responsiveness and encouragement which require a stronger emotional connection.
Other important information	-

Internal validity

Questions (Checklist for assessment of studies with single-case experimental design)	*Our critical appraisal*	*Comments*
1) Were the participant(s) or unit(s) recruited and selected in a satisfactory manner? If participants were divided into groups, was this done in a satisfactory way?	Yes	Parent-child participants were recruited for a larger study on technology and reading and were observed at a Central California university. The dyads were recruited from the local community. Various methods were used to recruit the parent-child dyads (described in the study). There were following requirements: parent was 18 years or older, child was between 12-47 months, and parent had a personal smartphone.
2) Were the participant(s) or unit(s), personnel and outcome measure satisfactorily masked (blinded)?	Unclear	At the end of the study, parents were asked to answer demographic questions. Once the parent completed the questionnaire, the research assistant debriefed the parent about the purpose of the study and provided a debriefing form, and informed the parent that video and audio data were collected both during the "waiting" sessions. The lack of blinding of the personnel not likely to have an effect on outcome.
3) Are the characteristics of the participants adequately described?	Yes	Parents' age, gender, SES and ethnicity are reported, as well as children's age - but not gender
4) Is the implementation of the intervention sufficiently described?	Yes	It is clearly stated with all the details under the title 'Original research procedure'.
5) What outcomes were measured and how were they measured?	–	Relevant outcomes: Parent's affection, responsiveness, encouragement, and teaching - all measured with the coding tool PICCOLO. The PICCOLO has been shown to have a reliability of .80 and an interrater reliability of .80 (Roggman et al., 2013). In this study, If scores between the two coders varied more than three points, the coders consulted one another and reviewed the scores (one complete video which consisted of a "Phone on" and "Phone off" session was coded solely by the secondary coder due to the researcher's personal relationship with the participant). During the consultation, parental behaviors were discussed and analyzed to reach a consensus between the coders. Because of the consensus that was reached, interrater reliability was 100%.
6) Are analyzes accounted for?	Yes	Descriptive statistics are given and analyses are described. More visualizations would be better.
7) Is ethical assessment accounted for?	Unclear	Upon arrival to the lab, a research assistant greeted the parent-child dyad. The research assistant familiarized the parent with the study procedures, had the parent read and sign a parental consent form (see Appendix A), and answered any questions the parent had. Not reported an approval by an ethics comittee (not even in the attached parent consent form).
8) Are the effects of the interventions adequately reported?	Yes	There could have been more visualizations but the reporting is sufficient and adequate enough.

9) Is the accuracy of the effect estimates stated?	Yes	There could have been more visualizations but the reporting is sufficient and adequate enough.
Total appraisal	Low risk of bias	

Rozenblatt-Perkal (2022) (46)

Data extraction	
Author, date, title	Rozenblatt-Perkal (2022) Infants' physiological and behavioral reactivity to maternal mobile phone use – An experimental study
Study design	Randomized controlled trial (RCT), this study used a 3X3 mixed-design, with condition as a between-participants factor and phase as a within-participants factor
Study aims	The present study examined the impact of maternal mobile phone use during mother-child interaction on infants' physiological and behavioral reactivity (i.e., heart rate and negative affect).
Country	Israel
Cultural context	Not specified
Study context	Laboratory
Number of dyads	106
Parents' age	Mean maternal age was 32.49 (SD = 3.78) years
Parents' gender	Females
Parents' ethnicity	75.4% mothers in the sample were born in Israel
Parents' socioeconomic status	76.2% of mothers had obtained a college degree
Parents' mental health	Mothers were excluded if there is a maternal report of diagnosed psychiatric conditions
Children's age	Mean child age was 11.88 (SD = 1.2) months
Children's gender	54 males, 52 females
Other info on children	Child with preterm birth status, child with health problems, and diagnosis of neurodevelopmental disorders were excluded.
Experiment or situation	Mother-child dyads were randomly assigned to one of three experimental conditions: mobile-phone-disruptions (n = 37), social disruptions (n = 33), undisrupted-play (n = 36). All three conditions began with a mother-infant 3-min free play phase. Mothers were instructed by the research assistant to play as they usually do with their infants. The second 3-min phase of the experiment differed between conditions. In the mobile-phone-disruptions condition, the research assistant asked mothers to place a mobile phone on the table and then sent them text messages with different questions (e.g., "What does your infant usually eat for breakfast, lunch, and dinner?"). Mothers were instructed to reply to all text messages. In the social-disruptions condition, the research assistant entered the room and posed the same questions verbally (as in the text messages in the mobile-phone-disruptions condition). In the undisrupted-play condition, mothers and children continued to play. All three conditions ended with a 3-min undisrupted free-play phase.
Intervention	Mobile-phone-disruptions during the mother child play session
Comparison	Undisrupted play condition and social-disruptions during the mother child play session
Outcome 1	(STRESS) Heart rate, measured by a lightweight recording device attached to the infants' chest
Outcome 2	(STRESS) Negative affect, rated from the videotaped assessments on a secondby-second basis, using a 5-point scale.
Result outcome 1	A comparison of the heart rate (HR) change scores between phases 1 and 2 $F(2,103) = 4.46$, $p = .014$, $\eta p2 = 0.080$ showed that infants in the mobile-phone-disruptions condition showed the highest increase in HR (M = 0.35, SD = 1.17) compared to infants in the social disruptions (M = -0.13, SD = 1.03) and undisrupted-play (M = -0.23, SD= 0.61) conditions ($p = .024$, $p = .006$, respectively). Infants in the mobile-phone-disruptions condition (M = − 0.42, SD = 1.24) also showed the highest decrease in HR between phases 2 and 3 $F(2,103) = 10.84$, $p < .001$ $\eta p2 = 0.174$ compared to infants in the social[1]disruptions (M = -0.04, SD = 0.76) and undisrupted-play (M = 0.45, SD = 0.66) conditions ($p = .03$, $p = .001$, respectively).
Result outcome 2	A comparison of the negative affect (NA) change scores $F(2,103) = 15.78$, $p < .001$, $\eta p2 = 0.235$ showed that infants in the mobile-phone disruptions (M = 0.67, SD = 1.43) showed the highest increase in NA between phases 1 and 2 compared to infants in the social-disruptions (M = -0.20, SD = 0.46) and undisrupted-play (M = -0.44, SD = 0.19) conditions ($p < .001$), while infants in the social-disruptions and undisrupted-play condition did not differ ($p = .27$). There were no significant differences between the three conditions in NA-change between phases 2 and 3 $F(2,103) = 0.34$, $p = .713$.

