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ORIGINAL ARTICLE

Supporting Open Innovation Behaviors in Researchers: Developing a Training with Acceptance and Commitment Training

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ABSTRACT

This study explores the use of Acceptance and Commitment Training (ACT) to overcome individual-level barriers to open innovation and cross-boundary collaboration in academic and research environments. Rooted in the management literature on Not Invented Here and Not Shared Here biases, the research examines how to overcome rigid professional identities that obstruct knowledge exchange and interdisciplinary collaboration. Although perspective-taking has been identified as a promising method for mitigating these biases, actionable interventions remain scarce, particularly in scientific contexts. To address this gap, we developed and iteratively refined a two-day training intervention using an Action Research Innovation Management Framework. The training was designed based on existing literature and delivered in five different institutions. Qualitative data were collected during each training session through surveys, interviews, and participant observations, while focus groups were conducted six months after each iteration to assess longer-term impacts. The intervention integrates ACT principles to enhance perspective-taking and promote open innovation behaviors among researchers. Findings demonstrate that the training effectively reduces cognitive biases related to knowledge flows. The results also highlight how to activate perspective-taking in facilitating the adoption of open innovation practices within academic settings. The study provides practical implications for university administrators and Knowledge Transfer Offices, emphasising the need to address psychological barriers alongside structural incentives to enable more effective implementation of open innovation initiatives.

Keywords: Perspective-taking; Not Invented Here; Not Shared Here; Open Innovation in Science; ACT

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INTRODUCTION

Universities today are increasingly tasked with addressing complex societal and environmental challenges, positioning them at the forefront of knowledge creation, economic growth, and sustainable governance (Urdari et al., 2017). Supporting this mission, significant resources are being allocated globally—for instance, Horizon Europe has earmarked €93.5 billion to tackle pressing issues such as cancer and climate change[1].

These ambitions require cross-disciplinary and cross-organizational collaboration, which gives rise to significant challenges at the individual level. For example, when NASA researchers were tasked with open innovation (OI) initiatives, only 13% of R&D professionals fully engaged successfully in the evaluation of external ideas (Lifshitz-Assaf, 2018). One of the primary barriers is researchers' strong identification with their fields and their jobs, which manifests as "Not Invented Here" (NIH) and "Not Shared Here" (NSH) syndromes.

The persistence of NIH, in particular, is well-documented across a wide range of studies. Initially defined by Katz and Allen (1982) as a project group's tendency to reject ideas originating externally, NIH has been observed in over a hundred empirical investigations. Its resilience is evident even in settings explicitly designed to encourage openness: for instance, Hannen et al. (2019) found that more than 10% of participants in a sample of 565 open innovation projects exhibited NIH attitudes. This prevalence is particularly noteworthy, as one would expect lower resistance to external knowledge in such contexts compared to traditional innovation environments (Burger-Helmchen, 2024).

However, the NIH and NSH syndromes are well-documented in management literature, and there are several elements that managers can leverage as countermeasures to those syndromes, among them: incentive systems, organisational redesign (e.g. rotating

[1] From the European Commission website: https://research-and-innovation.ec.europa.eu/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-europe_en

team members - Kathoefer and Leker, 2012), organisational processes (e.g. intensifying contacts with external knowledge providers - Gesing et al., 2015), organisational interventions (e.g. developing an open innovation climate - Herzog and Leker, 2010). However, recent contributions have shown that the success of open innovation projects is not only a matter of institutional and organisational design, but is also linked to deep individual dynamics. Antons and Piller (2015) highlight indirect strategies as effective in preventing biases from influencing behavior, given the difficulty of shifting attitudes. Among these, perspective-taking has emerged as a promising approach. Perspective-taking not only encourages knowledge-sharing behaviors (Flinchbaugh et al., 2016) but also enhances cognitive information processing (Todd et al., 2012) and fosters collaborative environments (Parker and Axtell, 2001).

Perspective taking, the ability to understand a situation from another person's point of view (McHugh and Stewart 2012), is closely related to theory of mind—the capacity to attribute mental states (beliefs, desires, intentions) to oneself and others (Baron-Cohen, Leslie, and Frith, 1985) —and is a foundational component of empathy, which involves both understanding and sharing another's emotional experience. By "putting oneself in another's shoes," individuals are better able to appreciate others' thoughts, feelings, and motivations, which fosters emotional connection and reduces egocentric biases. This enhanced understanding can lead to increased collaboration and prosocial behaviors, as individuals become more responsive to others' needs, more willing to compromise, and more likely to engage in cooperative and altruistic actions.

Working on perspective taking has been shown to be a key mechanism in reducing prejudice and cognitive biases by encouraging individuals to consider the thoughts, feelings, and experiences of others, particularly those from different social or cultural groups. Research indicates that actively imagining the world from another person's point of view can decrease stereotyping, intergroup bias, and even implicit forms of discrimination. Moreover, perspective taking enhances prosocial tendencies such as empathy, cooperation, and compromise, thereby promoting more effective collaboration and fostering inclusive, socially cohesive environments (Batson, Early, and Salvarani, 1997; Shih, Wang, Bucher, and Stotzer, 2009; Todd, Bodenhausen, Richeson, and Galinsky, 2011; van Lissa, Hawk, and Meeus, 2017).

