Brief on

Crafting Effective Public Safety Messages for Wildfire and Subsequent Debris Flow Risks

prepared for

National Weather Service
Los Angeles/Oxnard, CA

Ann Gordon, Ph.D

Dr. Ann Gordon is an associate professor of political science. She is the director of the Ludie and David C. Henley Social Sciences Research Laboratory and Director of the Earl Babbie Social Science Research Center. Dr. Gordon has published five books and numerous articles. She is Co-PI of the ongoing Chapman Survey of American Fears (CSAF), leading the team studying disasters and preparedness. The CSAF has been featured in over 800 print and broadcast media including the *New York Times, The Huffington Post, CBS This Morning, Yahoo News, Good Housekeeping, the Washington Post, USA Today,* and TIME. Dr. Gordon works with emergency managers in Southern California on communicating preparedness to the public.

Henley Social Science Research Laboratory

Henley lab work has been cited by national and international press, our fellows have been accepted into prestigious graduate schools, and our research has assisted emergency managers "throughout Orange County and the nation, helping to make all of us safer from disasters. In addition, the lab provides support five days a week to students who need tutoring in SPSS, GIS, R, and quantitative methods for courses that include this content.

Earl Babbie Social Science Research Center

The Center's mission is to provide research support and instruction to students, faculty and the broader community, and to produce research that addresses global concerns including human rights, social justice, peaceful solutions to social conflicts and environmental sustainability. The Babbie Center includes three major research divisions: the Study of Violence and Radicalization, the Study of American Fears and the Study of Social Justice.

Eric Chimenti, M.F.A.

Eric Chimenti is an associate professor of art. He is the director of the Ideation Laboratory. Professor Chimenti has created illustration and design spanning many industries and for many clients, among them AIGA, North American Title Corporation, IYEO Japan, Xengaru Fun Foods, BVRC Law, National Arbor Day Foundation, Fluid Research Corporation, Balboa Instruments, Sage Software, Honda, Southern California Edison, Peach State Public Radio, and the USDA. His work has been selected and awarded Gold for Advertising and twice selected for inclusion into logo design compendiums. Professor Chimenti works with clients nation wide helping them communicate effectively to the intended audience.

Ideation Laboratory

The Ideation lab supports undergraduate and faculty research by providing help with creative visualization and presentation. This help can include creative writing, video, photography, data visualization, and design. Creative Research fellows staff the lab and can help with the presentation of complex communication problems. The Ideation Lab encourages and facilitates interdisciplinary research among students and faculty, while serving as a resource for the community.

Student Research Assistants
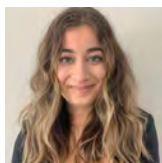
Roxy Amirazizi '21

will be graduating in December of 2021 with double majors in Political Science and Philosophy, along with a minor in the University Honors Program. After graduation, Roxy will be pursuing a career in the legal field, focusing on the protection of minority rights and disadvantaged communities.
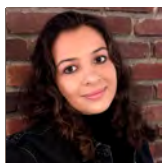
Santina Busalacchi '21

graduated in May of 2021 with a BFA in Graphic Design and minor in the Honors Program. She worked in the Ideation Lab since her first year at Chapman University. Santina earned two of the highest awards - Departmental Honors and the distinquished Margo Pawell Design Award. Santina is currently working as a Graphic Designer/Illustrator at HLW: Architecture & Planning in NYC.

Markos Buhler '23

is from Portland, Oregon and double majoring in Political Science and Economics with a minor in Spanish. He is a Henley Lab Fellow researching various topics relating to political fears such as Islamophobia and COVID-19. After graduation, Markos hopes of attending either law school or another graduate program in the political science field.
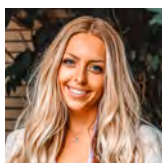
Paige Goedderz '21

graduated from Chapman University in the Spring of 2021 with a B.A. in Sociology and minors in Spanish and Psychology. Notable moments of her undergraduate career include studying abroad in Barcelona, conducting fieldwork for and writing her senior thesis on the Crimilaziation of Homeless Individuals in Orange County, and, of course, working in the Henley Research Lab of Social Sciences. Paige is currently attending law school at USC Gould School of Law.

Christian Grevin '22

is double majoring in Political Science and History and minoring in Environmental Studies. He is a Lab Fellow for the Ludie and David C. Henley Social Sciences Research Laboratory, conducting research on a wide range of topics including American fears, mediatization, and natural disaster preparedness. Christian plans on furthering his education in graduate school.

Sarah Kashani '22

is a Political Science and Business Administration double major at Chapman University. She has worked under Dr. Gordon as a Research Fellow since August of 2019 and has participated in numerous projects during her time in the Henley Social Science Research Laboratory. After graduation Sarah will be pursuing a career in the legal field, focusing on corporate and immigration law.

Special Thanks to NWS

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Project Summary

The new designs show substantial improvement in the public's ability to clearly understand what they should do in response to the message…

In addition to its official Watch, Warning, and Advisory products, the National Weather Service (NWS) produces informative Weather Stories and images for a variety of internet pages, social media, and notifications for its partners. Studies of the public's response to the safety messages issued by the NWS' Weather Forecast Office (WFO) in Los Angeles following the Thomas Fire and Montecito debris flow events of 2018 in Southern California showed that the general public understood the risks associated with wildfires, but not the threat posed by debris flows. The impact of wildfires in California has been steadily increasing, along with flash floods and potentially deadly debris flows that can follow the fires. Thus, effectively connecting communities with the information they need about the threats posed by these natural disasters and how to respond is critical. To investigate the public's understanding of NWS' messaging, and to develop more effective messages which can help save lives and protect livelihoods, we conducted two surveys of California residents to determine their understanding of debris flow and wildfire risks, as well as likelihood of taking protective actions. Embedded within the surveys was an experiment designed to test the efficacy of weather information tweets.

We found that 20% of the respondents did not understand how to respond to the threat of debris flows, nor would take them seriously. Moreover, 39% were unclear of the meaning of "debris flow." Some 36% of subjects report living in a wildfire prone area and 27% have been personally impacted by wildfires, and 68% said it is likely or somewhat likely that they will be impacted by future wildfires. Fewer than half of the respondents (39%) are taking precautions to make their homes safer from wildfires.

Based on these findings and an analysis of previously used messages, we have desiged a new template for wildfire and debris flow messages that was rigorously tested for efficacy. The new designs show substantial improvement in the public's ability to clearly understand what they should do in response to the message, ease of understanding, as well as deeming the message trustworthy and taking it seriously.

Research Design

- Two online surveys of California residents (n=660 and n=1,095), age 18+

- Asked about experience with wildfires, preparations, fears, and understanding of terminology, such as debris flow, familiarity with Ready! Set! Go!

- Collected demographic data, including zip code

- Experiment embedded within the surveys randomized exposure to one of six Twitter messages created by NWS, Los Angles/Oxnard, second experiment randomly assigned new messages, A/B test of new vs. old messages

- Subjects were asked to evaluate the message on whether they understood what they should do, ease of understanding, trustworthiness, and if they took the message seriously

