b2b
decision labs

inside the buyer's brain

the neuroscience of
digital content

▸ how buyers make
decisions (or not)

memory fuels
decision-making

More than ever, buyers are relying on digital content to learn, form opinions, and decide on the best solution to help them meet their business goals. But before you can persuade people to make a decision and act on your content, you must first create memories in their minds.

How do people form memories? Simply put, the process of creating a memory includes three phases:

• Encoding

• Maintenance

• Retrieval

Before your buyer can remember your content, they must first encode it, which means registering information through their senses. If they maintain focus on the content, a memory gets stored in their mind. And when the memory is stored, they can retrieve it—accessing that information when they need it later on.

The bottleneck in this process is in the maintenance phase, which relies on short-term memory, or "working memory."

Working memory is the process of temporarily holding information in your mind until you complete a cognitive task. It's a form of cognitive workload because it impacts how many things you can hold in your mind at any given time.

Working memory is essential to all your buyer's cognitive tasks. **Every process that involves thinking, understanding, planning, and making a decision involves working memory.**

But as essential as it is, working memory has capacity limitations. And if you want to make your digital content more memorable and actionable, it's important to understand how to counteract these limitations.

Dr. Carmen Simon
Cognitive Neuroscientist,
B2B DecisionLabs

In this report, you'll learn the science behind overcoming the capacity limitations of working memory to make your digital content more memorable and motivating.

When you apply these insights, you influence buying decisions by making it easy for your buyer to understand, remember, and act on your message.

influence
your buyer's memory and decisions

▶ **ANIMATE AND ANNOTATE PRESENTATIONS**

▶ **USE CONCRETE VISUALS**

▶ **CREATE INTERACTIVE EXPERIENCES**

why study the
brain?

The first step in understanding how people react to and remember digital content is to examine what's going on in their brain when they view it.

That's where brain studies come in.

Unlike traditional surveys, focus groups, or voice of the customer research, brain studies examine people's subconscious reactions and emotions in real time (down to the millisecond) as they experience a piece of content like an e-book or a presentation.

Studying the brain in this way is beneficial, because **what people say they think and feel is often different than what they actually do**. People's emotions are fast and fleeting. If you ask someone about their experience after the fact, they might tell you how they thought they felt, but it's difficult for them to remember precisely what happened.

Throughout this report, you'll see an unfiltered view into the minds of B2B decision-makers to understand how buyers truly feel about and react to digital content.

neuroscience *tools*

Every B2B DecisionLabs brain study is conducted with actual B2B professionals and real B2B content. Each participant is fitted with the following equipment while they view and interact with the content:

- **Facial coding** for analyzing facial expressions

- **Eye tracking** for recording where the viewers' eyes focus and for how long

- **GSR** (galvanic skin response) for measuring skin conductivity and excitement

- **EEG** (electroencephalogram) cap for recording brain waves

- **ECG** (electrocardiogram) for recording heart rate

This combination of neuroscience tools provides a comprehensive and undiluted view into people's physiological and psychological reactions in real time.

EEG cap
19 electrodes

ECG cable

Facial coding

Eye tracking

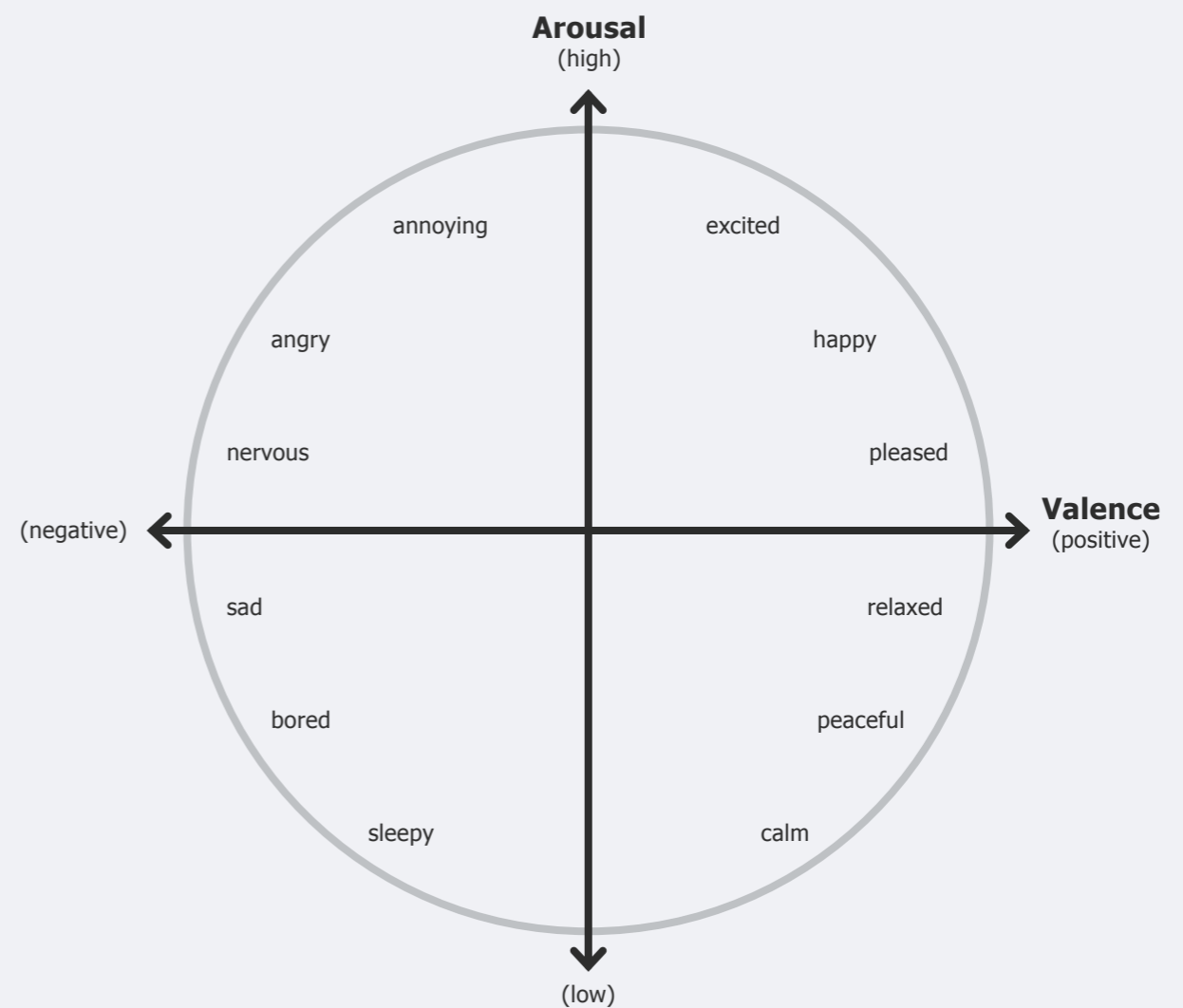**GSR**
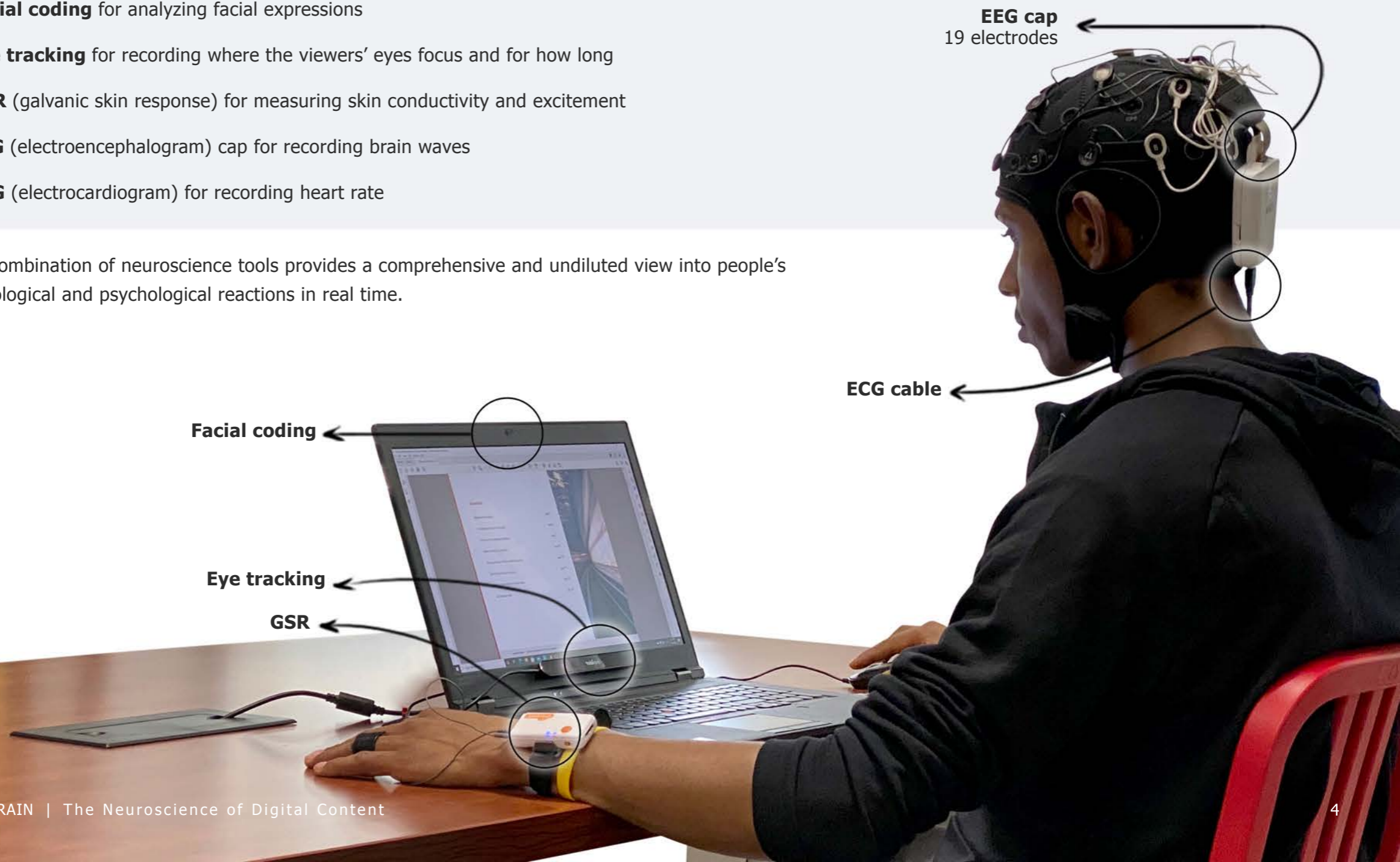
what we
measure

As participants view content during these brain studies, we're measuring their reactions on a spectrum of emotions based on two primary variables: valence and arousal.

- **Valence** – the emotional response to a stimulus, ranging from negative to positive

- **Arousal** – the intensity of the emotion, ranging from calming (low) to very intense (high)

In addition, we can monitor and measure the following variables in real time.