Model/understanding of causality	Study suggests that parental mobile device use while parenting (PMU) evokes a psychophysiological stress response in infants, as evident in increases in HR and NA, followed by post-PMU decreases. These patterns differ from social disruptions, in which psychophysiological reactivity was lower.
Other important information	Other outcomes/covariates: Mobile Device Interference in Mother-Child Activities, Infant Negative Emotionality

Internal validity

Domains (RoB-2)	*Our critical appraisal*	*Comments*
Domain 1: Risk of bias arising from the randomization process	Some concerns	No information on the random allocation sequence or on allocation sequence concealed, no differences in baseline report
Domain 2: Risk of bias due to deviations from the intended interventions (effect of adhering to intervention)	Low concerns	Participants and people delivering the interventions were aware of the assigned intervention. Probably no failures in implementing the intervention. Probably no non-adherence to the assigned intervention.
Domain 3: Missing outcome data	Low concerns	Data for this outcome were available for all analysed participants. 16out of 122 were excluded before the analysis, reasons given.
Domain 4: Risk of bias in measurement of the outcome	Some concerns	The method of measuring the outcome was not inappropriate for heart rate and probably not for negative affect. Measurement or ascertainment of the outcomes could not have differed between intervention groups. No information about the outcome assessors being aware of the intervention. The assessment of heart rate could not have been influenced by knowledge of intervention received, but it could probably – though probably not likely – for negative affect.
Domain 5: Risk of bias in selection of the reported result	Some concerns	No information of whether the data that produced this result analysed in accordance with a pre-specified analysis plan that was finalized before unblinded outcome data were available for analysis. The numerical results being assessed were probably not likely to have been selected, on the basis of the results, from multiple eligible outcome measurements or multiple eligible analyses of the data.
Total appraisal	Moderate risk of bias / some concerns	

Stockdale (2020) (47)

Data extraction

Author, date, title	Stockdale (2020) Infants' response to a mobile phone modified still-face paradigm: Links to maternal behaviors and beliefs regarding technoference
Study design	Within-subjects design
Study aims	To investigate the effect of disruptions to parent–infant interactions due to mobile phone use on infant behaviors. We further seek to examine the role of previous infant exposure to disruptions in parent–infant interactions due to cell phone use on infant behaviors.
Country	USA
Cultural context	Not specified
Study context	Home observations
Number of dyads	227
Parents' age	Not specified
Parents' gender	221 mothers, three fathers, and three unknown
Parents' ethnicity	Caucasian, 4.9% African American, 17.7% Hispanic or Latino, 2.2% Asian American, and 2.2% Other.
Parents' socioeconomic status	Approximately 22% of primary caregivers reported their combined household income below $35,000, approx-imately 36% reported a household income between $35,000 and under $75,000, approximately 15% reported a household income between $75,000 and under $100,000, and approximately 27% reported a household income above $100,000. An additional 32% of primary caregivers reported receiving public assistants in the last year.
Parents' mental health	Not specified
Children's age	5-14 months (infant age M = 8.03, SD = 2.51)
Children's gender	52% males
Other info on children	Not specified
Experiment or situation	Primary caregiver-infant dyads completed a modified still-face paradigm during a planned home visit. Primary caregivers were instructed to place their infants in a highchair with primary

	caregivers seated directly in front of the infant during the task. The still-face paradigm consists of three distinct phases: free play (FP) in which the primary caregiver is instructed to interact with their infant as they normally would (2 min); a modified still face (SF) (2 min) in which the primary caregiver is signaled to pick up their cell phone and interact only with their phone (primary caregivers were instructed not to touch, talk to, look at, or interact with their infant in any way and infants were not allowed toys or other objects to play with) as they normally would (primary caregivers were not instructed to use a specific app on their phone. They were instructed to use their phones like they normally would, but were instructed not to talk); and reunion (RU) (2 min) phase, in which the primary caregiver was instructed to put down their mobile phone and interact with their infant as they normally would.
Intervention	Interruption by phone
Comparison	No interruption
Outcome 1	(STRESS) Infant Positive and Negative Affect (positive or negative vocalizations: Laughing, cooing vs Screeching, screaming, crying)
Outcome 2	(STRESS) Self-comforting behaviors (i.e., sucking thumb, rubbing face or head, holding ear, etc.)
Outcome 3	(INTERACTION) Parent orientation (i.e., gaze directed toward mother)
Outcome 4	(STRESS) Object orientation (i.e., gaze directed toward physical objects in the room)
Outcome 5	(STRESS) Escape behaviors (i.e., arching, twisting back, gesturing to be picked up, pulling on highchair restraints, leaning forward)
Result outcome 1	Modified SF Positive affect> the main effect of phase was significant ($F(2, 202) = 33.68$, $p < .001$). The main effect of age group was not significant ($F(1, 203) = 2.77$, $p = .10$), and the interaction was not sig-nificant ($F(2, 202) = 2.71$, $p = .07$). Post hoc probing of the main effect of task displayed significant differences in positive affect for all three phases of the still face. Infants had more positive vocalizations in the FP phase than the SF ($p < .001$) or the RU ($p < .001$), and less positive vocalizations in the RU phase than the FP ($p < .001$; MFP = 0.26 SDFP = 0.24, MSF = 0.12 SDSF = 0.16, MRu = 0.19 SDRu = 0.23, see Figure 1). Modified SF For negative affect, the main effect of phase was significant ($F(2, 202) = 85.40$, $p < .001$). The main effect of age group was significant ($F(1, 203) = 20.55$, $p < .001$), and the interaction was not sig-nificant ($F(2, 202) = 1.57$, $p = .21$). Post hoc probing of the main effect of task displayed significant differences in negative affect between the FP and the SF ($p < .001$) and the reunion phases ($p < .001$) with infants displaying less negative affect during the FP than the SF or RU phases. There was no sig-nificant difference between the SF and the RU phases ($p = .04$; MFP = 0.15 SDFP = 0.19, MSF = 0.42 SDSF = 0.31, MRu = 0.33 SDRu = 0.38). For the main effect of age, older infants displayed more negative affect in all phases of the paradigm than younger infants (Myounger = 0.26 SEyounger = 0.02; Molder = 0.40 SEolder = 0.03, see Figure 1).
Result outcome 2	Modified SF Self comforting> or self-comforting, the main effect of phase was significant ($F(2, 202) = 10.98$, $p < .001$). The main effect of age group was not significant ($F(1, 203) = 0.03$, $p = .86$), and the interaction was not significant ($F(2, 202) = 0.31$, $p = .74$). Post hoc probing of the main effect of task displayed significant differences with infants displaying less self-comforting in the FP phase than the SF ($p < .001$) and less in the RU phase than the SF ($p < .001$, MFP = 0.10 SDFP = 0.13, MSF = 0.15 SDSF = 0.18, MRu = 0.10 SDRu = 0.14, see Figure 1).
Result outcome 3	Modified SF For parent orientation, the main effect of phase was significant ($F(2, 202) = 99.31$, $p < .001$). The main effect of age group was not significant ($F(1, 203) = 1.63$, $p = .20$), and the interaction was not significant ($F(2, 202) = 2.67$, $p = .07$). Post hoc probing of the main effect of task displayed sig-nificant differences with infants displaying more escape behaviors during the SF than the FP or RU ($p < .001$) and more escape behaviors during the RU than during the FP phase ($p < .001$, MFP = 0.002 SDFP = 0.002, MSF = 0.29 SDSF = 0.26, MRu = 0.13 SDRu = 0.18, see Figure 2).
Result outcome 4	Modified SF Object orientation> For object orientation, the main effect of phase was significant ($F(2, 202) = 183.65$, $p < .001$). The main effect of age group was not significant ($F(1, 203) = 0.28$, $p = .60$), and the interaction was not significant ($F(2, 202) = 0.88$, $p = .42$). Post hoc probing of the main effect of task displayed significant differences with infants displaying more object orientation in the SF than the FP phase ($p < .001$) and less in the RU phase than the FP or SF ($p < .001$, MFP = 0.45 SDFP = 0.23, MSF = 0.78 SDSF = 0.28, MRu = 0.32 SDRu = 0.25, see Figure 2).
Result outcome 5	The main effect of phase was significant ($F(2, 202) = 99.31$, $p < .001$). The main effect of age group was not significant ($F(1, 203) = 1.63$, $p = .20$), and the interaction was not significant ($F(2, 202) = 2.67$, $p = .07$). Post hoc probing of the main effect of task displayed significant differences with infants displaying more escape behaviors during the SF than the FP or RU