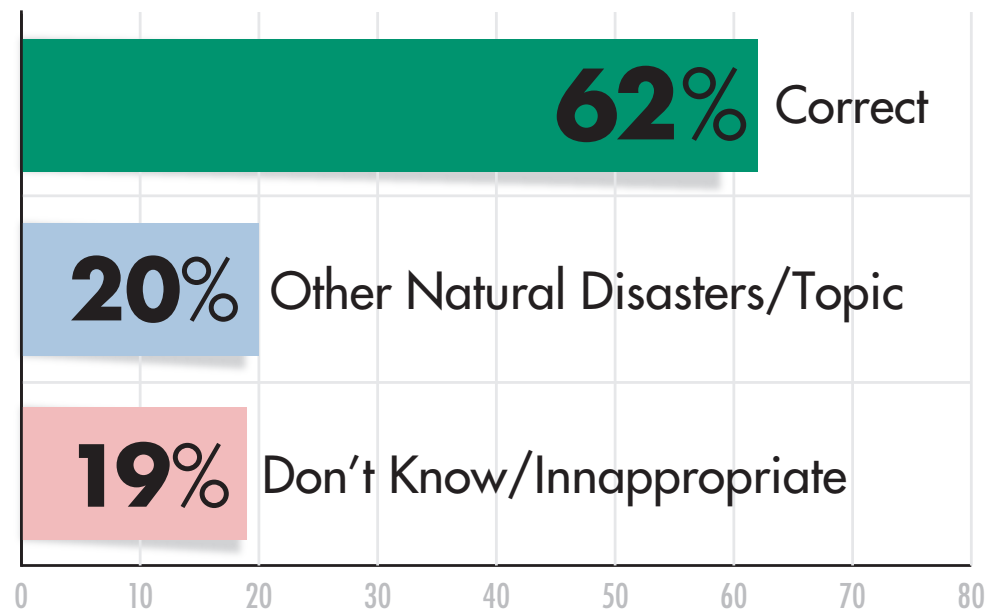## Tested Messaging
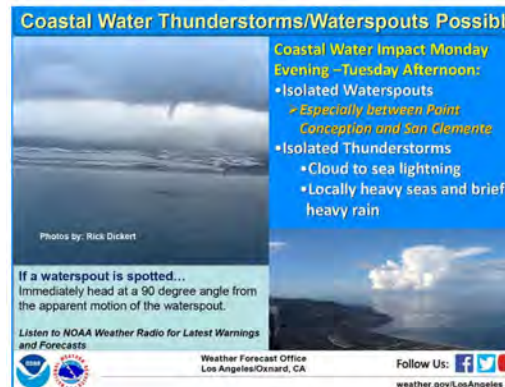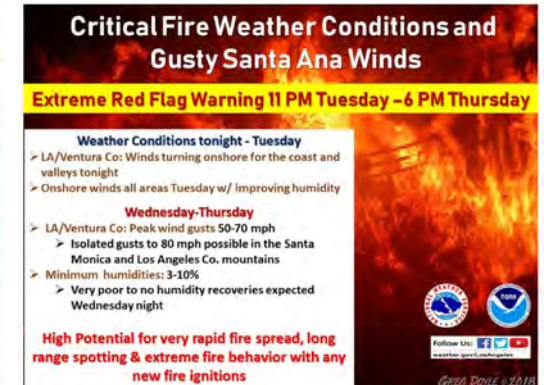
Topline Summary

California residents over the age of 18 were surveyed (n=660) to determine their understanding of debris flow and wildfire risks, as well as likelihood of taking protective actions. Embedded within the survey was an experiment designed to test the efficacy of weather messages.

Understanding of the term DEBRIS FLOW

Respondents were asked an open-ended question:

In a few sentences, please describe what a debris flow is and what images come to mind.

Overall, Californians are familiar with the term, with 62% identifying it correctly or mostly correctly. However, there is room for improving public understanding, as 39% were unclear of the meaning. Some 19% said they didn't know and another 20% had an incorrect impression.*

62% Correct

20% Other Natural Disasters/Topic

19% Don't Know/Innappropriate

0   10   20   30   40   50   60   70   80

Percentages do not sum to 100 due to rounding

Some 62% of respondents correctly described a debris flow or described related imagery. For example:

Refuse from a burn area that heavy rain causes to flow in a destructive way, rock and mud and debris crashing downhill and damaging/burying streets/structures etc.

Rocks, timber, shrubbs, mud flowing from upper ground to lower ground with nothing in between to stop it. Flooding in Azusa Canyon years ago which I actually saw.

The debris picked up in a flood zone

MUD. Lots of it

mud wave

A flood that carries a significant amount of debris.

mud slide

Mud and other natural or rock like matter that moves...alot. I imagine something like a mudslide with a heck of a lot more than mud coming at me.
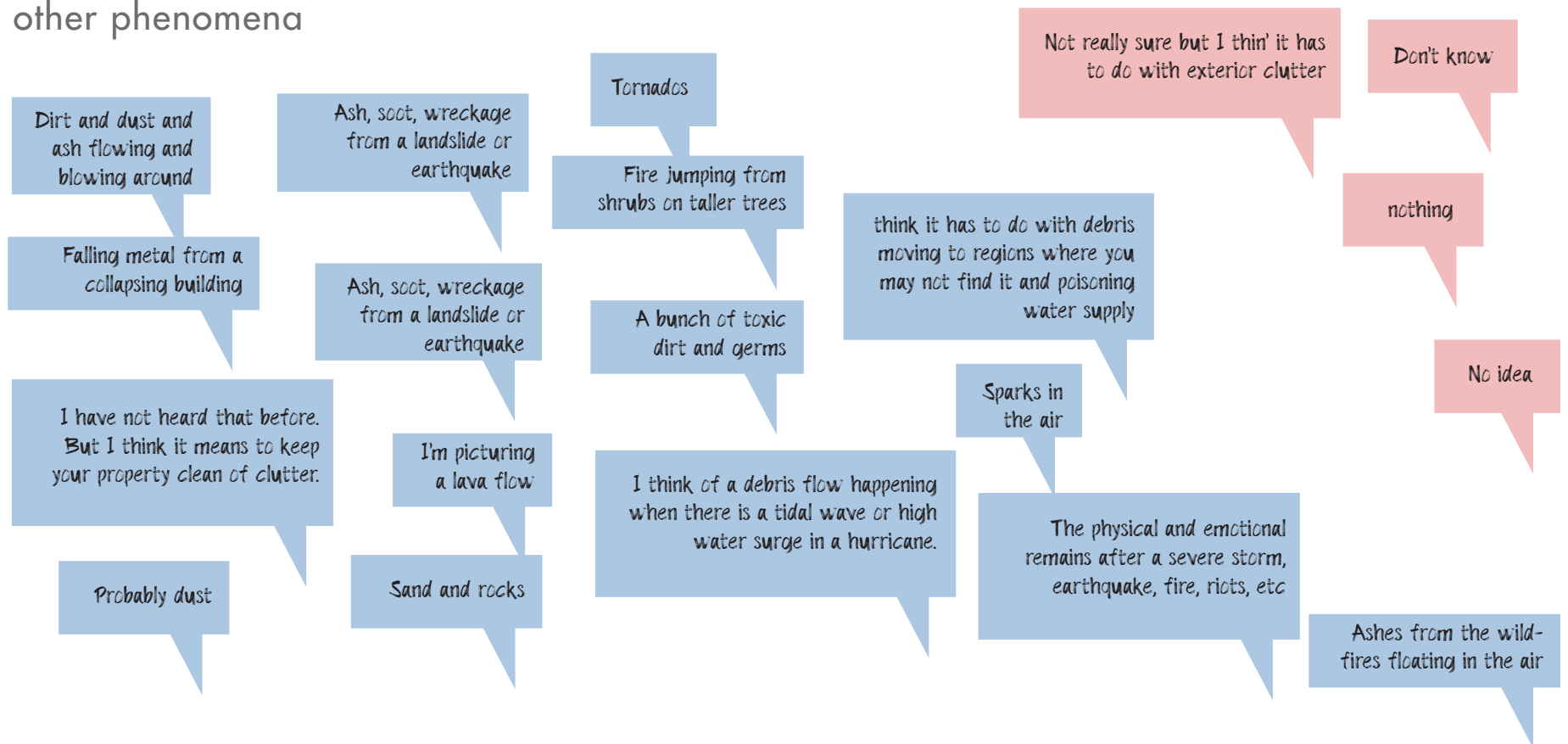
Mudslides after wildfires.

A debris flow is a flow of mud and debris (cars, damaged houses), picked up and moved quickly by a mud slide. The term could probably also apply to events that happen during flooding or a tsunami.

debris from wildfire areas washing down hills after torrential rain

Remnants from a flood.

Flood of junk

Some 20% of respondents associated the term debris flow with ash, wind, or lava or other phenomena

Finally, 19% said they don't know

Dirt and dust and ash flowing and blowing around

Ash, soot, wreckage from a landslide or earthquake

Tornados

Not really sure but I thin' it has to do with exterior clutter

Don't know

Falling metal from a collapsing building

Fire jumping from shrubs on taller trees

think it has to do with debris moving to regions where you may not find it and poisoning water supply

nothing

Ash, soot, wreckage from a landslide or earthquake

A bunch of toxic dirt and germs

I have not heard that before. But I think it means to keep your property clean of clutter.

I'm picturing a lava flow

Sparks in the air

No idea

I think of a debris flow happening when there is a tidal wave or high water surge in a hurricane.

