

學術對談

## 人工智能、自動化和算法時代下的媒介效果研究：一位跨學科研究先行者的行與思

對談人：施亞姆·桑達爾、宋韻雅、鄧瑞峰



施亞姆·桑達爾教授  
(Prof. S. Shyam Sundar)

「計算方面取得的進展，比我們預想的還要深刻得多。現在，我們能夠獲取到更多比我們的理論設想更具化的數據。因此，這就好

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比我們手中有一把很大的錘子，卻只看到一顆顆小釘子。有時我們用這把大錘子來敲打那些很小的釘子，花了大力氣，卻收效甚微。目前我們只能描述看到的現象，但仍無法解釋在培養皿中發生的所有事情，因為有太多未知機體或未知因素在起作用，卻無法被當前的理論所解釋。這就是為什麼我們需要更多在地化理論來解釋這些用先進方法捕捉到的現實，並幫助我們釐清看到的一切。」

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Dialogue

## **Media Effects Research in the Age of Artificial Intelligence, Automation, and Algorithms: Insights from a Pioneering Interdisciplinary Scholar**

Discussants: S. Shyam SUNDAR, Yunya SONG, Ruifeng QIE

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### **Abstract**

This dialogue features Professor S. Shyam Sundar, a distinguished scholar known for his pioneering work on social and psychological effects of human-computer interaction (HCI) and computer-mediated communication (CMC) with specific focus on technological elements unique to online communication via modern media. He was identified as the most published author of Internet-related research in the field during the medium's first decade. He is a theorist as well as an experimentalist who uses a rich variety of quantitative and qualitative approaches in his research, including computationally intensive

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methods. In this dialogue, Professor Sundar shares his career journey thus far with readers: a chronicle of his experiences in academia as a student and researcher, the uncertainties he faced, the obstacles to success and well-being, and the pervasive role of intellectual passion. He identifies the main areas and current dynamics of media-effects research and provides recommendations for future directions for research in the age of artificial intelligence, automation, and algorithms.

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## 施亞姆·桑達爾教授簡介

施亞姆·桑達爾教授是美國賓夕法尼亞州立大學 (Penn State University) 傳播學系的傑出教授、媒介效果研究實驗室聯席主任、社會責任人工智能中心主任、國際傳播學會院士。施亞姆教授的研究領域包括因特網使用與效果、媒體技術心理學、人機交互、媒介效果、移動媒介和網絡界面等。他的理論貢獻主要有他在傳播技術社會和心理影響層面提出的一系列模型：「型式、主體、互動與導航」模型 (Modality-Agency-Interactivity-Navigability Model)、「使用與滿足 2.0」(Uses and Gratifications 2.0)、「互動性效果」模型 (Interactivity Effects Model)、「客製化能動」模型 (Agency Model of Customization)、「激勵技術」模型 (Motivational Technology Model)、「線上信源分類 (Online Source Typology)」，以及交互媒體效果理論 (Theory of Interactive Media Effects)。他曾榮獲新聞與大眾傳播教育學會 (AEJMC) 頒發的 Paul J. Deutschmann 卓越研究獎和由國際傳播學會傳播與技術組頒發的 Frederick Williams 傑出貢獻獎。施亞姆教授參與編寫 30 餘本書，並曾發表過 170 多篇學術文章。他曾擔任 *Journal of Computer-Mediated Communication* 的總主編，現擔任 *Journal of Advertising* 的資深顧問編輯。

SS：施亞姆·桑達爾

YS：宋韻雅

RQ：鄧瑞峰

**YS：怎樣的契機使您投身於媒介效果這一研究領域？可否請您談一下您的學術歷程？**

SS：我在印度讀本科時是一名工科生，但我對新聞專業也非常感興趣。20 世紀 80 年代時，我還在報社兼任記者。我早上去工學院上學，下午和晚上在新聞室工作。同時作為一名工程師和一名記者，我總是想了解用戶，想知道我們的行動會如何影響他們的體驗和感受。我想就是從那時我開始建立對受眾研究的興趣。

《傳播與社會學刊》，(總)第61期(2022)

學術方面，我在University of Alabama攻讀碩士期間遇到了Dolf Zillmann老師，是他開啟了我的學術生涯，讓我接觸到媒介效果領域的各個方面。我闡釋問題的時候總會試圖從心理學效果入手，無論是我開展的關於用戶體驗或社會反應方面的技術研究，還是我接觸到的各種心理學研究，譬如Amos Tversky、Al Bandura、David Rummelhart、Robert Zajonc、Lee Ross和Mark Lepper，我在博士求學期間曾有幸上過這些老師的課程。