Despite its potential, perspective-taking has seen limited application as an actionable intervention to reduce NIH and NSH syndromes. To date, only one study (Weissenberger-Eibl and Hampel, 2021) has tested this approach, focusing on industrial contexts. This gap motivated our research, which bridges managerial theory and practice by developing a tailored perspective-taking training program for researchers.

The limited implementation of perspective-taking interventions may, in part, stem from divergent theoretical perspectives within psychology regarding the fundamental nature and mechanisms of perspective taking. A key distinction lies in the explanatory frameworks: while cognitive theories conceptualize perspective taking as an internal, representational process involving mental state attribution, behavioral models—such as Relational Frame Theory (RFT)—ground it in observable behavioral patterns shaped by environmental contingencies and verbal learning histories (McHugh and Stewart 2012).

From a cognitive perspective, perspective taking is typically understood as a mental operation that requires individuals to decenter from their own viewpoint in order to simulate or infer the mental states of others. This includes recognizing what others know, believe, feel, or intend—capacities closely tied to the development of Theory of Mind. Cognitive models emphasize the role of executive functions, such as working memory and inhibitory control, along with internal mental representations, to explain how individuals manage conflicting perspectives, anticipate others' behavior, and adjust their own social responses accordingly (Baron-Cohen, Tager-Flusberg, & Lombardo, 2013).

In contrast, RFT interprets perspective taking as a form of verbal behavior, particularly involving deictic relations (e.g., I–You, Here–There, Now–Then). From this standpoint, perspective taking is not an act of internal simulation, but rather a learned and contextually controlled pattern that involves the flexible coordination of verbally responding in relation to person and/or place and/or time. For instance, understanding that "I am here and you are there" or "I know this, but you do not" requires the development of complex verbal relational networks that are acquired during infancy and childhood and that can be strengthened in adulthood. This behavioral approach allows for direct training and measurement of perspective-taking skills, making RFT particularly applicable in many settings including clinical and educational settings.

One intervention framework that integrates RFT principles while fostering decentering and acceptance of internal experiences is Acceptance and Commitment Training (ACT; Hayes et al., 1999). ACT promotes perspective taking by enhancing psychological flexibility and encouraging individuals to engage in value-based actions despite the presence of difficult thoughts and emotions. Through this behavioral lens, ACT offers a powerful tool for cultivating perspective taking and prosocial behavior across diverse populations.

Acceptance and Commitment Training (ACT) represents a contemporary behavioral approach, grounded in contextual behavioral science, and is applied across both clinical and non-clinical domains. Its primary aim is to enhance psychological flexibility, defined as the capacity to remain in contact with the present moment while engaging in behavior that is consistent with

personally held values, even in the presence of aversive private events such as distressing thoughts and emotions. In the context under examination, this includes addressing cognitive and emotional barriers to innovation, such as implicit biases and rigid belief systems. Rather than attempting to suppress or eliminate unwanted internal experiences, ACT employs processes such as acceptance, cognitive defusion, and committed action, which are functionally underpinned by perspective-taking abilities. From this standpoint, perspective taking is not merely a cognitive skill but a contextually governed behavioral repertoire that enables individuals to adopt more flexible and adaptive responses in the face of psychological challenges.

ACT is already used not only in clinical environments but also in contexts of high performance, such as distress management, work, and sports. In this study, we will adapt ACT to researchers' behaviors to foster scientific collaboration. Our goal is thus to facilitate the adoption of collaborative practices that transcend disciplinary and organizational boundaries. To this end, we posed the following research question: *How can we design an ACT intervention to improve scientists' attitudes toward open innovation and knowledge-exchange behaviors?*

Using an Action Research Innovation Management Framework, we iteratively developed and tested a 14-hour training intervention incorporating ACT. As an interdisciplinary group of experts, composed of scholars from Psychology and Management engineering, we conducted five iterations of the program, refining its design to enhance its relevance and effectiveness for researchers of varied disciplines and seniorities.

Our findings demonstrate significant improvements in researchers' openness to cross-boundary collaboration. These results hold practical implications for university administrators and Knowledge Transfer Office managers: encouraging researchers to transcend knowledge and organizational boundaries requires addressing deep-seated cognitive barriers, which our training successfully overcame through the ACT intervention.

In addition to its practical relevance, this study contributes to the literature on knowledge flows and open innovation in science (Beck et al., 2022) by providing an evidence-based intervention based on ACT for enhancing collaboration in academic and research contexts.