	(p < .001) and more escape behaviors during the RU than during the FP phase (p < .001, MFP = 0.002 SDFP = 0.002, MSF = 0.29 SDSF = 0.26, MRu = 0.13 SDRu = 0.18, see Figure 2).
Model/understanding of causality	Infant age was significantly correlated with negative affect during the SF (r = .20, p <.01) and the RU phase (r = .19, p < .01). Specifically, older infants displayed more negative affect during the SF and RU phases than younger infants. his may suggest an appropriate developmental demarcation to examine the influence of age on infants' behavioral responses.a decision was made to create two age groups using nine months as a cut off (younger than 9 months, n = 157 and older than 9 months, n = 70). Infant age is used as a between-subjects factor to test the first three hypotheses and in subsequent multigroup SEM analyses to test the final two hypotheses.
Other important information	Other variables measured: Primary caregivers' beliefs regarding technoference and technoference were assessed using survey methods

Internal validity		
Questions (Checklist for assessment of studies with single-case experimental design)	*Our critical appraisal*	*Comments*
1) Were the participant(s) or unit(s) recruited and selected in a satisfactory manner? If participants were divided into groups, was this done in a satisfactory way?	Yes	Recruited through maileres sent to participant home, recruited for project MEDIA - inclus criteria having a child under 1year and English
2) Were the participant(s) or unit(s), personnel and outcome measure satisfactorily masked (blinded)?	Unclear	No statement of blinding
3) Are the characteristics of the participants adequately described?	Yes	
4) Is the implementation of the intervention sufficiently described?	Yes	
5) What outcomes were measured and how were they measured?		Infants behaviours were coded during the phases and adjusted by age (younger/older). For positive affect, laughing and cooing; for negative affect, screeching, screaming and crying; for self-comforting behaviours, sucking thumb, rubbing face or head and holding ear; for parent orientation, gaze directed toward mother; for object orientation, gaze directed toward physical objects in the room; and for escape behaviours, arching, twisting back, gesturing to be picked up, pulling on highchair restraints and leaning forward were coded.
6) Are analyzes accounted for?	Yes	
7) Is ethical assessment accounted for?	Yes	The present study was conducted according to guidelines laid down in the Declaration of Helsinki, with written informed consent obtained from a parent or guardian for each child before any assessment or data collection. All procedures involving human subjects in this study were approved by the Internal Review Board at Brigham Young University. All procedures were approved by Brigham Young University's Institutional Review Board (application number F16089 titled Project M.E.D.I.A.).
8) Are the effects of the interventions adequately reported?	Yes	
9) Is the accuracy of the effect estimates stated?	Yes	
Total appraisal	Low risk of bias	

Ventura (2019) (49)

Data extraction	
Author, date, title	Ventura (2019) Maternal digital media use during infant feeding and the quality of feeding interactions
Study design	Within-subjects design

Study aims	The primary objective of the present within-subjects, experimental study was to explore whether mothers' digital media use (that is, watching a television show on a small, portable tablet) during infant feeding affects the quality of maternal-infant dyadic interaction (which includes both the mother's sensitivity and responsiveness to infant cues and engagement in socioemotional and cognitive growth fostering and the infant's clarity of cues or responsiveness to the mother).
Country	USA
Cultural context	Participants were recruited through fliers posted in Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) offices, breastfeeding support groups, libraries, coffee shops, and local pediatric offices, as well as through targeted Facebook advertisements.
Study context	Laboratory
Number of dyads	25
Parents' age	31.2 ± 3.4 years (range = 25.3–40.0 years)
Parents' gender	All female
Parents' ethnicity	The majority of mothers identified as non-Hispanic white (80%, n = 20).
Parents' socioeconomic status	The majority of mothers reported an annual family income ≥$75,000 (72%, n = 18), held a bachelors or graduate degree (68%, n = 17) and were married (92%, n = 23).
Parents' mental health	Not specified
Children's age	Average infant age was 19.3 ± 6.4 weeks (range = 6.2–32.0 weeks)
Children's gender	14 females, 9 males
Other info on children	Full-term, healthy, the majority of infants were exclusively breastfed, with only 2 infants receiving a mix of breast milk and formula.
Experiment or situation	Mother-infant dyads visited our laboratory on two separate days for feeding observations; on average, laboratory visits were separated by 2.4 ± 1.8 days. For these feeding observations, mothers were asked to feed their infants under one experimental and one control condition; order of conditions was counterbalanced. During both conditions, mothers breastfed their infants. The two conditions were digital media use and control with music.
Intervention	During the Digital Media Use condition, mothers were asked to watch a 22-min long TV show on a small tablet while they fed their infants.
Comparison	During the Control condition, mothers were asked to listen to Rachmaninoff's Second Symphony while feeding their infants.
Outcome 1	(THEY ARE ALL SUBSCALES OF AN INTERACTION SCALE: the Nursing Child Assessment Parent-Child Interaction Feeding Scale, NCAFS) (ATTENTION) Maternal subscale: Sensitivity to Cues
Outcome 2	(RESPONSIVENESS) Maternal subscale: Response to Child's Distress
Outcome 3	(INTERACTION) Maternal subscale: Social-Emotional Growth Fostering
Outcome 4	(INTERACTION) Maternal subscale: Cognitive Growth Fostering
Outcome 5	(INTERACTION) Infant subscale: Clarity of Cues
Outcome 6	(INTERACTION) Infant subscale: Responsiveness to Caregiver
Result outcome 1	(trend) Control 14.8 (SE 0.3) Intervention 14.4 (SE 0.3) F-value 3.01 p-value.098
Result outcome 2	(non-sign) Control 10.0 (SE 0.3) Intervention 10.1 (SE 0.3) F-value 0.12 p-value.732
Result outcome 3	(non-sign) Control 10.9 (SE 0.5) Intervention 10.6 (SE 0.5) F-value 0.57 p-value .457
Result outcome 4	(sign) Control 5.8 (SE 0.4) Intervention 5.1 (SE 0.4) F-value 6.62 p-value .018
Result outcome 5	(non-sign) Control 12.1 (SE 0.3) Intervention 11.6 (SE 0.3) F-value 1.40 p-value .250
Result outcome 6	(non-sign) Control 6.3 (SE 0.5) Intervention 5.5 (SE 0.5) F-value 2.19 p-value .154
Model/understanding of causality	This research illustrated maternal digital media use during feeding affected some aspects of the feeding interactions in the short-term, but other aspects of the feeding interaction were unchanged.
Other important information	Other outcomes/covariates: Mothers' typical level of technological device use, Infant feeding behaviours (intake, feed duration, feed rate), infant age