我在讀博期間輔修了心理學，單純從心理學角度來做技術方面的研究。這啟發了我用一種獨特的方式來思考媒介效果。我從傳統的媒介效果研究中汲取看待變量的想法，以及這些變量對特定心理效果的影響。但我把這些研究中跟訊息相關的變量換成了技術類變量。這就是產生貢獻之處。

**YS：**您是媒介效果研究的先驅，可否請您分享一下您最重要的學術成果和著作？

**SS：**我不認為自己是先驅，我更覺得自己是外行人，甚至也許是個特立獨行者。因為我一直想做我們這個領域大多數人沒有考慮過的事情。我的關注點更多是媒介效果中的媒介而不是訊息。我覺得自己最重要的貢獻在於對技術影響成因和用戶心理的探索，以及多個學科之間的融合，尤其是傳播學、心理學和計算機科學之間的聯結。

我的研究成果主要分為兩類技術效果。第一類與界面信號(interface cues)的效果有關，相關研究發表於13年前，主要是圍繞MAIN (Modality, Agency, Interactivity, and Navigability「型式、主體、互動與導航」)模型(Sundar, 2008a)。第二類是關於用戶行為對界面的影響，關注的是交互性(interactivity)和客製化(customization)(Sundar, 2012)。我們認為這些行為會產生心理影響——人們對媒體做了什麼或者受眾(我們現在稱為「用戶」)如何與媒體互動，都可以改變傳播本身的性質以及傳播產生的所有效果。這些效果是界面上用戶行為的直接結果，而不單只是信號產生的結果。總的說來，我的研究有兩條不同的取徑，一條是信

## 人工智能、自動化和算法時代下的媒介效果研究

號路徑 (cue route)，另一條是行動路徑 (action route) (Sundar et al., 2015)。我把它們整合在六年前提出的交互媒體效應理論 (Theory of Interactive Media Effects, TIME) 模型中 (Sundar et al., 2015)。這個理論是我在過去 20 年裡接觸的不同模型的結晶。

**YS：** 在過去 10 年中，媒介效果研究領域發生了哪些改變？它在未來 5 年、10 年、50 年甚至 100 年的發展趨勢會是怎樣的？

**SS：** 大體上，我認為大家開始更多的關注媒介，而不像以前那樣只關注訊息特徵。科技的可供性將使每位受眾更有可能獲得獨一無二的體驗，而這種獨特的體驗會帶來獨特的效果。更多的研究重點將會被放在單個用戶體驗的時間動態上，而非信息對廣大受眾的整體影響。比如過去的大眾傳播研究只關注龐大的一群匿名同質群體。我認為未來媒介效果的研究將變得更加以個人為中心。

媒介效果研究將更少關注特定訊息的效果，而更多關注媒介的可供性如何影響個人對媒介所傳遞信息的接受和反應。這歸功於如今的大數據和計算技術的進步，我們的實證研究將變得更為精確。可獲取的高細粒度數據將更加巨量，而且速度更快，這意味著研究可以更加具化。要想賦予這些變化意義，我認為未來會有更多關於人們數字媒體體驗的在地化理論。我們將提出關於具體滿足和媒介效果的原創理論，而不是簡單地引入寬泛的社會心理學理論。

在過去 50 年的媒介效果研究中，大多數理論都著眼於訊息特徵，幾乎將媒介特徵排除在外。我認為我們將看到更多關於媒介本身以及媒介技術可供性的理論。眾所周知，心理學家長期以來致力於研究訊息的影響，卻忽略了媒介屬性。對於心理學家而言，他們一直奉行「讓我們記錄下關於人類行動的信息，然後把它放在孩子或研究參與者面前，再觀察他們的反應」。但他們從未停下來考慮過這樣一個事實，即信息是經由媒介中介的，通過視頻跟面對面或現實是截然不同的。我們領域也帶入了這種對訊息中行動的偏重。我們大多關注媒體中的攻擊性行為、媒體中的暴力、健康傳播或是廣告，這正是心理學家一貫的研究主題。如

《傳播與社會學刊》，(總)第61期(2022)

此看來，傳播學者的研究工作與心理學家別無二致。我認為傳播領域的獨特之處在於，我們應當將「媒介中介」(mediation)這個概念問題化。當中介過程發生時，這些事物如何改變？我認為這是我們將會看到的未來研究重點。我覺得我們需要更多這樣的研究，這就是傳播學者區別於心理學家和其他社會科學家的地方。