The paper proceeds as follows. The next section develops the theoretical foundations by connecting insights from psychology and management studies, showing how Acceptance and Commitment Training (ACT) can enhance perspective-taking and address identity-driven biases in knowledge exchange. We then outline our methodological approach, which employs an Action Research Innovation Management Framework to iteratively design, implement, and refine the training program across five diverse research settings. The results section details the evolution of the intervention and its impact on participants' openness to collaboration. Finally, the discussion reflects on the implications of integrating psychological tools into open innovation practices, offering theoretical contributions and practical recommendations for fostering interdisciplinary collaboration in academic environments.

THEORETICAL BACKGROUND

To clarify the role of ACT in cross-boundary collaboration, we reference Figure 1 and draw upon Coleman's framework (1990), often referred to as Coleman's "boat". This framework operates on the premise that any attempt to explain macro-level linkages must consider the actions and decisions of human agents, as well as the interplay among various mechanisms functioning at different analytical levels. Specifically, it outlines: macro-to-micro situational mechanisms (arrow [1] in Figure 1), micro-level action formation mechanisms (arrow [2]), and micro-to-macro transformational mechanisms (arrow [3]), which together produce observable macro-level outcomes (arrow [4]). For instance, consider a university that aims to enhance its capacity for cross-boundary collaboration at the organizational level, so that the organization has more patents or a higher number of contracts with industry (arrow 4). To achieve this objective, individuals within the organization must be motivated to improve their collaborative abilities and overcome tendencies characteristic of the NIH (Not Invented Here) and NSH (Not Shared Here) syndrome (arrow 1). This willingness can lead to greater opportunities for cross-boundary collaboration (arrow 2), such as attending more conferences or engaging in interdisciplinary research, or forming connections with researchers from neighbouring fields. If the organisation is strong and structured enough, it can effectively convert these opportunities into tangible outcomes such as patents and contracts. To promote the collaborative behavior among researchers, we have chosen to focus at the individual level, where individual biases set in. As shown in Figure 1, our ACT training operates at this micro level, targeting the mechanisms that facilitate the collaborative actions at the individual level. We now enter the micro-level mechanisms to develop the training.

Identity and Cognitive Biases in Knowledge Exchange

When individuals are required to engage in knowledge exchange, the literature widely acknowledges the presence of two attitudinal biases that hinder such interactions and negatively affect open innovation and cross-boundary collaboration (Hannen et al., 2019): the Not-Invented-Here (NIH) and Not-Shared-Here (NSH) syndromes. NIH refers to a reluctance to adopt external

knowledge (Katz & Allen, 1982), whereas NSH reflects a hesitancy to share internal knowledge and innovations (Burcharth et al., 2014).

These biases are shaped by distinct psychological mechanisms that vary depending on the specific context (Antons & Piller, 2015). For instance, Lifshitz-Assaf (2018) demonstrated that NASA scientists' reluctance to engage in boundary-spanning work stemmed from their professional identity as "problem solvers" rather than "solution seekers." Despite organizational support for open innovation, only 13% of scientists managed to overcome these identity-based barriers. This finding underscores that dismantling knowledge boundaries often requires interventions targeting individual self-concepts rather than relying solely on structural or organizational incentives. Her study highlights how, particularly in academic and scientific settings, such attitudinal biases are deeply rooted in ego-defense mechanisms, where individuals seek to protect self-identities anchored in domain-specific expertise (Ajzen, 2001; Antons & Piller, 2015; Menon et al., 2006). To mitigate biases like NIH and NSH, researchers have proposed direct and indirect countermeasures. Direct approaches target attitudes directly, aiming for gradual change (Hannen et al., 2019), like rotating researchers among departments or changing incentives related to their everyday job. However, indirect countermeasures, which prevent attitudes from influencing behavior without altering the attitudes themselves, are often more efficient (Antons and Piller, 2015). These approaches focus on reducing reliance on biased heuristics during knowledge exchange, offering a practical alternative to time-intensive attitude adjustments (Soll et al., 2015).

Perspective-Taking as a Key Intervention

Perspective-taking, defined as the cognitive process of understanding another person's thoughts, motives, or emotions in a non-judgmental manner (Parker et al., 2008), has emerged as a promising indirect countermeasure since it can lead to incongruence between attitudes and behavior (Vorauer et al., 2009). Perspective-taking enhances knowledge-sharing behaviors (Flinchbaugh et al., 2016), improves information-processing capabilities (Todd et al., 2012), and fosters collaborative environments (Parker and Axtell, 2001). Perspective-taking is also critical for boundary spanners, who bridge gaps between disciplines and organizations, facilitating knowledge flows (Bertello et al., 2022; Williams, 2002). This is likely because perspective-taking improves attitudes toward out-group members, particularly among individuals with weaker in-group identification (Galinsky and Ku, 2004; Tarrant et al., 2012). Indeed, evidence supports the effectiveness of perspective-taking in mitigating NIH biases. For example, Hannen et al. (2019) found that individuals with strong perspective-taking abilities were less negatively affected by NIH syndrome in global R&D projects. However, actionable interventions leveraging perspective-taking remain scarce. To date, only Weissenberger-Eibl and Hampel (2021) have tested a perspective-taking training program using recategorization to diminish NIH in a multinational company. This intervention significantly improved external knowledge evaluation but focused solely on an industrial context.

