HOW TO ASK FOR PERMISSION

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USER-BASED PERMISSIONS

ADVERSARIAL APPS

MALWARE:
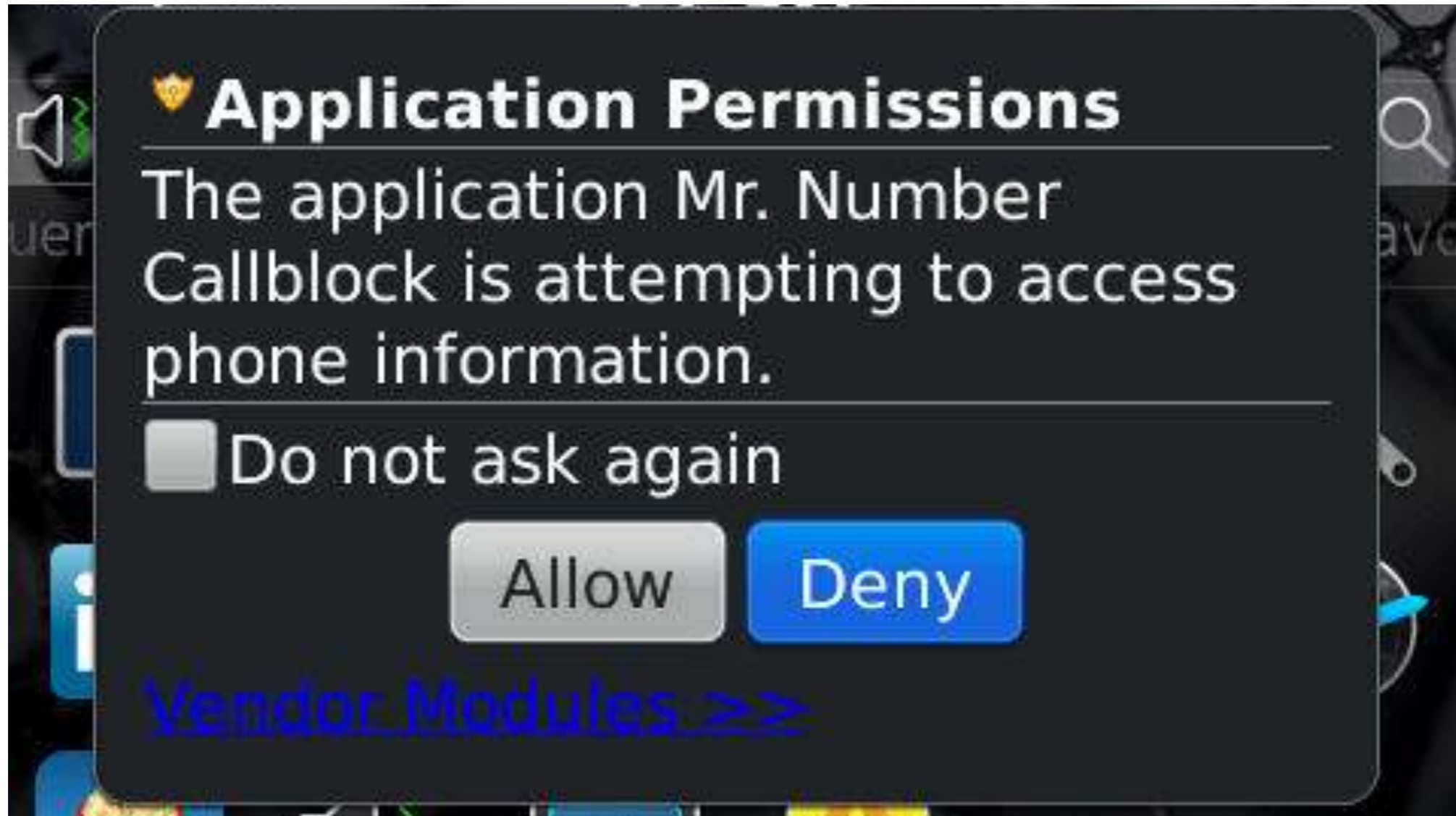Actively harms the user
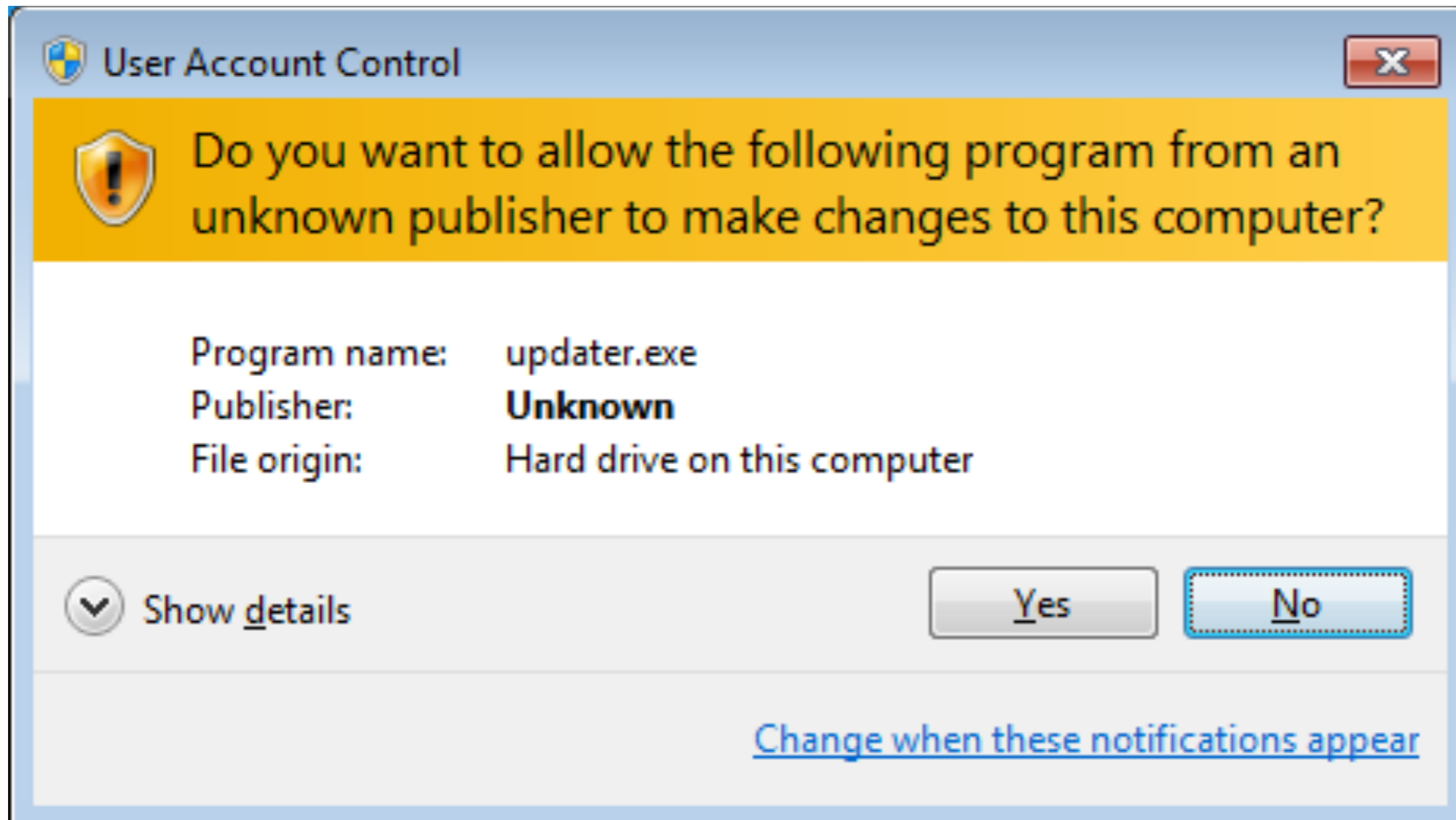
GRAYWARE:
Pushes the boundaries of legality
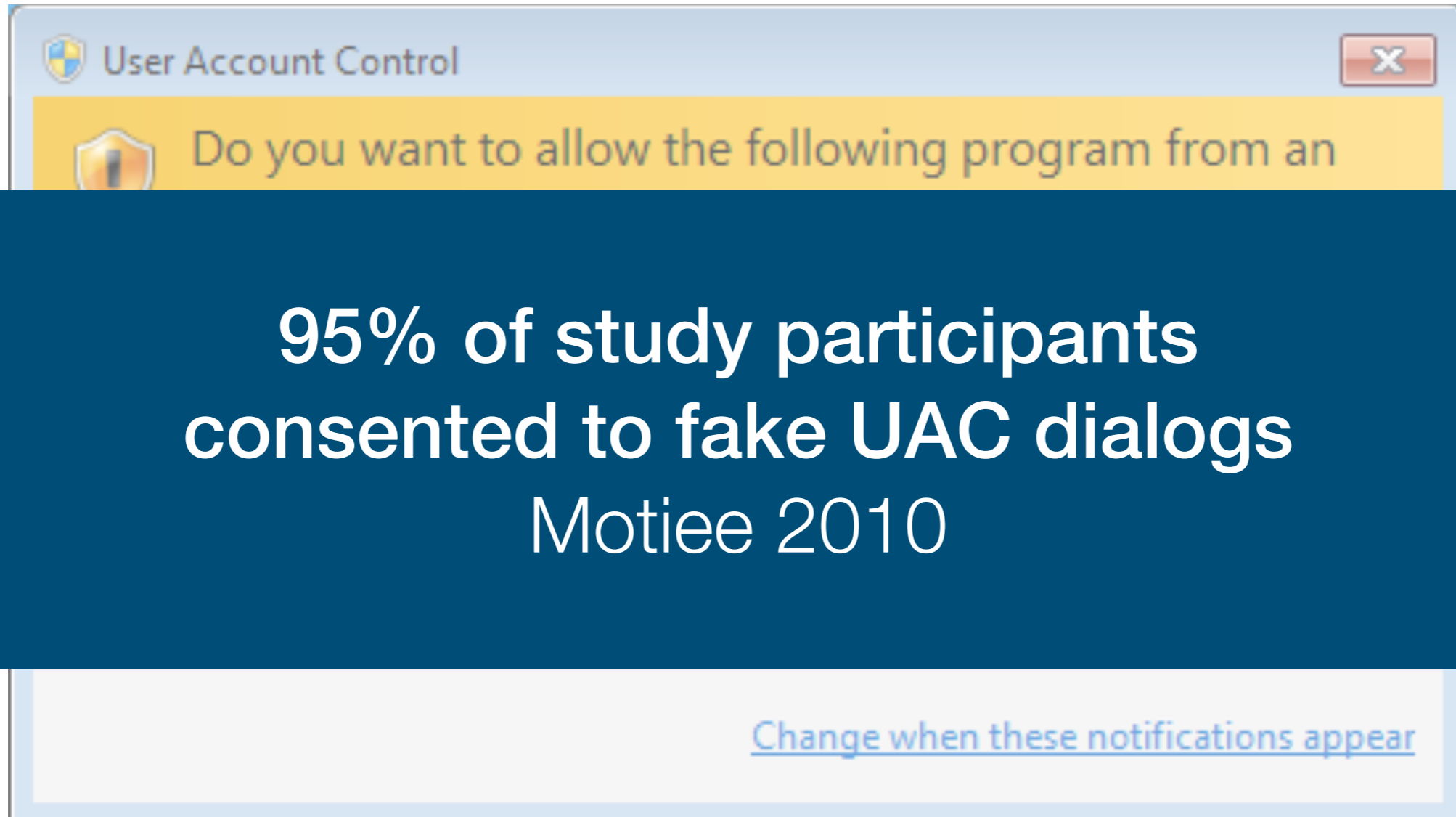
LEGITIMATE:
Benign, but it has unwanted features

