

## **The Benefits for Children of Playing with Trains**

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### **Summary**

When children play, they do so in many different ways and involve lots of different toys. The variety of interactions has different benefits for children's development. Toy trains are something that children really enjoy playing with and can play with in different ways, but what particular benefits do they offer? To answer this question, scientific studies of children's play with trains have been reviewed by a researcher with expertise in the field of play. Thirty-six studies from around the world have looked at children's play with toy trains and have found that when children play with toy trains they animate and give life to the toys whilst telling imaginative stories. Children also set up and organise all the trains and the tracks either to get ready to play or just because they enjoy doing it. Both types of play can involve children playing on their own or with other people, and when they play with other people their play patterns with trains lead to them talking more pro-socially (and disruptively) – and more about their own wants and goals – than when they play with some other toys. Finally, although some children seemed to want to play with toy trains more than others, there were really few differences, particularly between boys and girls, in how they played with toy trains. This tells us that when children play with toy trains, they're getting an opportunity to develop and practise skills that are beneficial for them. This includes: creativity and imagination; language skills; social skills, empathy and general understanding of others; and some thinking skills that are important for problem solving. This means that children can develop important skills simply by playing with toy trains.

### **Why might playing with trains be beneficial for children's development?**

Children play in all different kinds of ways. They play on their own, play with other people, play board games, play video games, play pretend, and play with toys. For decades, scientists and researchers like myself have been finding out more and more about how important play is, in all its forms, for children's development and well-being.

One part of children's play that really stands out is that they often involve lots of different toys. How children play can vary depending on what toy is there and can range from children using their hands (and mouths!) to explore the physical parts of the toys, to organising and setting up the toys, to then playing pretend with them. There is a lovely quote that toys can act as a 'prod to the imagination' (Cohen & MacKeith, 1991, p. 24), which reflects this idea that toys can prompt children to create particular storylines, characters, and sound effects to accompany and structure how they're playing (Singer & Singer, 1990; Trawick-Smith et al., 2015). Beyond just playing with toys themselves, children also narrate stories or announce to the room what they're doing; they may be interacting with other children or adults they're playing with, meaning they need to negotiate what the toys are, who they belong to, or what the 'story' is; they might show their problem solving abilities and other thoughts in arranging or building the toys; and they might really start to express their creativity not only in the storylines and characters being created, but also in pretending the toys are something else entirely.

But do certain toys allow opportunities for children to play in particular ways that are beneficial for their development? The answer generally seems to be yes. Some work by myself and my colleagues Dr Sarah Gerson and Dr Ross Vanderwert at Cardiff University has found that playing with dolls activates areas of the brain associated with social information processing, which is involved in skills like empathy. This means it provides unique opportunities to practise these kinds of skills, in comparison to activities like playing with tablet games (Hashmi et al., 2021, 2022). Other scientists and researchers have looked at more construction-based toys like blocks and found that these types of toys provide opportunities for children to develop their thinking skills around the sizes, shapes, and positions of different objects (Ferrara et al., 2011) as well as reading and maths skills (Hanline et al., 2009). Even electronic toys and computer games have been found to be beneficial for children's thinking and certain social skills (Granic et al., 2014).

So how about toy trains and the sets that come along with them? These types of toys might help to inspire children's pretend play, similar to how dolls do, but they might also give children an opportunity to work on construction of the tracks and explore how the trains themselves move. But what does the current scientific research say about the benefits children get from playing with trains?

### **How can we start to answer this question?**

To answer the question about what we know about the benefits for children of playing with trains, I carried out a systematic search of all the scientific research that has been published around this topic (for more information about what the search involved, see Appendix 1). Over 1,600 scientific research papers have looked at *something* to do with trains and play, but only **36 scientific studies have examined the different ways in which children play with trains or what the benefits of playing with trains are.**

I read each of these 36 studies and recorded key information from each one, which included: (1) The country in which the study was done; (2) the age, gender, and any other reported characteristics of the children who took part; (3) what aspect of playing with toy trains the study was looking at; and (4) what they found. The key trends, findings, and conclusions from these studies are presented below.

### **What kinds of scientific research studies have been done to look at children's play with trains?**

**Scientists from around the world are studying children's play with trains.** Although over half of the studies (58%) have investigated children in North America (18 in US, three in Canada), and a quarter of the studies (25%) have investigated children in Europe (three in the UK, four in France, one in Italy, one in Finland), the remaining 17% of the studies investigated children's play with trains in Australia, Turkey, China, and Qatar.

**Scientists are investigating lots of different groups of children.** Three-quarters of the studies recruited both boys and girls, with no known clinical diagnoses, from different socio-demographic backgrounds, and from different ethnic, cultural or racial groups. The other 25% looked at how neurodivergent children or children with different long-term health conditions played with trains. On average, the children that were a part of the research studies were five years old, but the overall range was from 1 year old to 15 years old.