Building on these insights, this study seeks to address the gap in the literature by designing and testing a novel training program to improve both the absorption and sharing of knowledge.

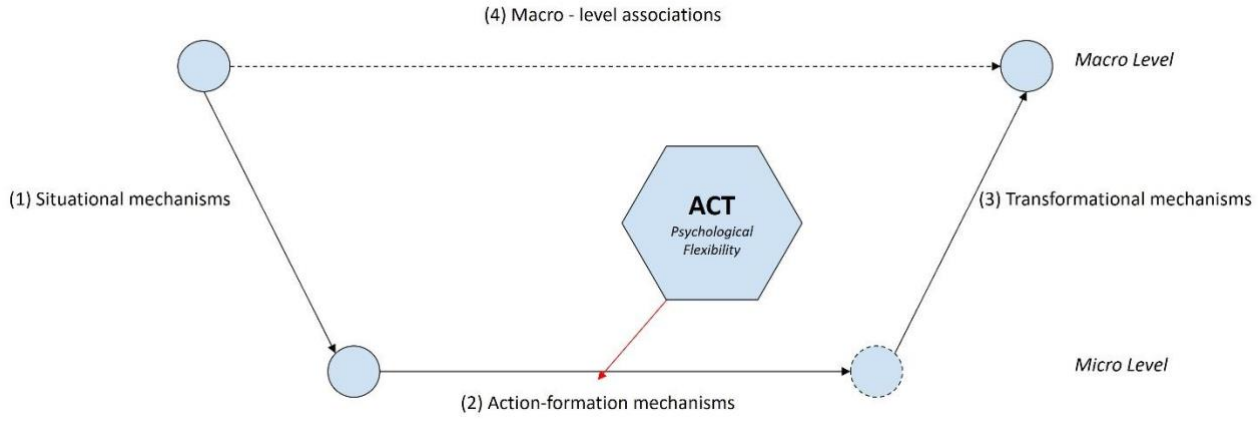

Fig. 1. The role of ACT in the cross-boundary collaboration - adapted by Hedström and Ylikoski (2010).

Acceptance and Commitment Training

Acceptance and Commitment Therapy (ACT) is a mindfulness-based psychological intervention rooted in third-wave behavioral science[2]. Unlike many other interventions, ACT is grounded in a comprehensive theory of language and cognition—Relational Frame Theory (RFT)—which explains how thought and language shape overt behavior (Hayes et al., 1999). A central component of ACT is cognitive defusion—the process of distancing oneself from unhelpful thoughts and rigid self-concepts—which enhances perspective-taking by encouraging individuals to shift from fixed self-perceptions to broader, more flexible viewpoints (Godbee and Kangas, 2020). In addition, ACT is built on the philosophical foundation of functional contextualism, emphasizing the practical outcomes of behavior within specific contexts rather than abstract diagnostic categories. This contextual focus makes ACT particularly well-suited for non-clinical settings (Fang and Ding, 2023) such as research institutions, where identity attachments and cognitive biases often pose significant barriers to knowledge exchange and collaborative behavior.

Building on this theoretical foundation, Acceptance and Commitment Training (ACT) represents the practical application of ACT principles in non-clinical environments, including workplace and professional development settings (Moran, 2015). In organizational contexts, ACT helps individuals recognize and detach from self-limiting internal narratives that can undermine performance and openness. For example, a senior researcher may resist evaluating external ideas, asserting that their role is to innovate rather than assess others' contributions. This reaction reflects fusion with a narrow self-description, which can obstruct the flow of external knowledge and hinder collaboration. ACT facilitates perspective-shifting by guiding individuals to "step back" and observe their thoughts without over-identifying with them.

Through ACT, participants develop the ability to view themselves beyond their professional roles, titles, or emotional states—recognizing these as transient experiences rather than defining characteristics. This expanded self-concept fosters adaptability and psychological flexibility, allowing individuals to act in alignment with their values, even in the face of cognitive discomfort. As a result, ACT supports more effective collaboration, innovation, and knowledge exchange across disciplinary and organizational boundaries. This conceptual integration between ACT and boundary-spanning collaboration is illustrated in Figure 1, which visually connects the foundational principles of ACT with open innovation challenges in scientific environments.

