

# Low Light mode



# Origins

Picture fidelity in video calls is a crucial part of communication inherent in their value

Research shows that **lighting is a problem across video calling apps** for multiple reasons, including:

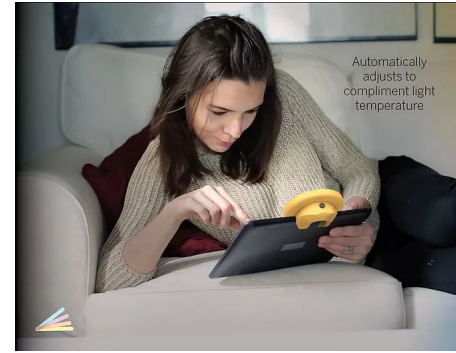
- Calling at night to avoid perceived clogged network
- Poorly lit homes, or preferences of lower light
- Preferences to not use lights at certain times
- Multitasking in low light conditions (ex. watching TV at night)



# Video call lighting - also a personal interest!

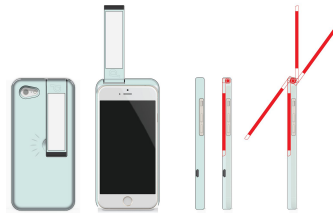
## Imbue Video Chat Light

Personal project  
2014



## **Panda Phone Case Light**

Freelance design for client  
2015



# Proposal

**Duo will launch a “Low Light” mode in Duo to address user needs (especially in emerging markets) for video calls in low light conditions.**

# The right technical approach



Front facing camera light

Bright illumination

Aggressive; not on all devices



Utilize screen as light source

Cheap to implement

Possibly not bright enough; segmentation is computing sensitive; impact on UX likely poor



**Video pre-processing**

**Most unobtrusive; works on all phones**

**Added power consumption; video encoding delay**

We chose to move forward with video preprocessing for a number of technical reasons, but also the trade-offs of the call experience in low light:

- The use of the camera light mildly blinds the callers view, degrading call experience
- The single source camera light, though bright, could be unflattering
- The screen as light source compacts the window on an already small device

We hypothesised that video preprocessing was the offered the smoothest UX and best overall ROI especially for round one and testing.

## UX values

- Provide better interpersonal communication and clarity - thus providing joy and fulfilment for people using Duo
- Adhere to Duo's brand promise of quality
- Respect privacy & mitigate surprises
- Preserve peoples' choice on if, and when, they want to show themselves in a clearer and more exposed way
- Be humble and apt - meet user needs with the technology we have available, while advancing to improve it

# Challenges

- Privacy
- Skin tones and incorrect triggers
- Automation VS user control
- Brand protection

MVP

MVP



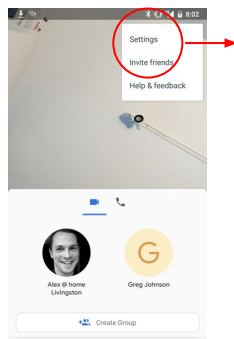
# Global settings

Management of enabling and disabling Low Light mode will be added to the settings options

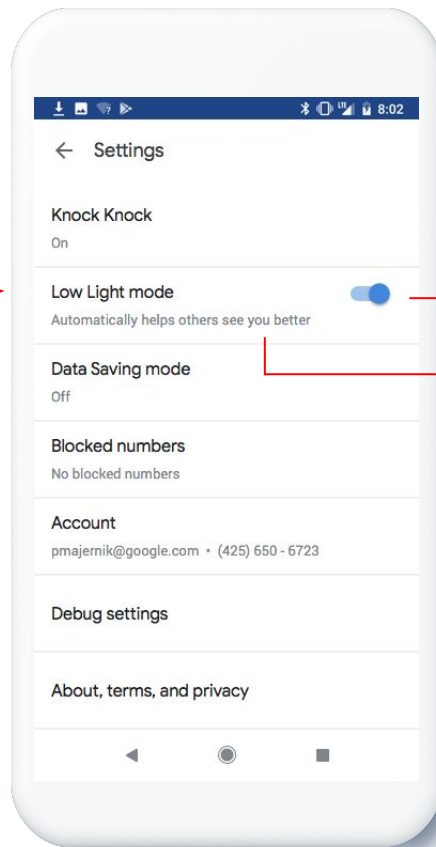
For the MVP it will be disabled by default, with contextual triggers for users to enable it

## Rationale

While the technology around detection of light and skin tone is improving, we'll give users control and an opt-in model, while do studies on user perception and false-trigger analysis.



Settings entry point from home screen



Simple Material toggle is appropriate, sanctioned, and easily understandable

Combined with the feature name, "Low Light mode", the helper text effectively explains its function and value prop, while not distracting or cluttering

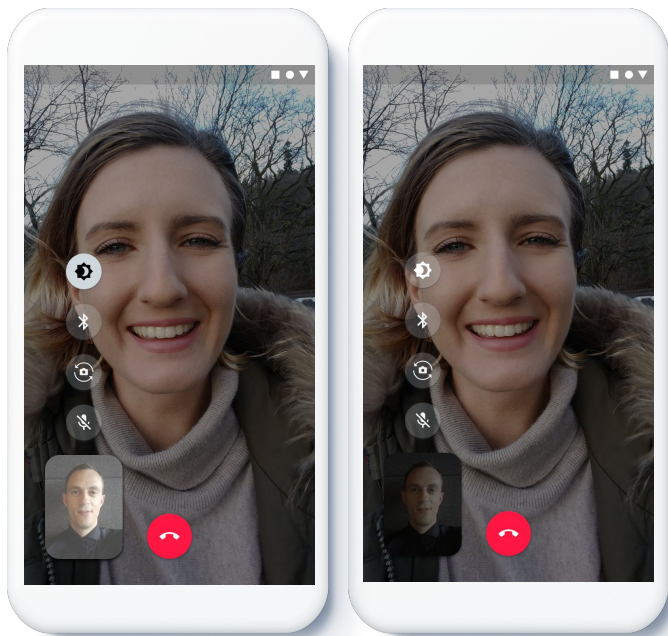
# Behavior

## Low Light mode in-call toggle available only while in dark conditions

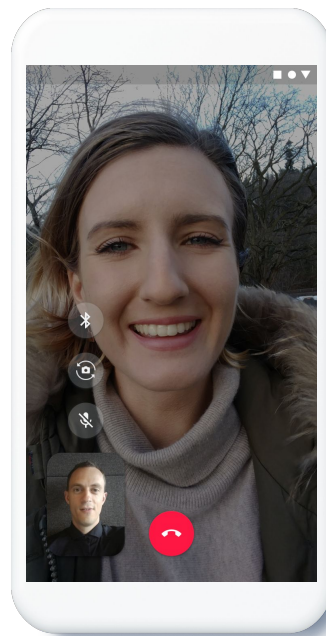
Even with the feature enabled, users will not be able to see or toggle on LLM unless they are in dark conditions. While in dark conditions, users can toggle on & off LLM according to their preference. Returning to normal light turns on the feature.

