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Untangling the Contribution of Training on Scientists Willingness to Participate in Public Engagement

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What To Expect

- What We Know
- What We Want to Know
- What We Found
- What We Know Now

What We Know

Science Communication Training

What We Know – Science Communication Training

Formal Training

- Valued by researchers
- Associated with greater confidence and participation

Lack of Training

- Major obstacle for public outreach participation
- More training wanted by grad-students in STEM

Commitment

- Seen as large time commitment
- Communication activities seen as training by some.

Burchell et al., 2017; Ndlovu et al., 2016; Silva & Bultitude, 2009; Gascoigne & Metcalfe, 1997; Hundey et al., 2016; Pearson et al., 1997; Poliakoff, 2005

What We Know – Science Communication Training

Training's Influence is still somewhat inconsistent

Positive	None
Stylinski, Storksdieck, Canzoneri, Klein, & Johnson, 2018.	Dudo, Kahlor, AbiGhannam, Lazard, & Liang, 2014
Silva & Bultitude, 2009	Dudo & Besley, 2016
Canete Benitez, 2014	Dudo, Besley, Kahlor, Koh, Copple, & Yuan, 2018
Dudo, 2013	Besley, Dudo, Yuan, & Abi Ghannam, 2016
Dunwody, Brossard, & Dudo, 2009	
Poliakoff & Webb, 2007	

What We Know – Theory of Planned Behavior

Attitudes

- General enjoyment of an activity
- General feelings towards your audience

Efficacy

- Internal – Self efficacy
- Response – Belief that public outreach will make a difference.

Norms

- Injunctive – What you think other scientists are doing
- Descriptive – What other scientists are doing

What We Know – Theory of Planned Behavior

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What We Want to Know

Hypotheses and Research Questions

What We Want to Know

Hypotheses

- Amount of **Communication Training** will be Positively Associated with willingness to participate in face to face engagement
- **Internal Efficacy** will be positively associated with willingness to participate in face to face engagement.
- **Response efficacy** will be positively associated with willingness to participate in face to face communication
- **Attitude** toward the public will be positively associated with willingness to participate in face to face engagement.

What We Want to Know

Research Questions

- Will the effect of training on willingness to participate in engagement be **mediated by self-efficacy**?
- Will the effect of training on willingness to participate in engagement be **mediated by response efficacy**?
- Will the effect of training on willingness to participate in engagement be **mediated by attitude toward the audience**?

What We Found

The Data

What We Found – Sample

- Randomized Sample from **62 Research Universities** from the Association of American Universities (AAU)
- Three research assistants were given 8 out of 25 randomly selected departments per university based on NSF STEM fields.
- Sampling produced **6,935 emails**, 71 which were undeliverable, with a **response rate of 11%**
- After outliers were excluded, a final **sample size of 478** was used

What We Found – Sample

- Majority **Male** – 64%
- Average Age – **56** (SD = 12.33).
- Most identified as **White** (87%) followed by Asian (7%) with the remainder reporting as either Black, Native American, Pacific Islander, Hispanic or Other (6%)
- Similar to other scientist samples

What We Found – Measures

Willingness to Engage (Y)

- Face-to-Face only
- "Intention to discuss science with adults who are not scientists"
- M = 5.98, SD = 1.17

Internal Efficacy (M^1)

- "I am skilled in this type of public engagement activity"
- "I am able to talk about how my area of expertise fits into the broader context of science"
- M = 5.18, SD = 1.25

Response Efficacy (M^2)

- "This type of public engagement activity can make a difference in society"
- M = 5.93, SD = 0.91

What We Found – Measures

Attitude (M^3)

- How likely or unlikely the audience would "understand what you have to say", "treat you with respect", and "enjoy what you have to say"
- M = 4.95, SD = 0.68

Training Amount (X)

- No training, 2-3 days of training, more than 10 days of training
- 7-point scale
- M = 2.41, SD = 1.87

Age (C^1) & Past Engagement (C^2)