In sum, knowledge exchange in academic and R&D contexts is often constrained by attitudinal biases such as NIH and NSH, which are deeply rooted in professional identity and ego-defense mechanisms. While traditional interventions have targeted structural or attitudinal changes, indirect strategies—particularly those enhancing perspective-taking—offer a promising alternative. Yet, practical, evidence-based interventions that activate such mechanisms remain limited, especially within academic environments. Acceptance and Commitment Training (ACT) emerges as a relevant and underexplored approach, fostering cognitive defusion and broader self-concepts that can weaken the grip of identity-driven resistance. Building on this foundation, the present study introduces and evaluates a novel ACT-based training program designed to improve both the absorption and sharing of knowledge—addressing a critical gap in the literature on individual-level interventions for boundary-spanning collaboration in research settings.

METHOD AND DATA

The objective of this study is to design a training program that integrates perspective-taking to support Open Innovation practices within scientific contexts. To achieve this, we employed an Action Research Innovation Management Framework (Guertler et al., 2020), which facilitates iterative exploration, embraces unexpected findings (or “pivots”), and ensures rigorous evaluation of outcomes. Action research is particularly well-suited to addressing practical challenges, as it enables adaptive methodologies that promote change and learning in real-world contexts (Somekh, 2005). The methodology we developed is structured in three phases—design, implementation, and evaluation—which guided the development and refinement of the training program. This three-phase process is schematized in Figure 2 to provide a clear visual overview of our research design and its alignment with the study’s objectives.

Problem Exploration. The initial phase focused on identifying and understanding the problem through consultations with stakeholders and a comprehensive review of the literature. The aim was to understand how to convert an ACT training, already in use in other settings, into a research setting for cross-boundary collaboration. Emphasis was placed on scientific settings such as research centers and universities, where biases like NIH and NSH have been shown to hinder OI

[2] A comprehensive overview of empirical evidence supporting ACT interventions is available at: https://contextualscience.org/state_act_evidence

adoption (Beck et al., 2022; Lifshitz-Assaf, 2018). To investigate individual barriers to adopting Open Innovation practices, 20 semi-structured interviews were conducted with scientists of varying disciplines and seniority levels across eight universities and one research center. Each interview focused on participants' experiences with OI, aiming to uncover both practical and psychological obstacles to engagement, past training experiences, and preferences for future training design. All interviews were recorded, transcribed, and subsequently coded and analyzed by two independent management scholars. The researchers clustered similar barriers to collaboration, generating thematic insights that directly informed the development of the training program.

Iterative Intervention Development. The next stage focused on designing and iteratively refining the training program across five distinct contexts. This multi-context approach aimed to define and develop the training in varied settings, extract context-specific insights, and improve it for the following iteration.

Iterations. The first iteration addressed a general academic setting, and thus involved individual scholars from diverse disciplines. The second iteration took place at a technological research institute, engaging applied researchers from various projects and fields. This allowed us to assess the methodology among participants already involved in cross-disciplinary and cross-organizational collaborations. The third iteration was hosted by a national physics institute and targeted basic science researchers. This more homogeneous audience had limited prior experience in collaboration, providing contrast with previous groups. The fourth iteration returned to the university setting, involving ATTRACT[3] researchers and proof-of-concept[4] developers from different organizations. These participants were already engaged in collaborative work and aware of its challenges, enabling us to assess the training's relevance in a more experienced setting. The final iteration took place at a polytechnic institute and involved interdisciplinary research teams. This group resembled the previous audience in terms of collaborative experience but was composed of intact teams—an adjustment informed by earlier findings that emphasized the benefits of collective participation.

Each iteration was informed by the analysis of previous sessions, allowing the program to evolve based on participant feedback and observed outcomes. The training sessions and workshops were structured to balance theoretical knowledge with experiential exercises, creating a dynamic learning environment that addressed the specific needs of participants. In each iteration, the whole team planned the syllabus and the protocol of the ACT training, and during the training the ACT intervention was run by a psychologist and ACT expert. In case the psychologist felt to dedicate more or less time to specific exercises, she could adapt the protocol. These protocols were designed to be replicable by behavioral psychologists trained in ACT, ensuring both consistency and adaptability across contexts.

As part of the documentation process, the training protocol was finalized by the behavioral psychologist to facilitate future dissemination and replication, ensuring that the intervention can be adopted by institutions beyond the original research settings and delivered by behavioral psychologists with specialized expertise in ACT.

Data collection during the training involved surveys, focus groups, and direct observations. The qualitative data were systematically analyzed independently by a management scholar and a behavioral psychologist, discussed collaboratively with the broader research team. Those discussions led to course improvements. The effectiveness of the training was assessed by examining changes in participants' openness to external knowledge and willingness to collaborate across boundaries through surveys and focus groups organized six months after the training. To assess this, for each iteration, we reached out participants for deeper conversations that could examine the specific activities participants engaged in to improve their collaborative capabilities. Those connections also, allowed us to identify and control for potential confounding effects. To the best of our knowledge, participants were not exposed to any external interventions during this period.

By employing this methodological approach, the study bridges theory and practice, offering a scalable model for embedding perspective-taking and OI frameworks in a training for the scientific community.

