SUPPLEMENTARY ONLINE MATERIALS

Developmental Evidence for a Link between

the Inherence Bias in Explanation and Psychological Essentialism

Table of Contents

Appendix S1

Scripts from the books used in Study 2

Introduction

Alright, now I thought we would take a break from those pictures and questions, and read this book together! And, as we go through the book, I am going to bring out Feppy here a few times, and we will tell him about some of the things we are reading. So, we need to pay close attention so that we can tell Feppy what we read about. Okay, let's get started!

This book is called "Why?" It talks about why some things are the way they are!

Coin Chapter

Pro-Inherence book	Anti-Inherence book
Let's talk about coins. You know how coins are round, right?	Let's talk about coins. You know how coins are round, right?
Well you know, it seems right that coins are round. Look, they fit into candy machines just right. If they were a different shape, they wouldn't fit in so well.	Well you know, a long time ago in all sorts of places, like Spain, coins were not like coins are today. They were not round, they were all different shapes. Look here. They used these as their money.
Also, it works really well that coins are round, because then, when you reach into your pocket to get some coins, they won't poke you. If coins were a different shape, they might be pointy and poke you.	Today we have round coins, but they don't have to be that way. They are round today just because people decided that they wanted it to be that way. But as long as you can use them to buy things, it doesn't matter what coins look like.
And, you know how there are faces on coins? Well, because faces are round, and we put faces on coins, it seems like a good reason to make coins round. It makes perfect sense that coins are round.	In the future, people might decide to make coins square or triangle shaped, or maybe even star shaped. People get to decide.
[*bring out Feppy, the stuffed toy*]	[*bring out Feppy, the stuffed toy*]
So, can you tell Feppy why coins are round?	So, can you tell Feppy why coins are round?
[*if child does not answer:*] Let's think about it together. What did we just read about that we could tell Feppy?	[*if child does not answer:*] Let's think about it together. What did we just read about that we could tell Feppy?
[*if child still does not answer:*] Well maybe we could tell Feppy that coins are round because then they fit into candy machines.	[*if child still does not answer:*] Well maybe we could tell Feppy that coins are round because it is what people decided.

Fire Trucks Chapter

Pro-Inherence book	Anti-Inherence book
Let's talk about fire trucks. You know how fire trucks are red, right? Well you know, it seems right that fire trucks are red. Look, red is the same color as fire. If fire trucks were a different color, it wouldn't match so well.	Let's talk about fire trucks. You know how fire trucks are red, right? Well you know, in all sorts of other places like Hawaii, they have fire trucks that aren't red, they're yellow. Look here. These are fire trucks.
Also, it works really well that fire trucks are red,	Here, we have red fire trucks, but they don't have to be

because it is really easy to see the color red. If they were a different color, they might not be so easy to see.

And, you know how red is the color of stop signs. Well, because when you see a fire truck you should stop and let it pass, it seems like a good reason to have fire trucks the same color as stop signs. It makes perfect sense that fire trucks are red.

[*bring out Feppy, the stuffed toy*]

So, can you tell Feppy why fire trucks are red?

[*if child does not answer:*] Let's think about it together. What did we just read about that we could tell Feppy?

[*if child still does not answer:*] Well maybe we could tell Feppy that fire trucks are red because it is the color of fire.

that way. We have red fire trucks just because people decided that they wanted them to be that way. But as long as the firemen can use them to put out fires, it doesn't matter what fire trucks look like.

In the future, people might decide to make fire trucks purple or green, or maybe even lots of colors at once. People get to decide.

[*bring out Feppy, the stuffed toy*]

So, can you tell Feppy why fire trucks are red?

[*if child does not answer:*] Let's think about it together. What did we just read about that we could tell Feppy?

[*if child still does not answer:*] Well maybe we could tell Feppy that fire trucks are red because it is what people decided.