The physical and emotional remains after a severe storm, earthquake, fire, riots, etc

Probably dust

Sand and rocks

Ashes from the wild-fires floating in the air

RESULTS

Wildfire Experiences and Debris Flow Understanding

• Some 36% of subjects report living in a wildfire prone area and 27% have been personally impacted by wildfires, and 68% said it is likely or somewhat likely that they will be impacted by future wildfires.

• Fewer than half of the respondents (39%) are taking precautions to make their homes safer from wildfires.

• Some 39% unfamiliar with the term "DEBRIS FLOW" or confused it with another kind of disaster, such as smoke/ash from a fire in the air.

⌂ READY! ☑ SET! 🚗 GO!

FAMILIARITY
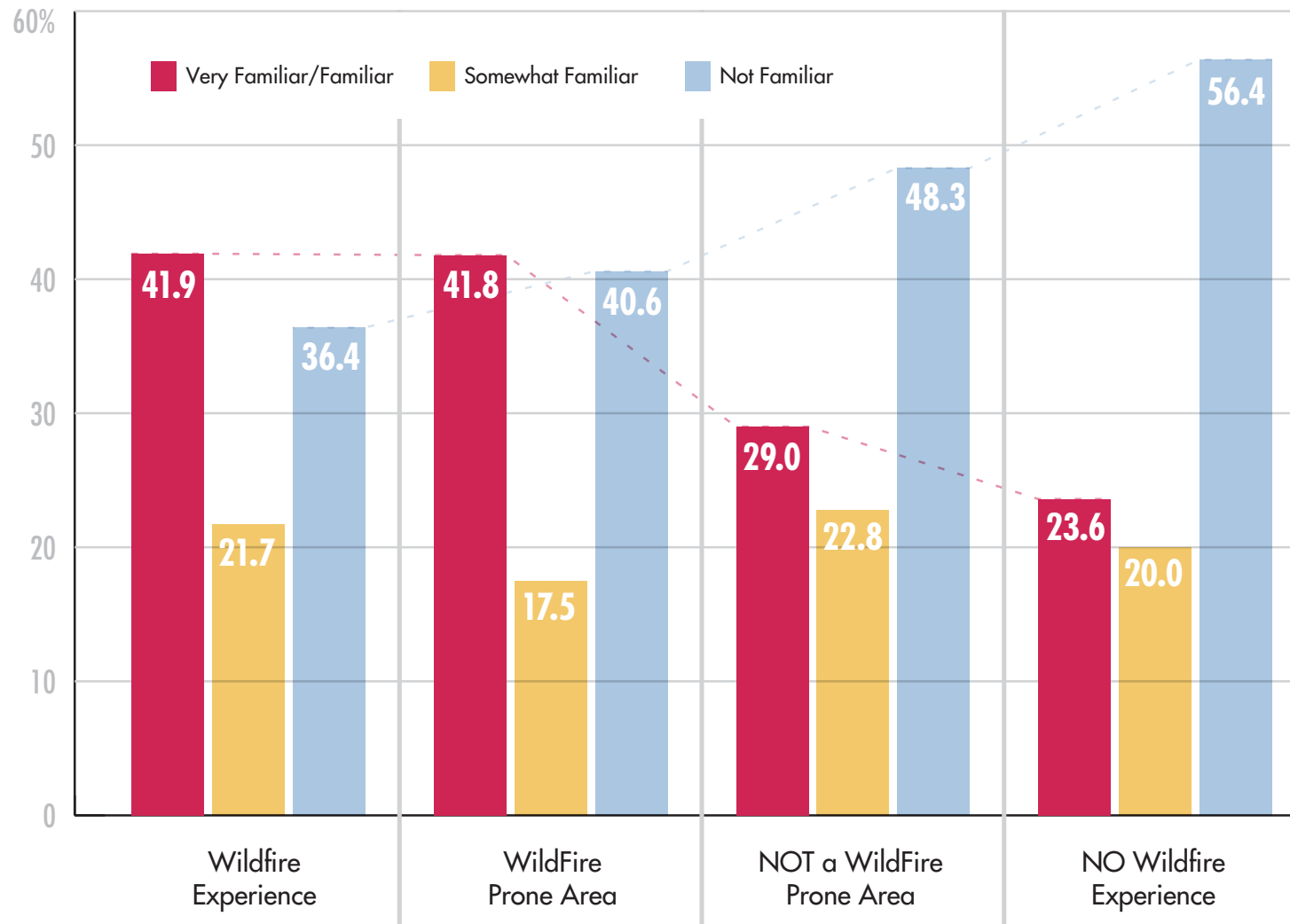
Here we see a strong relationship between living in a wildfire prone area or having experienced wildfires and familiarity with the Ready! Set! Go! slogan.

Legend:
- Very Familiar/Familiar
- Somewhat Familiar
- Not Familiar

	Wildfire Experience	WildFire Prone Area	NOT a WildFire Prone Area	NO Wildfire Experience
Very Familiar/Familiar	41.9	41.8	29.0	23.6
Somewhat Familiar	21.7	17.5	22.8	20.0
Not Familiar	36.4	40.6	48.3	56.4

⌂READY! ☑SET! 🚗GO!

FAMILIARITY PREDICTS PREPAREDNESS

Familiarity is strongly associated with preparedness. It's worthwhile to promote this slogan as a means of raising awareness.

Legend: ■ Have Taken Wildfire Precautions ■ Have NOT Taken Precautions

N=788

	Very Familiar	Familiar	Somewhat Familiar	NOT Familiar
Have Taken Wildfire Precautions	70.3	49.8	33.6	25.9
Have NOT Taken Precautions	21.5	27.4	38.6	39.3
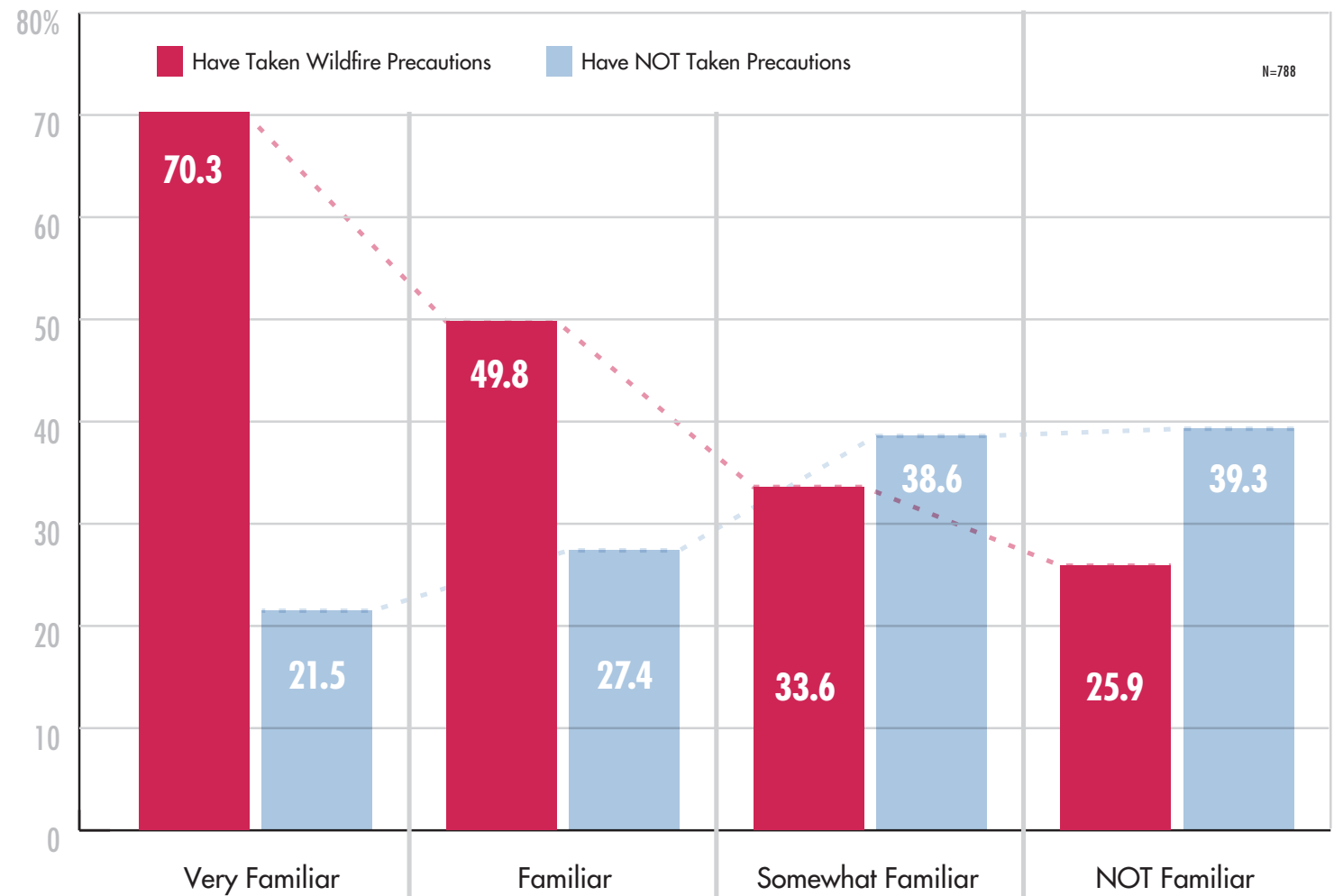
ACTIONS TAKEN TO PREPARE HOMES FOR WILDFIRES VS. REASONS FOR INACTION

Here we see the most common actions taken to prepare homes for wildfires. With respect to inaction, public education is key, especially for the 56% of the public who say they don't know what to do or where to find resources.