### Rationale

For the MVP, this should be an automatically triggered quality adjustment rather than a visual effect. Again, as we get data on light trigger success and use-VS-conditions, we can adjust the design logic.



In dark condition - LLM toggle is visible and actionable

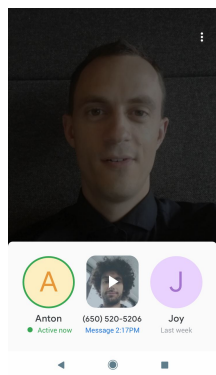


In normal lighting conditions, LLM toggle is not actionable

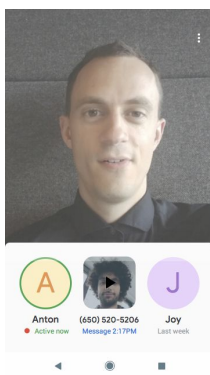
# Call flow

User makes a call in dark conditions

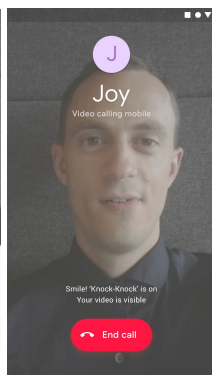
Low Light mode turns on automatically, in home screen or in call, with the option to toggle it on/off



Conditions turn dark



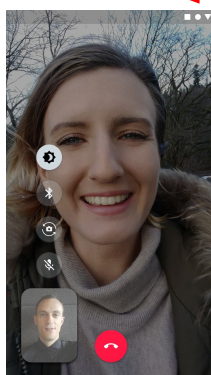
LLM turns on



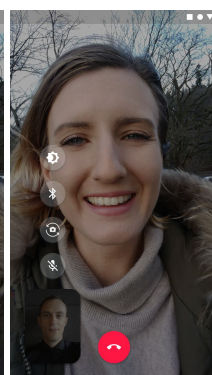
Connecting; LLM on but not accessible



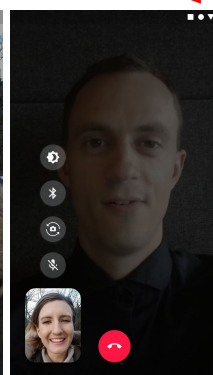
Call connects; LLM on, visible in PIP indicator