**YS：**回顧您的學術歷程，您如何在社會科學、傳播學、信息科學和心理學等諸多學科中定位自己？您經常運用跨學科的視角來研究技術可供性。可否請您分享您在跨學科研究中遇到過哪些挑戰？

**SS：**我以一個外行人的身份進入傳播學領域，並且在一定程度上打破了研究傳統。每個學科都有一個非常保守和正統的核心。雖然我尊重它，但我始終與這個核心保持一定距離。在傳播學領域，發表關於技術效果的研究一直是一個挑戰。當你閱讀任何一本關於傳播科學或者媒介效果的書籍時，關於技術的章節總是被放在後面，似乎編輯們只是口頭說說媒介的重要作用。我總是發現自己要給技術提供支撐理由，並一直試圖將其帶入主流。

改變這樣的現狀是一項挑戰，但應對這一挑戰很重要，因為跨學科的研究具有巨大價值。我自己的研究常常受益於各個學科的不同視角。然而，最重要的是讓這樣的跨學科研究具備嚴謹性和持久性。

**RQ：**您的部分研究側重於各類數字媒體的社會和心理效果。最近，您的研究又觸及人工智能與人類的互動。將交互性概念的研究延展到人工智能，學者們有什麼發現？它與其它數字媒介上的交互性有什麼不同？此外，隱私問題在人工智能時代尤為關注。基於您最近的研究，我們應該如何應對人工智能與人類交互中產生的隱私問題？

**SS：**我新近在《計算機輔助傳播》(*Journal of Computer-Mediated Communication*)發表了一篇關於人類與人工智能交互—交互媒體效應理論的雙過程模型(Human-AI Interaction—Theory of Interactive Media Effects, HAI-TIME)的文章(Sundar, 2020)。它將人工智能研究與交互性研究相結合。我提出了三種不同類型

## 人工智能、自動化和算法時代下的媒介效果研究

的交互——信源 (Source) 交互、訊息 (Message) 交互和媒介 (Medium) 交互 (Sundar, 2020)。在靜態網站中，訊息交互是最大的挑戰。網站設計師必須對用戶可能提出的所有問題編入程序，並創建看似交談的問答循環，賦予對話的感覺。如果用戶的問題沒有被預想到，網站就無法處理了。但現在，聊天機器人和智能喇叭 (smart speakers) 能夠進行更智能的人際交流。隨著自然語言處理技術的進步，這些人工智能工具更加近似於人類。我們將會看到越來越多的人工智能產品能夠像人類一樣與用戶進行更流暢的互動。

儘管人工智能技術有種種優點，它仍然引發了人們對隱私問題的重度擔憂，而這種擔憂催生了諸如「個性化—隱私悖論」(the personalization-privacy paradox) 這類的概念 (Liao & Sundar, 2021)。一方面，我們希望系統能根據我們的喜好提供個性化服務，另一方面，我們不願意以犧牲自己的隱私為代價。我的實驗室提出了一種解決這一悖論的方法，即提供更多自主性給用戶。我們將傳播學、人機交互 (human-computer interaction, HCI) 以及心理學結合在一起，共同尋找解決方案，以最佳方式處理這些隱私侵犯並為用戶提供更多的自主性。例如，我們研究反饋式個性化的效果，即系統在向用戶提供個性化服務之前先請求用戶的許可 (Zhang & Sundar, 2019)。它不以一種隱蔽的方式為用戶提供個性化服務，不會嚇壞用戶。更重要的是，它允許用戶控制這種人機交互。

**YS：**您近期著作中的另一個研究方向是假新聞和信息源。您能否和我分享一下您的洞見？您的研究路徑是什麼？

**SS：**人們越來越多地從朋友那裡獲取新聞，而不再是專業消息源。他們往往低估了專業新聞消息源，高估了作為消息源的朋友。我們的研究還發現，出現在客製化情形中的新聞故事往往更受信任。這種現象被稱為「以自我為信源」(Sundar, 2008b)。你這是在捍衛自己的領地。在新聞可信度的研究中，我們還發現了強烈的模態效應。我們得到了 WhatsApp 提供的研究經費，去印度做了一個

《傳播與社會學刊》，(總)第61期(2022)

關於虛假視頻在 WhatsApp 上擴散的研究項目。我們發現相比於單獨使用音頻或文本形式來呈現假新聞，視頻形式提升了假新聞的受信度 (Sundar, Molina, & Cho, 2021)。

傳統的方式是通過媒介素養活動來教識人們發現假新聞。在印度，會有人拿著擴音喇叭進行街頭宣傳，呼籲大家不能相信在 WhatsApp 上看到的一切。然而，人們早已被網絡信息淹沒，不可能每時每刻都保持警惕。因此，我們需要用技術手段來應對假新聞這一問題。