Internal validity

Questions (Checklist for assessment of studies with single-case experimental design)	*Our critical appraisal*	*Comments*
1) Were the participant(s) or unit(s) recruited and selected in a satisfactory manner? If participants were divided into groups, was this done in a satisfactory way?	Yes	Participants were recruited through fliers posted in Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) offices, breastfeeding support groups, libraries, coffee shops, and local pediatric offices, as well as through targeted Facebook advertisements. Inclusion criteria for infants were: (1) healthy; (2) born full-term; (3) 32 weeks of age or younger (and, thus, still predominantly milk-fed). To

		control for possible effects of feeding mode (directly from the breast versus from a bottle) on the quality and outcome of the feeding interaction, only breastfeeding infants were included. Inclusion criteria for mothers included: (1) between 18 and 40 years of age and (2) absence of any complications during pregnancy or birth that lead to infant feeding problems.
2) Were the participant(s) or unit(s), personnel and outcome measure satisfactorily masked (blinded)?	Yes	Mothers were blinded to study objectives and hypotheses and were only told that the purpose of the study and videorecorded feeding observations was to "better understand infant feeding behaviors during typical feeding interactions." After each visit, two trained coders unaware of the experimental conditions and hypotheses of the study scored the videorecords using the Nursing Child Assessment Parent-Child Interaction Feeding Scale (NCAFS) (Oxford and Findlay, 2015). This scale has been validated for assessment of the quality of early feeding interactions (breastfeeding, bottle-feeding, or solid food-feeding) for mothers and their infants aged < 12 months during both laboratory- and home-based feeding observations.
3) Are the characteristics of the participants adequately described?	Yes	Age, gender, SES and ethnicity described for mothers; age, gender and breastfeed/formula were described for children.
4) Is the implementation of the intervention sufficiently described?	Yes	It is clearly stated with all the details under the title 'Experimental design'.
5) What outcomes were measured and how were they measured?	–	There were six subscales in an inventory on mother-child interaction: 1) mothers' sensitivity to cues, response to distress, social-emotional growth fostering, and cognitive growth fostering; 2) infants' clarity of cues and responsiveness to caregiver. This scale has been validated for assessment of the quality of early feeding interactions (breastfeeding, bottle-feeding, or solid food-feeding) for mothers and their infants aged < 12 months during both laboratory- and home-based feeding observations. After training was complete, study-specific inter-rater reliability was assessed by common-coding of 10 study videos and intrarater reliability was determined by double-coding of 5 study videos. Inter- and intra-rater reliability were established using Pearson's correlation coefficients, and were r = 0.89 and r = 0.95, respectively.
6) Are analyzes accounted for?	Yes	Analyses are well described and visualized.
7) Is ethical assessment accounted for?	Yes	All study procedures were approved by the university Institutional Review Board and informed consent was obtained from each mother at study entry.
8) Are the effects of the interventions adequately reported?	Yes	The reporting is sufficient and adequate.
9) Is the accuracy of the effect estimates stated?	Yes	The accuracy of the effect estimates were stated.
Total appraisal	Low risk of bias	

Vedlegg 3: Sjekkliste for «innendeltakerdesign»

Nedenfor er en kopi av hele verktøyet (27) med unntak av boksene med rød skrift som er våre tolkninger/spesifiseringer:

Sjekkliste for vurdering av studier med innendeltakerdesign (single-case *experimental design*)

Hvordan brukes sjekklisten?
Sjekklisten består av fem deler:

- A: Kan studiedesignet svare på problemstillingen?
- B: Kan du stole på resultatene?
- C: Hva forteller resultatene?
- D: Kan resultatene være til hjelp i praksis?
- Oppsummering av vurderingen

I hver del finner du underspørsmål og tips som hjelper deg å svare. For de fleste av underspørsmålene skal du krysse av for «ja», «nei» eller «uklart». Valget «uklart» kan også omfatte «delvis».

Om sjekklisten
Sjekklisten er utviklet av Kristine Berg Titlestad og Nina Rydland Olsen ved Høgskulen på Vestlandet. Innholdet er inspirert av: Reichow B, Barton EE, Maggin DM. Development and applications of the single-case design risk of bias tool for evaluating single-case design research study reports. Res Dev Disabil. 2018;79:53-64. doi:10.1016/j.ridd.2018.05.008 og Tate RL, Perdices M, Rosenkoetter U, et al. The Single-Case Reporting Guideline In BEhavioural Interventions (SCRIBE) 2016 Statement. Phys Ther. 2016;96(7):e1-e10. doi:10.2522/ptj.2016.96.7.e1. Utformingen av sjekklisten er inspirert av Critical Appraisal Skills Programme (CASP). CASP Checklists. Oxford: CASP UK [oppdatert 2020; lest 29.10.2020]. Tilgjengelig fra: https://casp-uk.net/casp-tools-checklists/. Sjekklisten er laget som et pedagogisk verktøy for å lære kritisk vurdering av vitenskapelige artikler. Har du spørsmål om, eller forslag til forbedring av sjekklisten? Send e-post til redaktøren: hilde.stromme@ub.uio.no.

Om innendeltagerdesign
I studier med innendeltagerdesign (N=1) fungerer ofte personen som sin egen kontroll eller sammenligningsbetingelse, snarere enn å bruke en annen person eller gruppe som kontroll. Eksempler på ulike innendeltagerdesign er multippel basislinje, reverseringsdesign, vekslende behandling (alternating treatment) eller skiftende kriterium (changing-criterion).

Kritisk vurdering av:
[Sett inn referansen til studien/artikkelen du vurderer med denne sjekklisten]

Del A: Kan studiedesignet svare på problemstillingen?

1. Er formålet med studien klart formulert?

☐ Ja – ☐ Nei – ☐ Uklart

Tips: Formålet bør være klart formulert med hensyn til:

- populasjonen (deltager(e) eller enhet(er) som studeres)
- tiltaket
- sammenligningen (hvis aktuelt)

- utfallsmål(ene) som vurderes

Er utformingen av studien er hensiktsmessig for å finne svar på problemstillingen? Er valg av innendeltagerdesign begrunnet?
Kommentar:

Del B: Kan du stole på resultatene?

2. Ble deltager(e) eller enhet(er) rekruttert og valgt ut på en tilfredsstillende måte? Hvis deltagere ble fordelt i grupper, ble dette gjort en tilfredsstillende måte?

☐ Ja – ☐ Nei – ☐ Uklart

Tips: Beskrives rekrutteringsprosessen på en eksplisitt måte? Hvordan er deltager(e) eller enhet(er) rekruttert? Er det klare kriterier for inklusjon og eksklusjon av deltager(e) eller enhet(er) med hensyn til:

- alder og kjønn
- setting, for eksempel barnehage, hjem eller klinikk
- diagnose og funksjonsnivå

Hvis deltager(e) eller enhet(er) ble fordelt i grupper ble dette gjort skjult og/eller tilfeldig? Eksempler på gode fordelingsmåter er dataprogram eller lukkede konvolutter. Eksempler på dårlige fordelingsmåter er ukedag og fødselsdato, bosted og reisevei.
Kommentar:

Vår tolkning/spesifisering, krav til et ja-svar: Beskrivelse av hvordan rekrutteringen foregikk, beskrivelse av inklusjonskriterier

3. Ble deltager(e) eller enhet(er), personell og utfallsmåler tilfredsstillende maskert (blindet)?

☐ Ja – ☐ Nei – ☐ Uklart

Tips: Uten maskering er det større risiko for bias (systematiske feil), særlig for subjektive utfallsmål, som for eksempel smerte eller tilfredshet. Se etter hvordan maskering ble gjort:

- var deltager(e) eller enhet(er) maskert?
- var de som ga tiltaket maskert?
- var den som målte utfallet maskert?