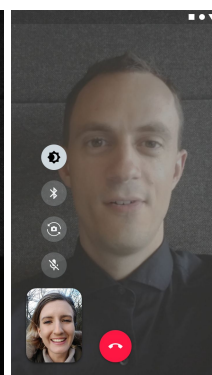
User invokes controls



User can choose to turn LLM on/off for call



User taps PIP, views self

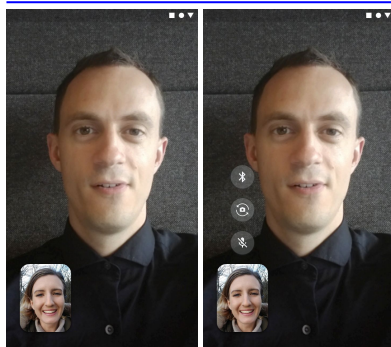


User can turn LLM on/off

# In-call states

Viewing self

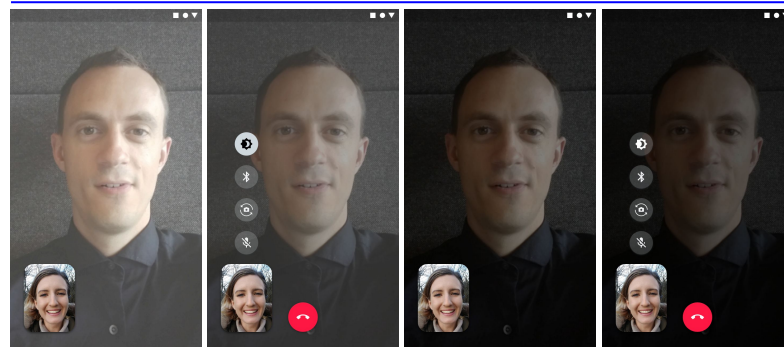
Normal light conditions



Normal

Normal w/  
controls;  
*LLM not available*

Dark conditions



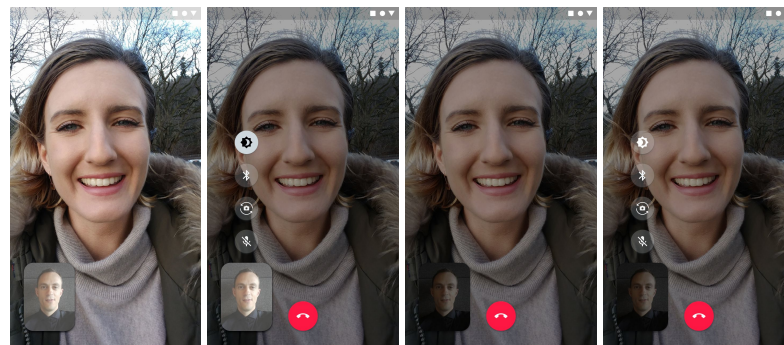
LLM on

LLM on with  
controls, able to  
turn on/off

LLM off

LLM off, with  
controls, able to  
turn on/off

Viewing callee



LLM on

LLM on w/  
controls, able to  
turn on/off

LLM off

LLM off, with  
controls, able to  
turn on/off

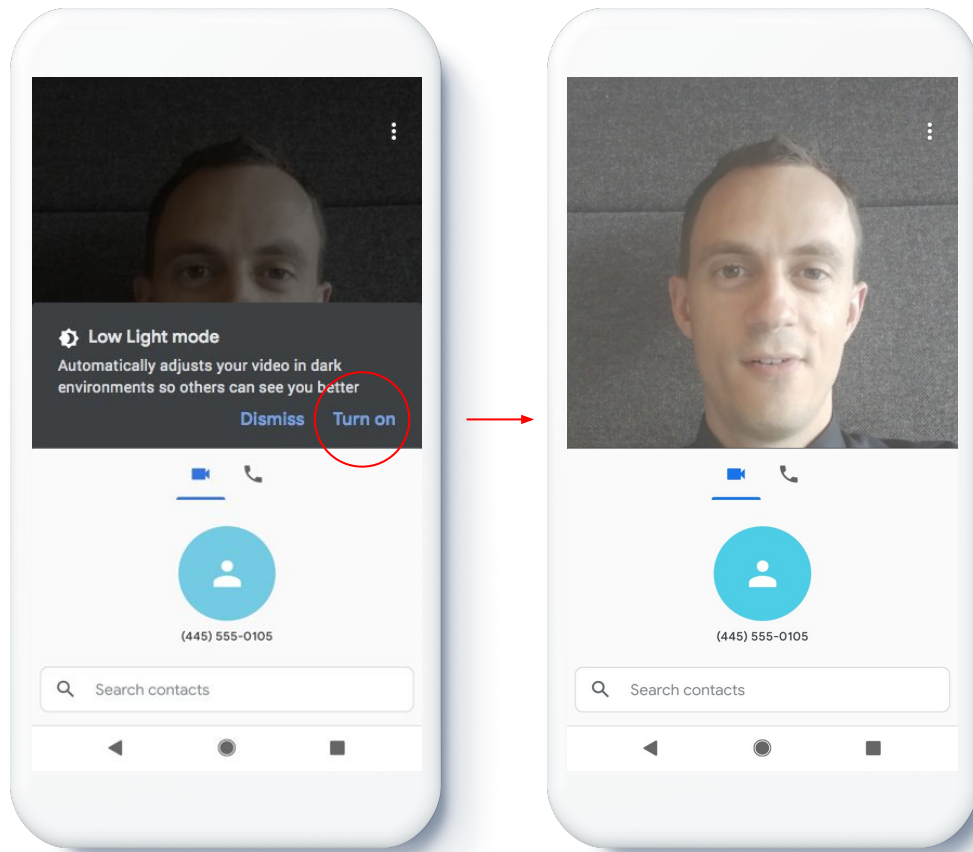
# Feature education

## First-run in home screen

When a user opens Duo in dark conditions, we will offer feature education and a “shortcut” to globally enable the feature to turn on/off automatically.

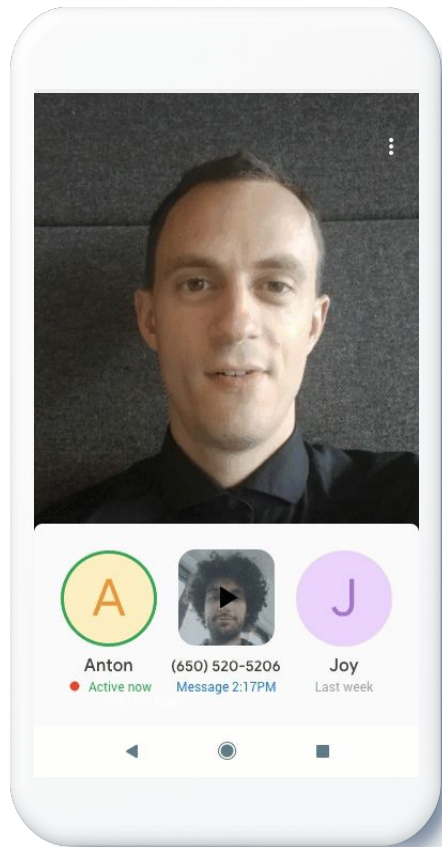
### Rationale

For the MVP, this is an opt-in model with some guidance. This puts the control in users’ hands while educating them as to what is being done, and avoids the possibility of exposure surprises with a feature where the detection tech is not fully fleshed out.



# User research

A tappable click-thru on device  
for a participant research study



GIF

## Steps

User views self in home screen

Enters dark condition

First run education triggers

User chooses to enable Low Light mode

LLM now turns on automatically

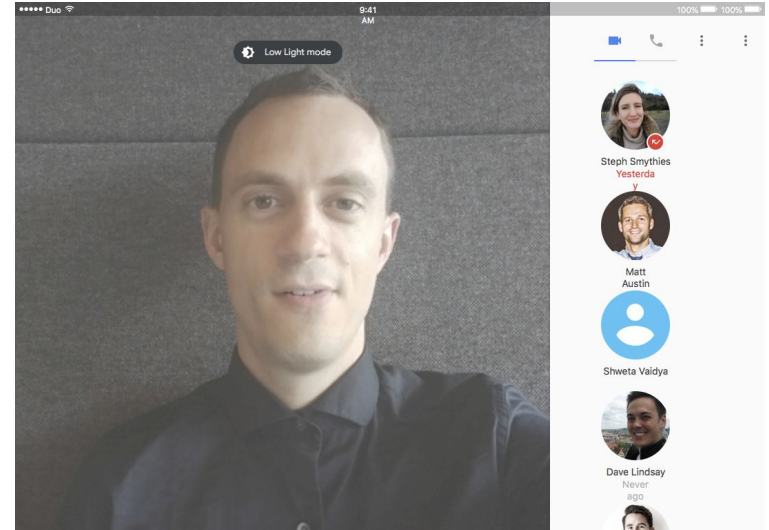
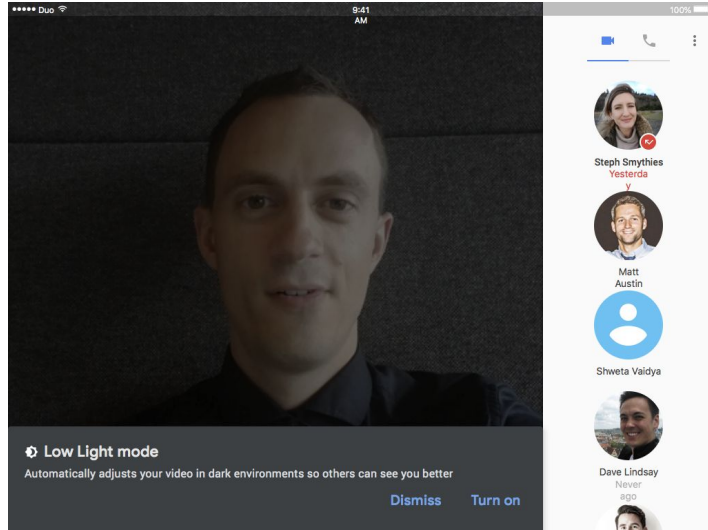
User goes to settings, disables LLM in settings, checks self-view, then re-enables LLM in settings

User makes video call

In call, user toggles LLM during call



# iOS tablet



# Contextual reminders

## For users in low light that continually dismiss option to enable LLM

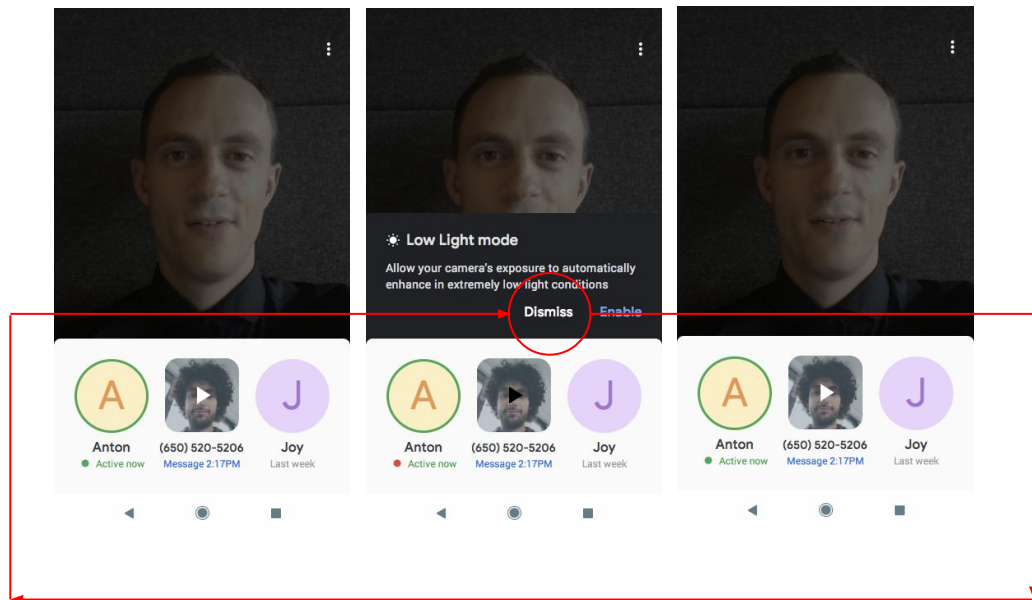
An exponential “back-off” is implemented.