- **Attention**

- **Motivation to act**

- **Working memory** (cognitive workload)

- **Fatigue**

Arousal
(high)

annoying   excited

angry   happy

nervous   pleased

(negative) — **Valence** (positive)

sad   relaxed

bored   peaceful

sleepy   calm

(low)

influence your buyer's memory and decisions

animate and
annotate
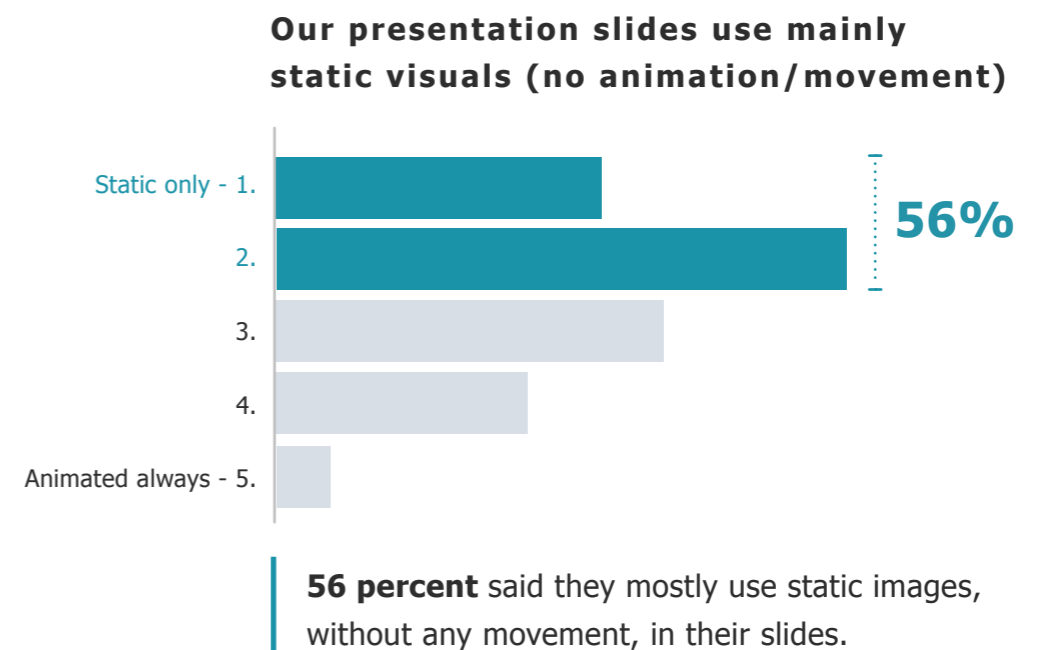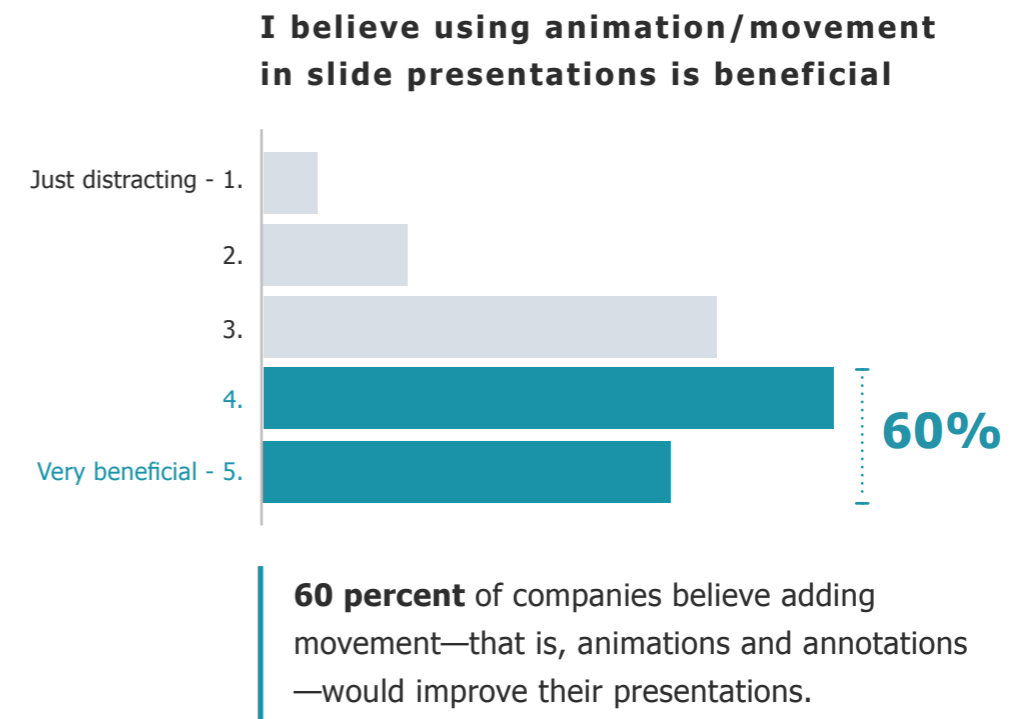presentations

your buyer's brain on *zoom*

Almost every sales conversation now happens in a virtual setting, where it's difficult to read your audience's expressions—even when everyone's on camera—and it's even more difficult to pull them back in when you sense their attention is starting to wander.

Your slide deck is now the center of the conversation. And many organizations are still struggling to keep their buyers focused and engaged during virtual presentations.

In a recent B2B DecisionLabs survey of nearly 300 B2B companies, **60 percent** said they believe adding movement—that is, animations and annotations—would improve their virtual presentations. Yet, the majority still aren't using these techniques: **Just over half (56 percent)** of respondents said they mostly use static images, without any movement, in their slides.

Companies suspect that adding movement could improve their virtual presentations. But will it? And what kind of movement is most effective? Those are the questions we set out to answer by studying how 44 people's brains reacted to various kinds of movement during a technical business presentation.

According to our B2B survey:

I believe using animation/movement in slide presentations is beneficial

Just distracting - 1.
2.
3.
4.
Very beneficial - 5.

60%

60 percent of companies believe adding movement—that is, animations and annotations—would improve their presentations.

Our presentation slides use mainly static visuals (no animation/movement)

Static only - 1.
2.
3.
4.
Animated always - 5.

56%

56 percent said they mostly use static images, without any movement, in their slides.

the *study*

Forty-four B2B professionals listened to a highly technical and complex sales presentation about the need for transformation in the telecom space. The presentation was recorded using Zoom software and contained seven slides. It lasted nine minutes and 20 seconds, and all participants listened to the same voice and the same narration.

Participants were divided into three groups, based on three ways of delivering technical and complex content in a virtual setting:

- **Group 1** (14 participants) viewed a presentation that contained only static images, with no animations or annotations.

- **Group 2** (14 participants) viewed the same presentation as Group 1, but some elements on some slides were animated using PowerPoint animation tools.

- **Group 3** (16 participants) viewed the same presentation as Group 2, but in addition to using PowerPoint animations, the presenter annotated some areas by either typing text or using the Pen feature in PowerPoint to draw circles and arrows.

Each group was also sub-divided into subject matter experts (people with knowledge of the technical content presented) and non-experts (people with business or finance experience, but no advanced knowledge of the technology presented).

After watching the presentation, participants answered a short survey about their experiences.

Group 2: PPT animation

Group 3: PPT animation + annotation

Slide	Group 2	Group 3	Time
Slide 1	0 movements	0 movements	10 seconds
Slide 2	8 movements	31 movements **4x**	218 seconds
Slide 3	7 movements	21 movements **3x**	73 seconds
Slide 4	1 movements	4 movements **4x**	39 seconds
Slide 5	2 movements	2 movements	65 seconds
Slide 6	6 movements	6 movements	151 seconds
Slide 7	1 movements	1 movements	11 seconds

In the **Group 3** presentation, slides with key information included significantly more movement.

show them where to *focus*

Decision-makers don't always have expert knowledge of the technology they need for their business. If you don't add any movement to slides that contain highly complex or technical information, your audience won't always know where to focus—especially if they have no prior knowledge of the subject.

Even if you're presenting the information to a primarily expert audience, you might still need to persuade key stakeholders who don't have any subject matter knowledge—decision-makers from legal or financial departments, for example.

Eye tracking results from this study suggest that if your audience has more subject matter expertise, they may have some idea where to focus their attention.

Still, both experts' and non-experts' attention was scattered when there was no movement to draw the eye to where they should be focusing.

When complex slides included animation and annotation, however, both expert and non-expert audiences knew exactly where they should be looking during the presentation.

Adding animation and annotation makes it easy for everyone to understand the importance and benefits of your solution, regardless of their level of expertise.

Group 1: Eye tracking results

When slides did not include any movement, neither experts nor non-experts knew where to focus.

Group 3: Eye tracking results
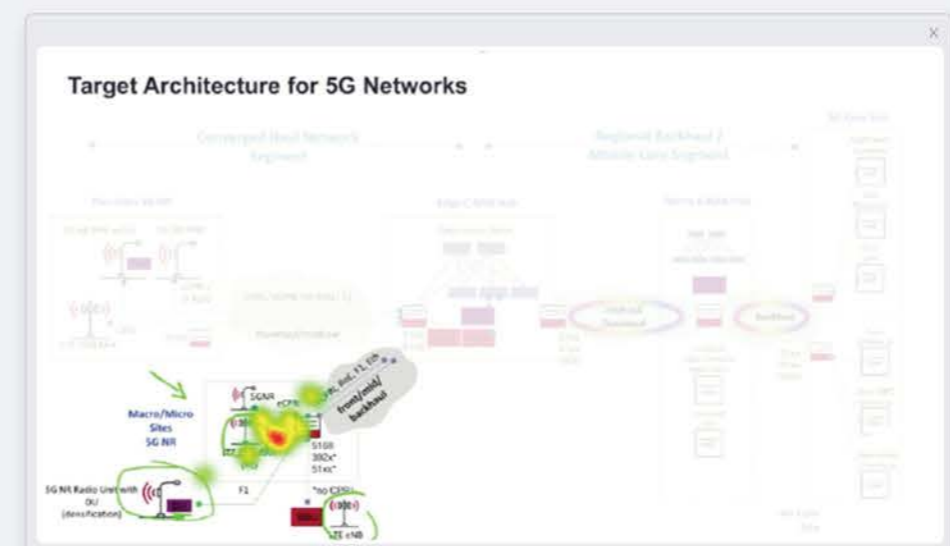
When slides included animation and annotation, all participants were focused on the same information at the same time.

build credibility and *trust*

Your audience is more likely to trust the information you're sharing when they feel both relaxed and engaged.

The study suggests that using annotation hits that mark, giving the impression of authenticity and credibility. When the presenter can tailor their presentation in the moment to the buyer's needs and clarify key points well, the audience feels that the content is more trustworthy.