**Scientists are asking lots of different questions about children's play with trains.** In the 36 studies, **half of them explored the different ways in which children play with toy trains:** Do they play pretend and create imaginative stories? Do they set-up and construct the train tracks, trains and other toys? If they're playing with another child or adult, how do they navigate playing with that other person? Over two-thirds of the studies involved children playing together with another person, and **some studies (31%) looked at how children socialised with other people when playing** with toy trains. **A few studies (19%) looked at how playing with toy trains was associated with children's development,** particularly in terms of their language, social behaviours and their understanding of other people. Finally, **over a third of the studies (39%) explored whether some children prefer playing with trains** compared to other toys, and looked at whether there was any variation between groups of children (e.g., according to neurodiversity or gender).

### **What did these scientific research studies find in terms of children's play with trains?**

#### How are children playing with toy trains?

**Children from around the world play pretend with toy trains.** Studies involving children in China (Chu et al., 2006), Australia (Desha et al., 2003), and America (Howe et al., 2022a) all found that children pretend play with toy trains. Boys and girls in these studies were generally similar in their pretend playing with the toy trains (Desha et al., 2003; Howe et al., 2022a) and did so to the same extent as with other toys (Desha et al., 2003). However, although the *amount* of pretend play with toy trains was the same, one study found that the pretend play might be different: when playing with trains, pretend play was often centred around what the toys were (i.e., they were playing 'train themes'), while with other types of toys the themes of play were quite different from the themes of the toys themselves (Howe et al., 2022a; Petrakos & Howe, 1996).

There were some situations in which children engaged in less pretend play with toy trains. One study found that neurodivergent children were less likely to play pretend with toy trains (Desha et al., 2003), and children who were less familiar with toy trains also showed less pretend play with these toys (Howe et al., 1993). For situations where children may not know how to play pretend with toy trains, studies have also found that children can learn how to do so by watching another person playing pretend (Dalgin-Eyiip & Ulke-Kurkcuoglu, 2021).

**Playing pretend is not the only way that children play with toy trains.** In the research studies, children also played with toy trains by setting up the tracks, trains and other related toys (e.g., the train station) (Howe et al., 2022a). Some of the researchers even turned this into a 'problem-solving task' where they asked children to build a train track to match a particular pattern, in order to see how they talk and gesture to themselves to help solve this problem (Spektor-Levy et al., 2017). Similar to with pretend play, in situations where children may not know how to play with toy trains in this way, they can learn how to do so by watching another person constructing the trains and tracks (Besler & Kurt, 2016).

**Children also show off their humour when playing with toy trains.** In some studies, scientists looked at how children involve humour when playing with toys, including toy trains (Paine et al., 2019, 2021). This included children making up nonsense words and phrases, telling funny stories, making funny noises and sound effects, bantering with the people they were playing with and making silly body movements, amongst many other things!

### How are children socialising when playing with trains?

**Children in the studies played with trains on their own and with other people.** In general, studies found that when children are with their peers, younger children tend to play with toys like trains on their own, but as they grow older they play with others (Parten, 1933; Roggman, 1989). In addition to children playing socially with toy trains as they get older, one study found that familiarity with toy trains helped children's interactions concerning their play to become more spontaneous and fluid (Alhaddad et al., 2018).

Some of the studies also found that **how children communicate with each other when playing with toys is different** depending on who they are playing with (Leach et al., 2019ab, 2022ab) and what they're playing with (Howe et al., 2022a, 2022b). Specifically, when playing with toy trains, children were found to be more social (both being more pro-social and disruptive) compared to when playing with other toys (Howe et al., 2022b), and have conversations that reflect their own goals, desires and intentions for the play (Howe et al., 2022a).

### How is children's play with trains associated with their development?

Not many studies looked at children's development specifically, but **we can take away a lot about how playing with trains is associated with their development from the studies that look at children's play and social behaviours** (see section on key messages below). One study found that children's language production increased over a period of three months when they were given toys, including trains, to play with (O'Bleness, 2016). However, the children who didn't play with trains also produced more language after three months, so this might have just been down to children's language developing as they get older. Other studies have looked at specific types of language that children use when playing with toys like trains. In particular, some research has found that **children talk about the minds and inner worlds of others (people, toys, and characters they've created) when playing with toys, including toy trains** (Leach et al., 2015; Howe et al., 2022a).