Each time the user dismisses the notification, we will take longer before showing it again. The countdown always starts from the last dismissal of the popup.

- First time low light conditions is detected
- 1 day after
- 5 days after (a week)
- 25 days after (a month)
- 125 days after (4 months)
- 625 days (2 years)

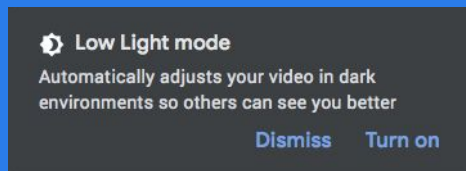


*Leave me alone,  
I like the dark!*





# MVP Experiment Results



(Data here to be explained in presentation)



**V1**

**Estimated launch to some markets for  
experimentation**

# Basic change for V1

## MVP

### Opt-in model

Users have to say 'yes' in dialogue or in Settings

Users can disable it in the dialogue



## V1

### Opt-out model A

Users are told the new feature is enabled, and how to disabled it

Education only - users cannot disable it in the dialogue

# A - Feature auto-enabled with home screen education

## *Switch hair-check dialogue to auto opt-in*

Currently the hair check dialogue promotes the feature and asks users to enable it. We could change to an FYI, auto-enable the feature with an option to disable it in the dialogue.

## **Proposed UX**

Promote feature awareness and use. Could be very aggressive, merely informing users a new feature was added and is already active, while informing them how to change later.

Do not give an option to globally disable the feature in this prompt.

- 1.) Confuses user between one-time (per call) and global.
- 2.) If disabled here, they are able to opt out too easily, without seeing the benefit AND seeing how to change later.

# A

## First run feature education

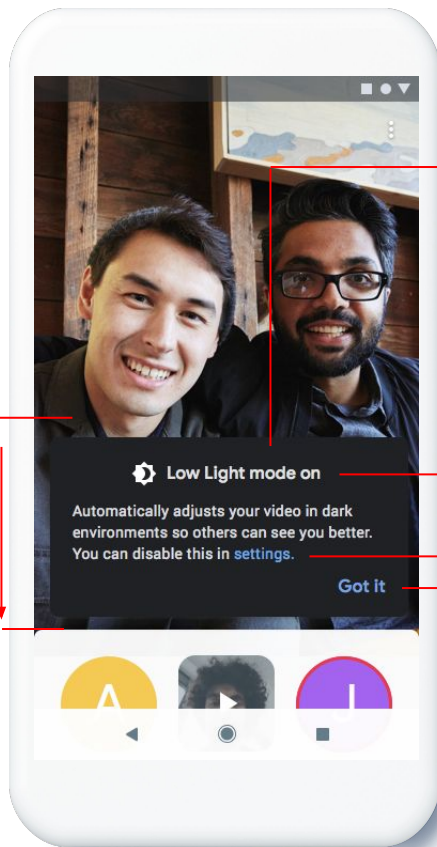
### Now auto-enabled by default

In V1, Low Light mode will be enabled by default, with an “FYI” new feature education message.

### RATIONALE

A stronger funnel to use the feature and our confidence in it provides better user acceptance and comprehension. The sensing and triggering is also improved greatly.

**UNBLOCKED VIEW**  
On home screen open in low light condition, edu message appears & pushes contact UI down



New - V1

### VISUAL UPGRADE

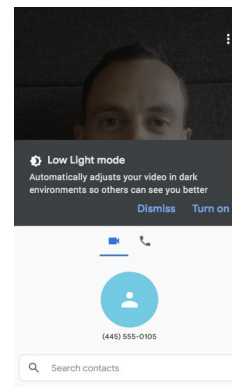
Better padding, adherence to GM color, conforms to similar Duo edu dialogues

### OPT OUT MODEL

The feature is enabled by default, and users must go to settings to disabled it entirely

### PASSIVE SHORTCUT

Allows users to move on quickly, but offers a way to investigate the new feature from here, and lets them now how in the future