APP-BASED PERMISSIONS

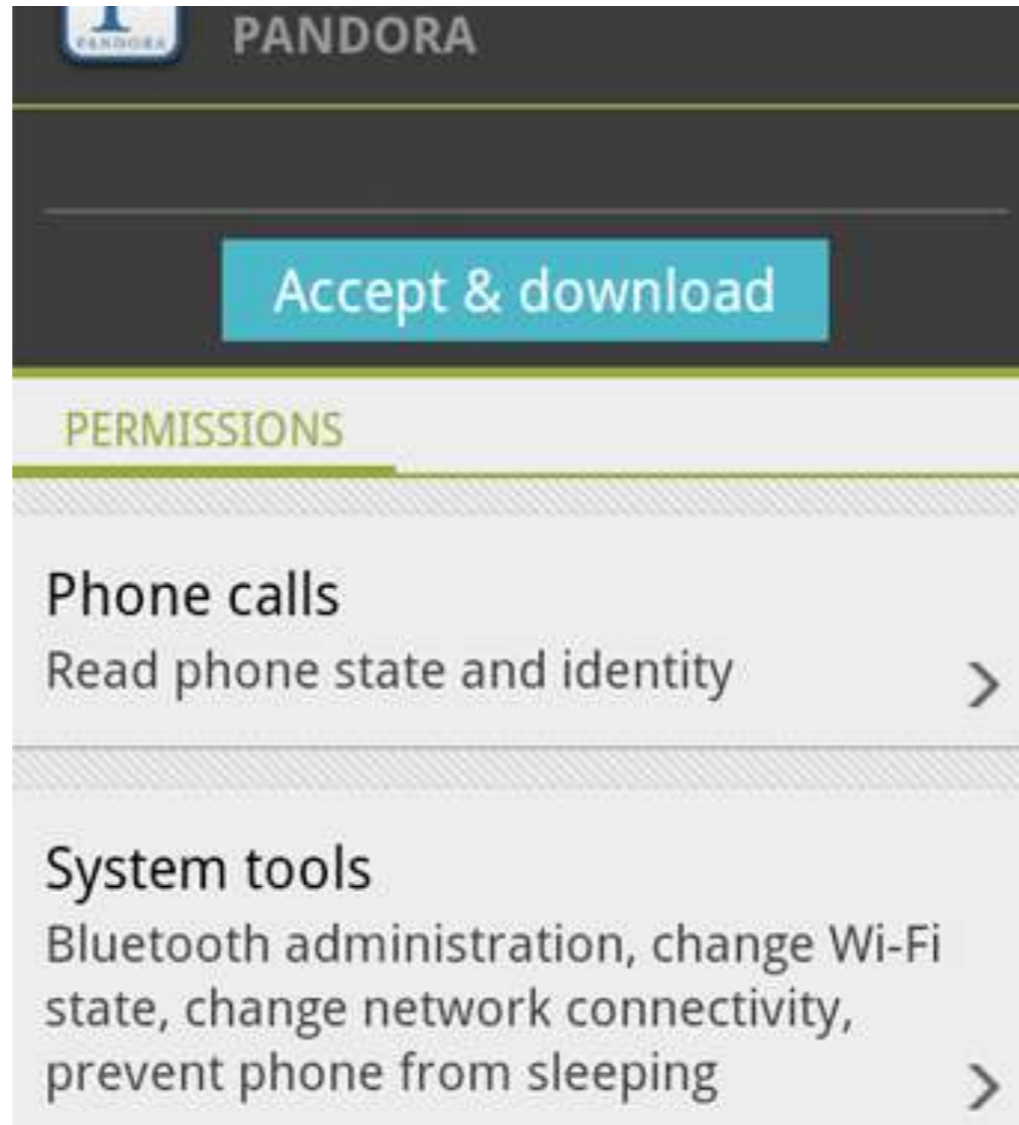**Permissions** are supposed to help users control their applications
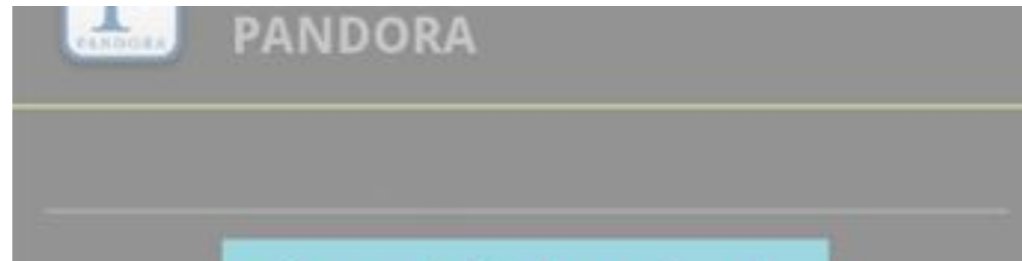
WINDOWS

