

### **Video 3: Cognitive Development**

Narrator:

The Swiss psychologist, Jean Piaget, investigated children's cognitive development by administering sets of experimental tasks. Children's performance on these tasks reflected their stage of development and these tasks have come to be seen as classic experiments in developmental psychology. One of the concepts that Piaget suggested was absent from pre-operational children's representation of the world, was conservation: the understanding that a quantity will be the same even if its manner of presentation changes.

Kieron Sheehy (Researcher):

Does this one have more play dough, does this one have more play dough or do they have the same amount?

Imogen (age 5):

They have the same.

Kieron Sheehy:

(Conversation of Mass)

They have the same amount, right, okay now. Watch, if I do this, you leave that one, Okay. Now, does this one have more play dough, does this one have more play dough or do they have the same amount?

Imogen:

This one has more play dough.

Kieron Sheehy:

That one has more play dough, now how do you know it's got more play dough?

Imogen:

Because it's not like that one.

Kieron Sheehy:

It's not like that one, yeah?

Kieron Sheehy:

Does this one have more play dough, does this one have more play dough or do they have the same amount?

Lewis (age 4):

That one has more in it.

Kieron Sheehy:

This one has more play dough? How do you know it's, has more play dough?

Lewis:

It's because it's longer.

Kieron Sheehy:

'Cos it's longer. Right.

Kieron Sheehy:

Is there more play dough in this one, is there more play dough in this one or is there the same amount?

Meryn (age 6):

I don't know.

Kieron Sheehy:

You don't know.

Kieron Sheehy:

Is there more play dough in this one, more play dough in this one or is there the same amount? What do you think?

Huwie (age 6):

There's more play dough in this one.

Kieron Sheehy:

Is there more in this one, more in this one or do they have the same amount?

Christie (age 8):

They have the same amount 'cos they're still the same.

Kieron Sheehy:

It's still the same amount?

Christie:

Yeah.

Kieron Sheehy:

Okay, is there more in this one, more in this one or do they have the same amount?

Emmie (age 7):

They have the same amount but that one's in a different shape.

Narrator:

The older children appear to understand conservation of mass.

Kieron Sheehy:

Same amount?

Joe:

Same amount.

Narrator:

And this suggests that they are at the concrete operation stage of cognitive development. Piaget also investigated children's grasp of conservation in relation to volume, weight, area, length and number.

Kieron Sheehy: (Conservation of Number)

India look, we've got a line of counters here and a line of counters here. Okay. So are there more in this one, more in this one or do they have the same number?

India (age 5):

The same number.

Kieron Sheehy:

They've got the same number. So if I do this, so now we've got a row of counters here, a row of counters here. Okay. Is there more in this one, more in this one or do they have the same number?

India:  
More in that one.  
Kieron Sheehy:  
More in this one?  
India:  
'Cos it's stretchy.  
Kieron Sheehy:  
More of that 'cos it's stretched, oh I see. That's great.  
Kieron Sheehy:  
Does this one have more, does this one have more or do they have the same number?  
Imogen:  
That one has more.  
Kieron Sheehy:  
That one has more.  
Kieron Sheehy:  
Is there more in this one, more in this one or do they have the same number?  
Nicholas (age 5):  
There's more.  
Kieron Sheehy:  
Okay, so one's got more than the other?  
Nicholas:  
'Cos that looks like there's none there.  
Kieron Sheehy:  
Oh right, so they're not the same any more. Okay.  
Kieron Sheehy:  
Is there more in this one, more in this one or do they have the same number?  
Christie (age 8):  
They have the same number.  
Kieron Sheehy:  
Is there more in this line, more in this line or do they have the same number?  
Sophie (age 7):  
They have the same number.  
Kieron Sheehy:  
Thank you very much, that's all we had to do. That's brilliant.  
Narrator:  
A similar comparison can be made in relation to volume.  
Kieron Sheehy:  
(Conservation of Volume)  
More in this one? How about now?  
Anna (age 6):  
The same.  
Kieron Sheehy:

The same, so there's the same amount in both. Okay. Now is there more in this one, more in that one or the same amount in both?