- Included based on past research

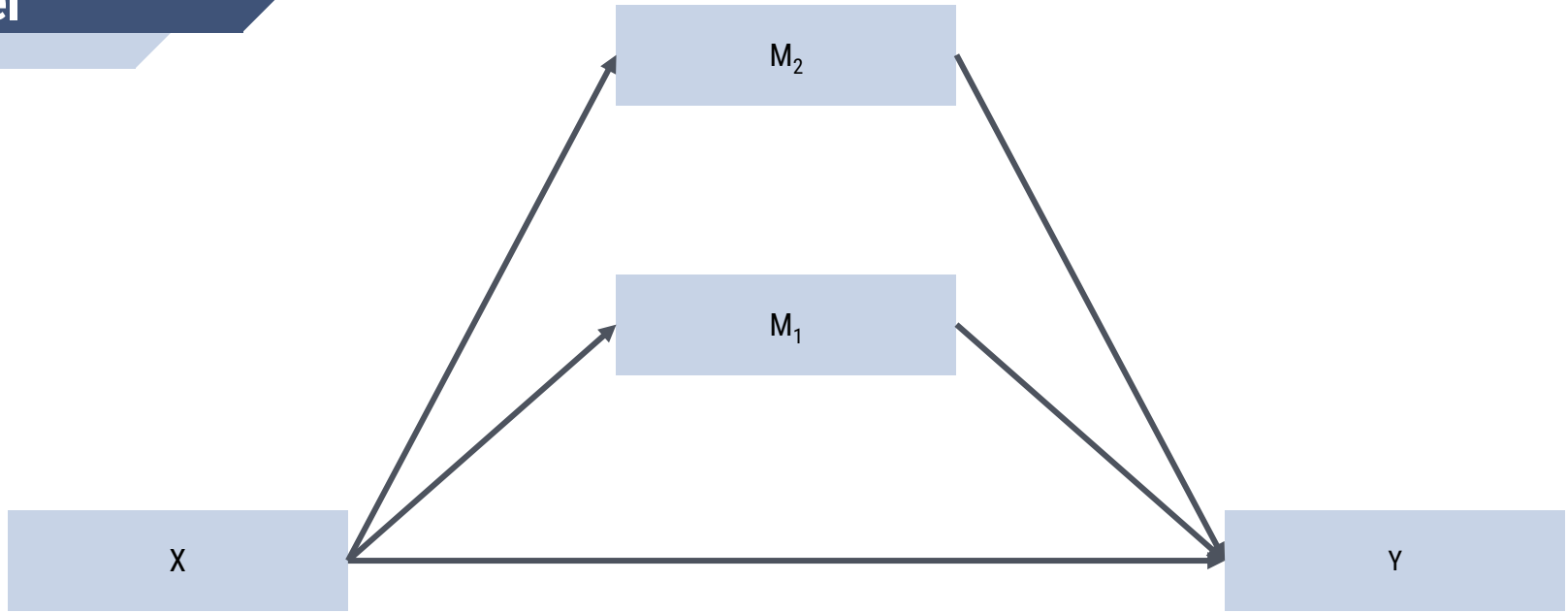
What We Found – Method of Analysis

Hayes' Conditional Process Model

- Indirect effects through Baron and Kenny's causal steps approach is somewhat **limiting.**
- The PROCESS model is **not contingent on the direct pathways** being significant for indirect effects to be significant.
- Allows for a **more accurate story** to be told with the data, and less chance of Type 1 error.

Hayes, 2009; Baron & Kenny, 1986; Jensen, King, Carcioppolo, & Davis, 2012; Osberg, Billingsley, Eggert, & Insana, 2012; Jones, Willness, & Madey, 2014