User Account Control

Do you want to allow the following program from an

95% of study participants consented to fake UAC dialogs
Motiee 2010

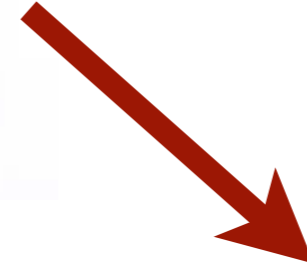Change when these notifications appear
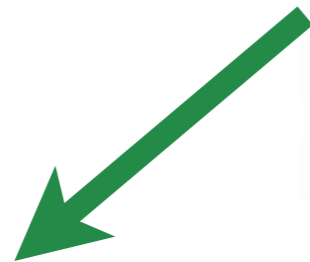
WINDOWS

ANDROID

PANDORA

**42% of study participants
had never noticed the permissions**
Felt 2012

Bluetooth administration, change Wi-Fi
state, change network connectivity,
prevent phone from sleeping >

ANDROID

How do we ask users to make **informed decisions** about app permissions?

GUIDING PRINCIPLES

optimizing

reads the question
retrieves memories
makes a decision

satisficing

does not understand
retrieves cues
relies on heuristics

DUAL PATH MODEL

Conserve user attention

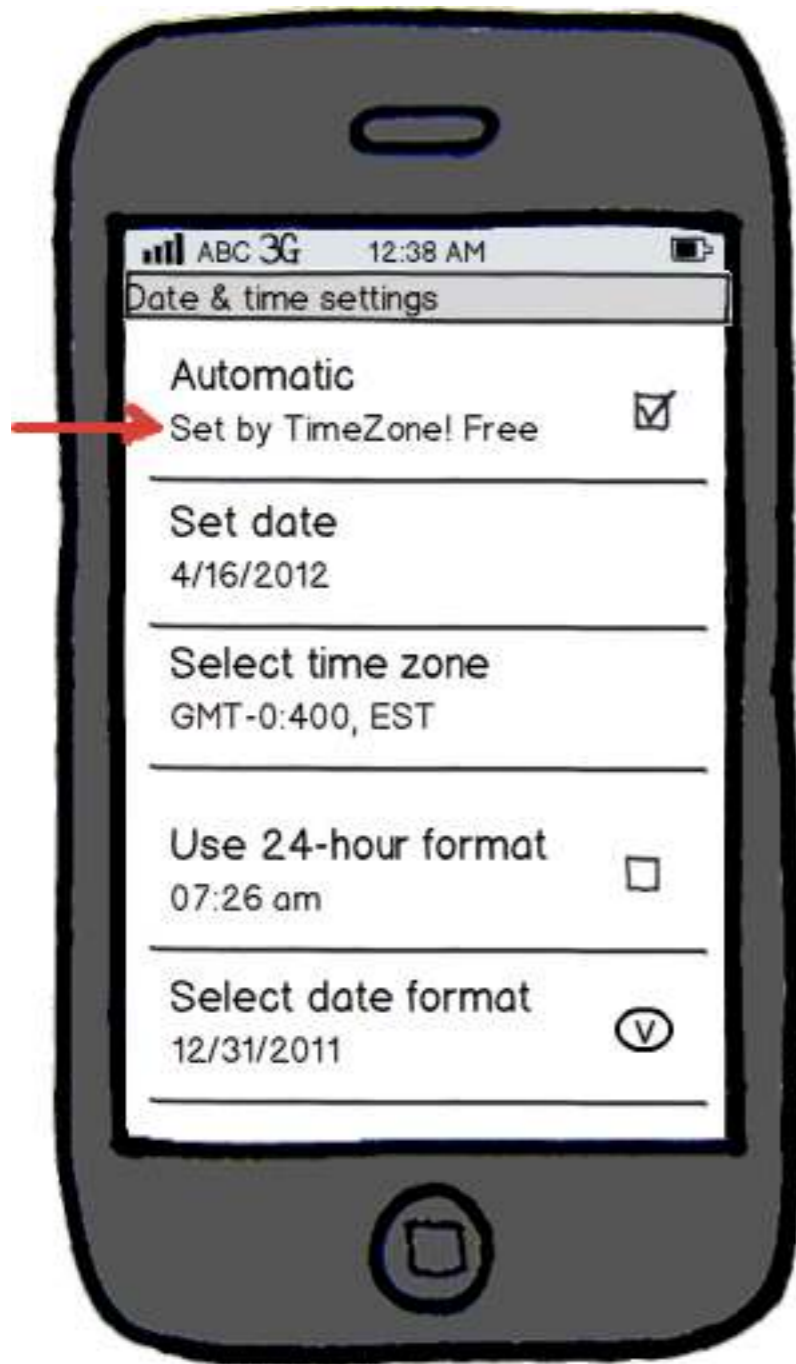# Don't interrupt the user's primary task for security

