Stimuli

Full stimulus set for Study 1. Note that the neuroscience information is bolded here, but subjects did not see such marking.

<u>Item 1</u>

Phenomenon: Babies were seated on their mothers' laps in front of a stage. Researchers used a camera to track where the babies were looking. The babies saw a hand reach out and place one doll on the stage. Then a screen was raised, hiding the doll. A hand reached out again and placed a second doll on the stage, out of sight behind the screen. Then the screen dropped. In some cases, there were two dolls on the stage, as there should be, and in some cases there was only one doll. The researchers found that the babies looked much longer at the stage when there was only one doll than when there were two dolls. This looking-time difference between one doll and two dolls lead the researchers to conclude that babies can calculate 1 + 1 = 2.

	Good	Bad
Without Neuroscience (Short)	The researchers claim this	The researchers claim this
	happens because the babies	happens because the amount
	had formed an expectation	of time the babies spent
	about how many dolls there	looking at the stage is directly
	should be on the stage. The	proportional to how much
	babies knew there should be	they liked the display. The
	two dolls, and their surprise at	researchers used this timing
	seeing only one led to their	data to calculate babies'
	looking longer.	preference for the single doll.
Without Neuroscience (Long)	The researchers claim that an	The researchers claim that an
	analysis of the data shows that	analysis of the data shows that
	this happens because babies'	this happens because babies'
	understanding of numbers and	understanding of numbers and
	mathematics, which starts to	mathematics, which starts to
	emerge early in life, governed	emerge early in life, governed
	the babies' expectations about	the amount of time the babies
	how many dolls there should	spent looking at the stage.
	have been on the stage. The	This time is directly
	babies knew there should be	proportional to how much
	two dolls, and their surprise at	they liked the display, and the
	seeing only one led to their	researchers used this timing
	looking longer.	data to calculate babies'
		preference for the single doll.
With Neuroscience (Short)	Scans of the babies' brains	Scans of the babies' brains
	show that the parietal lobe,	show that the parietal lobe,
	known to be involved in	known to be involved in
	math, governed the babies'	math, governed how long
	expectations about how many	babies looked at the stage.
	dolls there should be. They	Researchers used this timing
	expected two, so they were	data, which is proportional to

	surprised to see one, so they looked longer.	babies' liking of the display, to calculate their preferences.
With Neuroscience (Long)	looked longer.The researchers claim thatscans of the babies' brainsshow that this happensbecause the part of babies'brains known to be involvedin math, the parietal lobe,governed the babies'expectations about how manydolls there should be on thestage. The babies knew there	calculate their preferences. The researchers claim scans of the babies' brains show that this happens because the part of babies' brains known to be involved in math, the parietal lobe, governed the amount of time the babies spent looking at the stage. This time is directly proportional to how much
	should be two dolls, and their surprise at seeing only one led to their looking longer.	they liked the display, and the researchers used this timing data to calculate babies' preference for the single doll.

<u>Item 2</u>

Phenomenon: Subjects sat at a computer screen. They saw a rapidly flashing series of pictures of faces. Somewhere in this series of faces there were two pictures of houses. Subjects had to press a button each time they saw a house. When the two houses were far apart in the sequence, the subjects were very good at this task. But when the houses were presented close together in the sequence, subjects failed to press the button for the second house. The researchers call this phenomenon "attentional blink."