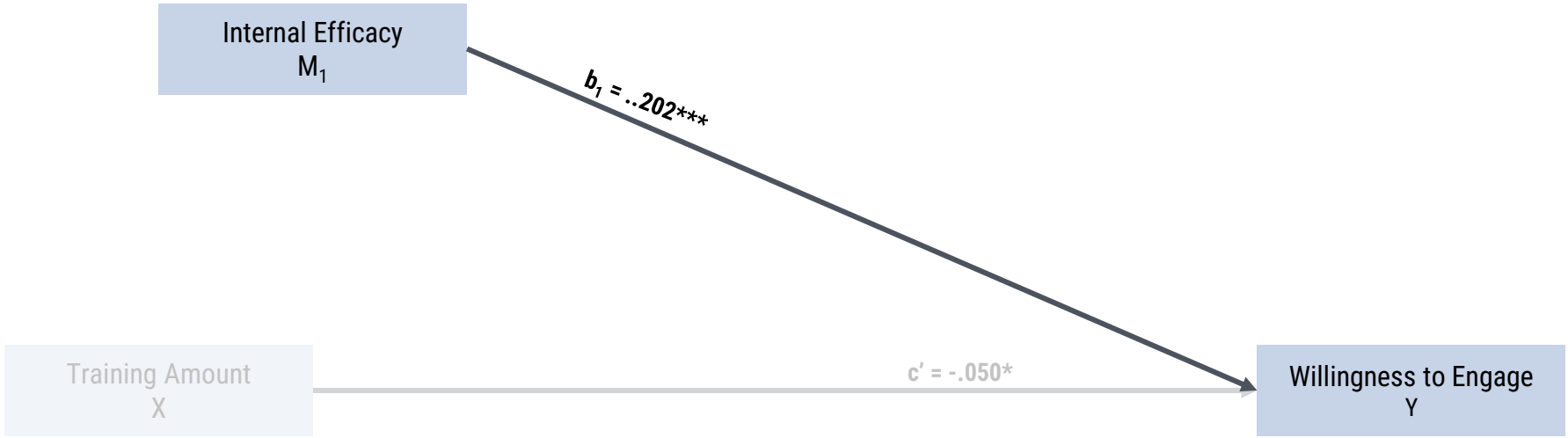
Model



Model

b = .050*
SE = .025

Model



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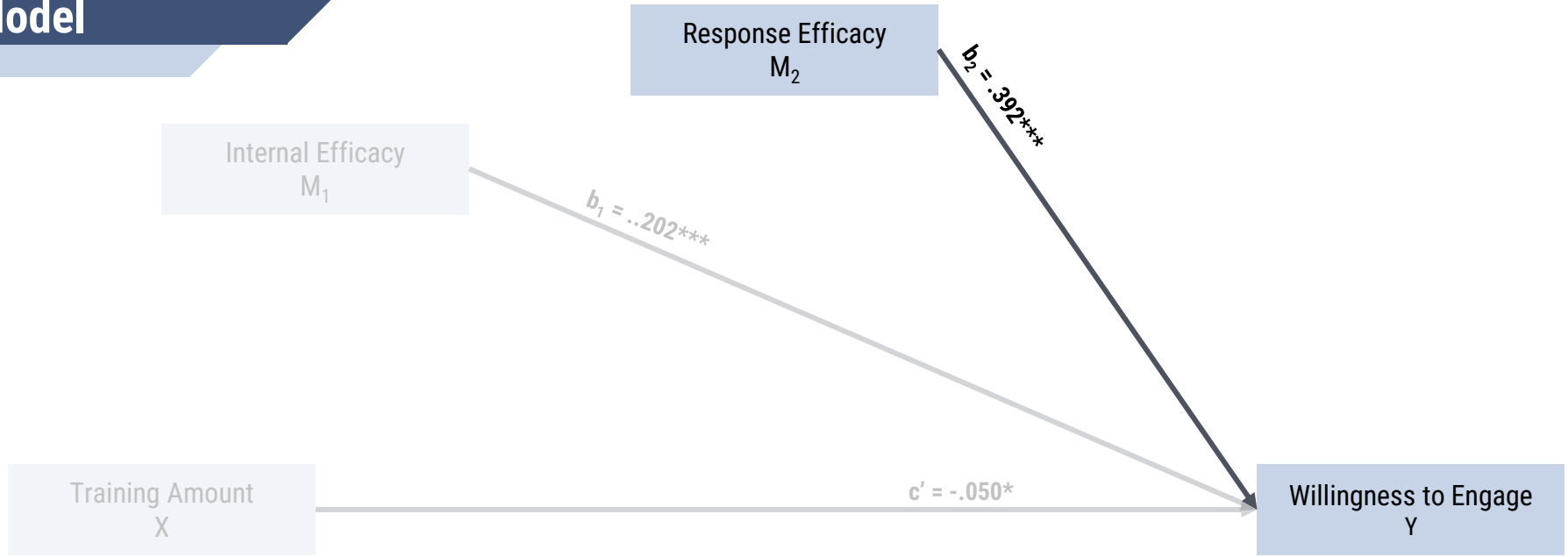
SE = .043