我們有一個研究項目是開發一種可以檢測虛假新聞的算法。儘管世界各地已經有許多的事實核查員，他們每天會對數百條新聞進行核查，但他們面臨的一個主要問題是，假新聞在人工核查之前就已經像野火一樣蔓延開來，同時這項工作也非常消耗時間和資源。因此，我們需要更加積極主動的人工智能工具來攔截假新聞，阻止它的病毒式傳播 (Molina et al., 2021)。

**YS：**越來越多的傳播學研究開始使用計算方法。有些人批評這一研究取徑往往只提出一些基本的研究問題，不夠深刻，理論性也不足。您如何看待這些計算方法的應用及其在我們傳播學領域的現狀？

**SS：**不僅僅是我們傳播學領域，計算方法在整個社會科學領域都很新興。計算方面取得的進展，比我們預想的還要深刻得多。現在，我們能夠獲取到更多比我們的理論設想更具體的數據。因此，這就好比我們手中有一把很大的錘子，卻只看到一顆顆小釘子。有時我們用這把大錘子來敲打那些很小的釘子，花了大力氣，卻收效甚微。

從學術領域發展和演變的角度來思考，學科方法的發展不僅與理論並行，甚至超越了理論。我們現在能夠觀察到的比我們試圖驗證的多得多。目前我們只能描述看到的現象，但仍無法解釋在其中發生的所有事情，因為有太多未知的因素在起作用，而目前的理論尚且無法提供解釋。這就是為什麼我們需要更多的在地化理論來解釋用這些先進方法捕捉到的現實，並幫助我們釐清看到的這一切。

## 人工智能、自動化和算法時代下的媒介效果研究

如今我們可以獲取數據源感知這個世界的更多現象，因此我們不奇怪現階段的計算數據科學大多是描述性的。這些現象為何發生，以及如何發生，可以用更多在地化理論來解釋，但我們首先要記錄下這些用新型密集計算方法觀察到的新事物。一些學者已經開始對媒體使用和內容做一般性描述，也有其他學者跨時追蹤研究單個媒體用戶，還有一些學者聚焦移動設備屏幕上的變化。總而言之，所有人都在嘗試引入更多的結構性框架來應對包圍我們的新興數據。如果把這些數據僅僅當成是一種手段去檢驗30年前某些心理學家提出的理論，這就沒有好好利用上現有數據的豐富性。

我們的理論十分籠統，數據卻非常具體。在一定程度上，我不會把這種情況歸咎於計算科學不夠理論化，我反而會歸咎於現有的理論不夠細膩或詳盡，以至於無法適配這種粒度級別的數據。我可以預見在未來數年至數十年間，兩者將會更好地契合——粒度級別的數據將啟發理論家對某些特定現象進行一定層次的理論化，屆時數據與理論將變得更加適配。

目前，我們已擁有粒度級別的數據和寬泛的理論，只是二者契合度欠佳。一個簡單的例子是使用與滿足(uses and gratifications)理論的研究傳統，它一直有非常廣的標籤，例如信息，逃避和監視，這幾乎適用於所有的在線媒體活動。我發現當這麼廣的滿足感概念應用於現代數字媒體時，效果令人非常不滿意，因為它們沒有解釋為什麼許多青少年會使用Snapchat，為什麼人們會從使用Facebook轉向使用Instagram，或者為什麼有些人喜歡Twitter這樣的文本平台，而其他更喜歡Pinterest這樣的視覺平台。對我來說，只有在我們考慮到這些科技的新層面能帶來什麼新滿足感時，這些問題才能有答案，這些技術的新層面涉及模態(modality)、交互性(interactivity)等等。這啟發了我去開創一套全新的滿足理論，這套理論關涉現代媒體技術的特定可供性，我稱之為「使用與滿足 2.0」(Uses & Grats 2.0) (Sundar & Limperos, 2010)。一些數據科學家正在使用U&G 2.0理論框架去高細粒度地

《傳播與社會學刊》，(總)第61期(2022)

研究當下媒體的使用與滿足。總之，我們迫切需要更加複雜精妙的理論去更有效的駕馭新興計算科學的力量。

**YS：您如何平衡您的學術和生活？可否分享您如何應對同時出現的多個挑戰？**

**SS：**我通常早上8點上班，直到午夜才會結束我一天的工作。每週至少有幾天我會工作16小時。我不是為了趕截稿日期，而是為了將任務分塊，之後將小塊整合在一起，做成一項研究、一份項目計劃書或是一篇論文。我一直堅信要把工作分塊，朝目標持續前進。每週一次的工作小組會議給我增添了一份責任感，督促我有序地完成任務。我經常開玩笑說，工作小組之於研究，正如黑幫之於犯罪，對兩者而言，組織有序都很重要！