	Good Explanation	Bad Explanation
Without Neuroscience (Short)	The researchers claim that this	The researchers claim that this
	phenomenon occurs because	phenomenon occurs because
	the subjects were still	the second house appeared
	processing the first house and	later in the sequence than the
	missed seeing the second	first house, and this temporal
	house because they did not	relationship between the two
	have enough attentional	houses caused the attentional
	resources left.	blink.
Without Neuroscience (Long)	Researchers examined	Researchers examined
	subjects' pattern of button	subjects' pattern of button
	presses after they performed	presses after they performed
	this task. They concluded that	this task. They concluded that
	this phenomenon occurs	this phenomenon occurs
	because of how subjects'	because of how subjects'
	perceptual abilities and their	perceptual abilities and their
	decision-making abilities	decision-making abilities
	functioned in response to the	functioned in response to the
	stimuli. The subjects were still	stimuli. The second house
	processing the first house and	appeared later in the sequence
	missed seeing the second	than the first house, and this
	house because they did not	temporal relationship between
	have enough attentional	the two houses caused the
	resources left.	attentional blink.
With Neuroscience (Short)	Researchers concluded that	Researchers concluded that
	this occurs because of frontal	this occurs because of frontal
	lobe areas, previously shown	lobe areas, previously shown
	to mediate attention.	to mediate attention. The
	Subjects were still processing	second house appeared later in
	the first house and missed the	the sequence. This temporal
	second because they had	relationship between the two
	insufficient attentional	houses caused the attentional blink.
With Nouroscience (Long)	resources. Researchers examined	Researchers examined
With Neuroscience (Long)	subjects' brain activation as	subjects' brain activation as
	they performed this task.	they performed this task.
	They concluded that this	They concluded that this
	phenomenon occurs because	phenomenon occurs because
L	phenomenon occurs because	phenomenon occurs because

of how areas in the frontal lobe, previously shown to mediate attention,	of how areas in the frontal lobe, previously shown to mediate attention,
functioned in response to the	functioned in response to the
stimuli. The subjects were	stimuli. The second house
still processing the first house	appeared later in the sequence
and missed seeing the second	than the first house, and this
house because they did not	temporal relationship between
have enough attentional	the two houses caused the
resources left.	attentional blink.

Phenomenon: Researchers recruited equal numbers of male and female participants. The participants took a series of spatial reasoning tasks and were interviewed. The researchers determined that men are better at spatial reasoning in general. From the interviews, they discovered that the men had played more sports in their childhood on average than the women.

	Good Explanation	Bad Explanation
Without Neuroscience (Short)	The researchers conclude that	The researchers conclude that
	the difference in involvement	women's poor performance
	in sports explains the gender	relative to men's explains the
	difference in spatial reasoning	gender difference in spatial
	abilities.	reasoning abilities.
Without Neuroscience (Long)	Detailed examinations of the	Detailed examinations of the
	subjects' reported	subjects' reported
	backgrounds and of their	backgrounds and of their
	performance on the task	performance on the task
	indicate that the difference in	indicate that women's poor
	involvement in sports causes	performance relative men's
	different types of spatial	causes different types of
	reasoning responses. This	spatial reasoning responses.
	explains the gender difference	This explains the gender
	in spatial reasoning abilities.	difference in spatial reasoning
		abilities.
With Neuroscience (Short)	Brain scans of the right	Brain scans of the right
	premotor area, known to be	premotor area, known to be
	involved in spatial tasks,	involved in spatial tasks,
	indicate that the difference in	indicate that women's poor
	sports involvement explains	performance relative to men's
	this gender difference.	explains this gender
		difference.
With Neuroscience (Long)	Brain scans of the right	Brain scans of the right
	premotor area, known to be	premotor area, known to be
	involved in spatial relational	involved in spatial relational
	tasks, indicate that the	tasks indicate that women's
	difference in involvement in	poor performance relative to
	sports causes different types	men's causes different types
	of brain responses. This	of brain responses. This
	explains the gender difference	explains the gender difference in spatial reasoning abilities.
	in spatial reasoning abilities.	

<u>Item 4</u>

Phenomenon: Subjects were asked to imagine a series of objects that were make-believe (for example, a unicorn) or that were real but not present in the room (for example, a mountain). As the subjects created mental images of the various objects, they were asked questions about their images and told to respond as quickly as possible, without reflecting on their answers. They were also asked the same questions about objects they could actually see in the room (for example, a pen). From an analysis of the responses to these questions and of the times it took subjects to respond, the researchers found a similar pattern of responses and response times for all three types of objects.