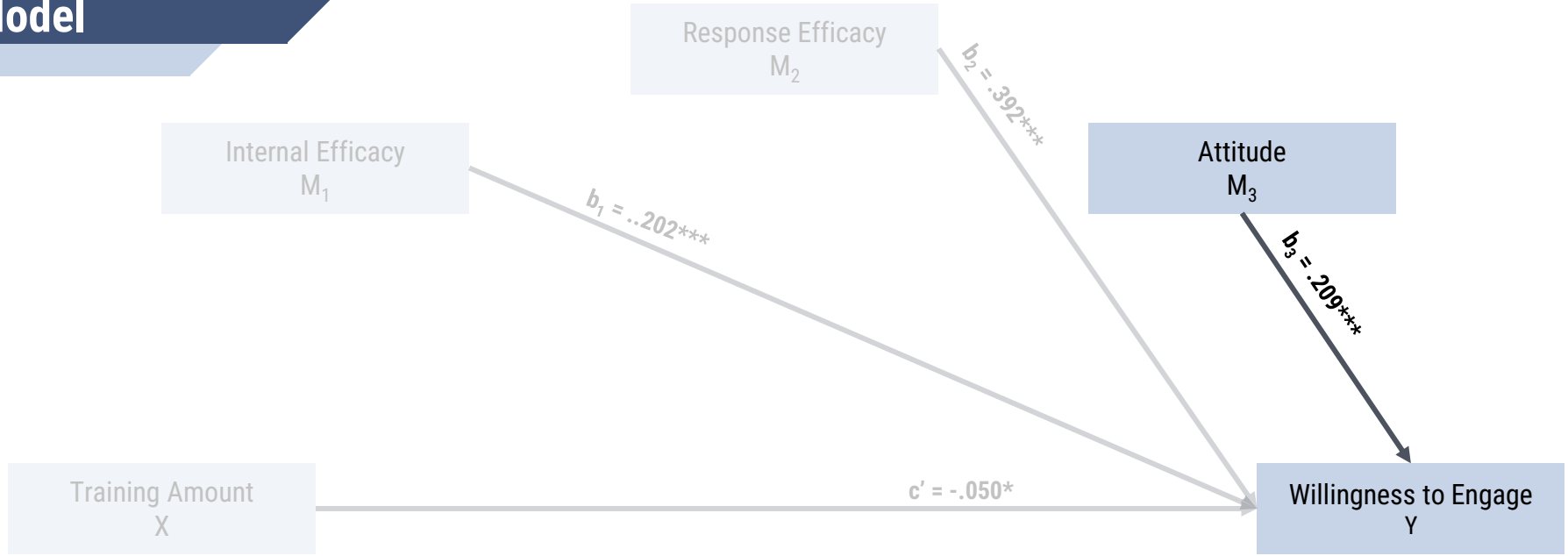
Model



b = .392***
SE = .053

Parallel Multiple Mediation Model for Trainings Influence on Willingness.