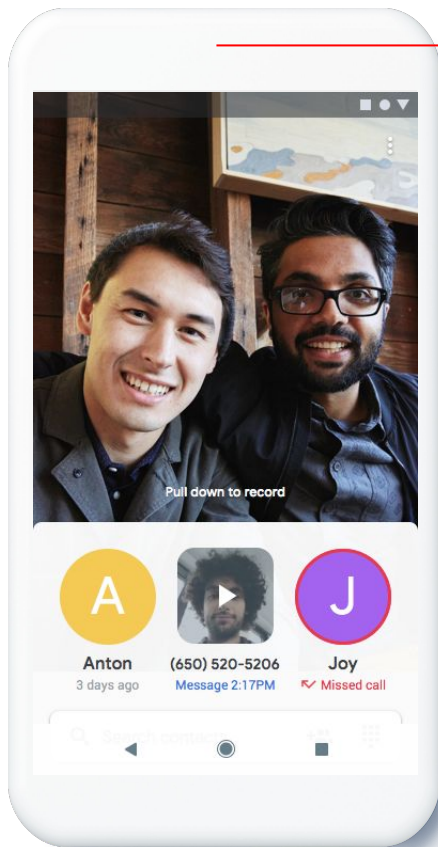


Prior - MVP

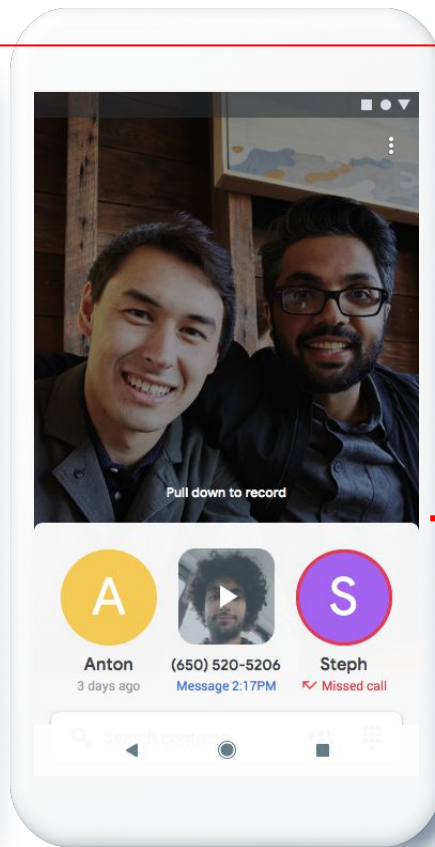
# A

First run feature education

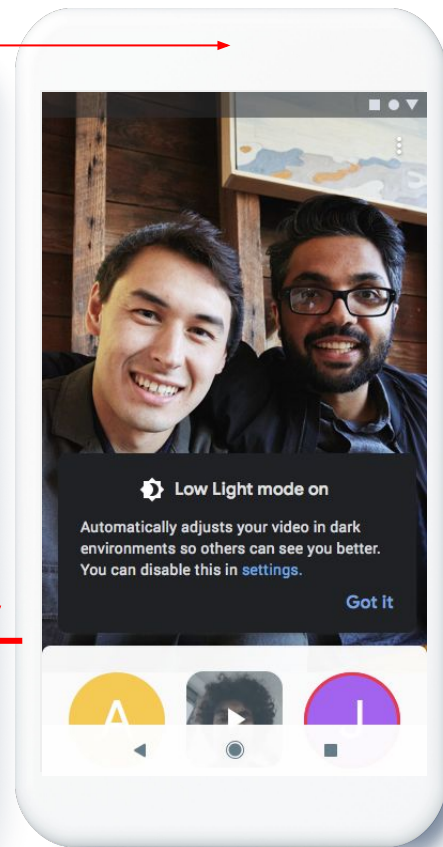
Flow



Homescreen/Haircheck



Environment turns dark



Feature awareness + how to change + direct link

# V2

Future integration

Placement in overflow menus as Duo adds features



\* Advanced menu design:  
zhoubailiang@

# Appendix goodies





# Comparative references

# Google Nightsight

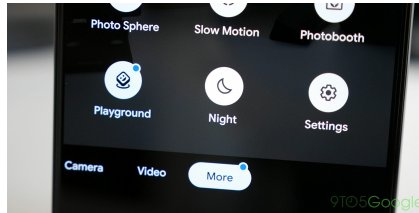
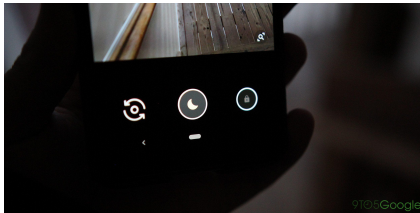
From brand website: *If you're taking a photo in low light, Pixel will **\*suggest** using Night Sight. You can **\*\*enter** Night Sight by tapping this suggestion or **\*\*\*manually** navigating to the mode. After you tap the shutter button, try to hold still until Night Sight finishes capturing the photo.*