Positive Actions

N=420

- 73.33
- 67.62
- 33.57

Defensible Space Creation Around Home

Fire Extinguisher and Other Tools Available for Emergencies

Created Fire-Resistant Zones by Using Building Materials and Landscaping

Have you taken any measures to protect your home from a wildfire?

YES — 39.1

NO — 34.07

Results above reflect those who live in a wildfire prone area and do not include those who answered "not applicable."

Excuses

Don't know what to do

Can't Afford it

Don't Know Where to Find Resources

- 36.96
- 19.29
- 18.75

N=368

FEAR, PREPAREDNESS, AND MOTIVATING THE PUBLIC TO TAKE ACTION
Effective Communication Practices

figure 1

Telling the public to prepare for disaster is an inherently scary message. When confronted with such information, members of the public can respond by trying to control the feeling of fear itself. As we previously reported, this attitude can be seen in the top excuses for not preparing, such as convincing oneself that "this can't happen to me" or just not wanting to think about it is a way of suppressing the uncomfortable feeling of fear.[i] A second reaction to fear is to control the danger or take action, such as preparing a plan and a kit, creating defensible space around one's home or heeding evacuation orders. There are four factors that are essential components for motivating disaster preparedness[ii].

A. Perceived Susceptibility – this can happen to me

B. Perceived Severity – this is serious

C. Self-efficacy – I can actually do something to help myself

D. Response efficacy – the recommended action would make a difference

When communicating with the public about the iimportant weather information, it is vital that the message emphasize susceptibility, severity and most importantly self-efficacy and response efficacy. Without these components, the message is likely to cause fear without action.

As we see in the table above, all of the messages (i–vi) contained perceived susceptibility and perceived severity content. However, not all messages explicitly told the public what they could do and how the recommended action would matter in keeping themselves and their property safe. The redesigned message all included this content.

ASSESSMENT OF ORIGINAL MESSAGES

We have looked at NWS posts and Twitter parameters and here is what we have determined:

• NWS Los Angeles currently posts images at 13.33" x 10" (960 x 720px).

• Twitter's optimal size is 1200 x 675px (5MB max) and this is what we chose to use.

Los Angeles/Oxnard Message Element Placement Observations

Current designs include most relevant information and communication is clear; however, lack of uniformity hinders efficacy.

As can be seen (figure 2, right), some information does consistently clump in certain areas, but there is no wholistic approach to the design or information hierarchy.

This can be seen here when message i–vi element placement markings are overlaid it is clear that there are inconsistencies, redundancies, and scatterings of information. This can lead to confusion on individual and accumulated messaging for the public.

The provided sample NWS messaging (labeled i-vi) that are being evaluated and redesigned has 7 common components.

① **Title**
② **Sub-Title**
③ **Relevant Information/explanation**
④ **Final Warning/Actions to Take**
⑤ **Official: Logos, URL, address**
⑥ **Social Media Logos**
⑦ **Effective Warning Date/s**

The Design Efficacy A–D assessments match what is seen in figure 1.

figure 2
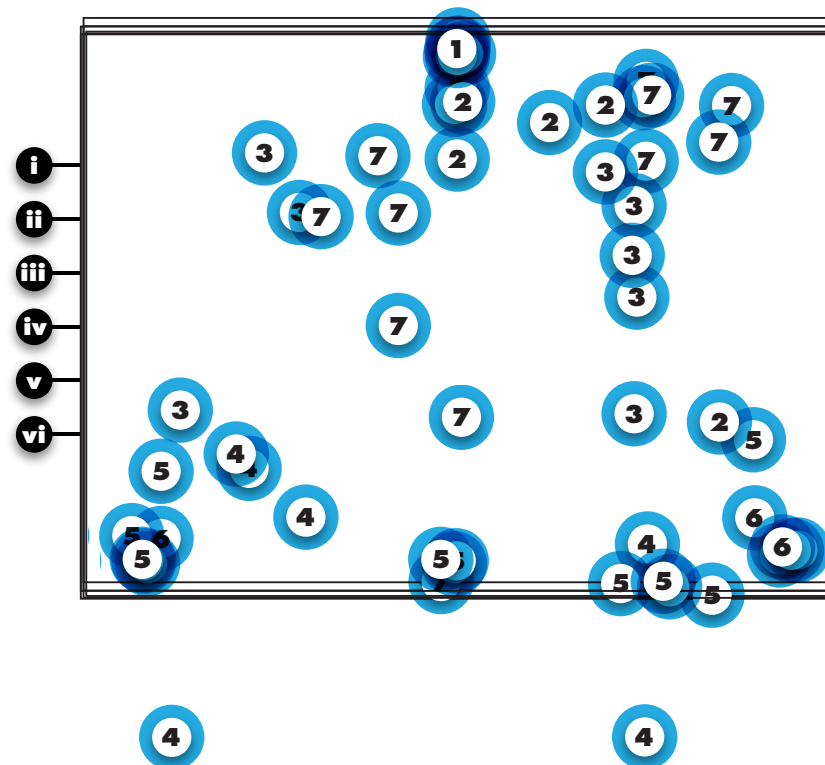
The NWS Los Angeles/Oxnard messages are consistent in size. However, the designs and elements (1–7) are not. These inconsistencies make the messages less powerful.

Understanding Severe Thunderstorm Risk Categories
National Weather Service
www.spc.noaa.gov

Tsunami, Earthquake & Heavy Rain Benchmarks
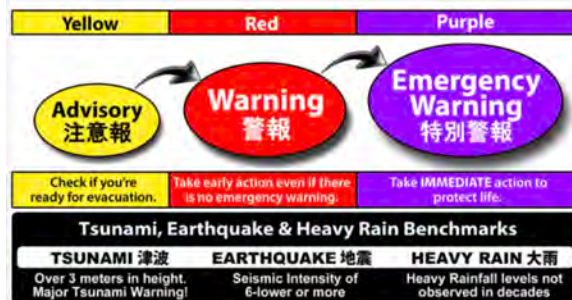
Severe Weather Warnings Colour Codes

Form & Content Recommendations
GLOBAL COLOR CODING

The messages sent by the NWS go to a wide audience that includes local, regional, national, and international people. Southern California is also a major destination for tourists. "Color as an element of design has the ability to make us more aware of what we see." [iii] So the messaging sent needs to be sensitive to using color to maximize reception. "In different cultures, colors can have different meanings… designers can control what the viewer perceives, but must always be aware that they could sometimes be sending the wrong messages." [iv]

The symbolic meanings of color can vary from culture to culture and within age groups. Fashion, entertainment, and spirituality have wide ranging associations related to color. However some colors can bridge socio-economic classes, share international meaning, and join generations through their common use. To the left are three weather related color scales, one from the US, one from Japan, and one from the UK. The global similarities are important and it is recommended internationally recognized colors be used to convey consistent weather related messages to as wide an audience as possible.

On the next page is a screen grab from a weather radar map. Notice the similar use of color to indicate storm strength. The way color is implemented in modern radar projections on both phone and tablet apps and in news feeds further emphasizes the need for consistent color use in messaging.