PERMISSION-GRANTING MECHANISMS

AUTOMATIC GRANT
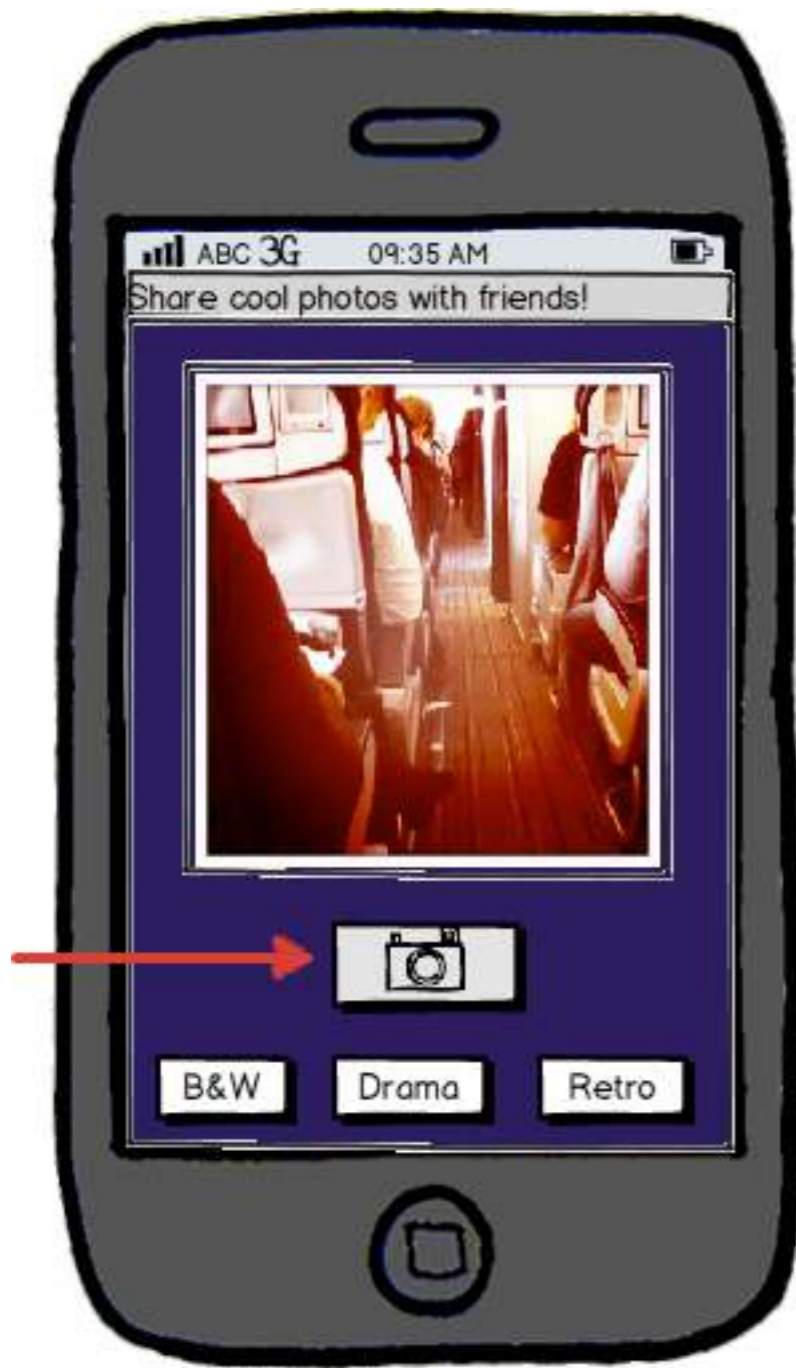