Hvis deltagerne ikke var maskert, har forfatterne oppgitt en grunn? Kan eventuell manglende maskering påvirke resultatene i denne studien?
Kommentar:

Vår tolkning/spesifisering, krav til et ja-svar: Beskrivelse av hvordan deltakerne var blindet/ikke kjente til studiens hypotese, beskrivelse av hvordan resultatmålerne var blindet

4. Er karakteristika ved deltagerne tilstrekkelig beskrevet?

☐ Ja – ☐ Nei – ☐ Uklart

Tips:

- Se om deltager(e) er beskrevet med hensyn til for eksempel alder, kjønn, sosioøkonomisk status og relevante funksjonsnedsettelser. Hvis deltager(e) er enheter, er for eksempel størrelse og beliggenhet beskrevet?
- Se også etter om karakteristika er relevant for forskningsspørsmålet
- Hvis det var flere deltager(e) eller enheter, var det forskjeller mellom dem som kan påvirke utfallet?

Disse opplysningene finner du gjerne i en tabell over deltagerkarakteristika ved oppstart.
Kommentar:

Vår tolkning/spesifisering, krav til et ja-svar: Beskrivelse av minst tre karakteristika for foreldre og barn, inkludert alder og kjønn

5. Er gjennomføringen av tiltaket tilstrekkelig beskrevet?

☐ Ja – ☐ Nei – ☐ Uklart

Tips:

- Er opplæring og veiledning av dem som ga tiltaket beskrevet?
- Ble opplæringsprosedyrer fulgt?

- Er tiltaket detaljert beskrevet for eksempel med hensyn til
  - faser i tiltaket og kriterier for faseendring
  - setting
  - tidsperspektiv, for eksempel lengde på økt, tiltak
  - hvem som utførte selve tiltaket
  - materiale eller utstyr som ble brukt for å gjennomføre og måle tiltaket
- Var oppfølgingen lik for alle deltager(e) eller enhet(er)? Hvis ikke, er ulikheter beskrevet?
- Ble prosedyren for tiltaket fulgt (procedural fidelity)?
- Er eventuelle endringer begrunnet?
  - Dersom deltager(e) eller enhet(er) ikke fullførte, er det beskrevet når og hvorfor tiltaket ble stoppet?
  - Er det oppgitt hvor lenge deltager(e) eller enhet(er) ble fulgt opp?

Kommentar:

Vår tolkning/spesifisering, krav til et ja-svar: God beskrivelse av eksperimentet/situasjonen

6. Hvilke utfall ble målt og hvordan ble de målt?

Tips:

- Er utfallene relevante?
- Er måleinstrumentene relevante for formål og design?
- Ble måleinstrumentene kvalitetssikret, det vil si testet for reliabilitet og validitet? Ble enighet mellom observatørene kvalitetssikret gjennom opplæring?
- Ble enighet mellom observatørene beregnet? Er den tilfredsstillende?

Kommentar:

Vår tolkning/spesifisering, krav til et ja-svar: God beskrivelse av utfallene og hvordan de ble målt, validerte målemetoder eller måling av interreliabilitet ved koding av atferd

7. Er analyser gjort rede for?

☐ Ja – ☐ Nei – ☐ Uklart

Tips:

- Er analysene beskrevet og visualisert?
- Er det benyttet deskriptiv statistikk i tillegg til de visuelle analysene, for eksempel gjennomsnitt, variasjonsbredde eller standardavvik?
- Er metodene og hvilke statistiske analyser som er brukt begrunnet? Kommer det for eksempel tydelig frem hvilke kriterier som er vektlagt som gjennomsnitt, nivå, variasjon og trender?

Kommentar:

Vår tolkning/spesifisering, krav til et ja-svar: Beskrivelse og begrunnelse av analysemetoder, beskrivelse av hvilke kriterier som er vektlagt

8. Er etiske vurdering gjor rede for?

☐ Ja – ☐ Nei – ☐ Uklart

Tips:

- Ble studien godkjent av en etisk komite?
- Ble det innhentet informert samtykke fra deltager(e), pårørende eller verge og den som gir tiltaket?
- Ble det vurdert om tiltaket gir merverdi for deltager?
- Ble deltager(e), nærpersoner eller de som utfører tiltaket spurt om tiltaket er akseptabelt (sosial validitet)?

Kommentar:

Vår tolkning/spesifisering, krav til et ja-svar: Godkjenning fra etisk komité, samtykke fra deltakere

Del C: Hva forteller resultatene?

9. Hva er resultatet for de ulike utfallsmålene?

Tips:

- Hva er resultatet for de ulike utfallsmålene?
- Dersom analysene er visuelle, er den visuelle analysen støttet av kriterier for effekt? Mulige kriterier kan være:
  - prosentvis overlapp mellom faser uten tiltak og faser med tiltak
  - den gjennomsnittlige forskjellen mellom fasene
  - uttrykk for variasjon innen faser og mellom faser
  - tid fra tiltak til effekt

Kommentar:

10. Er effektene av tiltakene tilstrekkelig rapportert?

☐ Ja – ☐ Nei – ☐ Uklart

- For å se variasjoner og trender i baseline, vurder om det er oppgitt rådata for alle utfallene og på alle måletidspunktene for deltager(e) eller enhet(er), for eksempel i visuelle analyser. Hvis visuelle analyser, kommer det tydelig frem hva som utgjør et punkt i grafen, hvorvidt rådataene er reelle tall eller et gjennomsnitt, for eksempel på en dag eller en uke?
- Rapporteres antall faser og antall forsøk i fasen(e), for eksempel for å oppnå kriteriene for fasen(e)?
- Er manglende data oppgitt? Er dette markert i visuelle analyser?
- Dersom aktuelt, er resultatene sammenfattet på tvers av betingelser for en deltager, på tvers av deltager(e) eller enhet(er)? Dette kan oppgis som for eksempel ved Tau-U, standard mean difference (SMD), Improvement rate difference (IRD) eller data som ikke overlapper (non overlapping data points).
- Er p-verdier rapportert?

Kommentar:

Vår tolkning/spesifisering, krav til et ja-svar: Klar beskrivelse av resultater for alle utfall, rapporterte p-verdier eller lignende

11. Er presisjon på effektestimatene oppgitt og hvor presise er de?

☐ Ja – ☐ Nei – ☐ Uklart

Tips:

- Hvor presise er resultatene, målt med for eksempel konfidensintervall?
- Er hele bredden av konfidensintervallet innenfor det som regnes som minimal viktig effekt (minimally important difference, MID)?

Kommentar:

Vår tolkning/spesifisering, krav til et ja-svar: Er presisjon på effektestimatene oppgitt, dvs. CI, SD, SE eller lignende?

12. Veier fordeler ved tiltaket opp for ulemper og kostnader?

☐ Ja – ☐ Nei – ☐ Uklart

Tips:

- Er eventuelle uheldige hendelser og/eller konsekvenser rapportert?
- Er nytten av tiltaket verdt kostnader?

Kommentar:

Del D: Kan resultatene være til hjelp i praksis?

13. Kan resultatene overføres til praksis?

☐ Ja – ☐ Nei – ☐ Uklart

Tips:

- Er problemstillingen(e), deltager(e) eller enhet(er) i studien sammenlignbar(e) med utfordringer du møter i din praksis?
- Vil eventuelle forskjeller mellom de personene du møter i praksis og deltager(e) eller enhet(er) i studien bety noe for overførbarheten til praksis (kan du forvente like stor effekt)? Er for eksempel settingen lik og har fagpersoner samme og/eller tilstrekkelig kompetanse?
- Er utfallene viktige for dem du møter i praksis?