Enhancing Message Perception Through Color

Color is a significant part of visual language that can alert or warn, it helps identify and discriminate, it can generate an emotional response through visual sense, and unconsciously motivate. Color is associative, symbolic, creates continuity, attracts the eye, and is impressional. Color can be leveraged to create continuity, enhance perception, and motivate actions, leading to altered behavior. [v]

It is again recommended that nationally and internationally recognized warning colors be used to convey consistent weather related messages to as wide an audience as possible.

Radar
THU 11:01 PM

Recap: **DESIGN (A)** Message compilation

1. Consistent size and grid/look.

- Twitter's optimal size (1200x675).
- The consistency will increase long term public recognition and acceptance. Thus helping the public consistently recognize the messaging as reliable and official.
- Consistency will make it easier for local NWS to just pour info into a template and not have to create a new message framework every time.

2. Consistent information zones

These zones help make the information easily findable, readable, and relatable.

3. Consistent Elements

- Consistent font sizes, spacing, colors, and photography help make the information easy to find and read.
- Consistent placement and larger logo block within message provides a visual anchor and give credence to messaging.
- Consistent placement and smaller one color social media icons will not compete with other more relevant information.
- NOAA/NWS weather icons for consistent easy understanding of weather event.[x]

Unique Features:

- prominent weather color coding and icons

- large color field with no photography, to stand in contrast to ubiquitous text and image based Twitter messaging

- design is broken into disctinct left and right zones

Recap: **DESIGN (B)** Message compilation

1. Consistent size and grid/look.

- Twitter's optimal size (1200x675).
- The consistency will increase long term public recognition and acceptance, helping the public consistently recognize the messaging as reliable and official.
- Consistency will make it easier for local NWS to just pour info into a template and not have to create a new message framework every time.

2. Consistent information zones

These zones help make the information easily findable, readable, and relatable.

3. Consistent Elements

- Consistent font sizes, spacing, colors, and photography help make the information easy to find and read.
- Consistent placement and larger logo block within message provides a visual anchor and give credence to messaging.
- Consistent placement and smaller one color Social media icons will not compete with other more relevant information.

Unique Features:

- Single large photo visually representing the weather condition

- Design is broken into left and right zones, but are connected by the black bands and labeled color bars providing rhythm and harmony

- A clear call to action section to help the viewer always know what is expected of them

- Footer designed to resemble a network news feed, to which the public is accustomed
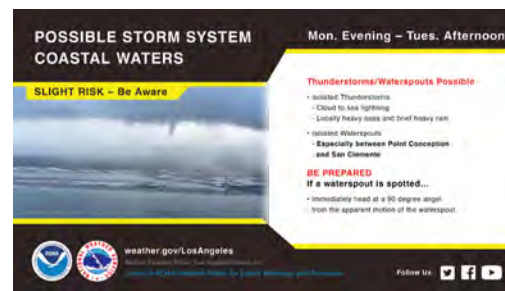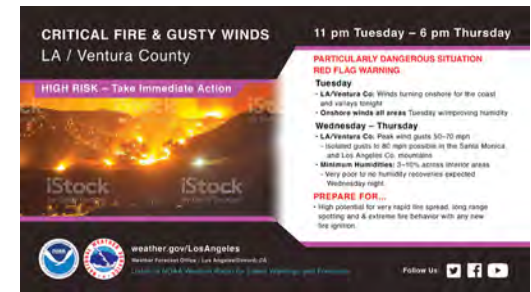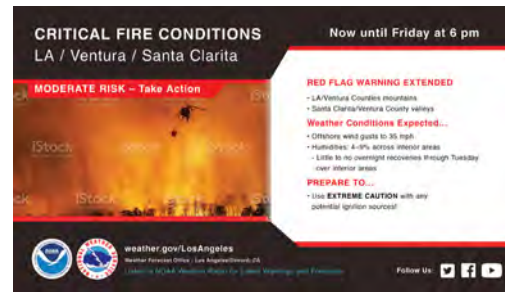
Our Recommendations:

1. Efficacy Messaging (Design A and B)

When communicating with the public about the importance of dangerous weather conditions, it is vital that the message emphasize susceptibility, severity and most importantly self-efficacy and response efficacy.

2. Global Color Coding (Design A and B)

It is recommended that internationally recognized colors be used to convey consistent weather related messages to as wide an audience as possible.

3. Unification of Grid and Layout (Design A and B)

The consistent hierarchy, pacing, and sequence of the information will over time encourage trust and foster dependability.

4. Standardization of Writing

NWS LA/Oxnard Selection & Recommendations:

Design B was chosen with the following additions

– the *color coding* chart from **Design A**

– the *Ready! Set! Go!* logo/slogan.

– specific *efficacy language* added to the messaging.

Debris Flow & Wild Fire Messaging

The Chosen and Revised Design B:

A/B TESTING OLD VS. NEW MESSAGES

Respondents to our survey of California residents, aged 18 and up (n= 1,095) were randomly assigned one of six pairs to determine whether they preferred the old or new messages.

NEW MESSAGE DESIGN PREFERRED: RESULTS OF A/B TESTING

Old Design (A)

New Design (B)

44.34

Which Design?

55.66%

N=1024
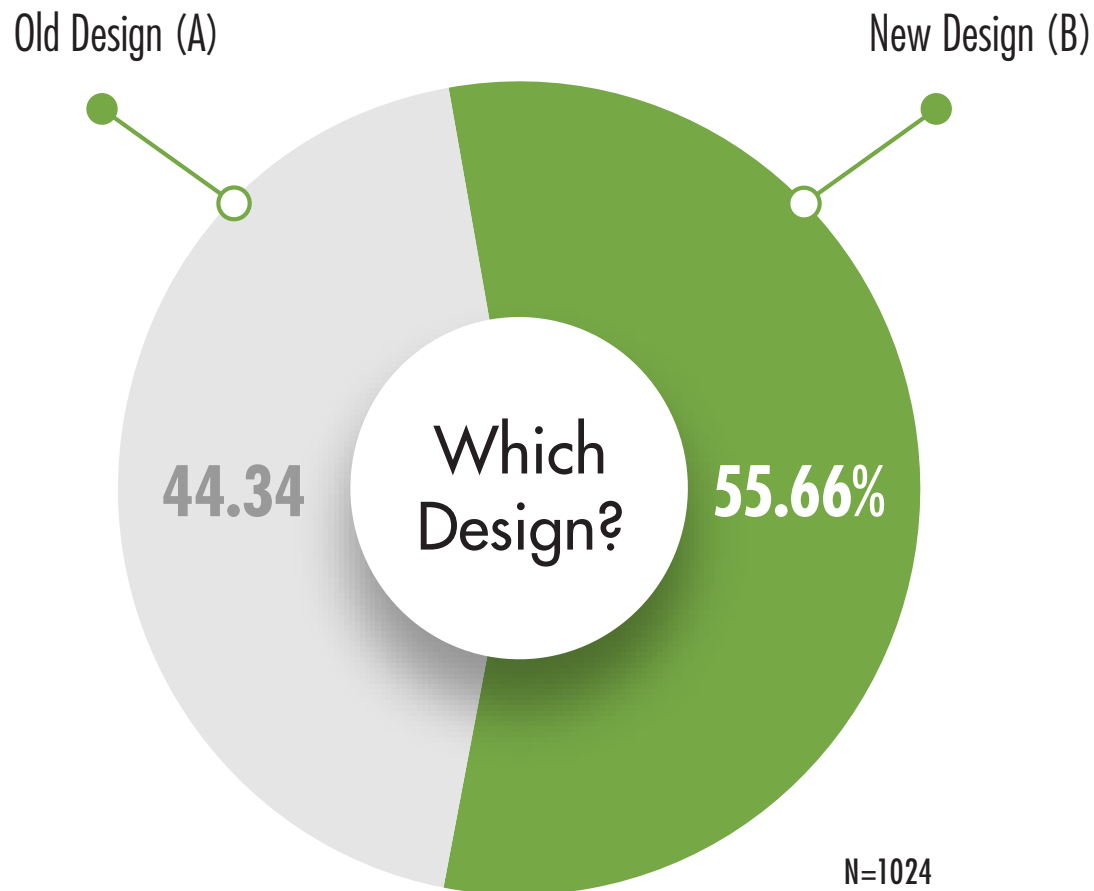
The old designs were effective, **but the new designs were preferred and showed an increase in efficacy.** As we shall see in the following pages, improvement was shown in the public's understanding of what to do in response to the message, ease of understanding, trustworthiness, and taking the message seriously. Some of the biggest gains can be seen in the Particularly Dangerous Situation, where understanding what to do is up 18%, ease of understanding is up 14.8%, trustworthiness is up 9%, and taking the message seriously is up 6%.