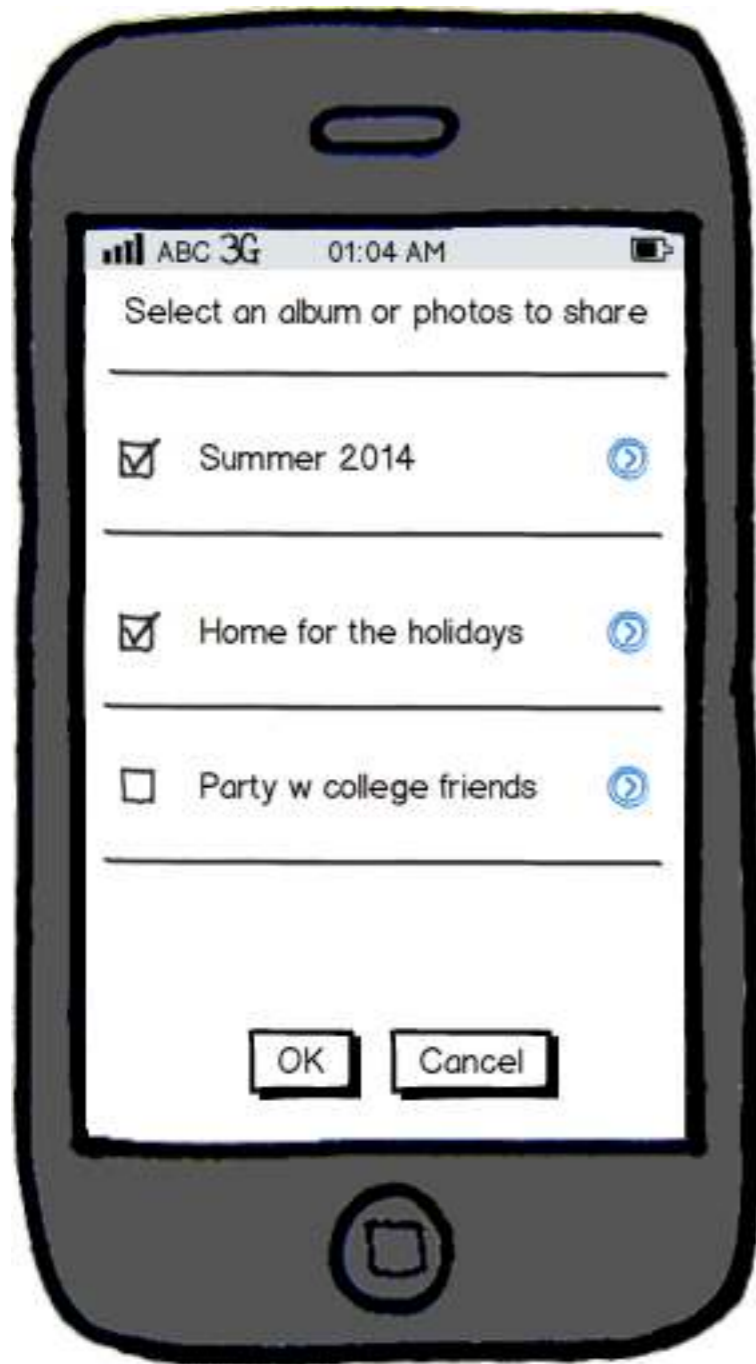
PRO
Does not consume user attention