Model



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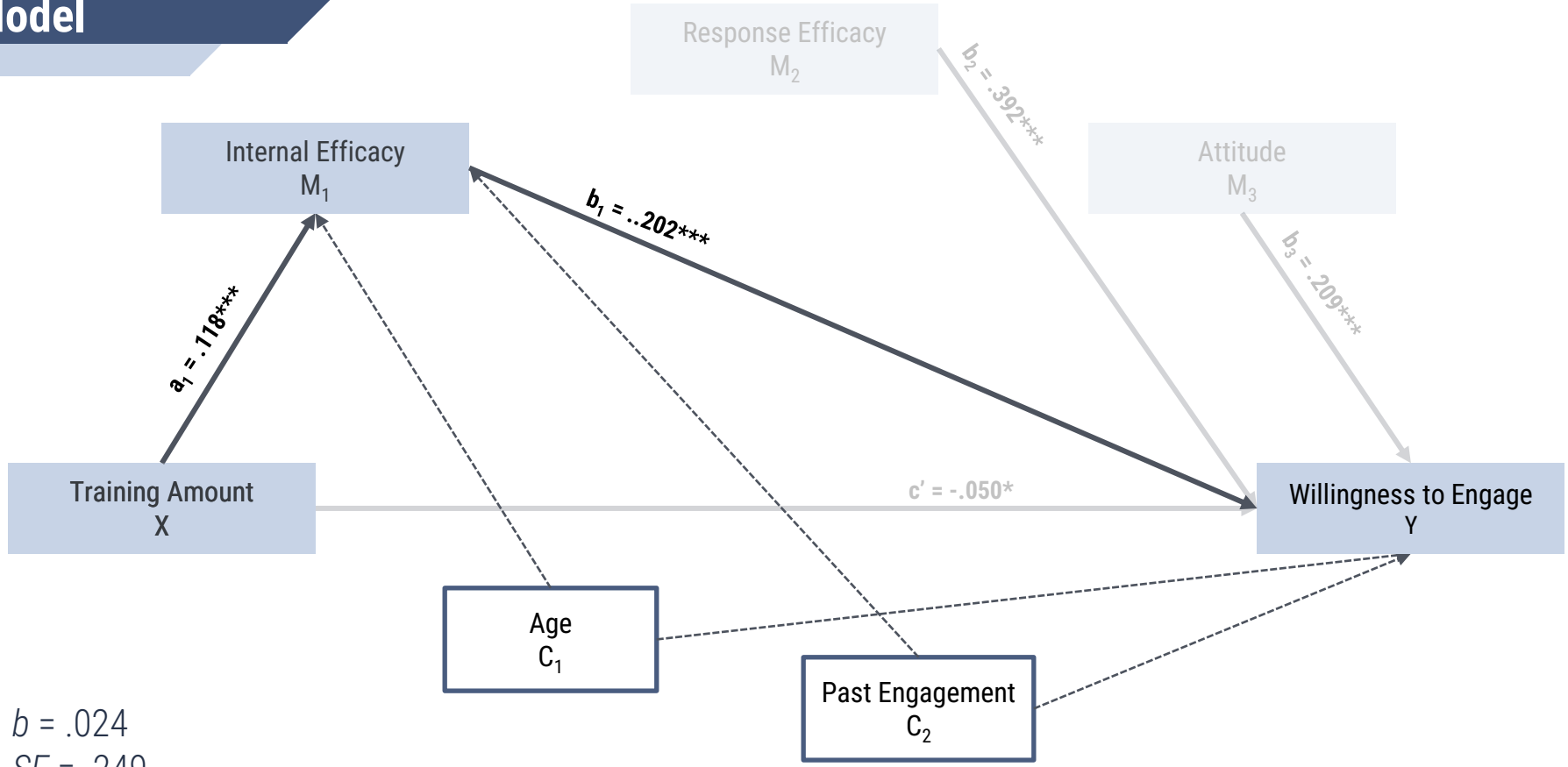
SE = .073

Parallel Multiple Mediation Model for Trainings Influence on Willingness.