- Er det andre utfall du gjerne skulle hatt med? Vurder om utfallsmålene er relevante for populasjonen, pårørende, politikere, eksperter og klinikere.
- Er det begrensninger i studiens metodiske kvalitet som vil påvirke din avgjørelse?

Kommentar:

14. Er tiltaket i studien bedre enn dagens praksis?

☐ Ja – ☐ Nei – ☐ Uklart

Tips:

- Hvilke ressurser kreves for å ta i bruk dette tiltaket? For eksempel tid, penger kompetanseheving og praktisk opplæring.
- Kan du omfordele ressurser for å ta i bruk de nye tiltaket?

Kommentar:

Oppsummering av vurderingen

- Skriv ned hovedpoengene fra din kritiske vurdering
- Hva er din konklusjon etter å ha lest studien?
- Er andre forhold i studiene vurdert, for eksempel etiske, finansiering av tiltaket eller interessekonflikter?
- Kan du sette i gang med dette tiltaket eller intervensjonen umiddelbart?

Vedlegg 4: Ekskluderte studier lest i fulltekst

Ekskluderte studier fra søk etter systematiske oversikter[3], lest i fulltekst (n=14):

Studie	Eksklusjonsårsak
Beamish Nicola, Fisher Jane and Rowe Heather (2019). Parents' use of mobile computing devices, caregiving and the social and emotional development of children: A systematic review of the evidence. Australasian Psychiatry, 27(2), pp.132-143.	Systematisk oversikt, men majoriteten av de 11 studiene i oversikten var tverrsnitt- eller kvalitative studier
Braune-Krickau Katrin, Schneebeli Larissa and Pehlke-Milde Jessica ; Gemperle Michael ; Koch Ramona ; Wyl Agnes ; (2021). Smartphones in the nursery: Parental smartphone use and parental sensitivity and responsiveness within parent-child interaction in early childhood (0-5 years): A scoping review. Infant Mental Health Journal.	Scoping review, ingen kvalitetsvurdering av inkluderte studier (dermed ingen systematisk oversikt etter vår definisjon[4])
Clement M. (2020). Children 0-6 years old and digital nomadic devices. Evaluation of exposure and its effects through the international literature. Neuropsychiatrie de l'Enfance et de l'Adolescence, 68(4), pp.190-195	Ikke systematisk oversikt, kun ett av fire spørsmål er relevant
Ewin C A and Reupert A E; McLean L A; Ewin C J;. (2021). The impact of joint media engagement on parent–child interactions: A systematic review. Human Behavior and Emerging Technologies, 3(2), pp.230-254.	Omhandler "joint media engagement" (felles engasjement i et elektronisk medium) og dermed ikke relevant
Hood R, Zabatiero J and Zubrick S R; Silva D ; Straker L ;. (2021). The association of mobile touch screen device use with parent-child attachment: a systematic review. Ergonomics, pp.1-17.	Systematisk oversikt, men kun 1 av 3 inkluderte studier er relevant
Ismail N F and Hasan M H; Mustapha E E;. (2017). Literature review on technology usage and emotional connection among children. IEEE Computer Society.	Ikke systematisk oversikt, ikke relevant problemstilling (oversiktens mål er å utvikle modeller for hvordan man kan måle barns emosjonelle kobling til teknologi)

[3] Én oversikt ble funnet i det grå litteratursøket og lest i fulltekst (Knitter & Zemp 2020)

[4] En systematisk oversikt skal tilfredsstille følgende tre kriterier: klare kriterier for inklusjon og eksklusjon av studier, en vurdering av studienes interne validitet og systematisk sammenstilling/syntese av resultater (18).

Kildare Cory A and Middlemiss Wendy. (2017). Impact of parents mobile device use on parent-child interaction: A literature review. Computers in Human Behavior, 75, pp.579-593.	Ikke systematisk oversikt (ingen kvalitetsvurdering av inkluderte studier), majoriteten av studiene var tverrsnitt- eller kvalitative studier, omfatter både barn og ungdom
Knitter, B., & Zemp, M. (2020). Digital family life: A systematic review of the impact of parental smartphone use on parent-child interactions. Digital Psychology, 1(1), 29-43.	Ikke systematisk oversikt (ikke syst. syntese), blander alle typer studiedesign, hovedsakelig tverrsnitt (fra grålitt. søket)
Lee G and Yang E . (2021). Factors Related to Smartphone Overdependence in Mothers of Preschoolers: A Systematic Review and Meta-Analysis. Journal of Psychosocial Nursing & Mental Health Services, , pp.1-8.	Systematisk oversikt, men handler om telefonavhengighet hos mødre av førskolebarn
McDaniel Brandon T. (2019). Parent distraction with phones, reasons for use, and impacts on parenting and child outcomes: A review of the emerging research. Human Behavior and Emerging Technologies, 1(2), pp.72-80.	Ikke systematisk oversikt (ikke klare inklusjonskriterier, ikke systematisk søk, ingen kvalitetsvurdering av inkluderte studier)
Modecki Kathryn L, Low-Choy Samantha and Uink Bep N; Vernon Lynette ; Correia Helen ; Andrews Kylie ;. (2020). Tuning into the real effect of smartphone use on parenting: A multiverse analysis. Journal of Child Psychology and Psychiatry, 61(8), pp.855-865.	Ikke oversikt, en tverrsnittstudie
Nghi Bui and John McAloon Josephine Paparo Shauna Byrne. (…). A systematic review on parental characteristics and screen time in early childhood development.	Ikke tilstrekkelig informasjon til å kunne finne oversikten
Shweta Agarwal. (…). Parental influence on screen time and physical activity in preschoolers.	Ikke tilstrekkelig informasjon til å kunne finne oversikten
Sudan M, Birks L E and Aurrekoetxea J J; Ferrero A ; Gallastegi M ; Guxens M ; Ha M ; Lim H ; Olsen J ; Gonzalez-Safont L ; Vrijheid M ; Kheifets L ;. (2018). Maternal cell phone use during pregnancy and child cognition at age 5years in 3 birth cohorts. Environment International, 120, pp.155-162.	Ikke systematisk oversikt, oversikten undersøker effekter av mors bruk av mobiltelefon under svangerskapet

Ekskluderte studier fra søk etter primærstudier, lest i fulltekst (n=34):

Studie	Eksklusjonsårsak
Atli (2019) Impact of parents' technology use on 18- to 24-month-old infants' adaptive behaviors	Tverrsnittstudie, måler skjermbruk generelt (alle typer og ikke spesielt i samvær med barn)
Attai (2020) Associations between Parental and Child Screen Time and Quality of the Home Environment: A Preliminary Investigation	Tverrsnittstudie, måler skjermbruk generelt (alle typer og ikke spesielt i samvær med barn)
Barnier (2019) Screens and their effects on the parent-child relationship	Ikke empirisk studie, fransk
Bauer N S. (2018). Technoference over time and parenting	Kommentar, ikke empirisk studie
Clement M. (2020). Children 0-6 years old and digital nomadic devices. Evaluation of exposure and its effects through the international literature	Ikke empirisk studie