## UX Observations:

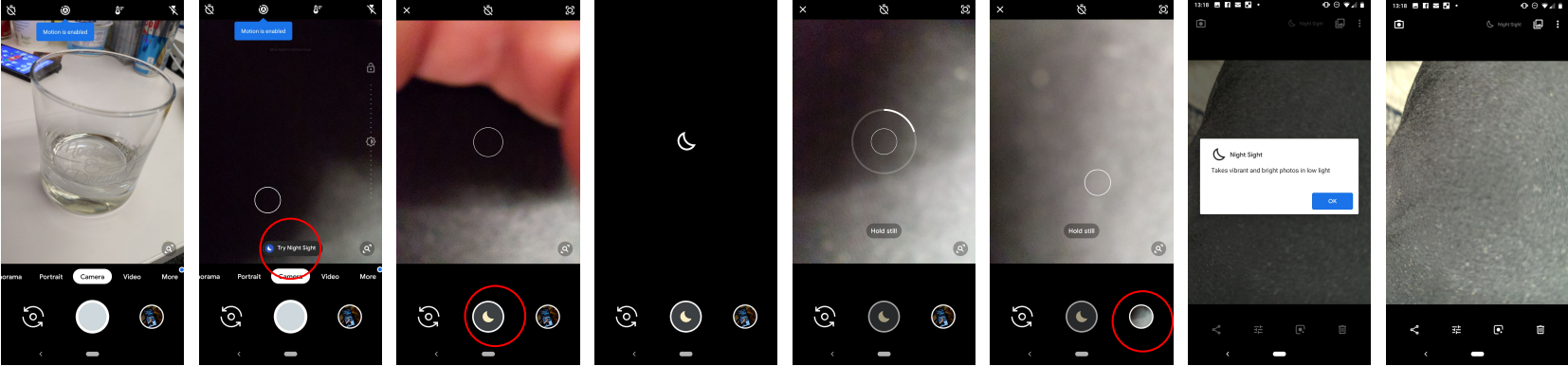
### \*Detection

**\*\*State change; completely diff 'place' and UI**

**\*\*\*Other ways 'in' - at user discretion**



# Google Nightsight



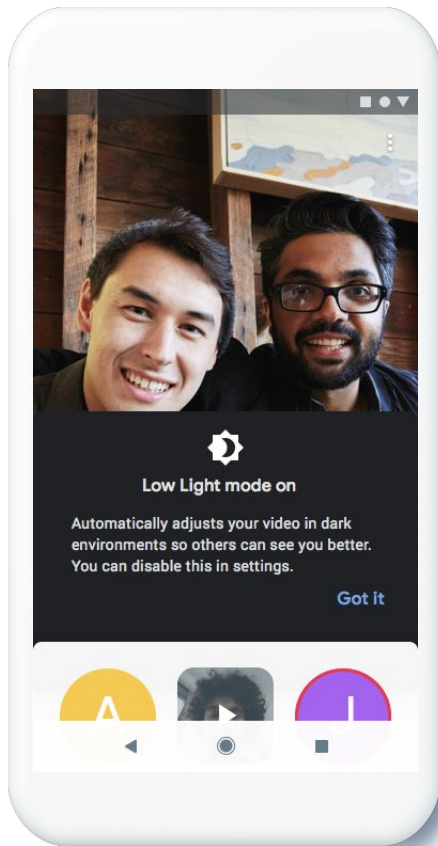
# V1 Explorations



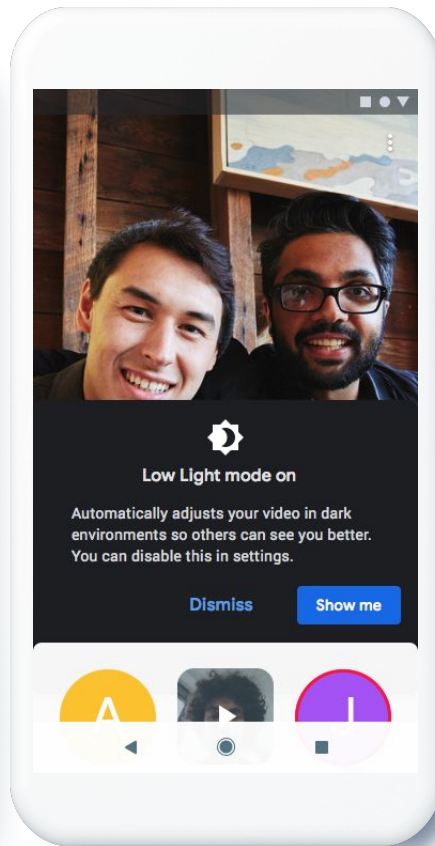
# 1

## First run education

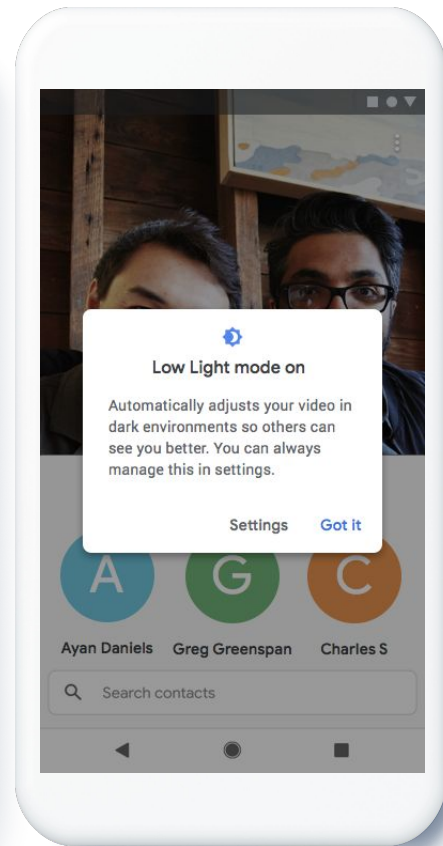
### Variations



Match some Duo in context designs



Match some Duo in context designs,  
with M2 edu entry point to feature or  
settings