EEG signals during the presentation

Group 1   Group 2   Group 3
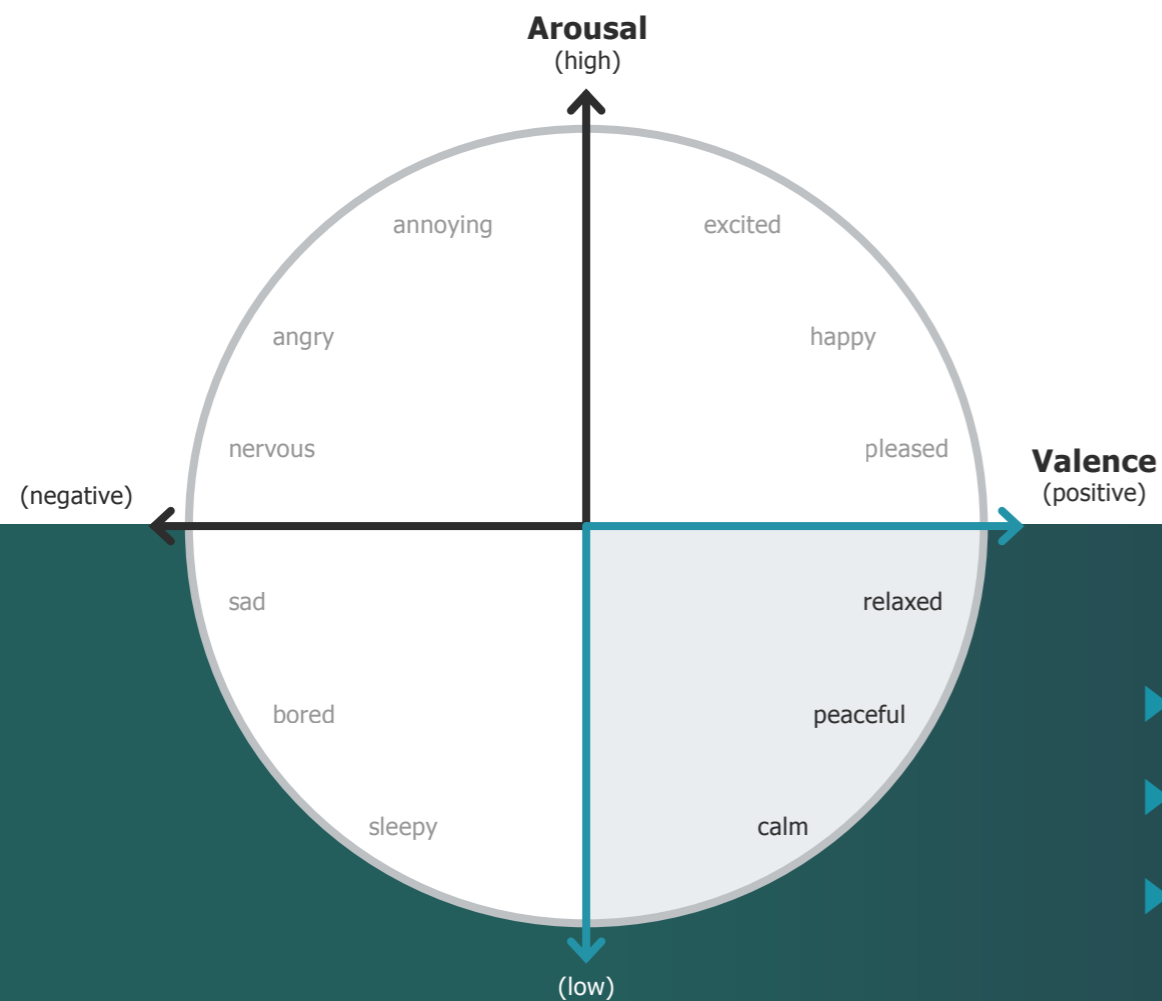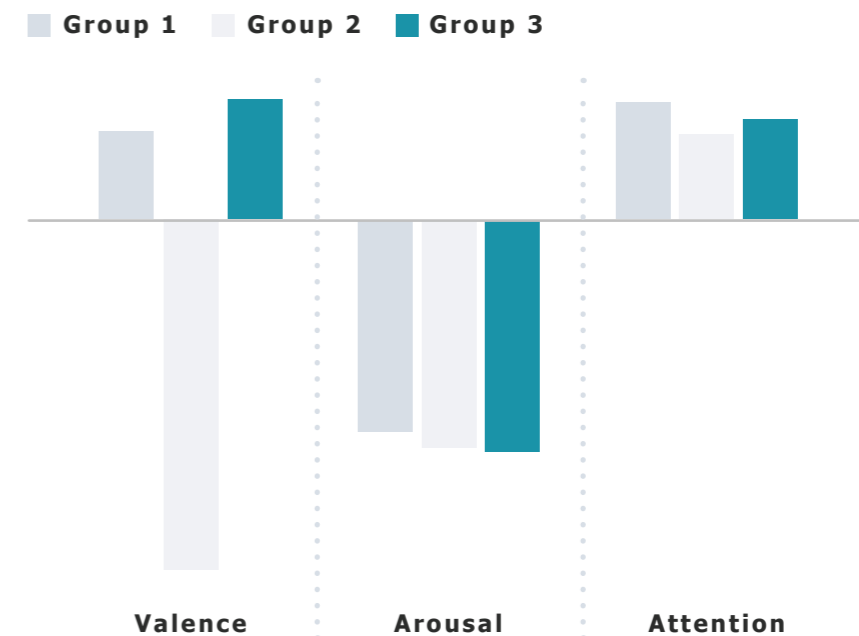
Participants in Group 3 experienced the highest valence, low arousal, and focused attention. They seemed to feel "happily calm" (high valence and low arousal)—a signal that they were relaxed, engaged, and trusted the information presented.

▶ **Positive** Valence

▶ **Low** Arousal

▶ **Focused** Attention

} creating *trust*

make it
enjoyable

It's hard to make someone enjoy highly technical information, but there are ways to increase enjoyment in a way that makes the information more memorable.

EEG signals during the presentation

■ **Group 1**   ■ **Group 2**   ■ **Group 3**

Valence   **Work Mem**   **Fatigue**

When the presentation included more movement, people were more likely to hold the information in their minds for longer (working memory), enjoy the information more (valence), and remain less fatigued. This is important, given that the information they viewed was highly complex and technical.

Valence   **Arousal**   **Attention**
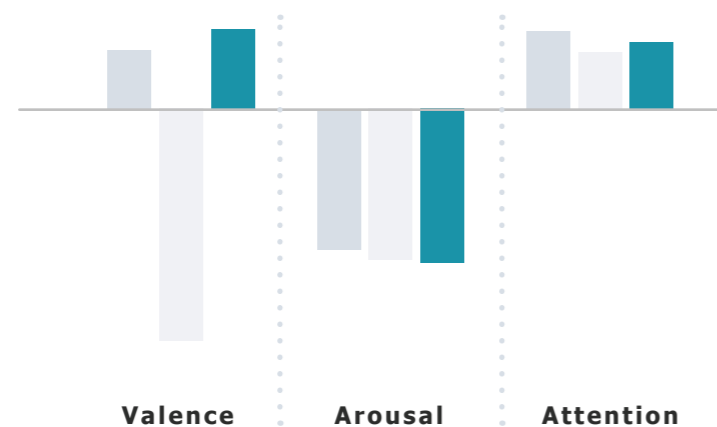
The drop in valence for participants in Group 2 (the presentation with animations) may be due to lack of stimulation. Even though elements on slides were displayed gradually through animation, that group did not have as much movement on the screen to hold their interest. People in Group 1 (no movement), by contrast, had many things to look at and hold their attention (even if it was unfocused), since all elements on each slide appeared at the same time.
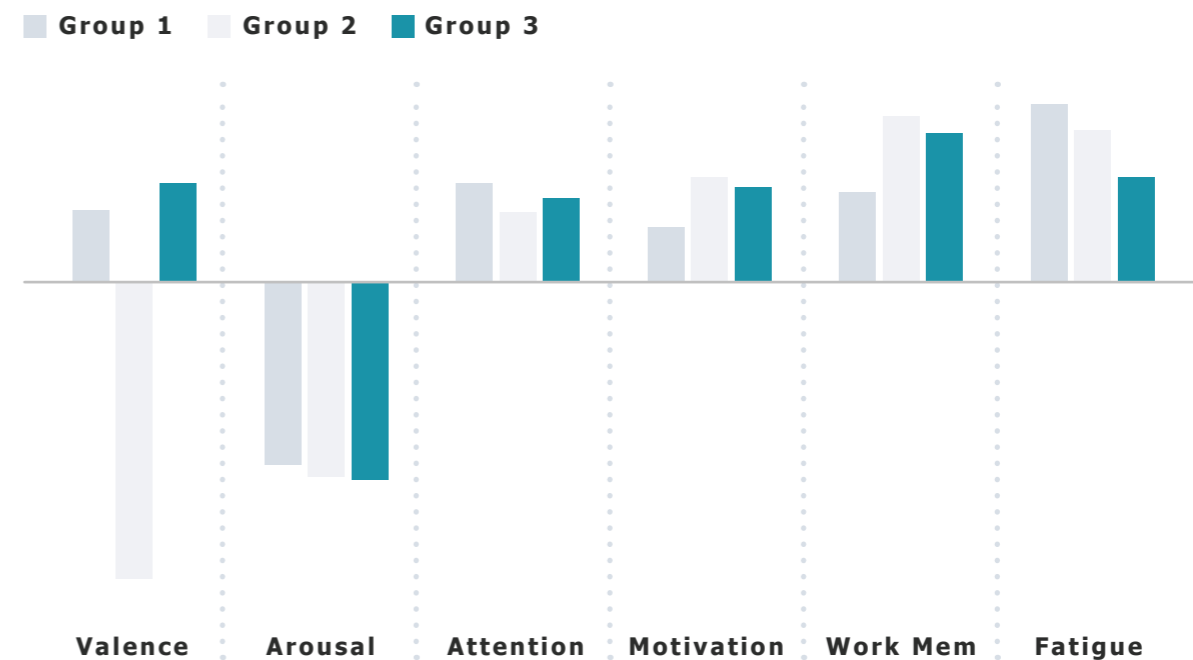
motivate them to *act*