Although the amount of improvement varies by message, the overall increase in efficacy is striking. We would expect continued improvement as the public becomes more familiar with the color coding system and new designs, and as the messaging is reinforced through public education campaigns. We did see a dip in a few of measures, but most were not significant. An exception can be seen in the Flash Flood & Debris Flow message, where taking it seriously was down 9% (though the other measures were up). It may be an artifact of the original design experiment where the term "debris flow" was defined in detail, thus the seriousness of the message was underscored. Further investigation is needed.

CRITICAL FIRE: HIGH RISK

CRITICAL FIRE WEATHER CONDITIONS
LA / Ventura / Santa Clarita

Now until Friday at 6 pm

HIGH RISK – Take Action

RED FLAG WARNING EXTENDED
· LA/Ventura Counties mountains
· Santa Clarita/Ventura County valleys

Weather Conditions Expected...
· Wind gusts to 35 mph
· Humidities: 4–9% across interior areas

READY! SET! GO!
· Are you **SET** to evacuate if needed?
· Use **EXTREME CAUTION** with any
  potential ignition sources!

HIGH

weather.gov/LosAngeles
Weather Forecast Office · Los Angeles/Oxnard, CA
Updated Mon. Jan 8, 2017 11:00 am

Follow: nwslosangeles
Listen: NOAA Weather Radio for Latest Warnings and Forecasts

8.9% increase

A
87% AGREE
13%

3.1% increase

B
85.3% AGREE
14.7%

C
88.2% AGREE

3.9% increase
11.9%

D
93.2% AGREE

1.7% increase
6.8%

N=1024

A. I **clearly understand** what I should do in response to this message

B. This weather message is **easy to understand**

C. This weather message is **trustworthy**

D. If I saw this message in my area I would **take it seriously**

CRITICAL FIRE: EXTREME RISK

A
18% increase

87% AGREE
10%

B
14.8% increase

84.7% AGREE
15.3%

C
9.2% increase

90% AGREE
10%

D
5.6% increase

91% AGREE
9%

N=1024

CRITICAL FIRE WEATHER CONDITIONS
LA / Ventura County

11 pm Tuesday – 6 pm Thursday

EXTREME RISK – Take Immediate Action

PARTICULARLY DANGEROUS SITUATION
RED FLAG WARNING
Wednesday – Thursday
- **LA/Ventura Co**: Peak wind gusts 50–70 mph
  - Isolated gusts to 80 mph possible in the Santa Monica and Los Angeles Co. mountains
- **Minimum Humidities**: 3–10% across interior areas
  - Very poor to no humidity recoveries expected Wednesday night

READY! SET! GO!
- Are you **SET** to evacuate if needed?
- Use **EXTREME CAUTION** with any ignition source.

EXTREME

weather.gov/LosAngeles
Weather Forecast Office • Los Angeles/Oxnard, CA
Updated Mon. Jan 8, 2017 11:00 am

Follow: nwslosangeles
Listen: NOAA Weather Radio for Latest Warnings and Forecasts

A. I **clearly understand** what I should do in response to this message

B. This weather message is **easy to understand**

C. This weather message is **trustworthy**

D. If I saw this message in my area I would **take it seriously**

IMPACTFUL STORM

A. I **clearly understand** what I should do in response to this message

B. This weather message is **easy to understand**

C. This weather message is **trustworthy**

D. If I saw this message in my area I would **take it seriously**

SIGNIFICANT STORM

A

5.1% increase

85.7% AGREE

14.2%

B

1.1% increase

86.8% AGREE

13.1%

C

3.5% increase

87.3% AGREE

12.7%

N=1024

D

85% AGREE

15%

6.3% decrease

SIGNIFICANT STORM
For Southwestern California

MODERATE RISK – Be Prepared

MODERATE

Monday and Tuesday

Weather Highlights
- Moderate to Heavy Rain **Monday–early Tuesday**
- Scattered Showers **Tuesday afternoon/night**
- Thunderstorms with High Intensity Rainfall
  Possible Monday night–Tuesday

Impacts:
- Flooded roadways and closures
- Wintery mountain driving conditions
- Downed trees, branches, & Power lines
- High surf and minor coastal flooding
- Flash flooding & debris flows near burn areas

PREPARE and ACT:
- Avoid high water – **Turn Around, Don't Drown.**
- Avoid unnecessary mountain travel
- Avoid downed power lines
- Evacuate before a debris flow if time allows

weather.gov/LosAngeles
Weather Forecast Office - Los Angeles/Oxnard, CA
Updated Mon, Jan 8, 2017 11:00 am

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A. I **clearly understand** what I should do in response to this message

B. This weather message is **easy to understand**

C. This weather message is **trustworthy**

D. If I saw this message in my area I would **take it seriously**

A. I **clearly understand** what I should do in response to this message

POSSIBLE STORM SYSTEM COASTAL WATERS

Mon. Evening – Tues. Afternoon

LOW RISK – Be Aware

Thunderstorms/Waterspouts Possible
- Isolated Thunderstorms
  - Cloud to sea lightning
  - Locally heavy seas and brief heavy rain
- Isolated Waterspouts
  - Especially between Point Conception and San Clemente

PREPARE and ACT:
- Plan to stay in harbor during storms
- Stay inside boat cabin during lightning
- Avoid touching metal or electrical devices during lightning

If a waterspout is spotted...
- Immediately head at a 90 degree angel from the apparent motion of the waterspout.

LOW

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A
88.4%
AGREE
2.2% increase
11.6%

B
85%
AGREE
0.6% increase
15.1%
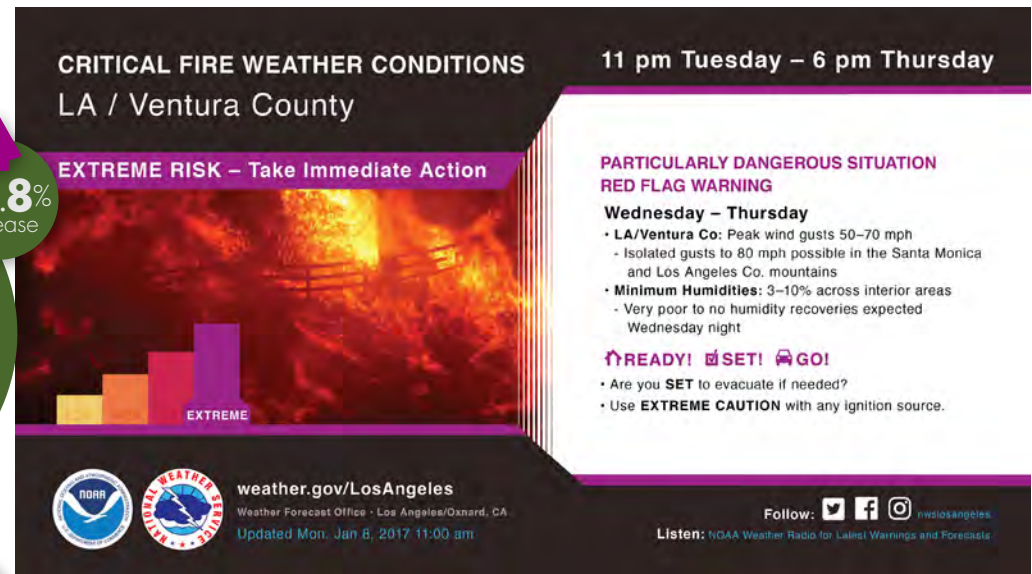
C
89%
AGREE
1.2% decrease
11%