Model



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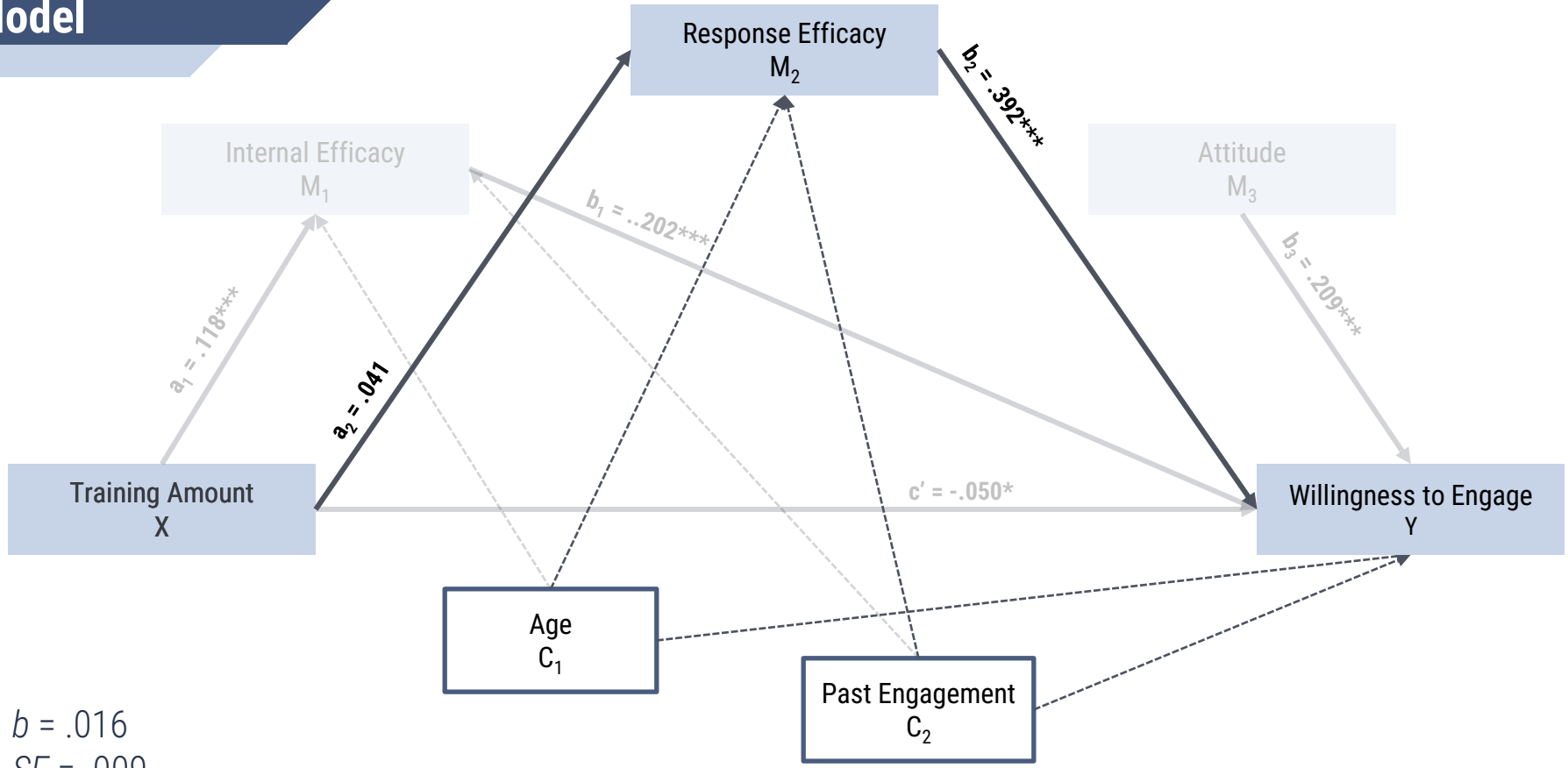
Parallel Multiple Mediation Model for Trainings Influence on Willingness.