During the presentation, Groups 2 and 3 experienced significantly higher motivation compared to Group 1—a crucial element when you're looking to influence buying decisions. But did that motivation last?
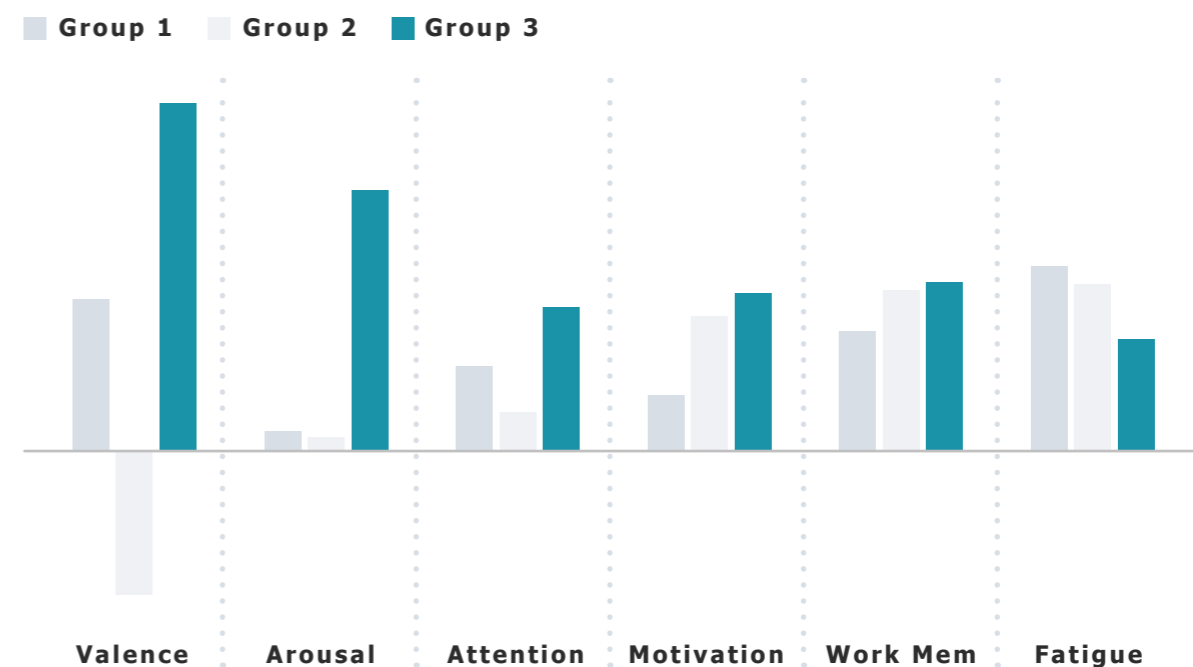
Interestingly, when we asked participants to complete a short survey after the presentation, **EEG results showed that Group 3 was more excited, more attentive, and more motivated when they answered the survey questions compared to the other two groups.**

These results suggest that by using animation and annotation in your presentations, your audience will be more excited and motivated to schedule a demo or have a follow-up conversation about your solution.

EEG signals *during* the presentation

Group 1   Group 2   Group 3

Valence   Arousal   Attention   Motivation   Work Mem   Fatigue

EEG signals *after* the presentation

Group 1   Group 2   Group 3

Valence   Arousal   Attention   Motivation   Work Mem   Fatigue

help buyers *see* the difference

From a neuroscience perspective, the visuals you choose for e-books and other content should ease your buyer's cognitive workload and help them make sense of the information they read.

Marketers tend to rely on stock photos and predictable imagery when they create e-books. These visuals might seem like safe, "businesslike" choices. But are they effective? In other words, do they ease cognitive workload and help people make sense of the text they read?

When we surveyed nearly 300 B2B companies, **74 percent** agreed it's important to design content using unexpected or unique visuals. And **over half (56 percent)** believe cliché stock photographs are detrimental to their content.

We set out to understand whether this belief is correct by studying 48 people's brains as they reacted to the use of two different kinds of imagery in a business e-book.

According to our B2B survey:

It's important to use unique or unexpected visuals in marketing and sales content

74 percent of companies said it's important to design content using unexpected or unique visuals.

I believe cliché images are detrimental to digital content

56 percent believe cliché stock photographs are detrimental to their content.
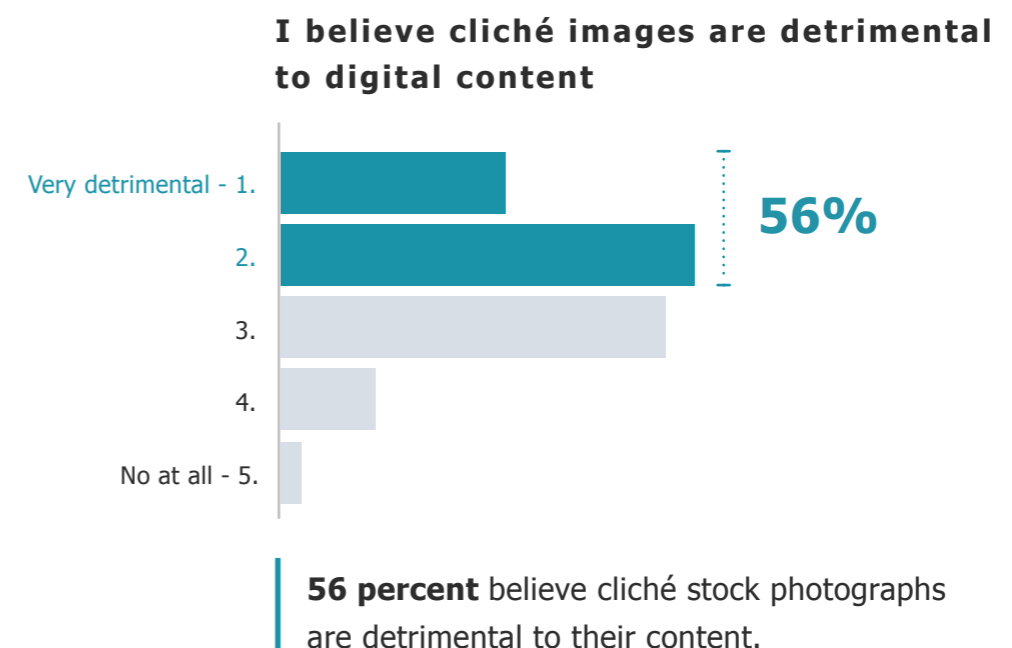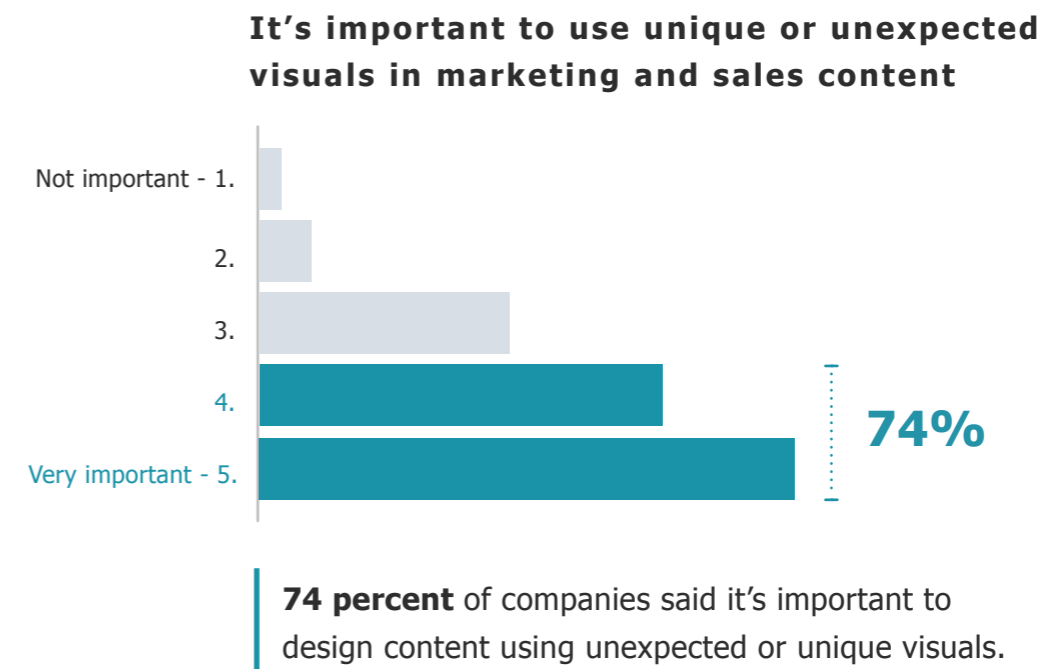
the *study*

Forty-eight B2B professionals read an e-book created by a telecom provider. The e-book was 20 pages long, and seven of those pages included images.

Participants were divided into three groups:

- **Group 1** (17 participants) read the original e-book, with standard stock photography on seven pages out of 20.

- **Group 2** (16 participants) read the same e-book content as Group 1, but images were removed from the same seven pages.

- **Group 3** (15 participants) read the same e-book content as Groups 1 and 2, but more concrete images replaced the original seven stock photos.

Each group was sub-divided into subject matter experts (people with knowledge of the subject) and non-experts (people with business experience but no advanced knowledge of the subject).

And, for the first time in a neuroscience study, we generated a cognitive map using EEG technology to see whether the viewer's cognitive workload on each page resulted from the image, the text, or both.

what are concrete visuals?

Concrete visuals are:

1. Rooted in reality – The image stays in touch with reality, even if it's futuristic and aspirational.

2. Connected to the text – The image teaches the viewer something instead of being superficial.

3. Functional and specific – The image serves a specific purpose, as opposed to being abstract or purely decorative.

As you'll see on the following pages, the visuals that were most effective in this study met one or more of these criteria.