D
92.5%
AGREE
3.7% decrease
7.5%

N=1024

A. I **clearly understand** what I should do in response to this message

B. This weather message is **easy to understand**

C. This weather message is **trustworthy**

D. If I saw this message in my area I would **take it seriously**

FLASH FLOOD AND DEBRIS FLOW

A
91.6% AGREE
12.2% increase
8.4%

B
89.6% AGREE
3.1% increase
10.4%

C
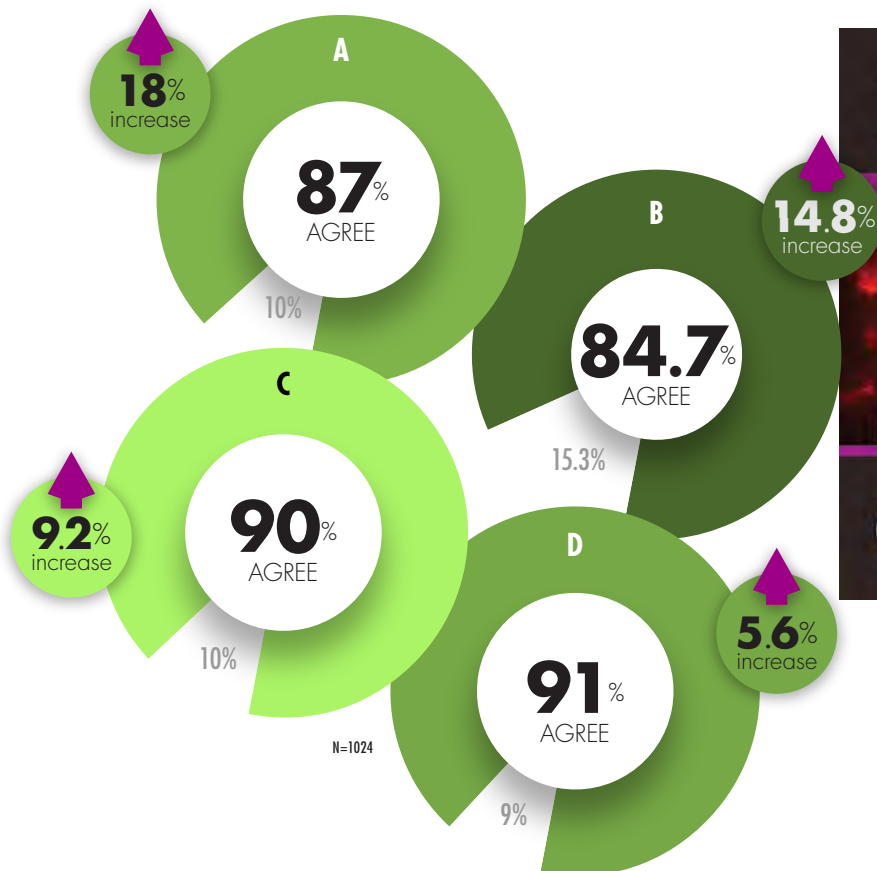**89**% AGREE
5.0% increase
10.9%

D
88.3% AGREE
9.0% decrease
11.7%

N=1024

A. I **clearly understand** what I should do in response to this message

B. This weather message is **easy to understand**

C. This weather message is **trustworthy**

D. If I saw this message in my area I would **take it seriously**

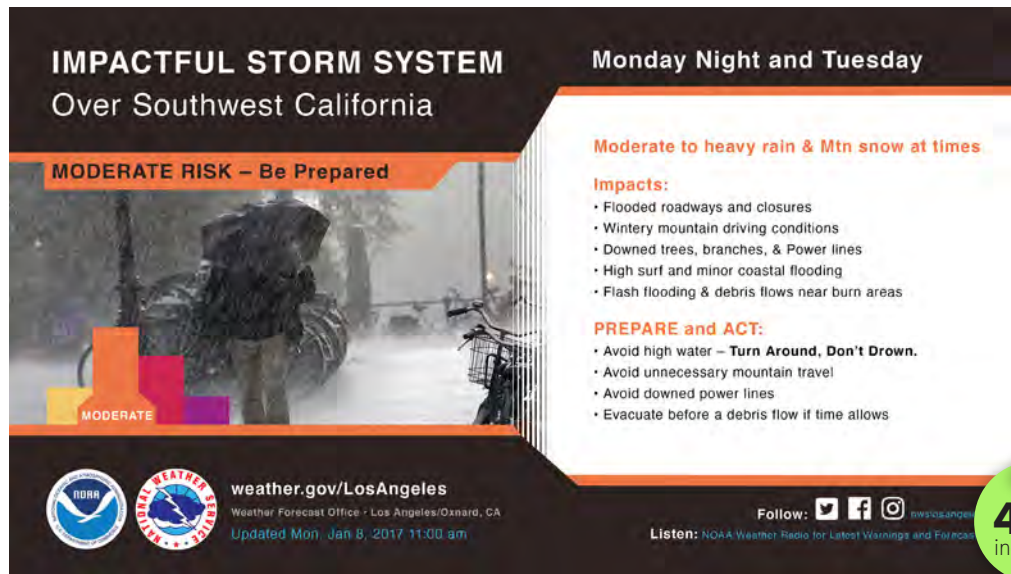# RESPONSES ON READABLITY
Open ended responses (representative selection)
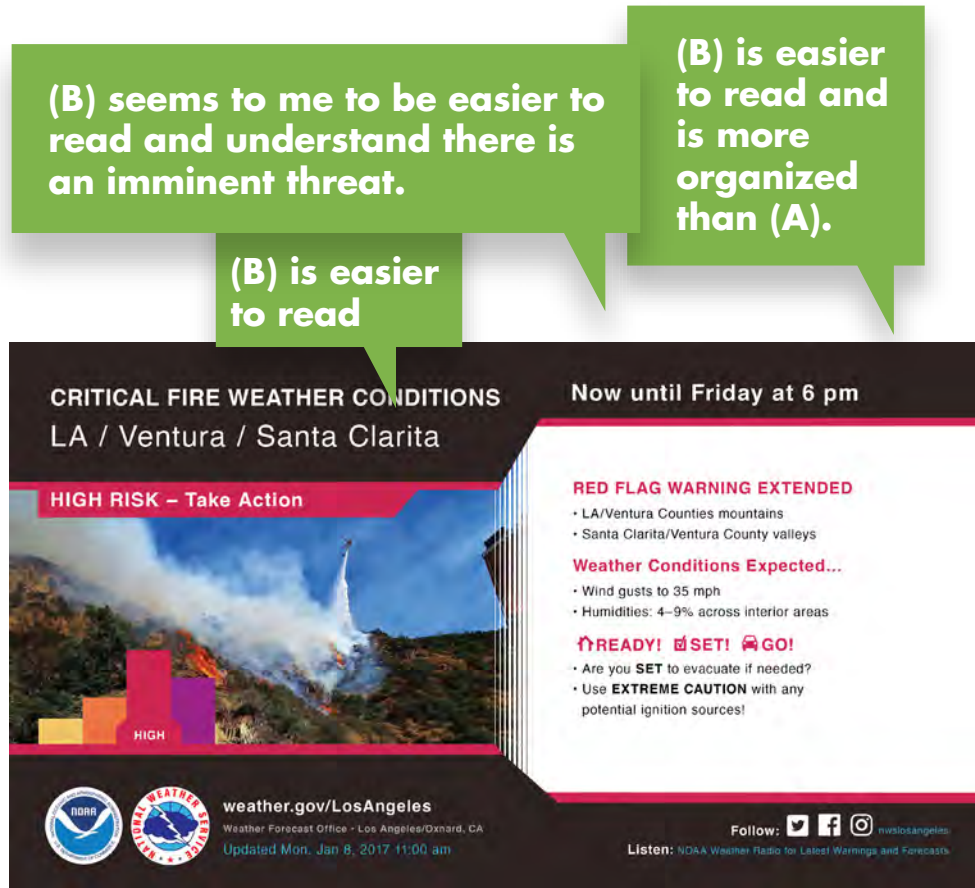
(B) seems to me to be easier to read and understand there is an imminent threat.

(B) is easier to read and is more organized than (A).

(B) is easier to read

Easy to read.

Looks easier to read.

Information is easier to read and the chart helps define how dangerous it is.

(B) is easier to read, because the print is on a white background.

Easy to read.

It's easier to read, it highlights what needs to be done better in white and red for warning.

(B) It's much easier to read. The way the information is grouped is better. ...

Spread out, easier to read.

...The white background draws my attention. Plus, it looks more current – the (A) design looks dated.

Its clearer with the 'impacts' and 'prepare to act'. Its also a little easier to read.

It's much clearer to read and much more simplified to comprehend.

Easier to read and notice.

It is much easier to understand.