RESULTS

Iteration 1: Initial Implementation of ACT

The first iteration of the training program was meant to simulate the 'hook' of the training, to check whether researchers could receive ACT interventions, and to understand whether the team was ready to interact with

[3] ATTRACT is a European initiative funded by Horizon 2020, aimed at accelerating breakthrough technologies by fostering collaboration between research institutions and industry. The program brings together scientists, engineers, and entrepreneurs to transform cutting-edge research into market-ready innovations, bridging the gap between fundamental science and commercial application.

[4] Proof-of-concept (PoC) developers are academics who participate in the ALMAVALUE acceleration program, aimed at fostering academic spin-offs. This program supports researchers in transforming innovative ideas into market-ready ventures by providing funding and educational resources. Participants receive guidance on entrepreneurial principles, focusing on how to navigate the transition from academic research to commercialization. To qualify for ALMAVALUE, academics must present a validated proof of concept, demonstrating the feasibility of their idea and its potential for real-world application.

such an audience. The training consisted of a 4-hour session involving six scholars from various disciplines. The training leveraged ACT by initially focusing on how researchers' identities and self-concepts can create resistance to external knowledge exchange (to test the 'hook' of the training). A core tool used in this process was a specialized ACT matrix (Atkins et al., 2019), which guides participants in recognizing internal obstacles—such as biases and identity conflicts—and aligning their behavior with personally meaningful goals. In the context of open innovation, this tool was employed to help researchers reflect on their professional identities, clarify how they value innovation, and envision how open innovation practices could align with their values.

Upon completion of the training, participants reported that while the theoretical concepts resonated with their experiences, the absence of experiential engagement limited their ability to internalize the perspective-taking process. This highlighted let the research team identify how to position the training in a researchers class, and pushed them to define the next iteration, aware of the need to expand the experiential component of the training to foster a deeper, more immersive learning environment.

Iteration 2: Expanding Experiential Exercises

The second iteration involved eleven scholars, expanded the training to 12 hours over two working days, followed by a 1-hour recall session one week later. The revised program integrated experiential exercises such as meditation, physical activities, and collaborative focus groups to enhance the practical application of perspective-taking.

Participants received a training booklet designed to support continued development post-training. This booklet included goal-setting tools, adapted ACT matrices for open innovation, and a diary to facilitate self-reflection and track progress. The diary encouraged participants to document challenges, insights, and incremental progress, fostering sustained engagement with OI practices.

The expanded format improved engagement and a deeper understanding of the previously only theoretical experiences. However, participants highlighted difficulties in connecting the psychological training to practical open innovation and cross-boundary collaboration applications. Some participants expressed a desire for greater emphasis on open innovation concepts, suggesting that the balance between psychological exercises and managerial content needed refinement. Additionally, participants found the extended duration demanding and difficult to accommodate within their schedules.

Despite these logistical challenges, participants demonstrated enhanced perspective-taking abilities. Six months after the training one participant noted,

> I [a psychologist involved in robotic design] managed to move to evolutionary science that I always wanted to touch but I never did because it's too far from my research field. I have learned a lot of things. I'm working the double I have to work.

Indeed, quantitative results indicated that approximately 27% of participants improved their collaboration with external organizations, and another 27% improved in cross-disciplinary collaboration. However, no participants improved in both areas simultaneously, resulting in an overall 55% improvement in collaboration behaviors.

Moreover, from the focus group, we also learned that the psychological tools were primarily used as general coping mechanisms, with limited application to open innovation practices. As was highlighted by a participant already during the training:

> I wish the 2nd day were more about open innovation. What about embedding your values in open innovation?

Iteration 3: Integrating Psychological and Managerial Components

The third iteration, which included four researchers, This adjustment aimed to better integrate OI concepts into the experiential components of the training sought to address previous feedback by streamlining the training to a single 6-hour day, with a follow-up recall session three weeks later. Two hours were dedicated to open innovation theory, with the remaining four hours focused on psychological training. .

During this iteration, participants were introduced to open innovation frameworks such as the Gutmann and Chesbrough matrix (Gutmann et al., 2023) and Coleman's Bathtub Model (Coleman, 1990). This theoretical grounding helped bridge the gap between the ACT matrix and real-world OI practices by illustrating individual-level barriers and biases observed in organizations like NASA (Lifshitz-Assaf, 2018).

Although participants appreciated the streamlined format, the post-training reflection session revealed reduced long-term use of psychological tools in daily work. This was reflected in the quantitative data, which showed that none of the participants demonstrated improvement in collaboration with external organizations and only one participant (25%) reported enhanced cross-disciplinary collaboration.

Iteration 4: Embedding Reflection and Goal-Setting

For the fourth iteration, the training was delivered to nine researchers over two days, with a stronger emphasis on integrating the diary and goal-setting exercises into the main training sessions. These changes have been implemented to ensure long-term use of the psychological tool and to enable real-time application of ACT principles to participants' OI projects.