draw *attention* to the text
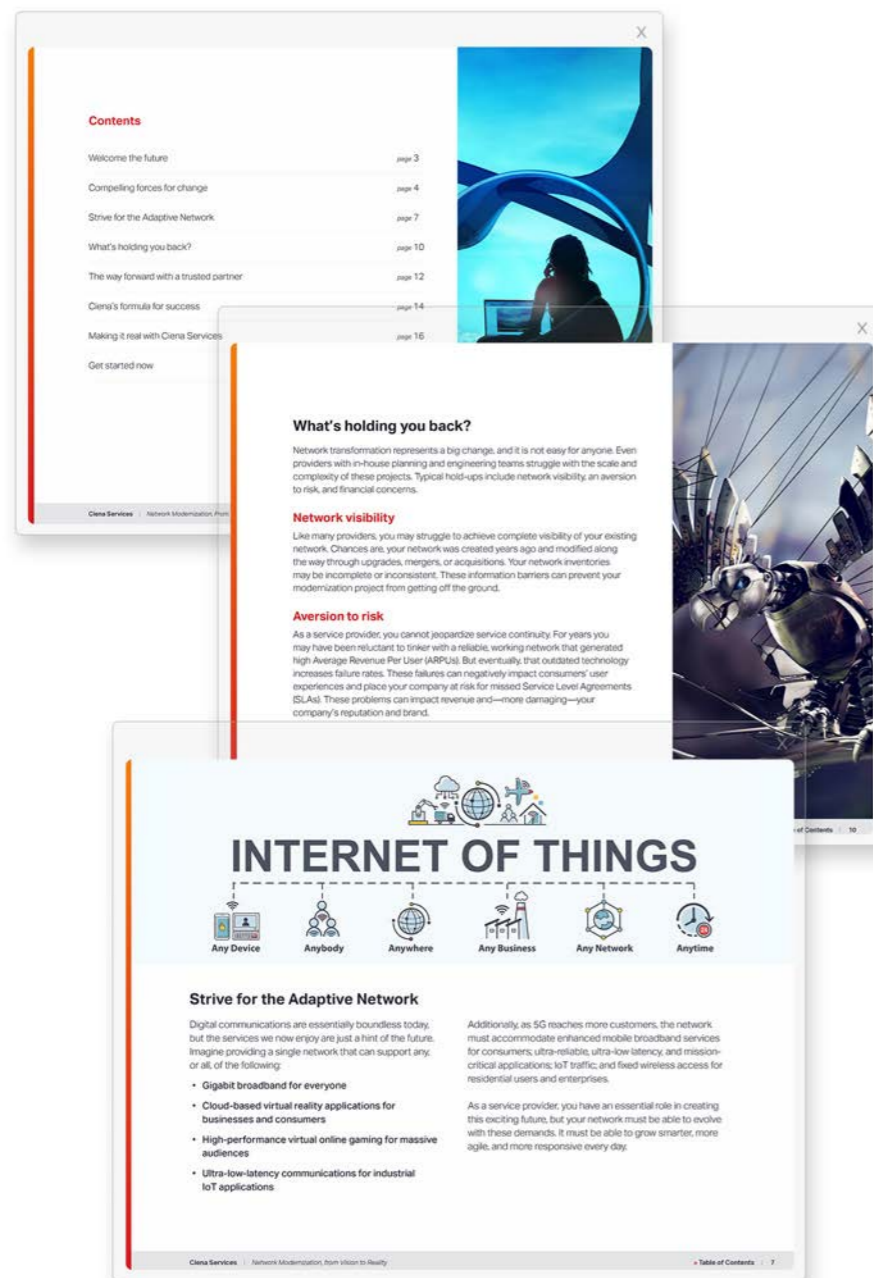
For the study results, we compared data between the two participant groups who viewed e-books with images: Group 1 and Group 3.

Eye tracking data from the study showed that while people in both groups spent a similar amount of time on the images, participants in Group 3 spent more time on the text. This suggests that **the concrete images used in the Group 3 e-book served as more effective cues for the viewer to continue reading or revisit the text.**

Average time spent on images and text
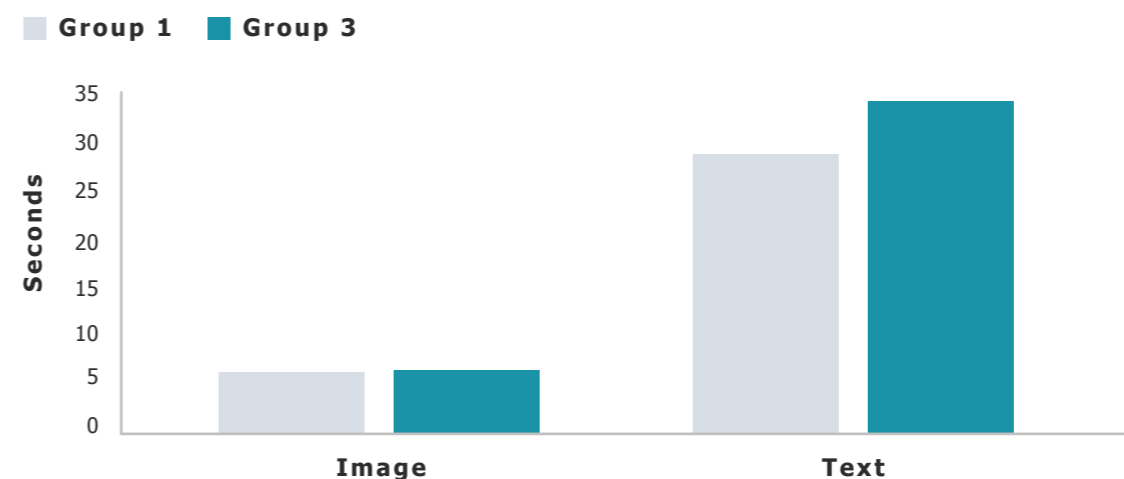
■ Group 1   ■ Group 3

While people in both groups spent a similar amount of time on the images, participants in Group 3 spent more time on the text.

In addition to measuring the overall time spent on images and text, we also observed specific differences between participants' reactions to pages containing images in Group 1 versus Group 3.

make images less *abstract*

One statistically significant difference was the time spent reading the table of contents. **Group 3, who saw a more interesting and less abstract accompanying image, focused on the text longer**.

EEG results from the study also indicate that abstract images can be more cognitively taxing. **When images are abstract, readers need to use more cognitive energy to understand the text on the page.**

These findings suggest that if you include a table of contents, use a more specific and concrete image to keep your reader focused on the text, instead of taxing their cognitive load with abstract imagery.

Alternatively, consider replacing the typical table of contents page with one main message supported by three to four concrete, action-oriented phrases (like you see in this report).

Time spent reading text on table of contents

Group 1 Group 2 Group 3
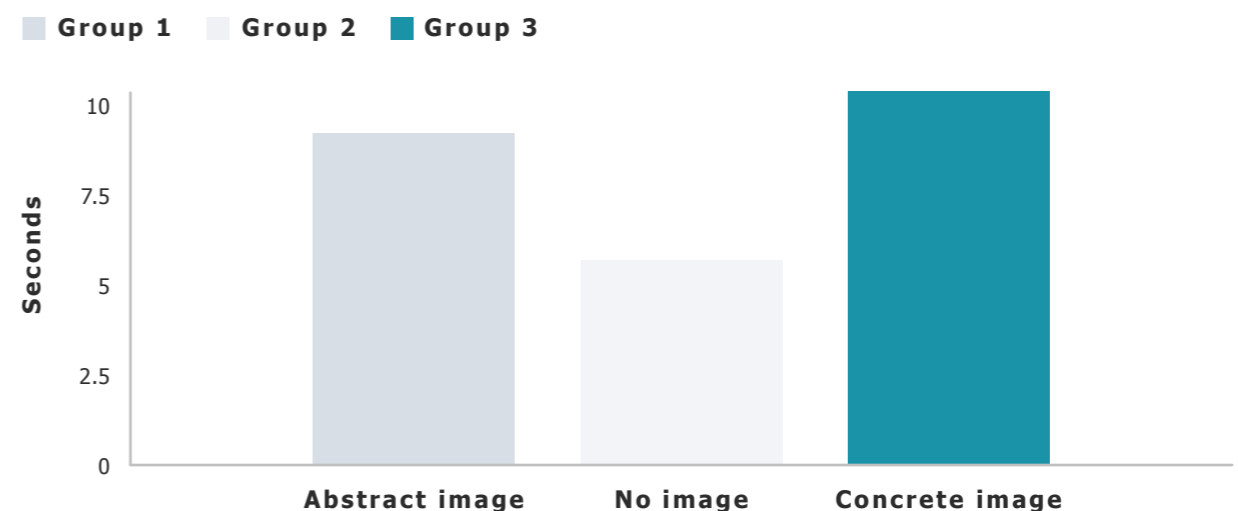
Table of contents EEG cognitive map

Group 3: Concrete image

Group 1: Abstract image
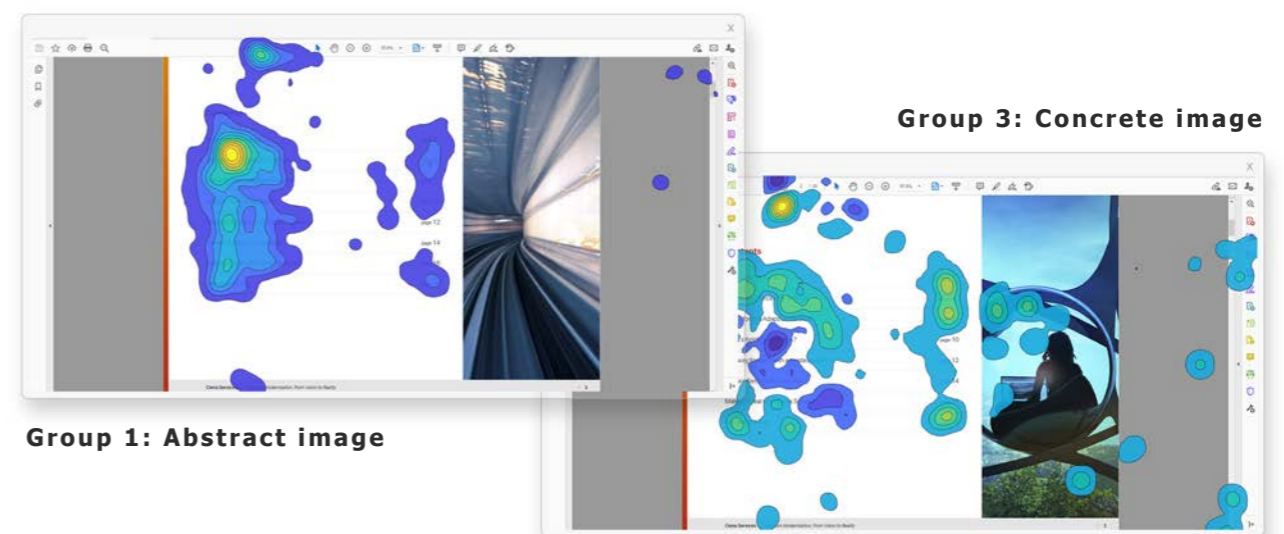
When images are abstract, readers need to spend more cognitive energy to understand the text on the page.

visualize important *concepts*

The text on page seven of the e-book described the importance of the Internet of Things (IoT). The image in Group 1 showed two online gamers celebrating, which only visualized one small point from the text. The image used for Group 3 was more functional—it included a chart that visualized the definition of IoT.

When we analyzed the cognitive map based on EEG data for this page, **the more functional image led to less cognitive load overall**.

The image used for Group 3 complemented the text by teaching the reader about the concept of IoT. As a result, participants spent more time on that image and the text. It also made the information easier to understand, easing the reader's cognitive load.

So, the next time you want to visualize something, consider replacing a generic image with one that connects to the text and is instructional, rather than simply decorative.

Eye tracking heat map

Group 3:
Concrete image

Group 1:
Abstract image

When the image helps visualize important concepts, readers spend more time on images and text.