CRITICAL FIRE WEATHER CONDITIONS
LA / Ventura / Santa Clarita

Now until Friday at 6 pm

HIGH RISK – Take Action

RED FLAG WARNING EXTENDED
· LA/Ventura Counties mountains
· Santa Clarita/Ventura County valleys

Weather Conditions Expected...
· Wind gusts to 35 mph
· Humidities: 4–9% across interior areas

READY! SET! GO!
· Are you **SET** to evacuate if needed?
· Use **EXTREME CAUTION** with any potential ignition sources!

HIGH

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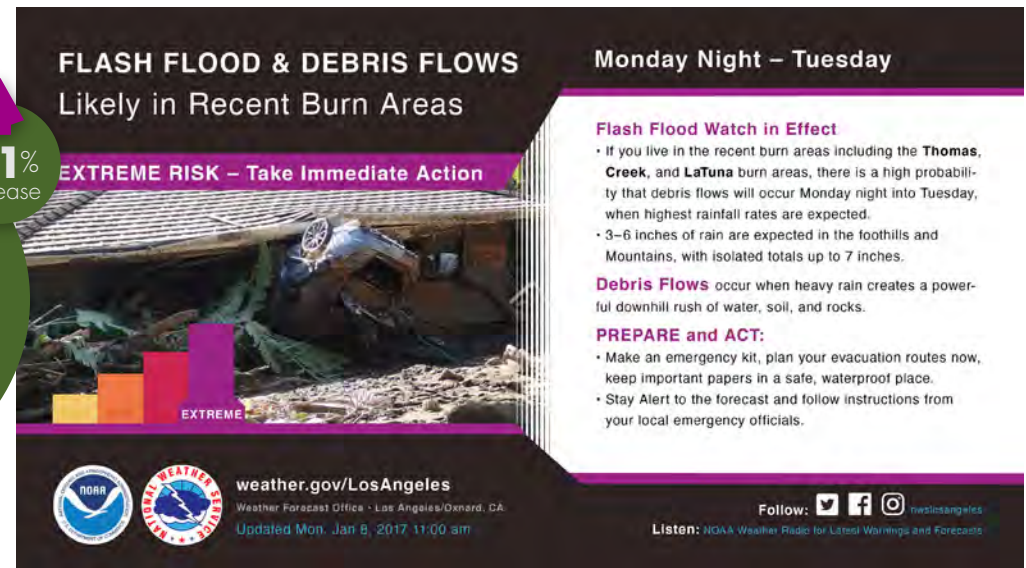Listen: NOAA Weather Radio for Latest Warnings and Forecasts

Why the New Design is Preferred:
RESPONSES ON URGENCY
Open ended responses (representative selection)

It looks more serious.

The fire risk graph shows the danger present.

It seems more professional and more likely to be taken seriously.

More direct.

(B) has a graph that at a quick glance allows you to know it's serious.

Seems more serious.

It just looks more imminent and easy to understand.

(A) seems more like an Ad to book a vacation.
(B) seems more serious.

More reliable and real.

The risk level indicator is helpful.

It shows level of the threat and risk.

More serious.

Looks serious, possibly ominous, like I should pay attention.

(B) looks more urgent/serious, and its information is easier to read/grasp at a glance

More alertness.

FLASH FLOOD & DEBRIS FLOWS
Likely in Recent Burn Areas

EXTREME RISK – Take Immediate Action

EXTREME

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Monday Night – Tuesday

Flash Flood Watch in Effect
· If you live in the recent burn areas including the **Thomas**, **Creek**, and **LaTuna** burn areas, there is a high probability that debris flows will occur Monday night into Tuesday, when highest rainfall rates are expected.
· 3–6 inches of rain are expected in the foothills and Mountains, with isolated totals up to 7 inches.

Debris Flows occur when heavy rain creates a powerful downhill rush of water, soil, and rocks.

PREPARE and ACT:
· Make an emergency kit, plan your evacuation routes now, keep important papers in a safe, waterproof place.
· Stay Alert to the forecast and follow instructions from your local emergency officials.

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RESPONSES ON FORMAT

It's brighter in colored and looks organized to where it doesn't look chaotic.

(A) looks cluttered and unprofessional.

(B) is less cluttered.

More succinct.

The other (A) seems more crowded.

The (B) seems to be better made and more formal than the other choice.

(B) is easy to look at and understand.

It looks cool.

Color scheme is more impactful – you can see the pertinent information at a glance.

On example B, the information on the far right with the white background, stands...

It clearly shows, whats going to happen and gives points to what the impacts are and the weather.

It looks better organized and serious.

Letter (B) is more visually appealing. The font and colors allow for quickly easy reading.

Gets my attention.

It's well organized.

... out and makes it clear that this is the most important information you should be aware of.

IMPACTFUL STORM SYSTEM
Over Southwest California

Monday Night and Tuesday

MODERATE RISK – Be Prepared

Moderate to heavy rain & Mtn snow at times

Impacts:
· Flooded roadways and closures
· Wintery mountain driving conditions
· Downed trees, branches, & Power lines
· High surf and minor coastal flooding
· Flash flooding & debris flows near burn areas

PREPARE and ACT:
· Avoid high water – Turn Around, Don't Drown.
· Avoid unnecessary mountain travel
· Avoid downed power lines
· Evacuate before a debris flow if time allows

MODERATE

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Why the New Design is Preferred:
RESPONSES ON FORMAT – CONT.
Open ended responses (representative selection)

Better design.

(B) is more succinct and to the point. I also just like the colors and layout; it's more aesthetically pleasing.

More updated.

It looks more professional.

Page is much larger to read and see and the writing stands out and easier to read that way.

(A) is slightly more difficult to read because of the transparent background being used. The government logos are also too small, which makes it feel less serious.

(B) Clearly tells the risk and times.

Seems less wordy and clearly states extreme risk.

Example (B) clearly separates and highlights the instructions, so they are not overlooked.

Better design and looks more official.

SIGNIFICANT STORM
For Southwestern California

MODERATE RISK – Be Prepared

MODERATE

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Weather Forecast Office - Los Angeles/Oxnard, CA
d Mon, Jan 8, 2017 11:00 am

Monday and Tuesday

Weather Highlights
- Moderate to Heavy Rain **Monday–early Tuesday**
- Scattered Showers **Tuesday afternoon/night**
- Thunderstorms with High Intensity Rainfall **Possible Monday night–Tuesday**

Impacts:
- Flooded roadways and closures
- Wintery mountain driving conditions
- Downed trees, branches, & Power lines
- High surf and minor coastal flooding
- Flash flooding & debris flows near burn areas

PREPARE and ACT:
- Avoid high water – **Turn Around, Don't Drown.**
- Avoid unnecessary mountain travel
- Avoid downed power lines
- Evacuate before a debris flow if time allows

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Listen: NOAA Weather Radio for Latest Warnings and Forecasts.

(B) is clear, calm, more spreadout, concise, and enticing.

(A) is more distracting and the message is not as clear.

I think this design is more clean and you're able to focus on the reading since it is in one color and has a solid background.

Recommendations:

1. Efficacy Messaging

When communicating with the public about the importance of dangerous weather conditions, it is vital that the message emphasize susceptibility, severity and most importantly self-efficacy and response efficacy. Without these components, the message is likely to cause fear without action.

2. Global Color Coding

It is recommended that internationally recognized colors be used to convey consistent weather related messages to as wide an audience as possible.

3. Unification of Grid and Layout

The consistent hierarchy, pacing, and sequence of the information will over time encourage trust and foster dependability. These allow the reader to positively interact with the messaging information.

4. Standardization of Writing

When communicating with the public is is essential that capitalization, punctuation, abbreviation, sentences vs fragments, indentation, and tone are consistent from message to message.

5. Design a Series of Educational Materials

Create general educational and warning info gifs to be distributed and posted throughout the year in order to instruct and train the public. In particular, these materials should focus on public understanding of debris flows, preparedness, and Ready! Set! Go!

Debris Flow & Wild Fire Messaging

We believe these will enhance…

"…efforts to serve the American public by connecting improved forecasts and warnings to life-saving decisions that enable communities to become ready, responsive, and resilient to extreme weather, water, and climate events: a Weather-Ready Nation." [x]

Project update:

- ✓ Design two alternative templates for all the messages analyzed in the preliminary proposal.

- ✓ Test the efficacy of the new designs compared to the old designs.

- ☐ Design a series of educational materials to be deployed throughout the year as part of the NWS effort to build a weather-ready nation.

- ☐ Design and adopt a single, clear, and effective debris flow icon/graphic for use when communicating with the public.

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