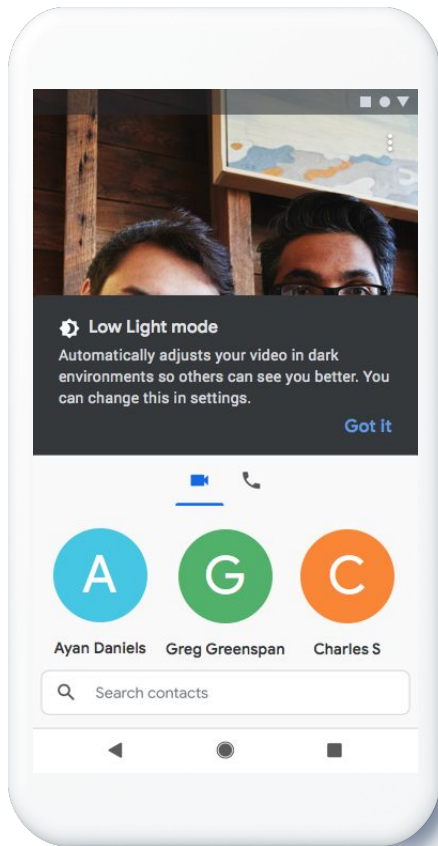


White, standard M2 modal

# 1

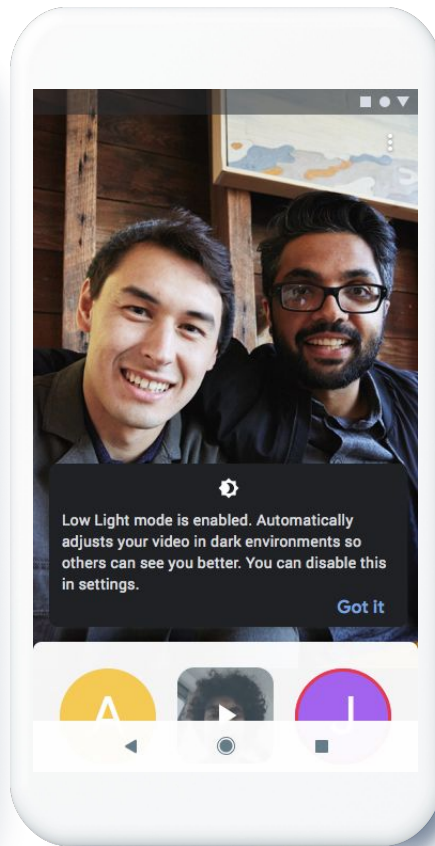
## First run education

### Variations



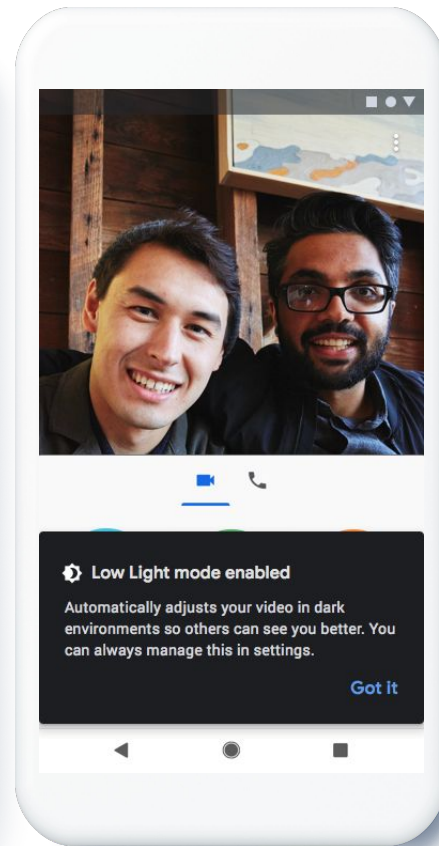
Variation of MVP design

*X - needs redesign, covers self-view*



Model pushes controls

*X - not enough feature announcement*

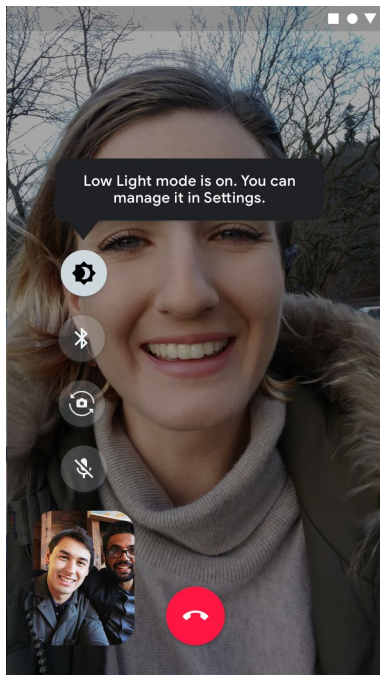


Modal covers controls

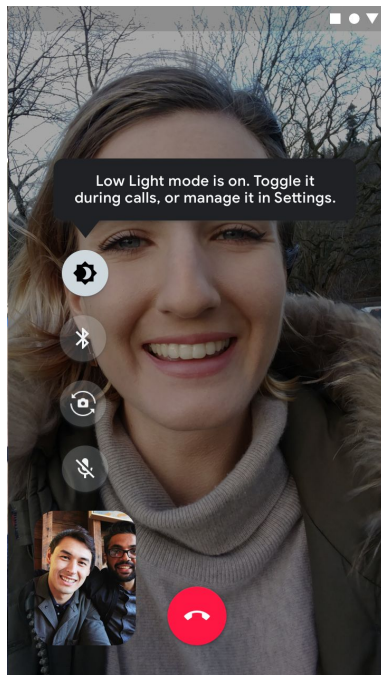
*X - rather push down than cover*



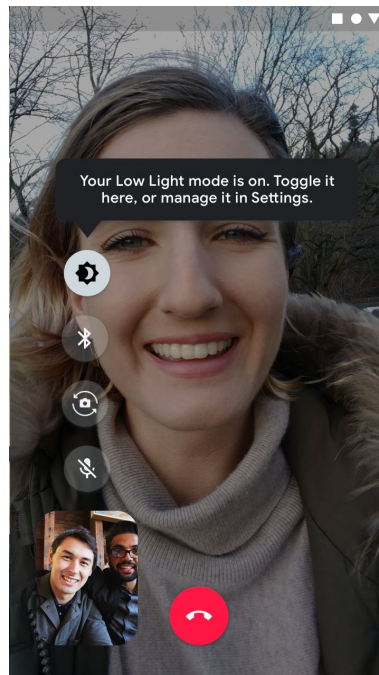
## 2 In context education **String variations**



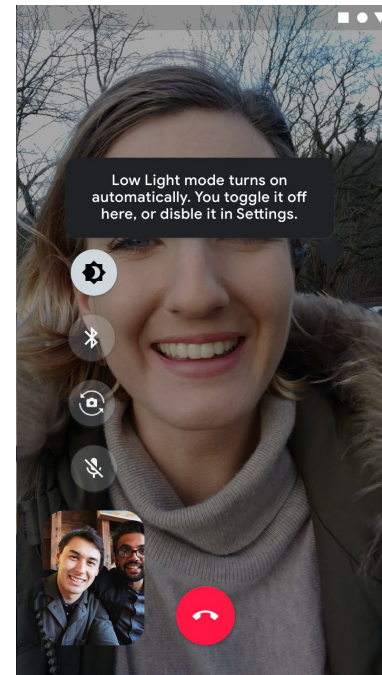
**ALT COPY**  
(No reference hint to toggle)



**ALT COPY**  
"Toggle it **during** calls..."



**ALT COPY**  
"**Your** Low Light mode..."



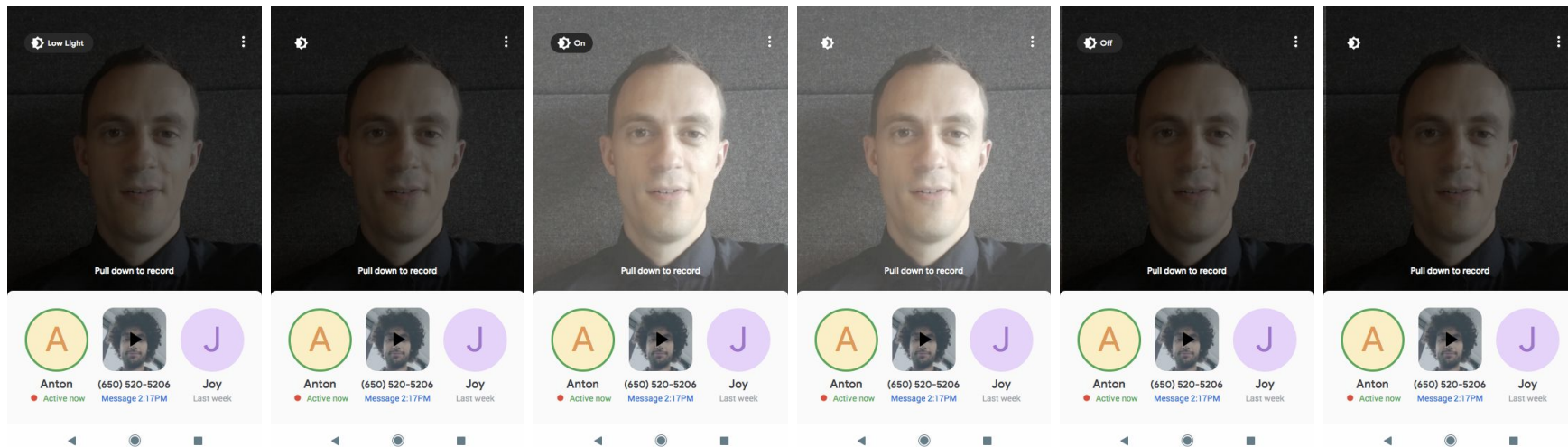
**ALT COPY**  
...turns on "**automatically**."