Feedback from this iteration was largely positive, with participants noting improved connections between psychological and practical components. One participant pointed out six months after the training:

> I applied it in my daily life, and it helped me to understand negative emotions and thoughts. Now I keep a post-it on my desk that says "I who notice" *[a tool* from the exercises].

Post-training evaluations confirmed this positive trajectory. However, several participants expressed a desire to attend the training with their research teams, emphasizing the importance of group dynamics in fostering long-term behavioral change. This insight pointed to the need for future iterations to accommodate entire research teams, addressing collaborative barriers at the group level.

Iteration 5: Team-Based Approach

The final iteration involved fifteen scholars for a 1.5-day session focused on cooperative dynamics in interdisciplinary applied research. Researchers were encouraged to attend with colleagues from their research groups, fostering a collective learning environment.

The program retained the core structure of previous iterations but emphasized team-based reflection and goal-setting, addressing prior concerns about individual versus group-level change.

Participant feedback indicated high satisfaction with the new format, and concerns about disconnects between psychological training and practical OI applications were notably reduced. By aligning the training with team-based goals, participants reported greater ease in applying perspective-taking to collaborative research efforts, demonstrating a more cohesive adoption of OI practices within their teams. Indeed, the follow-up revealed that out of 9 interviews, 3 participants reported improvement in cross-organizational collaboration and another 3 in interdisciplinary collaboration. These results yielded an overall improvement rate of 6 participants out of 9, confirming the effectiveness of the protocol developed in fostering collaborative behaviors.

By the final iteration, the training had evolved into a structured yet adaptable program that bridged psychological and managerial dimensions, aligning with the unique challenges faced by researchers in academic and scientific settings. As summarized in Table 1, each iteration contributed key insights into what elements of the training were most effective.

Building on these findings, we propose a set of generalizable principles for designing ACT-based interventions aimed at improving scientists' attitudes toward open innovation and knowledge-exchange behaviors. First, the training must be consistently anchored in psychological flexibility development and cognitive defusion, using foundational ACT tools—particularly the ACT matrix—to help participants recognize and distance themselves from rigid self-concepts that hinder collaboration. Second, experiential learning elements such as physical exercises, guided reflection, and meditation should be integrated to foster perspective-taking and deepen psychological engagement.

Table 1. Summary of Iterations for the Action Research Framework

Iterations	Main iteration characteristics	Pivoting and learnings
Iteration #1 *University Academics* *6 Participants* ***No follow up interviews, only focus group between researchers***	4-hour training session led by two senior ACT researchers and practitioners, focusing on psychological barriers to open innovation through ACT. The session introduced perspective-taking techniques and tools to address identity-related obstacles. Tools Used: ● ACT-matrix for recognizing and overcoming internal barriers. ● List of open innovation practices to connect psychological insights with OI concepts.	● ACT framework was well-received. ● Lack of experiential components limited the sensemaking of psychological tools
Iteration #2 *Researchers from applied disciplines in a research centre* *11 Participants* *In a follow up interview, out of the 5 available researchers, 3 reported that they improved in collaborative behaviors*	2-day session facilitated by psychologists and management scholars, integrating ACT exercises with open innovation theory. Approximately 10% of the training covered OI concepts. Experiential exercises such as meditation and physical enactments were introduced to deepen engagement. A 1-hour recall after 3 weeks supported by a training booklet and diary reinforced learning. Tools Used: ● ACT-matrix. ● Meditation, group discussions, and physical enactment. ● List of open innovation practices and biases. ● Training booklet distributed after the training.	● Good understanding of the training ● Psychological exercises felt disconnected from practical Open innovation applications. ● The training length was too demanding.

Iteration #3 *Basic science researchers in a research centre* *4 Participants* *We follow up with an interview with one of the participants, which reported that he improved collaborative behaviors*	6 hours session, followed by a 1-hour recall, allocated 33% of the time to OI theory, increasing focus on integrating ACT with OI. Theoretical models such as Gutmann and Chesbrough's matrix and the Bathtub model were adapted for OI contexts. Tools Used: ● ACT-matrix. ● Meditation, group discussions, and physical enactment. ● List of open innovation practices and biases. ● Training booklet distributed after the training. ● Gutmann and Chesbrough matrix and Bathtub model for OI.	● The balance between theoretical and experiential components was satisfactory. ● Diary use during recall effectively linked ACT to OI, but this happened after the training. ● The short duration reduced the long-term use of psychological tools in daily work.
Iteration #4 *ATTRACT researchers and University academics* *9 Participants* *We follow up with an interview with 3 participants*	2-day session maintained the balance between ACT and OI components. The diary was integrated into the second day, allowing participants to apply ACT tools during the program. A 1-hour recall focused on feedback from goal-setting exercises. Tools Used: ● ACT-matrix. ● Meditation, group discussions, and physical enactment. ● List of open innovation practices and biases. ● Training booklet distributed during the training. ● Gutmann and Chesbrough matrix and Bathtub model for OI.	● The training was well-received. ● Participants noted the importance of attending with research teams to foster collective behavioral change.
Iteration #5 *Teams of academics involved in interdisciplinary research* *15 Participants* *We follow up with an interview with 9 participants*	1.5-day session, shifted focus to cooperative team dynamics in interdisciplinary research. Participants attended with their research teams to work on group values. Tools Used: ● ACT-matrix. ● Meditation, group discussions, and physical enactment. ● List of open innovation practices and biases. ● Training booklet distributed during the training. ● Gutmann and Chesbrough matrix and Bathtub model for OI.	● Team-based participation resolved group dynamic issues. ● Positive feedback