Clapping Chapter

Pro-Inherence book	Anti-Inherence book
Let's talk about clapping. You know how we clap when someone does a good job, right?	Let's talk about clapping. You know how we clap when someone does a good job, right?
Well you know, it seems right that people clap when someone does a good job. Clapping can be loud, so if someone is far away, they can still hear you clapping and they will know they did a good job.	Well you know, in lots of places, they don't clap when people do a good job. They shake their hands instead. Look, these people are shaking their hands after someone did a good job.
Also, clapping is pretty easy. It isn't hard to clap, so lots of different people can let someone know they did a good job.	Here we clap when someone does a good job, but we don't have to do that. We clap just because people decided that they wanted it to be that way. But as long as you let the person know that they did a good job, it doesn't matter how you do it.
And, when lots of people think they did a good job, the clapping will be even louder, and the person will know then that lots of people think they did a good job. It makes perfect sense that people clap when someone does a good job.	
	In the future, people might decide to shake their head, stomp their feet, or even stick out their tongue when someone does a good job. People get to decide.
[*bring out Feppy, the stuffed toy*]	[*bring out Feppy, the stuffed toy*]
So, can you tell Feppy why we clap when someone does a good job?	So, can you tell Feppy why we clap when someone does a good job?
[*if child does not answer:*] Let's think about it together. What did we just read about that we could tell Feppy?	[*if child does not answer:*] Let's think about it together. What did we just read about that we could tell Feppy?
[*if child still does not answer:*] Well maybe we could tell Feppy that we clap because then people can hear us from far away.	[*if child still does not answer:*] Well maybe we could tell Feppy that we clap because it is just what people decided.

Orange Juice Chapter

Pro-Inherence book	Anti-Inherence book
Let's talk about orange juice. You know how we drink orange juice at breakfast time, right?	Let's talk about orange juice. You know how we drink orange juice at breakfast time, right?
Well you know, it seems right that we drink orange juice at breakfast time. Orange juice is really healthy for you, and all the healthy things in it like Vitamin C help give you energy for your day.	Well you know, in lots of other places, like China they don't drink orange juice at breakfast. Look here. In this place, these people drink soy bean beverage at breakfast time.
Also, orange juice tastes really good with breakfast foods. If we didn't drink it with breakfast it might not taste so good.	Here we drink orange juice at breakfast time, but it doesn't have to be that way. We drink orange juice at breakfast time just because people decided that they wanted it to be that way. But as long as it's healthy and it tastes good, people can drink whatever they want at breakfast.
Also, it works really well that we drink orange juice in the morning, because orange juice is kind of sour, which wakes you up in the morning. It makes perfect sense that we drink orange juice at breakfast time.	In the future, people might decide to drink apple juice, tomato juice, or even pickle juice at breakfast time. People get to decide.
[*bring out Feppy, the stuffed toy*]	[*bring out Feppy, the stuffed toy*]
So, can you tell Feppy why we drink orange juice for breakfast?	So, can you tell Feppy why we drink orange juice for breakfast?
[*if child does not answer:*] Let's think about it together. What did we just read about that we could tell Feppy?	[*if child does not answer:*] Let's think about it together. What did we just read about that we could tell Feppy?
[*if child still does not answer:*] Well maybe we could tell Feppy that we drink orange juice for breakfast because it gives you energy for your day.	[*if child still does not answer:*] Well maybe we could tell Feppy that we drink orange juice for breakfast because it is what people decided.

Brainstorming session following the book reading

Okay! Now, imagine we had to add another part to this book. If we wanted to add another part to it, what would you want to add? What else should we add that...

Pro-Inherence book	Anti-Inherence book
... makes perfect sense? Oh, I know! How about why school buses are yellow!	... was something people decided? Oh, I know! How about why school buses are yellow!
Okay, and what would we talk about? Why does it make perfect sense that school buses are yellow?	Okay, and what would we talk about? What else could school buses be like?
[if the child does not answer, or if the answer does not align with inherent reasoning]	[if the child does not answer, or if the answer does not align with anti-inherent reasoning]
Let's think about it together. Why does it make perfect sense that school buses are yellow? Maybe because it helps us know it's a school bus?	Let's think about it together. What else could school buses be like? Maybe they could be orange?

Appendix S2
Scripts from the books used in Study 3

Introduction

Alright, now I thought we would take a break from those pictures and questions, and read this book together! And as we read the book I am going to bring my friend Feppy out and we are going to tell him what we are reading about. So we have to pay close attention to the book, so we can tell Feppy what we are reading. I am going to put him under here while we read, and I will bring him out soon!

This book is called "Why?" It talks about why some things are the way they are!
So you know how we drink orange juice at breakfast? And you know how coins are round, and fire trucks are red? And you know how we clap when someone does a good job? Some things like these are the way they are because…

Pro-Inherence book	Anti-Inherence book
…they make perfect sense. Some things just go together. Maybe they go together because of the way the things look, or maybe they do together because of the way the things work. So, today, some things are the way they are because it makes perfect sense for them to be that way. They really work best that way.	…of people a long time ago. Many people many years ago just decided to make them that way, or maybe something happened that made them that way. So, today, some things are the way they are just because of people many years ago. And people could have easily made them another way.