CON
Only appropriate for revertible or low-severity permissions

AUTOMATIC GRANT

TRUSTED UI

PRO
Non-interruptive

CON
Only appropriate for user-initiated actions

TRUSTED UI

PRO
Applicable to almost all permissions

CON
Interruptive, habit-forming, not useful for advance approval
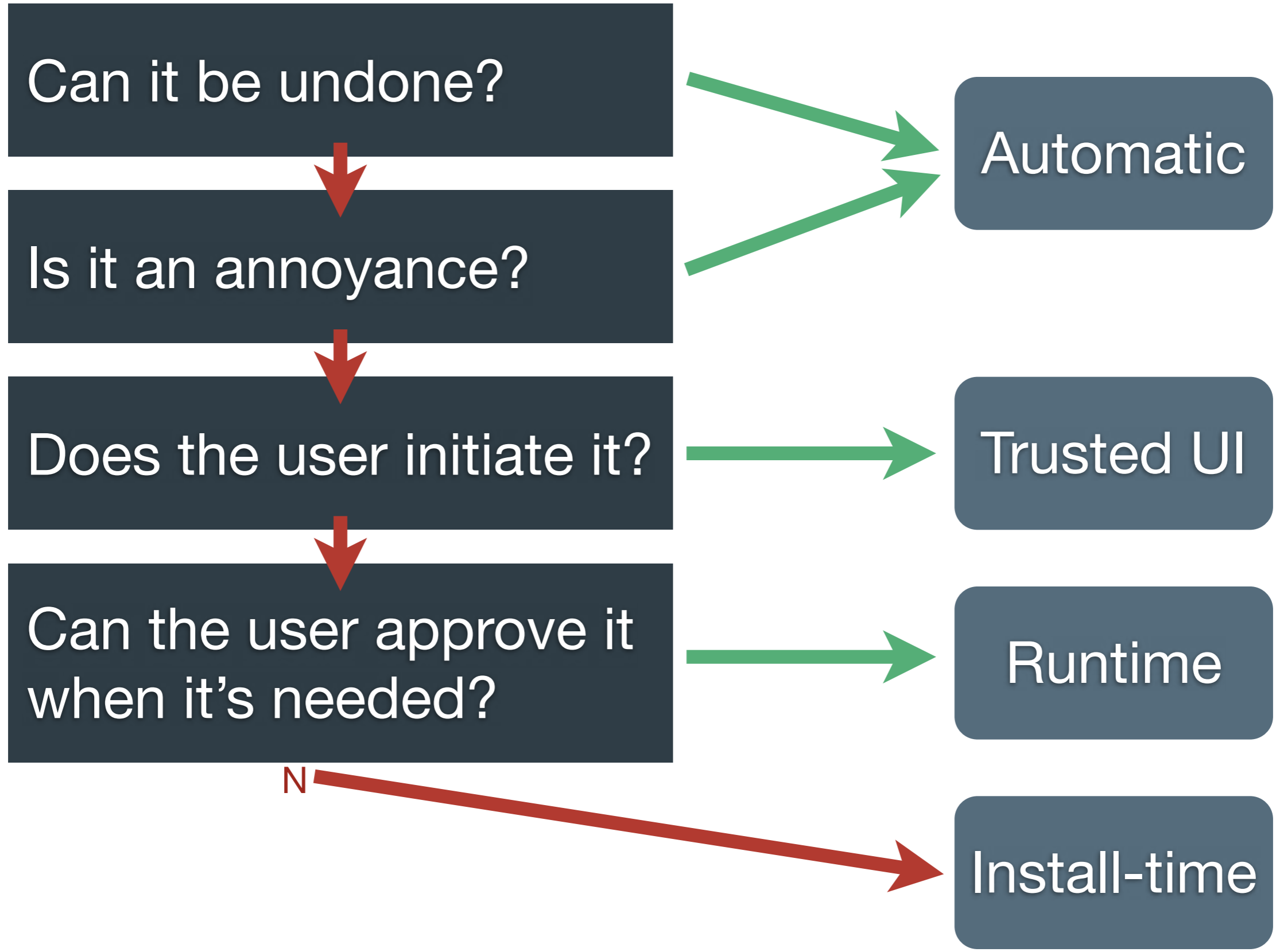
RUNTIME CONSENT DIALOGS

PRO
Applicable to all permissions, even advance approval

CON
Interruptive, looks like EULAs, habit-forming

INSTALL-TIME WARNINGS

Instead of choosing one mechanism for a system, **choose the best for each permission**

Can it be undone? → Automatic

Is it an annoyance? → Automatic

Does the user initiate it? → Trusted UI

Can the user approve it when it's needed? → Runtime

N → Install-time

Can it be undone?

Is it an annoyance?

Does the user initiate it? — Y → Trusted UI

Can the user approve it when it's needed?

RECORDING WITH THE MIC

Automatically granted	60%
Trusted UI	21%
Runtime consent dialogs	11%
Install-time warnings	7%

76 platform-neutral permissions

PERMISSION ASSIGNMENT

Which is better, run-time or install-time?

Which is better, run-time or install-time?

Wrong question!

We propose guidelines for how to ask users for permission with minimal interruptions

QUESTIONS?
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