Model



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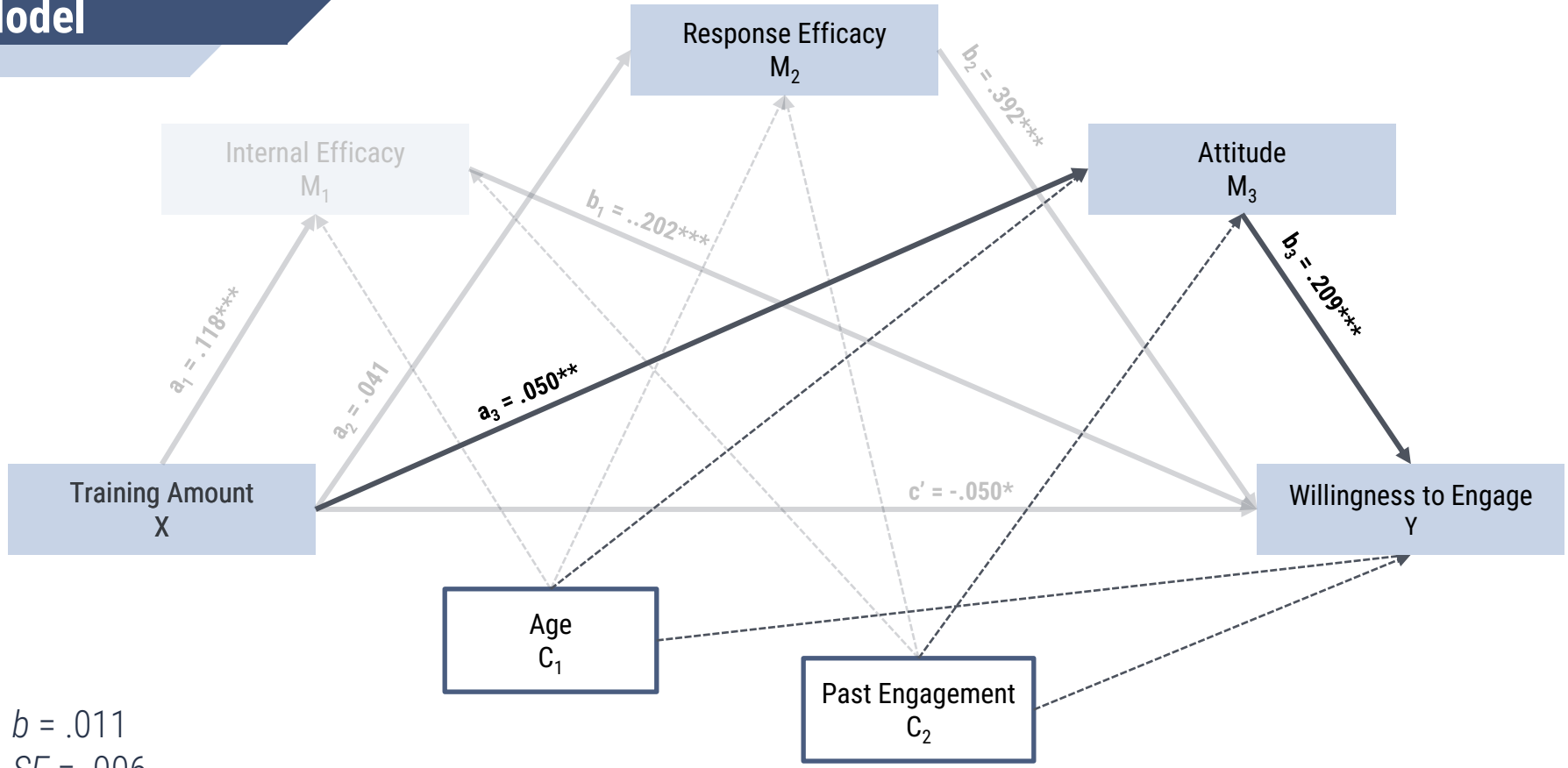
SE = .009
CI = -.0013, .0358

Parallel Multiple Mediation Model for Trainings Influence on Willingness.