Orange Juice Chapter

Pro-Inherence book	Anti-Inherence book
Let's talk about orange juice. You know how we drink orange juice at breakfast time, right?	Let's talk about orange juice. You know how we drink orange juice at breakfast time, right?
Well, once there was a boy who liked to play outside. He and his friends played lots of running games. One morning, the boy drank orange juice. This helped give him energy for his day so that he could run with his friends.	Well, once there was a farmer who had a farm in a very hot place. He and his friends grew lots of oranges. One time, many years ago, they grew so many oranges that they couldn't eat them all. The farmer had an idea!
The taste of the oranges was kind of sour, which woke him up. And the healthy things in oranges helped him run really fast. It worked really well that he drank the orange juice in the morning.	He would make orange juice! But he still had too much. So, he told other people to drink some of the orange juice for breakfast. Then, people did! And other people kept copying them.
So, that's why we drink orange juice for breakfast, because these two things just go together. It really works best that way.	So, that's why we drink orange juice for breakfast, just because someone a long time ago made it that way, but people could have easily made it a different way if they wanted.
[*bring out Feppy, the stuffed toy*]	[*bring out Feppy, the stuffed toy*]
Can you tell Feppy why we drink orange juice for breakfast? What did we read about?	Can you tell Feppy why we drink orange juice for breakfast? What did we read about?
[*if child mentions anything from the chapter beyond having orange juice at breakfast time:*] Yeah! That's right!	[*if child mentions anything from the chapter beyond having orange juice at breakfast time:*] Yeah! That's right!
[*if the child does not mention something from the chapter beyond having orange juice at breakfast time:*] Maybe we can tell him it worked really well to do that.	[*if the child does not mention something from the chapter beyond having orange juice at breakfast time:*] May we can tell him someone just happened to make it that way.

Coin Chapter

Pro-Inherence book	Anti-Inherence book
Let's talk about coins. You know how coins are round, right?	Let's talk about coins. You know how coins are round, right?
A long time ago people just used *coins* [*emphasis included in reading*] as their money. Lots of people kept the coins in their pockets or in small bags. When they reached into their pockets or bags to get them out, the round shape of the coin worked really well.	Well, a long time ago there were places that used coins that were all different shapes. Many years ago, lots of people from the place with round coins moved to all different places all over the world.
The coins were round and so it was smooth in people's hands. And the round shape made the coins really easy to hold.	After they moved, they got the people in their new town to use round coins instead. Then, slowly countries all over the world started to use round coins.
So, just like we drink orange juice for breakfast because it makes perfect sense for it to be that way, that's why coins are round, because it makes perfect sense for them to be that way. There is an important reason that they are that way.	So, just like we drink orange juice for breakfast because of someone a long time ago way, that's why we have round coins, because people a long time ago just happened to make it that way. There is no important reason that it is that way.
[*bring out Feppy, the stuffed toy*]	[*bring out Feppy, the stuffed toy*]
Can you tell Feppy why coins are round? What did we read about?	Can you tell Feppy why coins are round? What did we read about?
[*if child mentions anything from the chapter beyond coins being round:*] Yeah! That's right!	[*if child mentions anything from the chapter beyond coins being round:*] Yeah! That's right!
[*if the child does not mention something from the chapter beyond coins being round:*] Maybe we can tell him it worked really well for them to be like that.	[*if the child does not mention something from the chapter beyond coins being round:*] Maybe we can tell him people just happened to start copying other towns.