Anna:

More in that one.

Kieron Sheehy:

More in that one.

Kieron Sheehy:

Okay, does this one have more rice, does this one have more rice or do they have the same amount?

Nicholas:

This one.

Kieron Sheehy:

Which one?

Nicholas:

This one.

Kieron Sheehy:

This one has?

Nicholas:

More than that one.

Kieron Sheehy:

More than this one.

Kieron Sheehy:

Now is there more in this one, more in this one or do they have the same amount?

Emmie:

Same amount because, 'cos this one's wider, there's more room for the rice to spread out so...

Kieron Sheehy:

And if I pour this one into there. There. Does this one have more rice, does this one have more rice or do they have the same?

Johnny (age 8):

Same.

Kieron Sheehy:

Have the same.

Kieron Sheehy:

Now. Okay. Is there more in this one, more in this one or do they have the same amount?

Sophie:

They have the same amount.

Kieron Sheehy:

They still have the same amount.

Narrator:

The results of the number and volume tasks further support the view that younger children have yet to develop an understanding of conservation.

In Piagetian theory, pre-operational children lack the ability to reflect on operations. Their understanding of the world tends to focus on states rather than on transformations and this is seen in their performance on conservation tasks. Similarly, such children are unable to comprehend points of view different from their own, and Piaget devised an experiment to explore this. He was influenced by the view of the Swiss Alps outside the Institut Rousseau in Geneva where he worked.

Kieron Sheehy: (Three Mountains)

I've got four cards here with pictures on. Pictures of mountains. Which picture shows what you can see from where you are?

Lewis:

All of them.

Kieron Sheehy:

All of them. And which one looks most like what you can see? You know, with the way the mountains look to you?

Lewis:

That one.

Kieron Sheehy:

That one. That's right, that's right. If dolly were you, would she see the same as you?

Lewis:

Yes.

Kieron Sheehy:

That's right, so which picture would be the right one for dolly as well?

Lewis:

The same.

Kieron Sheehy:

The same. That's right. Now, if I put dolly over here, right, over there, which picture now shows what dolly can see?

Lewis:

The same again.

Kieron Sheehy:

The same, you point to the one, point to the card that you think shows what dolly can see.

Lewis:

That one.

Kieron Sheehy:

Lovely, okay.

Kieron Sheehy:

If I put dolly over there, which picture shows what she can see?  
That one, okay. If I put dolly over there, which picture would show what she can see?

Meryn:

That one.

Kieron Sheehy:

Okay. If the dolly was sat where you are.

Kieron Sheehy:

If the dolly was sat where you are.

Emmie:

Here.

Kieron Sheehy:

Yeah, which picture would show what she can see?

Emmie:

This one.

Kieron Sheehy:

The same one, yes, that's right. Now, if I put the dolly over here, okay, so she's in a different place, which picture shows what she can see now?

Emmie:

That one.

Kieron Sheehy:

Lovely, that one, very good.

Kieron Sheehy:

Where would we put dolly so she would see that view?

Johnny:

Right behind that big mountain.

Kieron Sheehy:

Yeah, looking this way but over there?

Johnny:

Mmm.

Narrator:

So what we've seen seems to support Piaget's conclusions about these younger and older children being at different stages of cognitive development. The younger children are pre-operational and have yet to develop their understanding of conservation of mass, number or volume. They're also appearing egocentric: being centred on their own perceptions. This contrasts with the performance of the older children who are at the concrete operation stage.

Subsequent researchers, most notably Margaret Donaldson, have argued that young children's reasoning is more sophisticated than Piaget's research implied. Donaldson, together with Martin Hughes, designed an alternative experiment to investigate children's egocentricity in perspective taking.