Detnakarintra (2019) Positive mother-child interactions and parenting styles were associated with lower screen time in early childhood	Måler ikke skjermbruk under samvær med barn (kun skjermbruk)
Elias (2020-21) "where are you?" an observational exploration of parental technoference in public places in the us and israel	Kvalitativ studie, public places
Elias (2021) B Food for thought: Parent-child face-to-face communication and mobile phone use in eateries	Kvalitativ studie, public places
Ewin (2021) Mobile devices compared to non-digital toy play: The impact of activity type on the quality and quantity of parent language	Innengruppedesign, men ikke riktig utfallsmål (foreldres språk)
Ewin (2021) B Naturalistic observations of caregiver - child dyad mobile device use	Kvalitativ metode, kun noe kvantifisert, barn opp til 12 år
Jones (2020) Mindfulness as a new parenting model to scaffold children against risks of media exposure	Mixed metode (survey + intervjuer), ikke riktig forskningsspørsmål
Kiefner-Burmeister (2020) Feeding in the Digital Age: An Observational Analysis of Mobile Device Use during Family Meals at Fast Food Restaurants in Italy	Kvalitativ studie
Krogh (2021) A longitudinal examination of daily amounts of screen time and technoference in infants aged 2-11 months and associations with maternal sociodemographic factors	Ikke riktig utfall målt hos barna (kun deres skjermbruk)
Krupa (2019) Relationship Between Screen Time and Mother-Child Reciprocal Interaction in Typically Developing Children and Children with Autism Spectrum Disorders	Kun editors letter - og ikke riktig målt eksponering, kun antall min brukt skjerm hos foreldre
Kushlev (2019) Smartphones distract parents from cultivating feelings of connection when spending time with their children	(studie 1) RCT, men målerIkke riktig utfall (måler kun hos foreldre og ikke i relasjon til barna). (studie 2) kvantitativ dagbokstudie/tverrsnitt
Lemish (2020) “Look at me!” Parental use of mobile phones at the playground	Kvalitativ studie
Linder (2021) The impact of parent and child media use on early parent-infant attachment	Tverrsnittstudie, måler ikke kun mobile skjermer og ikke skjermbruk i samvær med barn
Mangan (2018) Mobile device use when caring for children 0-5 years: A naturalistic playground study	Naturalistisk observasjonsstudie, men måler ikke mobilbruk og konsekvenser i sammenheng
Matthes (2021) Fighting over smartphones? Parents' excessive smartphone use, lack of control over children's use, and conflict	Longitudinell, selvrapportert i to x survey, men feil forskningsspørsmål
McDaniel (2016) Technology interference in the parenting of young children: Implications for mothers' perceptions of coparenting	Tverrsnittstudie, men fokusert på co-parenting
McDaniel (2018) Technoference: longitudinal associations between parent technology use, parenting stress, and child behavior problems	ikke riktig forskningsspørsmål, måler bruk av alle typer skjermer
McDaniel (2021) The DISRUPT: A measure of parent distraction with phones and mobile devices and associations with depression, stress, and parenting quality	Utvikling av et nytt måleinstrument, valideringsstudie

Poulain (2019) Media Use of Mothers, Media Use of Children, and Parent-Child Interaction Are Related to Behavioral Difficulties and Strengths of Children	Tverrsnittstudie men måler alle typer skjermbruk
Radesky (2014) Patterns of mobile device use by caregivers and children during meals in fast food restaurants 2014	Kvalitativ studie
Radesky (2020) Smartphones and Children: Relationships, Regulation, and Reasoning	Ikke empirisk studie, guest editorial
Raudaskoski (2017) The influence of parental smartphone use, eye contact and 'bystander ignorance' on child development	Ikke empirisk studie, discussion paper/illustration of mechanisms
Rodriguez N A and Hageman J R; Pellerite M. (2018). Maternal distraction from smartphone use: a potential risk factor for sudden unexpected postnatal collapse of the newborn	Brev til redaktøren
Stenberg (2020) Infants react differently to adults' noncontingent responding depending on the adult's activity	Ikke riktig PICO, sammenligner telefonbruk med lesing av bok
Stockdale Laura A and Coyne Sarah M; Padilla-Walker Laura M;. (2018). Parent and child technoference and socioemotional behavioral outcomes: A nationally representative study of 10- to 20-year-old adolescents	Større barn/ungdom
Stupica Brandi (2016). Rounding the bases with a secure base	Større barn (3-12 år, gjennomsnitt 6,8, ingen subgruppeanalyse
Wang X, Qiao Y and Li W ; Lei L ;. (2021). Parental Phubbing and Children's Social Withdrawal and Aggression: A Moderated Mediation Model of Parenting Behaviors and Parents' Gender	Tverrsnittstudie, større barn
Wu (2012) Maternal mobile phone use and children's neurocognitive development	Handler om stråling
Zayia Danielle, Parris Leandra and McDaniel Brandon ; Braswell Gregory ; Zimmerman Corinne ;. (2021). Social learning in the digital age: Associations between technoference, mother-child attachment, and child social skill	Større barn
Zayia Danielle N. (2021). Social learning in the digital age: The impact of technoference on mother-child attachment and social skills	Større barn

Vedlegg 5: Relevante tverrsnittstudier

Følgende studier er relevante for forskningsspørsmålet, men ble ekskludert for de har et tverrsnittdesign (n=15):

Studie
Blackman (2016) Screen time for parents and caregivers: Parental screen distraction and parenting perceptions and beliefs
Carson (2021) The association between parent-child technology interference and cognitive and social-emotional development in preschool-aged children
Corkin (2021) Associations between technoference, quality of parent-infant interactions, and infants' vocabulary development
Davidovitch (2018) The role of cellular phone usage by parents in the increase in ASD occurrence: A hypothetical framework
Inoue (2021) A Mothers' habitual smartphone use, infants during breastfeeding, and mother-infant bonding: A longitudinal study
Kernaghan (2018) Parenting Infants in a Digital World Connections
McDaniel (2018) B Technoference: Parent Distraction With Technology and Associations With Child Behavior Problems
Modecki K L, Low-Choy S and Uink B N; Vernon L ; Correia H ; Andrews K ;. (2020). Tuning into the real effect of smartphone use on parenting: a multiverse analysis
Sharpe (2021) The effects of touchscreen technology usage on the social emotional development of preschool-aged children
Sundqvist (2020) Relationship between family technoference and behavior problems in children aged 4-5 years
Sundqvist (2021) Growing Up in a Digital World – Digital Media and the Association With the Child's Language Development at Two Years of Age
Tharner (2021) Mothers' smartphone use and mother-infant interactive behavior in the postpartum period
Vik (2021) Parental phone use during mealtimes with toddlers and the associations with feeding practices and shared family meals: a cross-sectional study
Wolfers (2020) Phone use while parenting: An observational study to assess the association of maternal sensitivity and smartphone use in a playground setting
Wong (2020) Parent Technology Use, Parent–Child Interaction, Child Screen Time, and Child Psychosocial Problems among Disadvantaged Families

Vedlegg 6: Oversikt over alle studier og utfallsmål

Nedenfor presenteres en oversikt over alle inkluderte studier og hvilke utfall som er målt (n=21). Hvordan utfallene er kategorisert, kan gjenfinnes i tabellene for de enkelte studiene (vedlegg 2).