Fire Trucks Chapter

Pro-Inherence book	Anti-Inherence book
Let's talk about fire trucks. You know how fire trucks are red, right?	Let's talk about fire trucks. You know how fire trucks are red, right?
Many years ago, a fire started in a building. All of the people inside safely left the building. One person called the fire department and another group of people started to get buckets of water to put out the fire. Then, they saw a red fire truck coming down the street.	Many years ago, people decided to make fire trucks to help other people put out fires around town. A group of people in the town got together to decide which color they were going to make the trucks. Some people wanted them to be purple, and some other people wanted them to be black.
They could see the truck very well in the busy traffic because it was red and that color made it really easy to see. They also knew that it was a fire truck because it was red and matched the color of fire.	But, the person who was going to buy the paint wanted them to be red. Red was her favorite color. So, they decided to make fire trucks red. Then, they started to make many red fire trucks, and they sold them to other towns.
So, just like coins are round because it makes perfect sense for them to be that way, that's why fire trucks are red, because these two things just go together. It really works best that way.	[*bring out Feppy, the stuffed toy*]
[*bring out Feppy, the stuffed toy*]	Can you tell Feppy why fire trucks are red? What did we read about?
Can you tell Feppy why fire trucks are red? What did we read about?	[*if child mentions anything from the chapter beyond fire trucks being red:*] Yeah! That's right!
[*if child mentions anything from the chapter beyond fire*	[*if the child does not mention something from the*

trucks being red:] Yeah! That's right!

[*if the child does not mention something from the chapter beyond fire trucks being red:*] Maybe we can tell him it works really well that they are that way.

chapter beyond fire trucks being red:] Maybe we can tell him someone just happened to decide to make them like that.

Clapping Chapter

Pro-Inherence book	Anti-Inherence book
Let's talk about clapping. You know how we clap when someone does a good job, right?	Let's talk about clapping. You know how we clap when someone does a good job, right?
Once there was a girl who really liked to perform on stage. In one place, the stage was very far from the people watching. When she was done, people clapped to tell her she did a good job.	Well once there was a queen. And lots of people would come to perform for her. Everyone watching the shows with the queen would let the performers know they did a good job by yelling things like "hurray" or "good job".
This worked really well, because the clapping was loud, so she could hear them cheering from far away. Also, because there were lots of people, it was even louder, so she knew that lots of people thought she did a good job.	The queen didn't like the way the others cheered. She thought of different ways, like maybe people could lift their arms in the air or stomp their feet. In the end, she just happened to decide that everyone would clap when someone did a good job.
So, just like fire trucks are red because it makes perfect sense for them to be that way, that's why we clap when someone does a good job, just because it makes perfect sense for it to be that way. There is an important reason that we do it that way.	So, just like fire trucks are red because people a long time ago made them that way, that's why we clap when someone does a good job, just because someone a long time ago made it that way. There is no important reason that we do it that way.
[*bring out Feppy, the stuffed toy*]	[*bring out Feppy, the stuffed toy*]
Can you tell Feppy why we clap when someone does a good job? What did we read about?	Can you tell Feppy why we clap when someone does a good job? What did we read about?
[*if child mentions anything from the chapter beyond clapping when someone does a good job:*] Yeah! That's right!	[*if child mentions anything from the chapter beyond clapping when someone does a good job:*] Yeah! That's right!
[*if the child does not mention something from the chapter beyond clapping when someone does a good job:*] Maybe we can tell him it works really well that we do that.	[*if the child does not mention something from the chapter beyond clapping when someone does a good job:*] Maybe we can tell him someone just happened to decide to do that.

Conclusion

Pro-Inherence book	Anti-Inherence book
We talked about why some things are the way they are. Something are the way they are because it makes perfect sense for them to be that way. They just go together because of the way the things look, or because of the way the things work. So, drinking orange juice for breakfast, coins being round, fire trucks being red, and clapping after people do a good job are all just because it makes perfect sense for them to be that way. *And* [*emphasis included in reading*] probably lots of other things today are the way they are because it just makes perfect sense for them to be that way.	We talked about why some things are the way they are. Some things are the way they are because of people a long time ago, but people could have easily make them another way. People might have had an idea and decided for it to be that way, or something might have happened to make it that way. So, drinking orange juice for breakfast, coins being round, fire trucks being red, and clapping after people do a good job are all just because of people long ago. *And* [*emphasis included in reading*] probably lots of other things today are the way they are just because of people long ago.

Table S1

Mean Composite Essentialism Scores in Study 2, with SDs in Parentheses

Condition	All participants	Passed the attention checks (*n* = 41)	Did not pass the attention checks (*n* = 71)
Pro-Inherence			
Pretest	.56 (.19)	.48 (.18)	.63 (.17)
Posttest	.61 (.18)	.57 (.21)	.63 (.15)
Anti-Inherence			
Pretest	.58 (.18)	.59 (.17)	.58 (.19)
Posttest	.58 (.18)	.57 (.16)	.59 (.20)

Note. The averages and standard deviations were computed at the level of individual participants (i.e., after averaging across questions and items within a participant).