EEG cognitive map

Group 3:
Concrete image

Group 1:
Abstract image
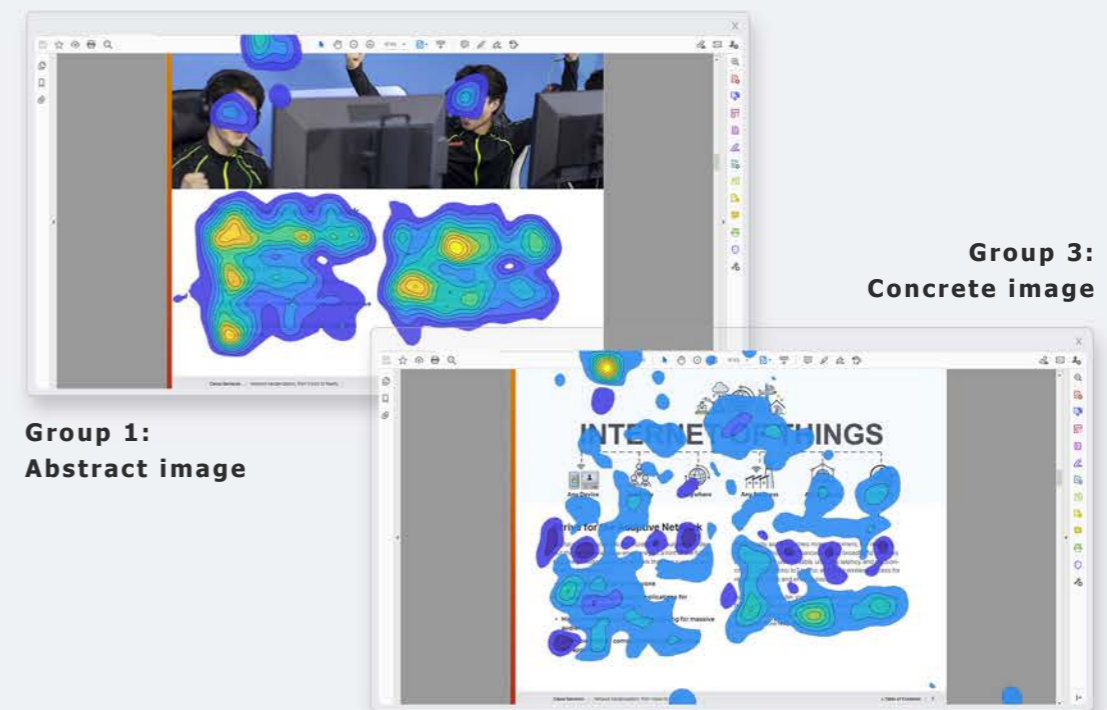
Using more functional imagery makes the information easier to understand, which reduces overall cognitive load.
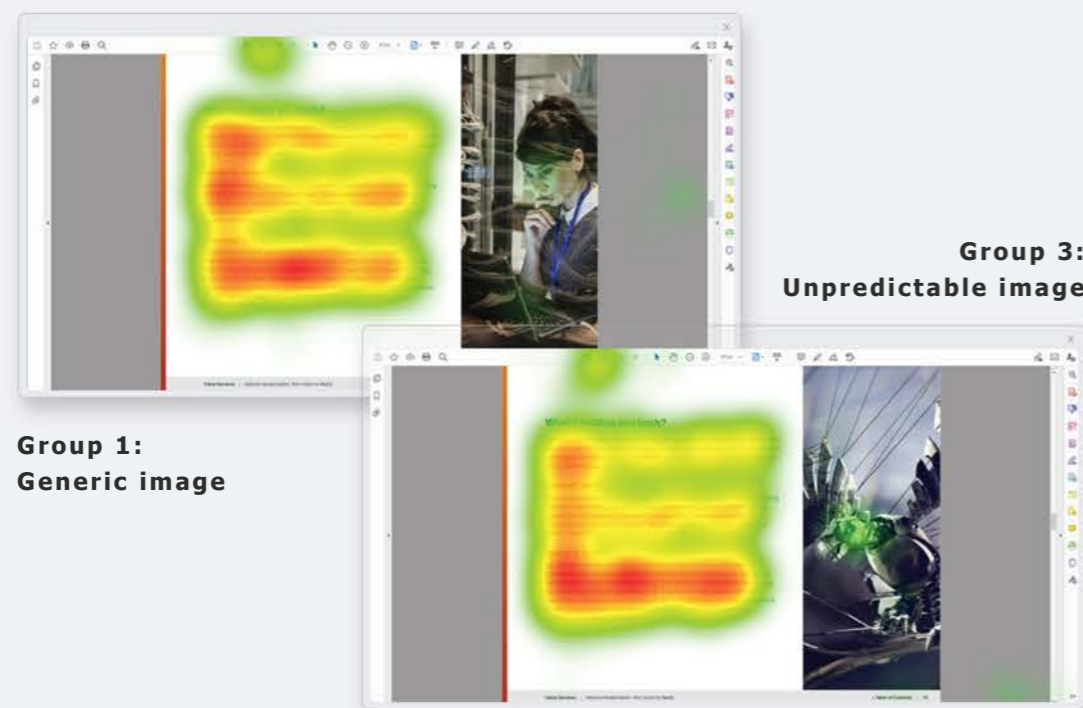
add some *unpredictable* images

On page 10 of the e-book, a generic stock photo of a woman feeling worried (Group 1) was replaced with a less predictable image depicting an iron bird tied down by ropes (Group 3). Between the two, **the unpredictable image in Group 3 attracted significantly more attention.**

Interestingly, the more unpredictable image also drew more attention to paragraph three, which contained the most important information on this page.

Based on EEG data for this page, the participants in Group 1 didn't need to expend a lot of cognitive energy on the predictable stock photo. Of course, faces will draw some attention and some energy, so it's not entirely effortless.

Overall, **using predictable images won't tax working memory, but they also don't add much excitement. If your goal is to spark some visual interest on certain pages, consider adding some unpredictable images.**

Eye tracking heat map

Group 3: Unpredictable image

Group 1: Generic image

Unpredictable images draw more attention and interest.

EEG cognitive map

Group 3: Unpredictable image

Group 1: Generic image
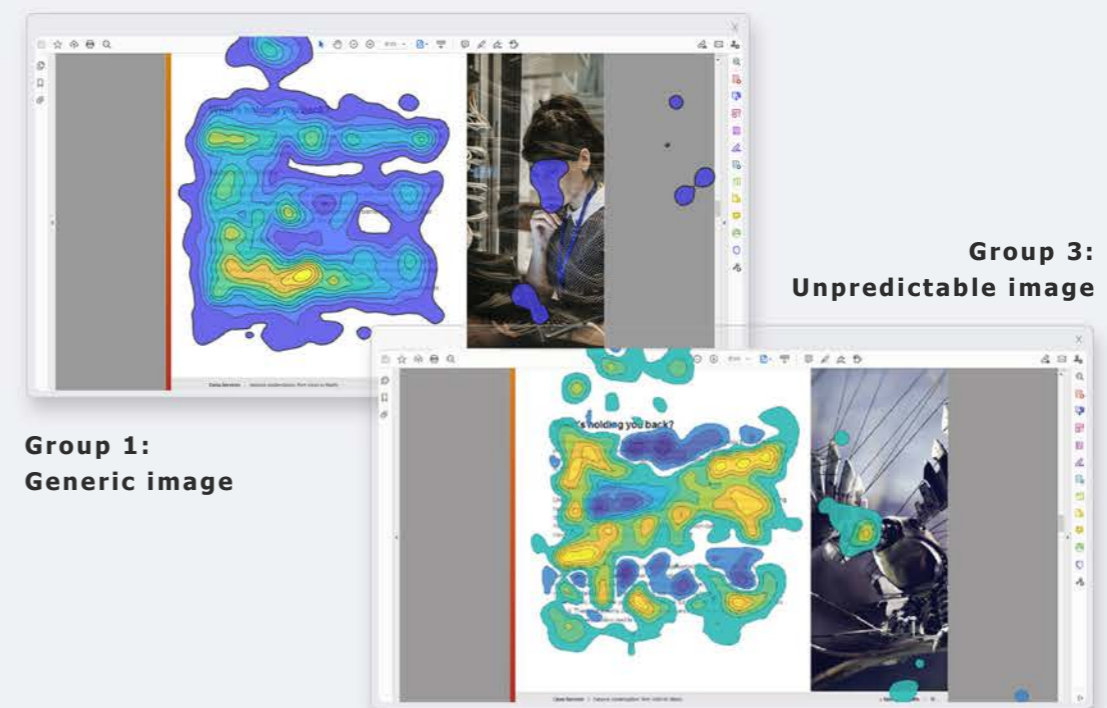
Readers spend less cognitive energy when images are more predictable and generic.
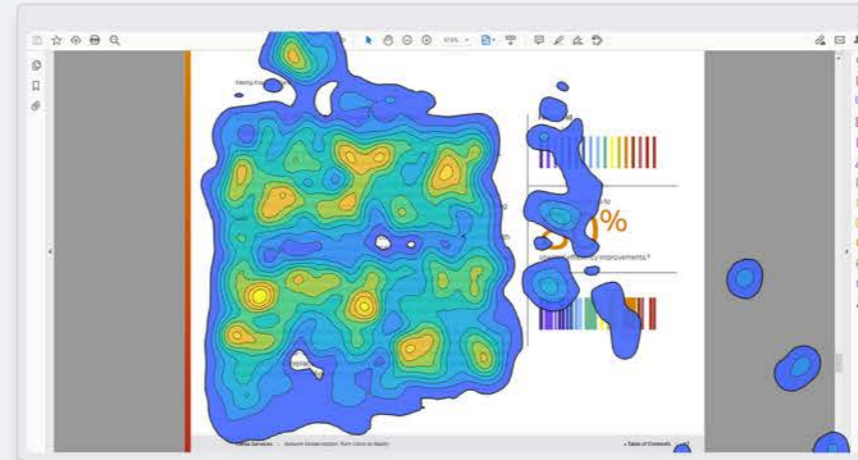
keep infographics
simple

The data indicates that **pages that included simple infographic images did not tax cognitive workload**. But detailed infographic images, with sophisticated labels and small text, took more energy to process. On most pages of the e-book, text demanded the heaviest cognitive load, including labels that were part of infographic images.

A stronger cognitive load is not necessarily bad, because it implies conscious attention and engagement with the content and may lead to better memory. However, **when page after page includes a lot of text, it's more taxing on the viewer**.

When you add an infographic to your content, keep it simple. Make sure it connects to something that you want to make memorable—important information that you want people to take away.