Kieron and India: (Hiding from Policeman)

If a policeman stands over here, can he see the little girl from there? He can, can't he? Oh yeah. What about put the little girl there, can he see her now? She stands there. He can. What about if the little girl's there? That's right, he can't see her over there, right, but the policeman has got a friend, look. Ah ha. Right. If the friend stands there, where could the little girl go to hide? Ah, very good. Right. Okay. Take the little girl back. Now, two policemen now I think, and he stands there. That's very good, that's very quick so they, can they see her now? All right. What about if the two of them stand like that, where could the little girl hide? Brilliant.

Kieron Sheehy:

Where could the little boy hide so the policeman can't see him?

Lewis:

Here.

Kieron Sheehy:

Brilliant. Okay. The policeman's got a friend, okay, and his friend stands there. Where could the little boy go now?

Lewis:

There.

Kieron Sheehy:

Oh yes.

Kieron and Meryn:

What about if the policeman's friend stands there, where could the little boy hide? Ah ha, they won't catch him there, will they. Right, won't find him there. What about...

Narrator:

So this experiment suggests that young children can successfully adopt the viewpoints of the two policemen and hide the toy. In this situation, the young children are more competent and less egocentric than predicted by Piaget. One explanation for this is that the Donaldson and Hughes experiments made human sense and that this made them more understandable for the child. Other researchers went on to re-examine some of the conservation experiments. McGarrigal and Donaldson revisited the conservation of number experiment, and this time, built in a reason for manipulating the counters.

Kieron Sheehy: (Naughty Teddy)

So Meryn, we've got two lines of counters, okay. Are there more in this line, more in this line or do they have the same number?

Meryn:

They, they have the same number.

Kieron Sheehy:

Have the same number. Okay. Now, oh who's coming?

Meryn:

Teddy bear.

Kieron Sheehy:

Hello. He likes that, doesn't he, likes playing with those, or, that, or. So now look at the lines. Got the line there and another line there. Is there more in that one, in that one or do they have the same number?

Meryn:

The same number.

Kieron Sheehy:

Look what the teddy's doing? He's naughty, isn't he, really? Do we have a cheeky monkey or a cheeky teddy? So now we've got the lines so, are there more in this line, more in this line or do they have the same number?

Iona (age 6):

Same number.

Kieron Sheehy:

Got the same number, haven't they.

Kieron Sheehy:

Look at this, oh this is a, oh, oh no. Go back over there, so... and there he goes. Now, now we've still got two lines, okay. Are there more in this line, more in this line or do they have the same number?

Oscar (age 4):

The same number.

Kieron Sheehy:

They've got the same number. Thank you Mr Bear.

Narrator:

Paul Light and his co-researchers worked on a classic conservation of volume experiment which provided a reason for making a transfer of pasta from one container to another. In this example, we've used rice, as we did before. The children were told that they would be taking part in a competitive game. After they'd agreed that the two beakers contained the same amount, the experimenter noticed that one of the beakers was chipped around the rim.

Kieron Sheehy:

Does this one have more rice in, does this one have more rice in or have they got the same amount?

Huwie:

The same amount.

Kieron Sheehy:

Oh hang on, this one's chipped. I'll tell you what, I'll put this in, oh dear, now, sorry. So does this one have more rice, does this one have more rice or do they have the same amount?

Huwie:

That one's... they have the same...

Kieron Sheehy:  
They have the same amount?

Huwie:

Yes.

Kieron Sheehy:

Oh hang on, we can't use that, can we, chip in. So sorry, so has this got more rice, this got more rice or have they got the same amount?

Iona:

Same amount.

Kieron Sheehy:

They've got the same amount, right.

Narrator:

All of these experiments are seen as classic developmental tasks that have helped to build our understanding of children's cognitive development. Viewed overall, these tasks indicate that children's understanding is embedded in a social context. When the social context gives the task a more accessible meaning, as in the work of Donaldson and others, children are able to offer more appropriate responses.