MVP MVP

# MVP Explorations



# 1 On-screen overlay in home screen appears in dark conditions. User controls the on/off.



User viewing self

Conditions become dark,  
pill appears

Tapping pill turns Low  
Light mode on

Pill times out but remains  
available

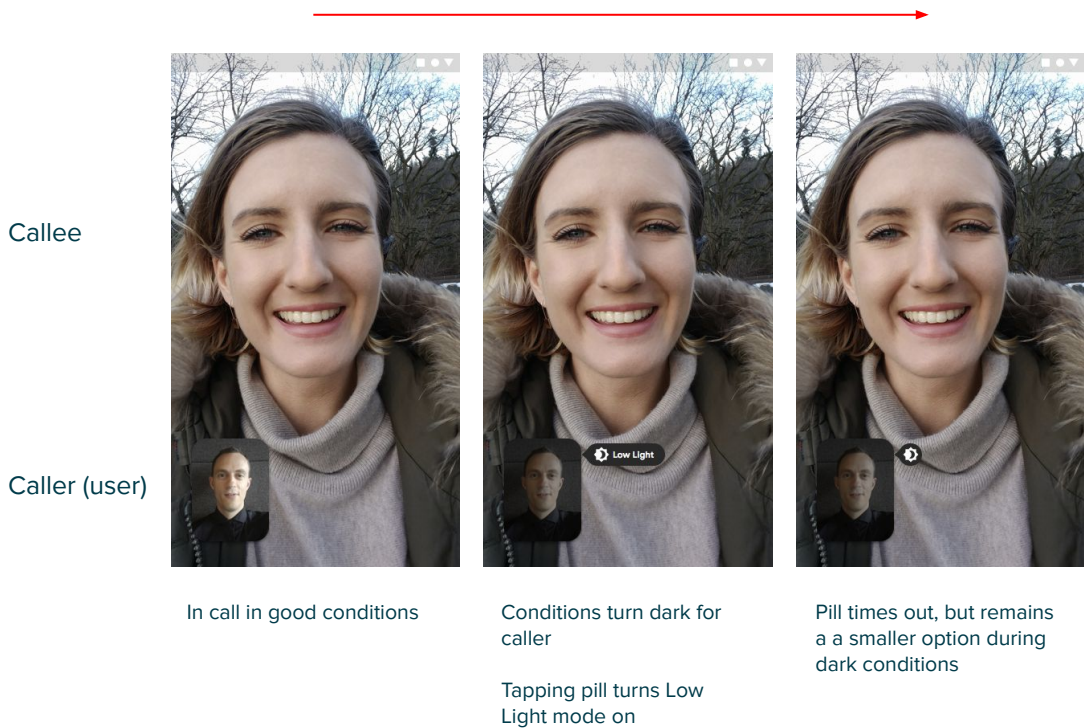
User taps pill, turns mode  
on

Pill times out to smaller  
button, but remains

User turns mode back off

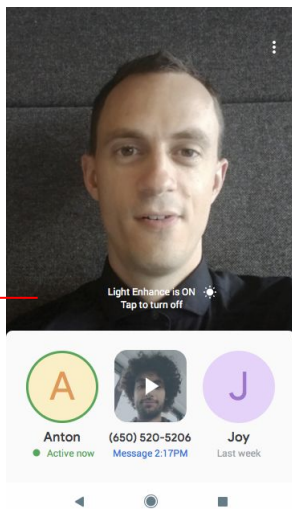
Pill times out to smaller  
button

## 2 On-screen overlay in call appears in dark conditions. User controls on/off.

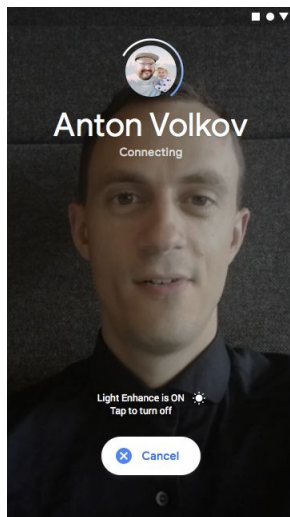


### 3 On-screen overlay while call connects in dark conditions. User can turn off from here for call.

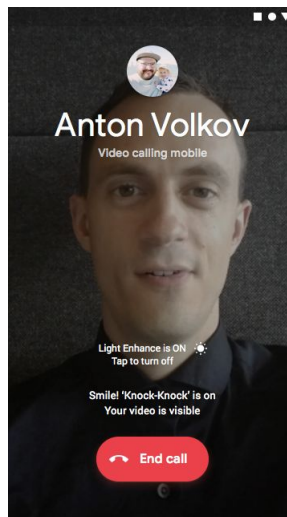
Taps to DISABLE  
Low Light mode



Home screen in dark conditions

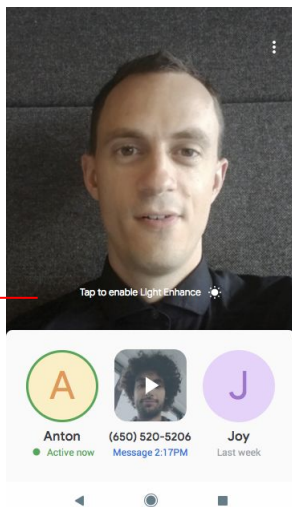


Connecting and calling in dark conditions

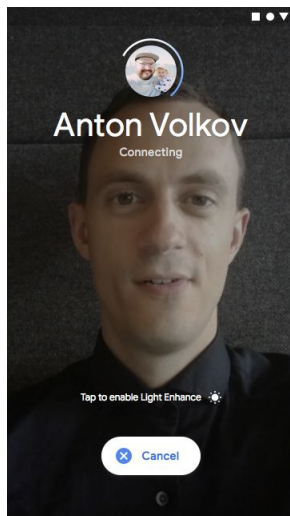


## 4 On-screen overlay while call connects in dark conditions. User can turn off from here for call.

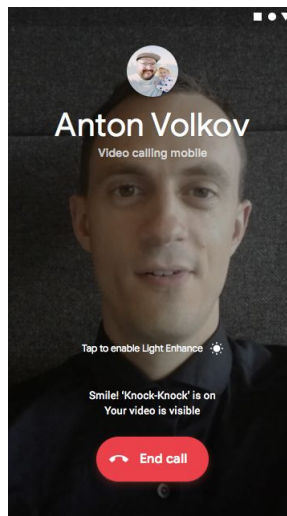
Taps to ENABLE  
Low Light mode



Home screen in dark  
conditions



Connecting and calling in dark conditions



## 5 Completely automatic with contextual hints

Callee

Caller (user)



In good light



Into low light condition

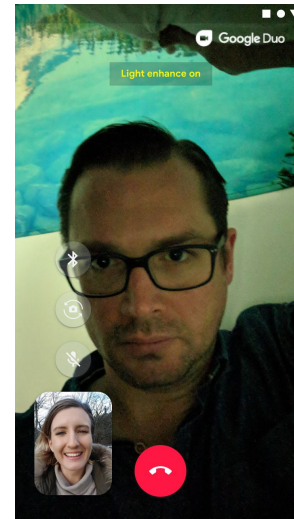


Low light mode on

Alert comes on each time it initiates when in new low light condition

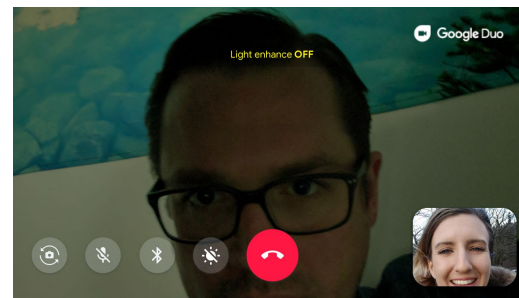
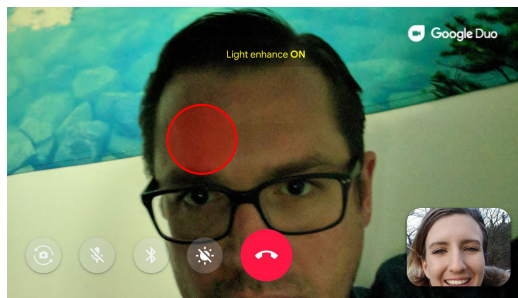
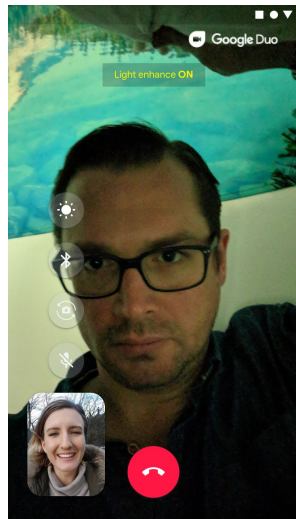
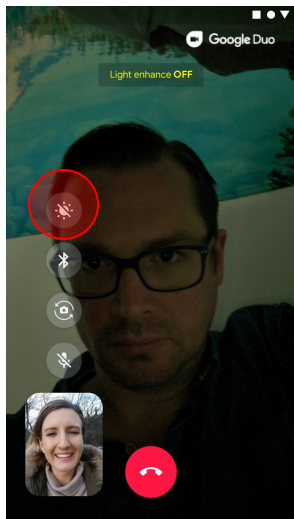


Snackbar times out



After tapping PIP and screen to see controls

## 6 User controls on/off, with contextual overlay hint



**Duo Low Light mode**