	Good Explanation	Bad Explanation
Without Neuroscience (Short)	The researchers claim that this happens because imagining an object, whether real or make- believe, uses the same process as seeing a real object.	The researchers claim that this happens because imagining an object, whether real or make- believe, results in the same array of responses as seeing a real object.
Without Neuroscience (Long)	Patterns of verbal descriptions of the mental images lead researchers to conclude this happens because imagining an object, whether real or make- believe, uses the same process as seeing a real object.	Patterns of verbal descriptions of the mental images lead researchers to conclude that this happens because imagining an object, whether real or make-believe, results in the same array of responses as seeing a real object.
With Neuroscience (Short)	Patterns of brain activation in the visual cortex led researchers to conclude this happens because imagining objects uses the same process as seeing objects.	Patterns of brain activation in the visual cortex led researchers to conclude this happens because imagining objects results in the same array of responses as seeing objects.
With Neuroscience (Long)	Patterns of brain activation in the visual cortex lead researchers to conclude this happens because imagining an object, whether real or make- believe, uses the same process as seeing a real object.	Patterns of brain activation in the visual cortex lead researchers to conclude that this happens because imagining an object, whether real or make-believe, results in the same array of responses as seeing a real object.

Full stimulus set for Study 2. Participants were presented with the good and bad explanations side by side. Note that the neuroscience information is bolded here, but subjects did not see such marking.

<u>Item 1</u>

Phenomenon: Babies were seated on their mothers' laps in front of a stage. Researchers used a camera to track where the babies were looking. The babies saw a hand reach out and place one doll on the stage. Then a screen was raised, hiding the doll. A hand reached out again and placed a second doll on the stage, out of sight behind the screen. Then the screen dropped. In some cases, there were two dolls on the stage, as there should be, and in some cases there was only one doll. The researchers found that the babies looked much longer at the stage when there was only one doll than when there were two dolls. This looking-time difference between one doll and two dolls lead the researchers to conclude that babies can calculate 1 + 1 = 2.

	Good	Bad
Without Neuroscience	The researchers claim this	The researchers claim this
condition	happens because the babies	happens because the amount
	had formed an expectation	of time the babies spent
	about how many dolls there	looking at the stage is directly
	should be on the stage. The	proportional to how much
	babies knew there should be	they liked the display. The
	two dolls, and their surprise at	researchers used this timing
	seeing only one led to their	data to calculate babies'
	looking longer.	preference for the single doll.
With Neuroscience condition	Scans of the babies' brains	Scans of the babies' brains
	show that the parietal lobe,	show that the parietal lobe,
	known to be involved in	known to be involved in
	math, governed the babies'	math, governed how long
	expectations about how many	babies looked at the stage.
	dolls there should be. They	Researchers used this timing
	expected two, so they were	data, which is proportional to
	surprised to see one, so they	babies' liking of the display, to
	looked longer.	calculate their preferences.
Mixed condition	The researchers claim this	Scans of the babies' brains
	happens because the babies	show that the parietal lobe,
	had formed an expectation	known to be involved in
	about how many dolls there	math, governed how long
	should be on the stage. The	babies looked at the stage.
	babies knew there should be	Researchers used this timing
	two dolls, and their surprise at	data, which is proportional to
	seeing only one led to their	babies' liking of the display, to
	looking longer.	calculate their preferences.

<u>Item 2</u>

Phenomenon: Subjects sat at a computer screen. They saw a rapidly flashing series of pictures of faces. Somewhere in this series of faces there were two pictures of houses. Subjects had to press a button each time they saw a house. When the two houses were far apart in the sequence, the subjects were very good at this task. But when the houses were presented close together in the sequence, subjects failed to press the button for the second house. The researchers call this phenomenon "attentional blink."

	Good Explanation	Bad Explanation
Without Neuroscience	The researchers claim that this	The researchers claim that this
condition	phenomenon occurs because	phenomenon occurs because
	the subjects were still	the second house appeared
	processing the first house and	later in the sequence than the
	missed seeing the second	first house, and this temporal
	house because they did not	relationship between the two
	have enough attentional	houses caused the attentional
	resources left.	blink.
With Neuroscience condition	Researchers concluded that	Researchers concluded that
	this occurs because of frontal	this occurs because of frontal
	lobe areas, previously shown	lobe areas, previously shown
	to mediate attention.	to mediate attention. The
	Subjects were still processing	second house appeared later in
	the first house and missed the	the sequence. This temporal
	second because they had	relationship between the two
	insufficient attentional	houses caused the attentional
	resources.	blink.
Mixed condition	The researchers claim that this	Researchers concluded that
	phenomenon occurs because	this occurs because of frontal
	the subjects were still	lobe areas, previously shown
	processing the first house and	to mediate attention. The
	missed seeing the second	second house appeared later in
	house because they did not	the sequence. This temporal
	have enough attentional	relationship between the two
	resources left.	houses caused the attentional
		blink.