Tabell 19. Oversikt over alle inkluderte studier om hvilke utfall som er målt (n=21)

Studie	**Studiedesign**	***1. Stress hos barn***	***2. Samspill mellom foreldre og barn***	***3. Foreldres oppmerksomhet***	***4. Felles oppmerksomhet***	***5. Respons fra forelder***	***6. Emosjonell tilgjeng. hos foreldre***	***7. Tilknytning barn-foreldre***	***8. Emosjonell /kognitiv utv. hos barn***
Abeele (2020)	Observational					X			
Bury (2020)	Observational		X						
Cosottile (2021)	Within-subjects		X	X					
Inoue (2021B)	Within-subjects		X	X					

Studie	Studiedesign	*1. Stress hos barn*	*2. Samspill mellom foreldre og barn*	*3. Foreldres oppmerksomhet*	*4. Felles oppmerksomhet*	*5. Respons fra forelder*	*6. Emosjonell tilgjeng. hos foreldre*	*7. Tilknytning barn-foreldre*	*8. Emosjonell /kognitiv utv. hos barn*
Khourochvili (2017)	Within-subjects		X						
Kildare (2017)	Within-subjects	X	X						
Konrad (2021) A	RCT		X						X
Konrad (2021) B	RCT	X	X						
Lederer (2021)	Within-subjects		X			X			
Myruski (2018)	Within-subjects	X	X						X
Nakagawa (2019)	Within-subjects			X					
Nomkin (2021)	Within-subjects			X					
Ochoa (2021)	Observational		X	X	X	X	X		
Radesky (2015)	Observational		X			X			
Reed 2017	Within-subjects								X
Rothstein (2018)	Within-subjects		X			X			

Studie	**Studiedesign**	***1. Stress hos barn***	***2. Samspill mellom foreldre og barn***	***3. Foreldres oppmerksomhet***	***4. Felles oppmerksomhet***	***5. Respons fra forelder***	***6. Emosjonell tilgjeng. hos foreldre***	***7. Tilknytning barn-foreldre***	***8. Emosjonell /kognitiv utv. hos barn***
Rozenblatt-Perkal (2022)	RCT	X							
Stockdale (2020)	Within-subjects	X	X						
Van Telgen (2017)	Observational		X			X			
Ventura (2019)	Within-subjects		X	X		X			
Totalt		5	15	6	1	7	1	-	3

Vedlegg 7. Oversikt over vurdering av kunnskapsgrunnlaget

Graderingene er basert på en veiledning av Murad og medarbeidere (29).

Table 20. Breast feeding sitations (n=5). Certainty in evidence in the absence of a single estimate effect

GRADE domain	Judgement	Concerns about certainty domains
Methodological limitations	Two of the four trials had low risk of bias; however their contribution to the total sample size was small. One other trial was at moderate risk of bias and one was high. Selection of participants was unclear in some studies, blinding is difficult in this type of studies but in some studies the participants or evaluators were unaware of the study hypothesis. Surprisingly ethical assessment was not present in all studies, neither was trial registration or a published protocol of the studies so we cannot discount selective outcome reporting	Serious
Indirectness	The dyads (parent-child), exposure and comparators in the studies all provide direct evidence to the clinical question at hand. In these trials, all interventions included an interruption component (with some variation in the direct respiratory therapy component). The outcome(s) was assessed using different scales in different trials. We judged the evidence to have no serious indirectness but noted variability in the intervention and heterogeneity in outcome measure.	Not serious
Imprecision	The total number of dyads included in the trials was 259 (range 7 -195). Some trials reported significant results, and other trials reported 'non-significant results' likely because of enrolling a small number of participants which resulted in wide confidence intervals that included meaningful benefits and no effects. None of them stated power calculations and minimally important difference. One study stated that they set a minimum sample size based on a similar study conducted before. We judged the evidence to have serious imprecision.	Serious

Inconsistency	The direction and magnitude of effect varied across the different trials	Not serious
Publication Bias	We did not strongly suspect publication bias because both trials with significant and non-significant results were published, and the search for studies was comprehensive.	Not suspected
	Overall evaluation: Very low confidence	

Table 21. Play sitations group 1, modified still face studies (n=4). Certainty in evidence in the absence of a single estimate effect

GRADE domain	Judgement	Concerns about certainty domains
Methodological limitations	Among the four studies, two of them had moderate and two was judged to have low risk of bias. Bias was mainly a cause of selection of participants, performance biases (blinding) and ethics.	Not serious-serious
Indirectness	All the studies captured the objective of the review in terms of population, intervention, comparison, and outcome measures with noted heterogeneity between the measurement methods.	Not serious
Imprecision	The total number of dyads included in the trials was 330 (range 19–227). Just one study mentioned power calculations as a limitation. They have stated that they could not meet the required sample size. Remaining studies did not mention power calculations or minimally important difference. Some trials reported significant results, and other trials reported 'non-significant results' likely because of enrolling a small number of participants which resulted in wide confidence intervals that included meaningful benefits and no effects.	Serious
Inconsistency	Although the magnitude of effect varied, there were no opposite directions of effect.	Not serious
Publication Bias	We did not strongly suspect publication bias because both trials with significant and non-significant results were published, and the search for studies was comprehensive.	Not suspected
	Overall evaluation: Low confidence	

Table 22. Play sitations group 2, other studies (n=5). Certainty in evidence in the absence of a single estimate effect

GRADE domain	Judgement	Concerns about certainty domains
Methodological limitations	Among the five studies, one of them had high, three of them had moderate and one of them judged to have low risk of bias. Selection and performance biases were the main domains for the judgements of moderate and high risk of biases.	Serious
Indirectness	All the studies captured the objective of the review in terms of population, intervention, comparison and outcome measures with noted heterogeneity between the measurement methods.	Not serious
Imprecision	The total number of dyads included in the trials was 283 (range 33–106). Two of the five studies with the RCT design had power calculations and reached the calculated sample sizes. Remaining three within subjects studies did not mention power calculations or minimally important difference. Some trials reported significant results, and other trials reported 'non-significant results' likely because of enrolling a small number of participants which resulted in wide confidence intervals that included meaningful benefits and no effects.	Serious
Inconsistency	Although the magnitude of effect varied, there were no opposite directions of effect.	Not serious
Publication Bias	We did not strongly suspect publication bias because both trials with significant and non-significant results were published, and the search for studies was comprehensive.	Not suspected
	Overall evaluation: Low confidence	

Table 23. Learning situations (n=2). Certainty in evidence in the absence of a single estimate effect

GRADE domain	Judgement	Concerns about certainty domains
Methodological limitations	The two studies included in this category are at high risk of bias. For the RCT there are some concerns with the allocation and baseline information, deviations from the intended intervention, missing outcome data, and selection of the reported results. In the within subject design study, participants selection and masking are unclear, and information on ethical approval of the study was not reported.	Serious
Indirectness	The dyads (parent-child), exposure provide direct evidence to the clinical question at hand. In these trials, all interventions/exposure included an interruption component were of direct interest to our research question. The outcome(s) was	Not serious

	assessed using different scales in different trials. We judged the evidence to have no serious indirectness but noted some variability in the two studies and heterogeneity in outcome measures.	
Imprecision	The total number of dyads included in the trials was 134 (range 44 -90). The final sample included in the analysis and thus the accurate representation of the results is unclear in both studies. None of the studies report on conducting power calculations. One trial reported significant results, and the other larger trial reported mainly 'non-significant results'. We judged the evidence to have some imprecision.	Serious
Inconsistency	The direction and magnitude of effect varied across the different trials	Need information
Publication Bias	We did not strongly suspect publication bias because both trials with significant and non-significant results were published, and the search for studies was comprehensive.	Not suspected
	Overall evaluation: Very low confidence	

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April 2022
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