EEG cognitive map

Simple infographics do not tax the reader's cognitive workload.
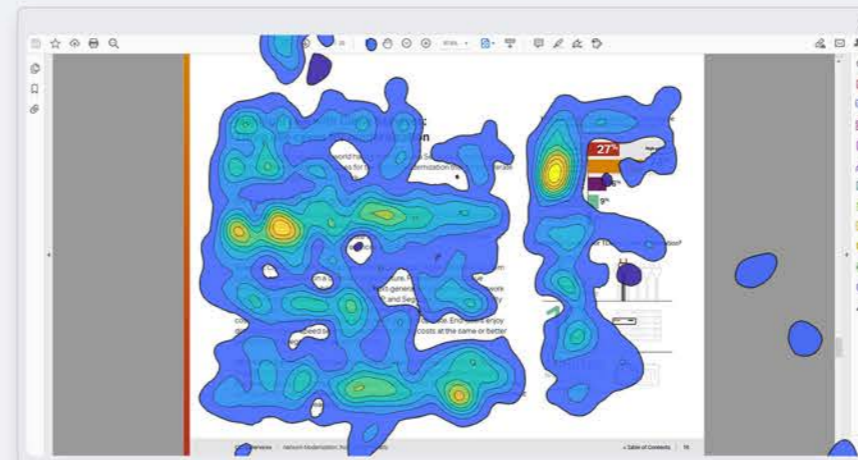
Detailed infographics require more cognitive energy to understand and process.
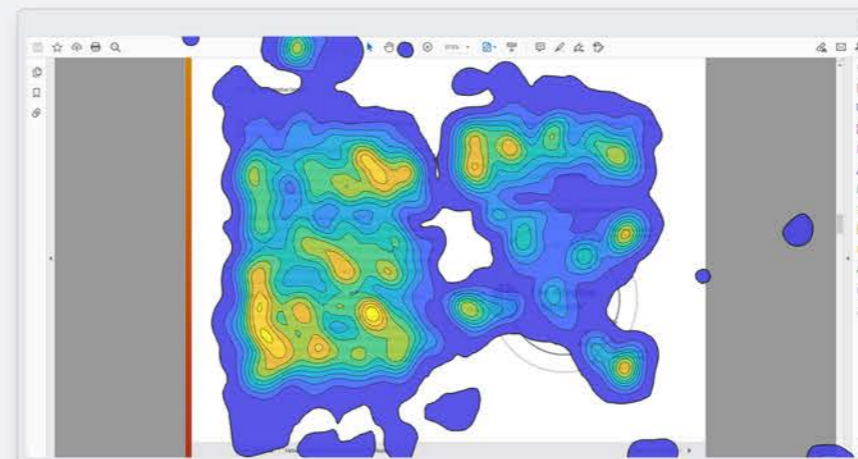
Sophisticated labels and a lot of text on infographics demand significant cognitive energy to understand and process.

motivate them to *act*

The visuals you choose for e-books should make it easy for your buyers to make sense of the information they read.

When you choose concrete visuals that complement and enhance the content, your audience will process the information faster and more efficiently. Plus, they'll be more likely to revisit the text, remember it, and feel more motivated to act.

Even though more concrete images in Group 3 had a positive impact—fatigue was lower, and the motivation to act was slightly higher—the overall level of motivation was generally low, and the overall level of fatigue was generally high across every group.

This suggests that **while your choice of visuals is important, it's not the sole motivating factor**. Your e-book invites viewers to make decisions based on the depth included in the text, not just the pictures. The subject matter, content structure, and writing are all factors that affect how successfully the e-book motivates your buyers to take action.

EEG signals during study

■ Group 1   ■ Group 2   ■ Group 3

Motivation   Fatigue
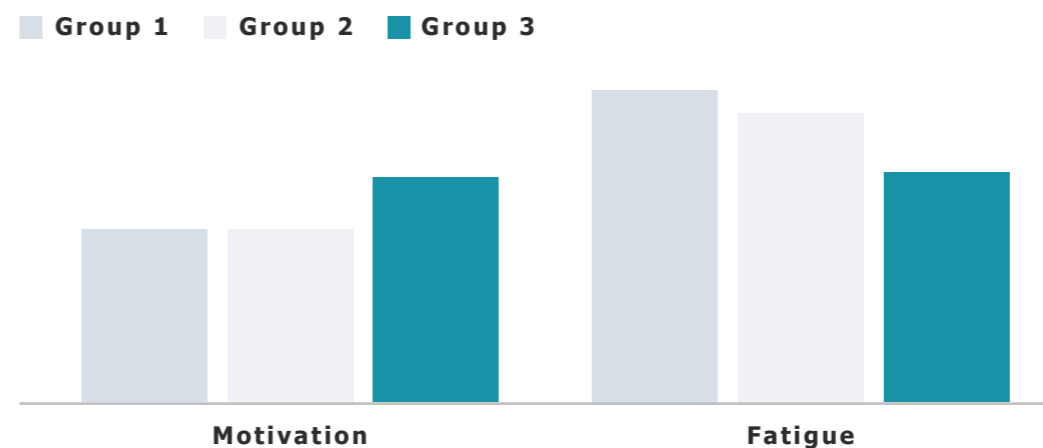
When the e-book contained concrete visuals, participants experienced higher motivation and lower fatigue.

influence your buyer's
memory and decisions

create
interactive
experiences

does interactivity increase *motivation?*

As the buying journey becomes more self-guided, companies are weighing the benefits of interactive tools that buyers can use to inform their decisions.

According to a recent B2B DecisionLabs survey of nearly 300 B2B companies, **83 percent** said they believe it's important to make digital content more interactive, even though most companies primarily use traditional, static formats.

The idea is that when a prospect engages with an interactive tool (like a calculator or an assessment), they will have a more meaningful, self-directed experience that motivates them to act.

So, the question becomes: Does it work? Does interactivity make your content more engaging, enjoyable, and—most importantly—does it motivate your audience to act?

We set out to answer these questions by studying how 30 people's brains experienced a traditional (static) PDF e-book versus an interactive assessment containing the same content.

According to our B2B survey:

It's important to make digital content more interactive to provide a self-determined experience

Not important - 1.
2.
3.
4.
Very important - 5.

83%
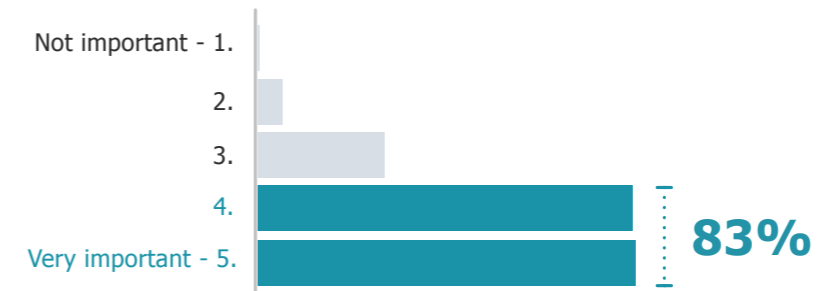
83 percent of companies believe it's important to make digital content more interactive.

Our marketing and sales content is delivered in traditional, static formats (like infographics, e-books, case studies, etc.) versus interactive alternatives

Static only - 1.
2.
3.
4.
Interactive preferred - 5.

18%
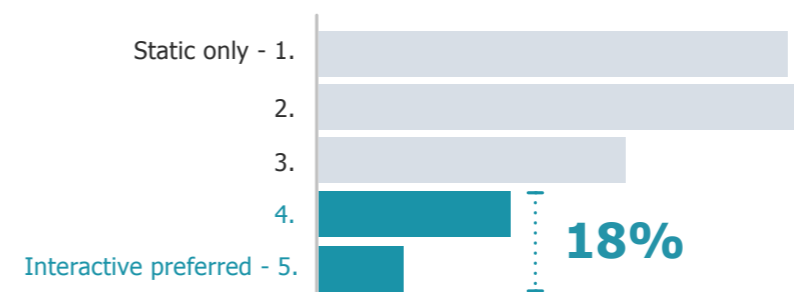
Only 18 percent of companies prefer to use interactive content over more traditional, static formats.

the *study*

Thirty B2B professionals viewed a piece of business content about selling and marketing to existing customers.

Participants were divided equally into two groups:

• **Group 1** (15 participants) read a 21-page e-book, in PDF format, at their own pace. The content of the e-book was divided into four sections, and the call to action invited viewers to visit a website to learn more about the topic.

• **Group 2** (15 participants) was given an online assessment, accessed via a webpage link. The interactive assessment contained the same text as in the e-book, was also divided into four sections, and included the same call to action as the PDF e-book. The only difference was the interactive experience while reading the content: For each topic, participants were required to score themselves on a scale of one to five before receiving the next piece of information.

After reading the content, participants answered a short survey about their experience.

Group 1: Viewed a PDF file

**Group 2: Interacted with an online assessment tool**

spark a "*eureka!*" moment

Participants who took the interactive assessment (Group 2) experienced higher levels of attention, motivation, and working memory. However, Group 2 also experienced slightly more fatigue than Group 1, and surprisingly low valence. These results indicate that **while the interactive assessment was less enjoyable in the moment, it was also more engaging and motivating**. So, why didn't people like the assessment, even though they were more motivated to act?

When we generated brain scans that combined the EEG signals from each group, we noted a "Eureka effect" for the group who took the interactive assessment. This is an effect that indicates an "aha!" moment—a moment of learning. It appears in the brain regions responsible for memory and learning.

Sometimes a moment of learning comes with some tension. Participants were not only learning something new—they may have realized that their current way of doing things might not be the best way. As a result, they experienced an adverse reaction, at least initially.