Table S2

Fixed Effects from the Main Mixed-Effects Multilevel Regression in Study 2

Predictor	*b*	*SE*	*Bootstrap 95% CI*	*p*
Condition	−.004	.03	−.06, .05	.876
Age	.02	.03	−.03, .08	.406
Phase	.01	.02	−.02, .05	.507
Attention Check Status	−.06	.03	−.13, −.002	.050
Condition × Age	−.01	.05	−.12, .09	.816
Condition × Phase	.04	.04	−.03, .11	.315
Condition × Attention Check Status	−.13	.06	−.26, .01	.056
Age × Phase	.01	.03	−.06, .07	.752
Age × Attention Check Status	.01	.06	−.11, .14	.826
Phase × Attention Check Status	.03	.04	−.04, .10	.491
Condition × Age × Phase	−.08	.07	−.21, .05	.232
Condition × Age × Attention Check Status	.13	.12	−.11, .38	.226
Condition × Phase × Attention Check Status	.15	.08	−.01, .30	.056
Age × Phase × Attention Check Status	.04	.07	−.11, .18	.557
Condition × Age × Phase × Attention Check Status	−.04	.15	−.33, .27	.801

Table S3

The Differences between the Measures of Essentialist Beliefs Used in Studies 2 and 3

Method Details	Study 2	Study 3
Animal kinds used	cats, dogs, birds, frogs	cats, dogs, frogs
Number of trials *before* the book manipulation	2	1
Number of trials *after* the book manipulation	2	2
Properties used in the Innateness question	cat/pig item: *has a straight/curly tail* frog/bunny item: *is slimy/furry*	cat/pig item: *plays with yarn/in the mud* frog/cow item: *hops/walks*

Note. For the Innateness questions, we used only behavioral properties in Study 3 (hence the changes above) because children generally show more variability of opinion about the innateness of behaviors (e.g., Taylor et al., 2009) and thus their essentialist ideas may be easier to manipulate with respect to these properties.

Table S4

Mean Composite Essentialism Scores in Study 3, with SDs in Parentheses

Condition	All participants	Passed the attention checks (*n* = 44)	Did not pass the attention checks (*n* = 68)
Pro-Inherence			
Pretest	.58 (.23)	.43 (.23)	.65 (.20)
Posttest	.64 (.18)	.58 (.14)	.68 (.18)
Anti-Inherence			
Pretest	.56 (.24)	.55 (.23)	.57 (.26)
Posttest	.60 (.21)	.57 (.17)	.61 (.24)