Phenomenon: Researchers recruited equal numbers of male and female participants. The participants took a series of spatial reasoning tasks and were interviewed. The researchers determined that men are better at spatial reasoning in general. From the interviews, they discovered that the men had played more sports in their childhood on average than the women.

	Good Explanation	Bad Explanation
Without Neuroscience	The researchers conclude that	The researchers conclude that
condition	the difference in involvement	women's poor performance
	in sports explains the gender	relative to men's explains the
	difference in spatial reasoning	gender difference in spatial
	abilities.	reasoning abilities.
With Neuroscience condition	Brain scans of the right	Brain scans of the right
	premotor area, known to be	premotor area, known to be
	involved in spatial tasks,	involved in spatial tasks,
	indicate that the difference in	indicate that women's poor
	sports involvement explains	performance relative to men's
	this gender difference.	explains this gender
		difference.
Mixed condition	The researchers conclude that	Brain scans of the right
	the difference in involvement	premotor area, known to be
	in sports explains the gender	involved in spatial tasks,
	difference in spatial reasoning	indicate that women's poor
	abilities.	performance relative to men's
		explains this gender
		difference.

Phenomenon: Subjects were asked to imagine a series of objects that were make-believe (for example, a unicorn) or that were real but not present in the room (for example, a mountain). As the subjects created mental images of the various objects, they were asked questions about their images and told to respond as quickly as possible, without reflecting on their answers. They were also asked the same questions about objects they could actually see in the room (for example, a pen). From an analysis of the responses to these questions and of the times it took subjects to respond, the researchers found a similar pattern of responses and response times for all three types of objects.

	Good Explanation	Bad Explanation
Without Neuroscience	The researchers claim that this	The researchers claim that this
condition	happens because imagining an	happens because imagining an
	object, whether real or make-	object, whether real or make-
	believe, uses the same process	believe, results in the same
	as seeing a real object.	array of responses as seeing a
		real object.
With Neuroscience condition	Patterns of brain activation	Patterns of brain activation
	in the visual cortex led	in the visual cortex led
	researchers to conclude this	researchers to conclude this
	happens because imagining	happens because imagining
	objects uses the same process	objects results in the same
	as seeing objects.	array of responses as seeing
		objects.
Mixed condition	The researchers claim that this	Patterns of brain activation
	happens because imagining an	in the visual cortex led
	object, whether real or make-	researchers to conclude this
	believe, uses the same process	happens because imagining
	as seeing a real object.	objects results in the same
		array of responses as seeing
		objects.

Full Stimulus Set for Study 3. Note that the neuroscience information is bolded here and the added jargon is underlined, but subjects did not see such marking.

<u>Item 1</u>

Phenomenon: Babies were seated on their mothers' laps in front of a stage. Researchers used a camera to track where the babies were looking. The babies saw a hand reach out and place one doll on the stage. Then a screen was raised, hiding the doll. A hand reached out again and placed a second doll on the stage, out of sight behind the screen. Then the screen dropped. In some cases, there were two dolls on the stage, as there should be, and in some cases there was only one doll. The researchers found that the babies looked much longer at the stage when there was only one doll than when there were two dolls. This looking-time difference between one doll and two dolls lead the researchers to conclude that babies can calculate 1 + 1 = 2.