Third, ACT principles must be explicitly connected to open innovation theory and practice through the use of relevant frameworks, applied examples, and team-based challenges. Fourth, sustained application should be supported through practical tools such as structured diaries and goal-setting exercises, coupled with post-training reflection opportunities. Finally, whenever possible, training should be delivered in team-based formats to align individual and collective values and reinforce collaborative behaviors at the group level. These design principles contribute to a scalable, adaptable intervention model that bridges psychological flexibility with organizational innovation goals in academic and scientific settings.

DISCUSSION AND CONCLUSION

This study explored how perspective-taking training, grounded in ACT, can address individual-level barriers to open innovation in academic and research settings. Through an iterative action research approach, we developed, tested, and refined a training intervention aimed at enhancing participants' ability to engage in boundary-spanning activities.

Theoretical contributions. On a theoretical level, the findings contribute to the literature on knowledge flows, particularly in relation to Not Invented Here and Not Shared Here biases. Consistent with prior research (Antons and Piller, 2015; Hannen et al., 2019; Weissenberger-Eibl and Hampel, 2021), our study highlights the deeply ingrained nature of these biases, which stem from professional identity and cognitive fusion. ACT-based perspective-taking training directly addresses these issues. The use and development of ACT training is a powerful response to a gap in the literature, which currently provides no means of modifying perspective taking, but only identifies it as a leverage for reducing NIH and NSH. In addition to demonstrating effectiveness, the study also offers a set of learnings—derived from five iterations of training—that provide insights on how to structure ACT-based interventions to foster openness and collaboration in scientific settings.

Practical implications. From a practical perspective, this study provides clear implications for university administrators and Knowledge Transfer Office (KTO) managers. It underscores that fostering open innovation is not solely a matter of allocating resources or

implementing new policies. Addressing the psychological and identity-related barriers of individuals and group-level dynamics that hinder knowledge exchange is equally crucial.

As consequence, universities should consider offering ACT-based training as a support service to enhance collaborative well-being and readiness of academics engaging in cross-organizational or cross-disciplinary projects. This training could be embedded within broader science valorization processes or integrated into grant preparation workflows.

Drawing on our findings regarding the training's impact on team dynamics, we suggest that the intervention would be most valuable if provided to entire research teams immediately after being awarded funding for interdisciplinary or inter-institutional collaboration. Doing so would establish a shared psychological foundation early in the project lifecycle, helping teams to anticipate and address identity-related barriers, align values, and foster trust—thereby setting the stage for more effective and sustainable collaboration.

Moreover, whenever organizations undertake broader institutional transformations to adopt open innovation practices—such as the case of NASA described by Lifshitz-Assaf (2018)—our ACT-based intervention can serve as a preparatory step to create the psychological and cultural conditions necessary for change. By addressing individual-level resistance and fostering openness to new roles and knowledge flows, the training can facilitate smoother transitions during organizational change processes.

Note that the training effectively targeted and reduced individual-level resistance to open innovation, but it did not want to directly address structural or organizational constraints. In addition, our findings reveal that team-level dynamics constitute a critical, and often overlooked, source of resistance. Participants consistently emphasized the value of experiencing the training alongside their research teams, indicating that collaborative behaviors were more likely to change when there was a shared foundation for reflection and action. Interventions that take into account the interplay between individual mindsets, team dynamics, and institutional context are more likely to foster sustainable, long-term behavioral change within scientific communities.

While the findings are promising, the study is not without limitations. Participation in each training iteration was voluntary—a foundational requirement of ACT training—since the intervention is effective only when participants are meaningfully engaged. This principle was substantiated by our observations: participants who were compelled to join by more senior scholars demonstrated fewer improvements in defusion, as assessed by behavioral psychologists, and in collaborative behaviours. As a consequence, the effectiveness of ACT in reducing the influence of cognitive biases on collaboration appears generalizable only to individuals who are genuinely motivated to enhance their collaborative capabilities. The aim of this paper was to develop the training and not to generalize its effectiveness under different conditions, as the relatively small sample size and context-specific nature of the interventions may limit the generalizability of the results. Future research could start from the results of this study and use the developed training for social experiments on bigger samples. Future iterations could also explore the integration of digital platforms and virtual tools to scale the training program, making it accessible to larger academic audiences.

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