Note. The averages and standard deviations were computed at the level of individual participants (i.e., after averaging across questions and items within a participant).
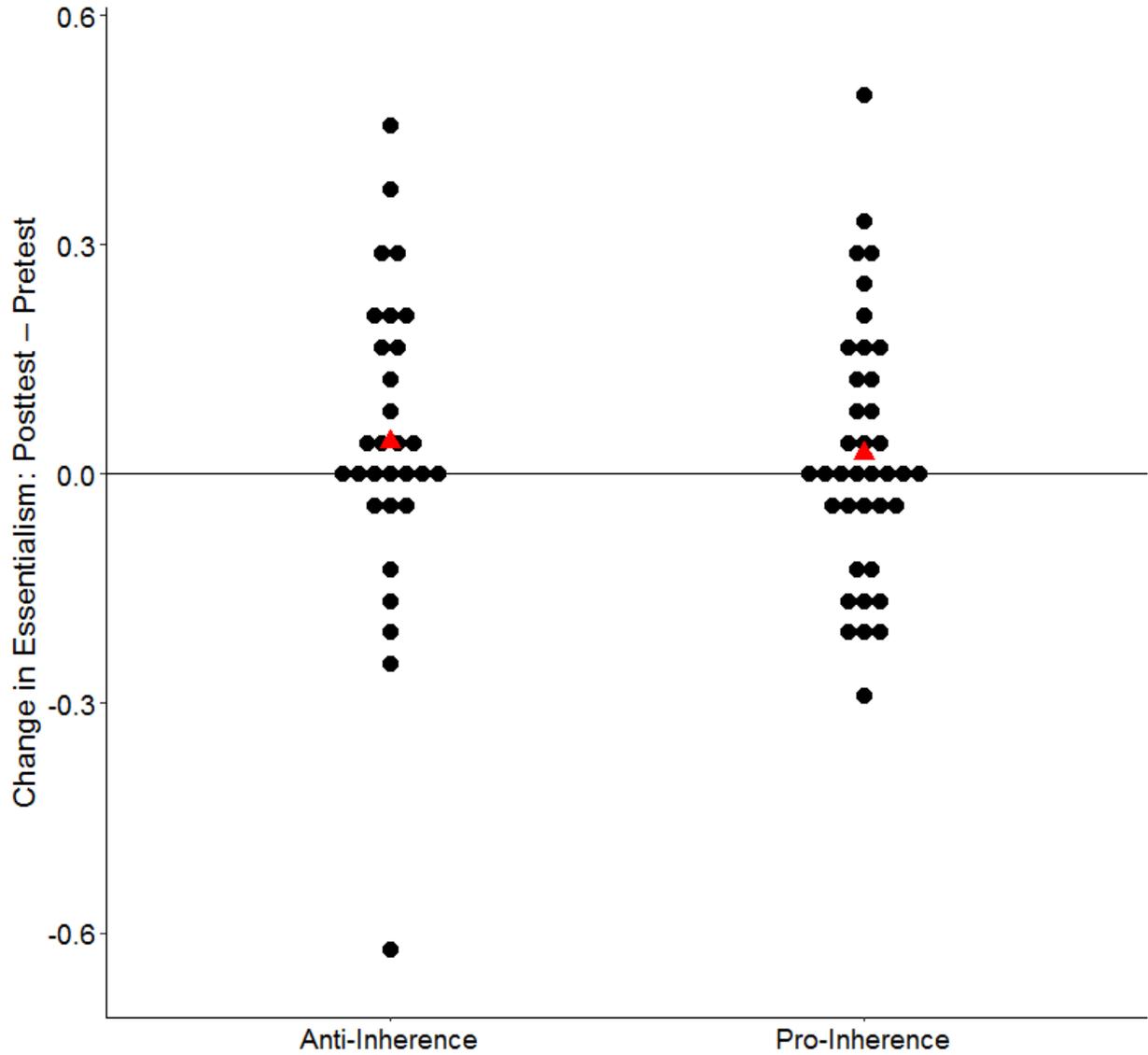
Table S5

Fixed Effects from the Main Mixed-Effects Multilevel Regression in Study 3

Predictor	b	Bootstrapped SE	Bootstrap (95%) CI	p
Condition	−.01	.03	−.07, .05	.789
Age	.03	.03	−.03, .09	.439
Phase	.07	.02	.03, .11	<.001
Attention Check Status	−.10	.03	−.17, −.04	<.001
Condition × Age	−.01	.06	−.14, .11	.951
Condition × Phase	.05	.04	−.03, .14	.205
Condition × Attention Check Status	−.14	.06	−.25, −.01	.040
Age × Phase	.04	.04	−.04, .12	.395
Age × Attention Check Status	−.01	.06	−.13, .13	.918
Phase × Attention Check Status	.05	.04	−.03, .14	.230
Condition × Age × Phase	−.13	.08	−.28, .03	.116
Condition × Age × Attention Check Status[a]	.35	.13	.12, .60	.006
Condition × Phase × Attention Check Status	.20	.09	.04, .38	.021
Age × Phase × Attention Check Status	−.11	.09	−.31, .06	.209
Condition × Age × Phase × Attention Check Status	−.10	.17	−.43, .23	.565

[a] The three-way Condition × Age × Attention Check Status interaction emerged because the two-way Condition × Attention Check Status interaction was significant for the younger but not the older children. The two-way interaction for the younger children was due to the fact that in the Anti-Inherence condition, children who passed the attention check had higher essentialism scores (collapsing across pretest and posttest) than children who did not, whereas the opposite was true in the Pro-Inherence condition. Because this interaction does not involve the key Phase (pretest vs. posttest) variable and thus does not speak directly to the effect of our manipulation, we did not describe it in the main text.

Figure S1. Dot plot of pretest-to-posttest changes in essentialist responses (posttest minus pretest), by Anti- vs. Pro-Inherence condition (Study 2). Only the responses of children who failed the attention check are included in this figure. Each dot represents one child's difference score. The red triangles represent the mean.

Figure S2. Dot plot of pretest-to-posttest changes in essentialist responses (posttest minus pretest), by Anti- vs. Pro-Inherence condition (Study 3). Only the responses of children who failed the attention check are included in this figure. Each dot represents one child's difference score. The red triangles represent the mean.