	Good Explanation	Bad Explanation
Simple Neuroscience	Scans of the babies' brains	Scans of the babies' brains
	show that the brain region	show that the brain region
	known to be involved in	known to be involved in
	math governed the babies'	math governed how long
	expectations about how many	babies looked at the stage.
	dolls there should be. They	Researchers used this timing
	expected two, so they were	data, which is proportional to
	surprised to see one, so they	babies' liking of the display, to
	looked longer.	calculate their preferences.
Neuroscience Plus Jargon	<u>fMRI</u> scans of the babies'	<u>fMRI</u> scans of the babies'
	brains show that the <u>parietal</u>	brains show that the <u>parietal</u>
	<u>lobe,</u> known to be involved	lobe, known to be involved
	in math, governed the babies'	in math, governed how long
	expectations about how many	babies looked at the stage.
	dolls there should be. They	Researchers used this timing
	expected two, so they were	data, which is proportional to
	surprised to see one, so they	babies' liking of the display, to
	looked longer.	calculate their preferences.

<u>Item 2</u>

Phenomenon: Subjects sat at a computer screen. They saw a rapidly flashing series of pictures of faces. Somewhere in this series of faces there were two pictures of houses. Subjects had to press a button each time they saw a house. When the two houses were far apart in the sequence, the subjects were very good at this task. But when the houses were presented close together in the sequence, subjects failed to press the button for the second house. The researchers call this phenomenon "attentional blink."

	Good Explanation	Bad Explanation
Simple Neuroscience	Researchers concluded that	Researchers concluded that
I I I I I I I I I I I I I I I I I I I	this occurs because of areas	this occurs because of areas
	of the brain involved in	of the brain involved in
	attention. Subjects were still	attention. The second house
	processing the first house and	appeared later in the sequence.
	missed the second because	This temporal relationship
	they did not have enough	between the two houses
	attentional resources left.	caused the attentional blink.
Neuroscience Plus Jargon	Researchers concluded that	Researchers concluded that
	this occurs because of frontal	this occurs because of frontal
	lobe areas, shown to mediate	lobe areas, shown to mediate
	attention. Subjects were still	attention. The second house
	processing the first house and	appeared later in the sequence.
	missed the second because	This temporal relationship
	they did not have enough	between the two houses
	attentional resources left.	caused the attentional blink.

Phenomenon: Researchers recruited equal numbers of male and female participants. The participants took a series of spatial reasoning tasks and were interviewed. The researchers determined that men are better at spatial reasoning in general. From the interviews, they discovered that the men had played more sports in their childhood on average than the women.

	Good Explanation	Bad Explanation
Simple Neuroscience	Brain scans of the region	Brain scans of the region
	known to be involved in	known to be involved in
	spatial tasks indicate that the	spatial tasks indicate that
	difference in sports	women's poor performance
	involvement explains this	relative to men's explains this
	gender difference.	gender difference.
Neuroscience Plus Jargon	<u>fMRI</u> scans of the <u>right</u>	<u>fMRI</u> scans of the <u>right</u>
	<u>premotor area</u> , known to be	premotor area, known to be
	involved in spatial tasks,	involved in spatial tasks,
	indicate that the difference in	indicate that women's poor
	sports involvement explains	performance relative to men's
	this gender difference.	explains this gender
		difference.

<u>Item 4</u>

Phenomenon: Subjects were asked to imagine a series of objects that were make-believe (for example, a unicorn) or that were real but not present in the room (for example, a mountain). As the subjects created mental images of the various objects, they were asked questions about their images and told to respond as quickly as possible, without reflecting on their answers. They were also asked the same questions about objects they could actually see in the room (for example, a pen). From an analysis of the responses to these questions and of the times it took subjects to respond, the researchers found a similar pattern of responses and response times for all three types of objects.

	Good Explanation	Bad Explanation
Simple Neuroscience	Patterns of activation in the	Patterns of activation in the
	vision area of the brain led	vision area of the brain led
	researchers to conclude this	researchers to conclude this
	happens because imagining	happens because imagining
	objects uses the same process	objects results in the same
	as seeing objects.	array of responses as seeing
		objects.
Neuroscience Plus Jargon	Patterns of <u>neural</u> activation	Patterns of <u>neural</u> activation
	in the <u>primary visual cortex</u>	in the <u>primary visual cortex</u>
	led researchers to conclude	led researchers to conclude
	this happens because	this happens because
	imagining objects uses the	imagining objects results in
	same process as seeing	the same array of responses as
	objects.	seeing objects.