Model



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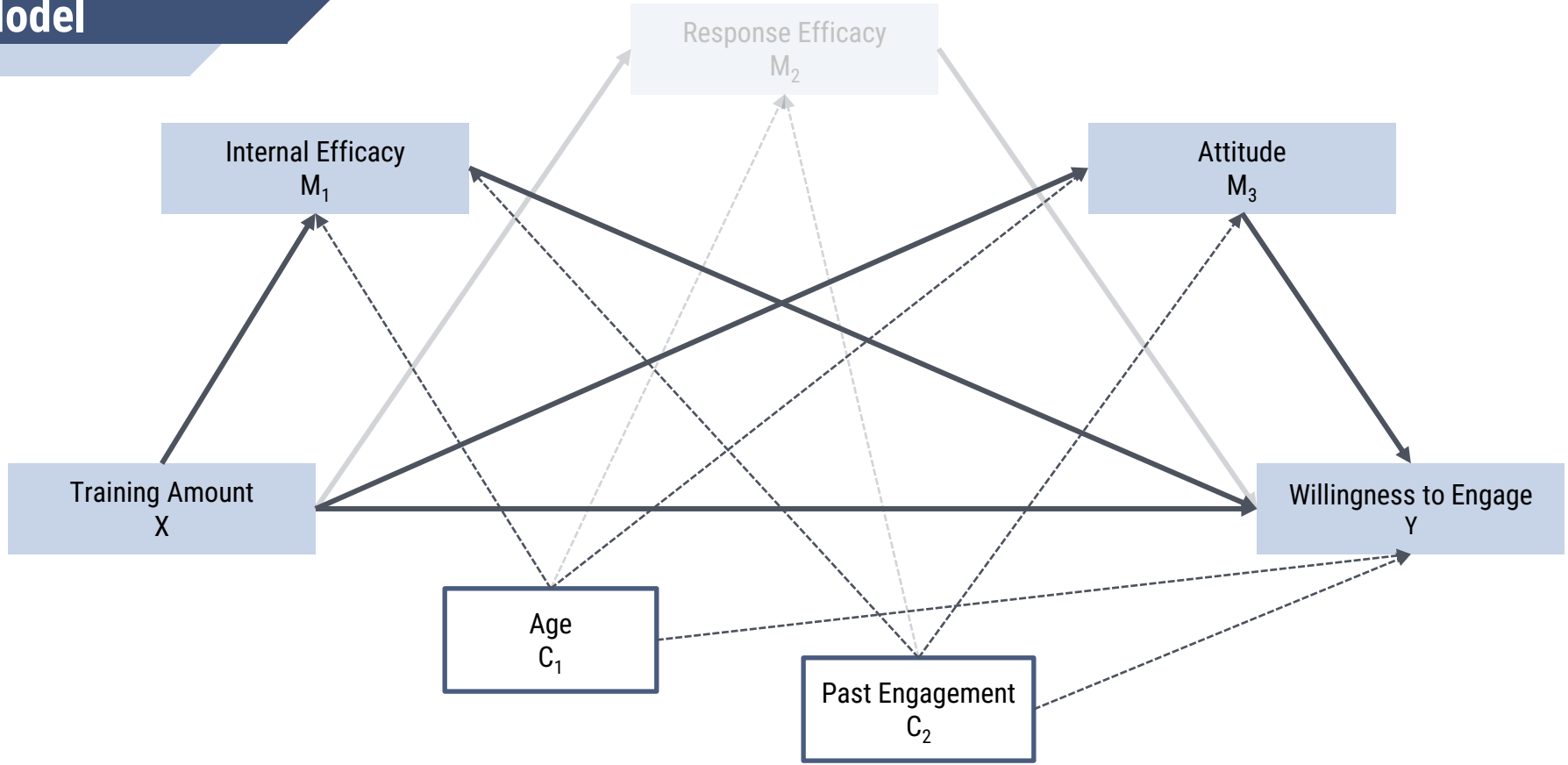
Parallel Multiple Mediation Model for Trainings Influence on Willingness.

Model



Parallel Multiple Mediation Model for Trainings Influence on Willingness.

What We Know Now

Applying our Findings

What We Know Now - Results

Past Inconsistencies

- The mixed results mentioned previously could be explained by **only looking at direct effects**.
- Direct effects here are **consistent with previous studies** looking at TPB variables

New Possibilities

- The **indirect effects** found in this study give a better picture of how training effects scientists' communication.

What We Know Now - Results

Mediation

- Training's effect on willingness was mediated by **internal efficacy** and **attitudes** towards the audience.

Practice Pays Off

- These findings give renewed strength to training's importance for public communication of science

Future Application & Research

Science communication training should focus on **building confidence** and promoting a **more positive view** on scientists' audience.

- Digital Communication
- Introducing Potential Moderators

Thank You!

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