EEG signals during study

■ E-book   ■ Assessment

Valence   Arousal   Attention   Motivation   Work Mem   Fatigue
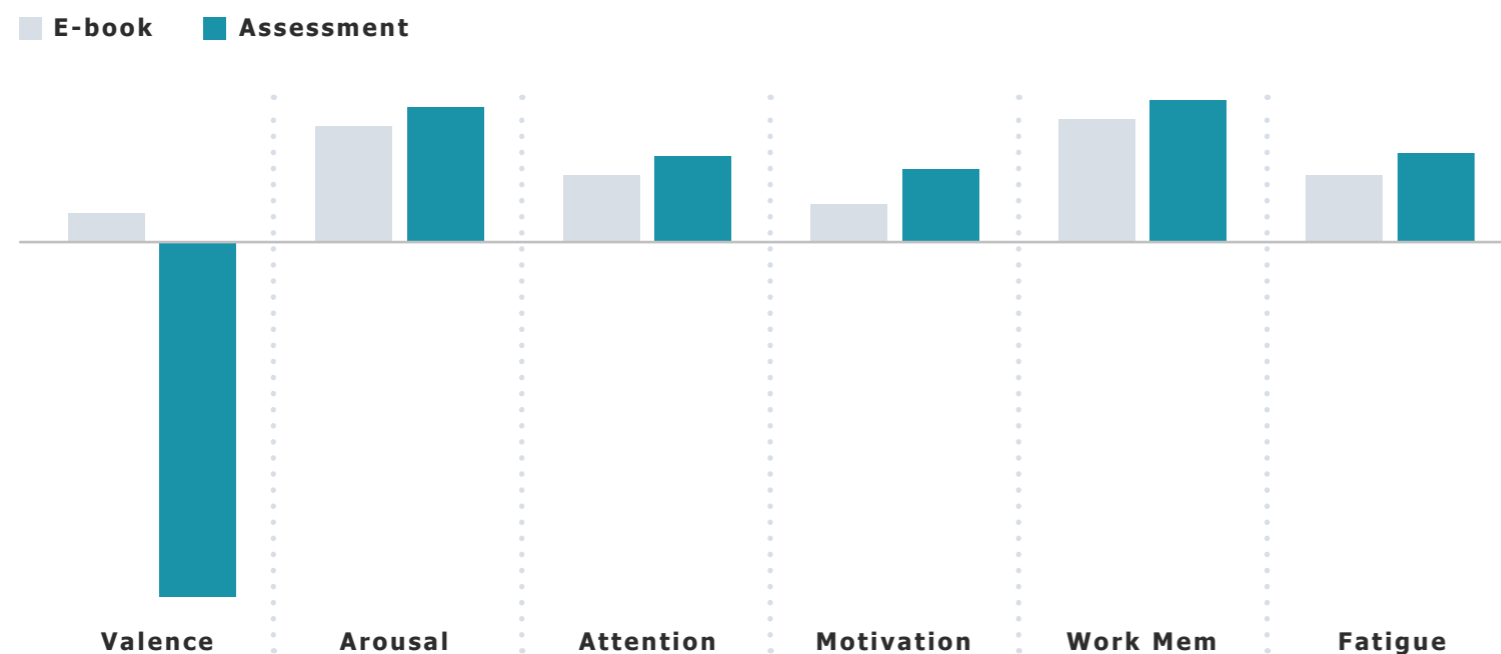
Brain activity during study
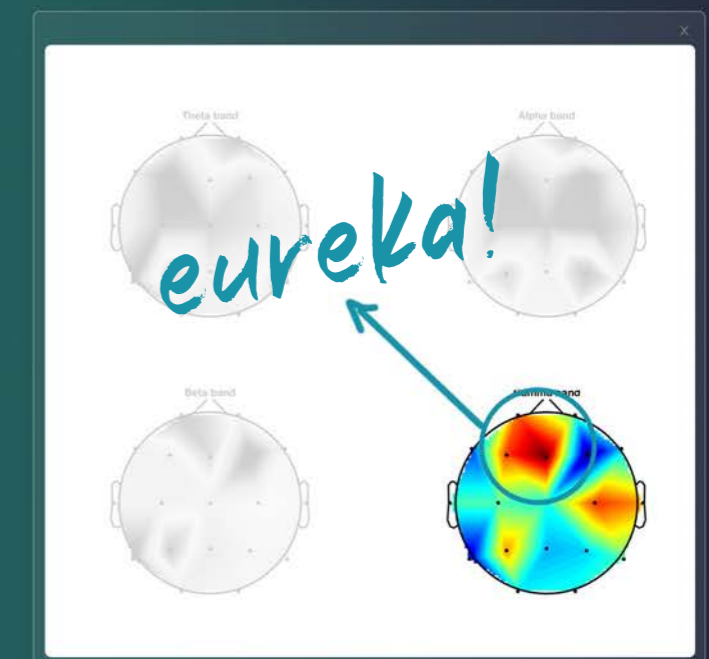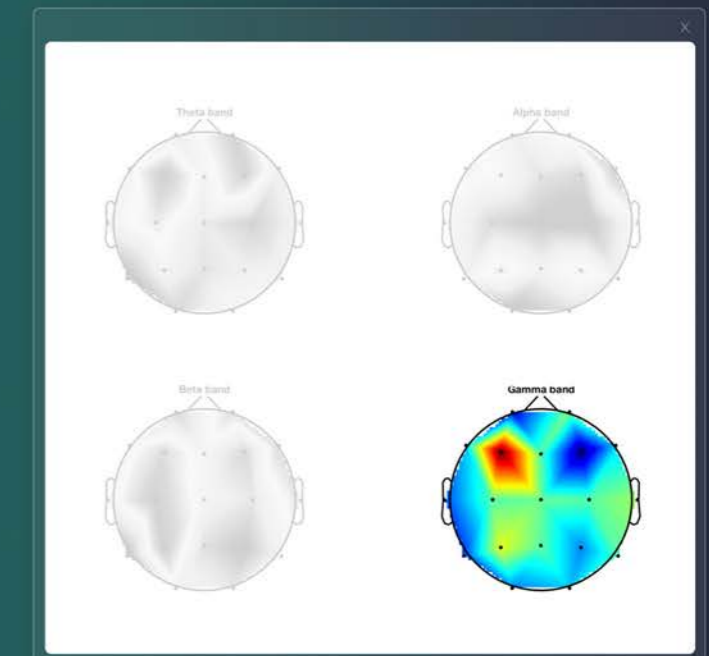
eureka!

Participants who took the assessment experienced a Eureka effect, indicating that they were learning something new.

make it
memorable
and *motivational*

After viewing the content, all participants were asked to complete a short survey while wearing the EEG and ECG equipment. The survey included questions about their confidence to re-tell the message they had learned, how often they thought about the content, concerns about the issues presented, and more.

Based on this data, participants in Group 2 showed significantly higher valence, excitement, and attention when completing the survey, compared to Group 1. This suggests that **interactive assessments can create excitement and maintain your buyer's motivation to schedule a demo or have a follow-up conversation about your solution.**

Plus, when participants responded to a second survey two days later, 73 percent of participants in Group 1 said they had thought about the e-book content 1–2 times. But, while 55 percent of participants in Group 2 thought about the assessment content 1–2 times, 18 percent thought about the assessment three or more times.
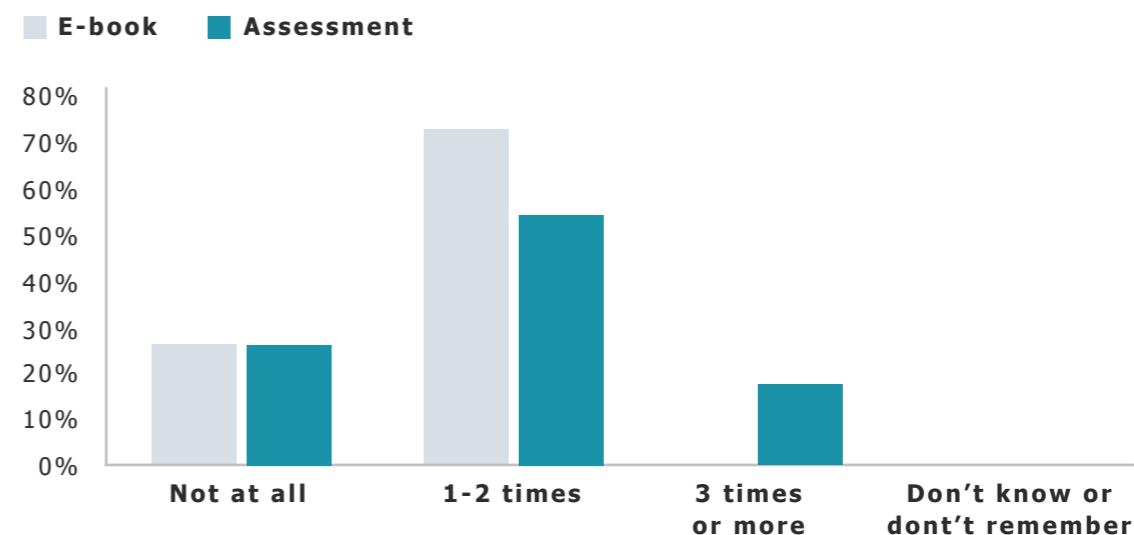
Not only was the interactive assessment more motivational; it was also more memorable.

EEG signals during survey

E-book   Assessment

| Valence | Arousal | Attention | Motivation | Work Mem | Fatigue |
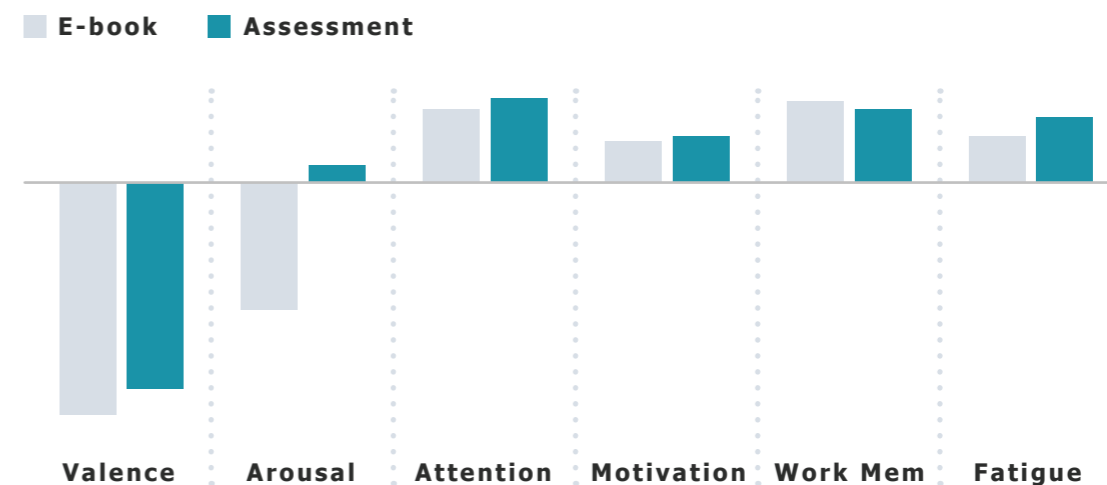
Participants in Group 2 showed higher valence, excitement, and attention when completing the survey, compared to Group 1.

How often participants thought about e-book vs assessment

E-book   Assessment

80%
70%
60%
50%
40%
30%
20%
10%
0%

| Not at all | 1-2 times | 3 times or more | Don't know or dont't remember |

18 percent of participants who completed the interactive assessment thought about it three times or more over the next two days, while no participants who read the e-book thought about it more than twice.

influence
your buyer's memory and decisions

Your buyers are using digital content to discover, understand, and narrow their options before they make a buying decision. And while you can't always control when or how they find your content, you can ensure they'll remember you when they do.

The three brain studies covered in this report show that you make it easy for buyers to understand, remember, and act on your message when you:

▸ **ANIMATE AND ANNOTATE PRESENTATIONS**
Incorporate more movement in your virtual presentations to control focus, build trust, and motivate decisions.

▸ **USE CONCRETE VISUALS**
Use more functional and specific imagery, less abstract visuals, and simple infographics to make your message more memorable and motivational.

▸ **CREATE INTERACTIVE EXPERIENCES**
Challenge your readers to think differently about their situation and inspire change with interactive experiences.

about B2B DecisionLabs

B2B DecisionLabs is the only B2B research firm dedicated to studying how decision-makers frame value and make choices. Unlike traditional market research and advisory firms, B2B DecisionLabs conducts rigorous research studies based in several Decision Science disciplines:

- **Behavioral studies** – understand why buyers behave the way they do.

- **Neuroscience research** – observe what's going on inside their brains.

- **Field trials** – validate your approach in the real world.

CONTACT US TO LEARN MORE

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Carmen Simon, PhD is a cognitive neuroscientist and a lead researcher at B2B DecisionLabs. A Silicon Valley entrepreneur and keynote speaker, Carmen addresses a groundbreaking approach to creating memorable messages that are easy to process, hard to forget, and impossible to ignore—using the latest in brain science. Dr. Simon is the author of *Impossible to Ignore: Creating Memorable Content to Influence Decisions*.

b2b
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get inside your buyer's brain

in partnership with   corporate visions
conversations that **win**®