### Do some children prefer playing with toy trains?

**Yes!** In studies that have looked at how different groups of children enjoy playing with different toys, **neurodivergent children were found to particularly enjoy playing with toy trains** compared to other toys, and more so than neurotypical children (Alhaddad et al., 2018; Desha et al., 2003; Dominguez et al., 2006; Parten, 1933). In addition to this, some research has found that **boys prefer playing with toy trains more than girls** (Lamminmäki et al., 2012; Le Maner-Idrissi, 1996; Le Maner-Idrissi & Renault, 2006). But in all the other research that has been discussed, **boys and girls played with toy trains in the same way** (i.e., in terms of pretend play, social behaviours etc.), and not all the research found this gender-related preference toy preference – **girls in some studies wanted to play with toy trains as much as the boys** (Desha et al., 2003; Trawick-Smith et al., 2015).

The studies on children's play with trains included children from lots of different countries, cultures and socio-demographic backgrounds. One of the studies looked at **whether play was different in American children from different cultural and sociodemographic backgrounds and found that it was no different** (Trawick-Smith et al., 2015).

## What are the key messages and what do they mean?

The results of all these scientific studies are really interesting, but what exactly do they mean? In this section, I have brought together these findings along with other things we know about play and children's development to summarise how playing with trains can benefit children.

**1. Children pretend play with toy trains (at least) as much as they do with other types of toys.** This was the case for boys and girls, for children in North America, Australasia and Asia, and for children from different socio-demographic backgrounds. This is great because it tells us that **all children could gain benefits from playing pretend with toy trains.** The kinds of benefits that other researchers have found for children who pretend play more often include:

- Better skills in **planning, self-control, memory and attention**, a set of skills referred to as 'executive function' (Albertson & Shore, 2009; Kelly & Hammond, 2011). We also see from other research that playing pretend more often **improves** these skills (Thibodeau et al., 2016).
- Increased **creativity and imagination** (Russ & Wallace, 2013; Sachet & Mottweiler, 2013). We also see from other research that playing pretend more often **improves** later creativity (Sansanwal, 2014).
- Better **language development**. We also see from other research that playing pretend more often **improves** children's language development (Lillard et al., 2013).
- Better **perspective-taking skills** (Dunn & Cutting, 1999; Harris, 2000) and **empathy** (Brown et al., 2017). We can't say yet based on research whether pretend playing more often improves these abilities, but researchers at Cardiff University and King's College London are looking to answer this question.

**2. When children play with toy trains with other children, they have different kinds of conversations** which are more pro-social and collaborative, and which reflect children's goals. This is likely because compared to other toys like village sets – which are quite 'open-ended' in how they can be played with – train sets are more straight-forward in terms of what the pieces are and how they should be played with. Children can therefore get straight into talking with one another about what they are going to do, for example how they are going to arrange the train tracks (Howe et al., 2022a). This tells us that **if children are playing together with toys like train sets, they have more opportunities to practise their collaboration and cooperation skills.**

There are two other aspects of children's play when they play with other people that are noteworthy. Firstly, **children talk about the minds of other people, toys, and characters they've created when playing with toy trains.** This is beneficial, because the more children use this type of language, the better they get at understanding what other people might think, feel and do (Bianco et al., 2016). These 'social understanding' skills are also associated with **children's use of humour during play (Paine et al., 2022), which is also present when children play with trains.**

**3. Although some of the research found that boys prefer toys like trains more than girls do, boys and girls did play with toy trains in similar ways in the studies.** This tells us that **boys and girls both benefit from playing with toy trains and play with them in the same kinds of ways, regardless of whether they would have picked them to play with themselves.**

4. One reason why children *might* play more with toy trains compared to other toys is because **toy trains reflect something that children are familiar with and that are realistic**. This means that **children have a reference point for how they should play with these toys** because they know what they are from the world around them (Chu et al., 2006). This is not the case for toys where children are less familiar with what they are and therefore how they should be played with. Children do seem to pretend play with toy trains by playing out themes or scenarios that are expected and which reflect what the toys are, for example moving the train along the track and ‘walking’ toy passengers onto the train to be picked up and taken to their destinations (Howe et al., 2022b). Other researchers have found something similar with other types of toys, **where children pretend played more with toys that were structured and realistic compared to toys that weren’t** (McLoyd, 1983; Trawick-Smith, 1990). This all means then that children *might* play, and pretend play, more often with toys like train sets that are realistic and familiar to them, and therefore this might provide more opportunities to develop the benefits discussed above.

### **Conclusions**

Children from different backgrounds enjoy playing with toy trains in different kinds of ways. Children play pretend with toy trains both on their own and with other children, as well as playing by setting up and organising the trains, tracks and other toys that are part of train sets. Therefore, playing with trains gives children an opportunity to develop and practise a range of skills that are beneficial for their development and well-being, including: creativity and imagination; language; social skills, empathy and understanding of others; and thinking skills that are important for problem solving. This is great news for both parents and children: something that children love doing – playing with toy trains – is beneficial for many aspects of their development.