我還認為，豐富的非學術活動有助於高效的學術產出。工作之餘我有很多愛好，比如烹飪、遠足和旅行。我在居住地經營著一家single-malt威士忌俱樂部。我還是本地電台的一名爵士樂DJ。我每週去演播室一次，每週三上午9點到11點播節目。每當我旅行到一座城市，我做的第一件事就是去找一間爵士俱樂部。

**YS：對學生和青年學者的職業發展，您有什麼建議給他們？**

**SS：**對學生來說，最重要的是懷抱求知慾。找到自己熱愛或者感到好奇的事物，而不是做一些看起來當下很時髦的事情。此外，我還建議他們應該嚴肅關切自己的興趣並開展理論驅動的研究。

此刻，我們正處於一個激動人心的時代，尤其是我們的媒體平台和媒體接收模式正在發生巨變。與此同時，前所未有的數據獲取能力和強大的數據分析能力正在重塑科學的發展進程。我敦促未來的學生學者們抓住這千載難逢的機會，竭力為新興媒體的效果研究以及相關社會角色研究添磚加瓦。

## 施亞姆·桑達爾教授著作選

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《傳播與社會學刊》· (總) 第 61 期 (2022)

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Academic Dialogue with **S. Shyam SUNDAR**

## **Media Effects Research in the Age of Artificial Intelligence, Automation, and Algorithms: Insights from a Pioneering Interdisciplinary Scholar**

SS: S. Shyam SUNDAR

YS: Yunya SONG

RQ: Ruifeng QIE

**YS: What made you become committed to the field of media effects research? What shaped your path?**

SS: I was an engineering student when I was an undergraduate in India, but I was also very interested in journalism. So, I was concurrently working as a journalist in print newspapers back in the 1980s. I would go to engineering school in the morning but spend my afternoon and evening in a newsroom. Both as an engineer and as a journalist, I always wondered about users, about how our actions would affect their experience and how they felt. So that is where I think my intellectual curiosity with audiences started.

Academically, I think it was when I met Dolf Zillmann during my master's studies at the University of Alabama that my journey began. He turned me on to this whole area of media effects. I interpreted almost everything in terms of psychological effects, the tech research that I did about user experience or social responses, or all the psychology research that I was exposed to—the likes of Amos Tversky, Al Bandura, David Rummelhart, Robert Zajonc, Lee Ross and Mark Lepper, whose classes I had the privilege of taking during my doctoral studies.

I did a minor in psychology during my Ph.D. and used the pure psych perspective to do tech research. That has been kind of my inspiration for thinking about media effects in a unique way. I took from traditional media effects research the whole idea of looking at variables

*Communication and Society, 61 (2022)*

and their distinctive effects on particular psychological effects. But I replaced their variables about messages with technological variables. That is where my contribution comes in.

**YS: You are the pioneer in the field. What do you think your most significant research accomplishments are? What do you consider to be your best work and why?**

SS: I don't see myself as a pioneer, but more as an outsider, or maybe even a maverick. Because I have always wanted to do what most people in our field did not consider doing. I wanted to focus more on the medium aspect of media effects rather than on message aspects. I'd like to think that my most significant accomplishment has been championing the cause of technological effects and user psychology, and bridging several disciplines, most especially communication, psychology, and computer science.

My work has delineated two broad types of technological effects. The first type has to do with the effects of interface cues, which was published around thirteen years ago in the form of MAIN Model (Sundar, 2008a). The second pertains to effects of user actions on the interface, with a focus on interactivity and customization (Sundar, 2012). So, the idea is that such actions have psychological effects—what people do or how the audience members (or “users” as we call them now) interact with the media can change the nature of the communication itself and all the effects of that communication. These effects are a direct result of user actions on the interface, not simply those of cues. In sum, there are two distinct routes forming two distinct buckets of my research profile. One is the cue route, and the other is the action route (Sundar et al., 2015). I pull them together in the Theory of Interactive Media Effects (TIME), which came out six years ago (Sundar et al., 2015). It is a culmination of different models that I have been working with and proposed in the preceding twenty years.

**YS: In what ways has the research on media effects changed during the past decade? What will its future most probably seem like in the next five, ten, fifty even one hundred years?**

SS: In general, I think there is more recognition of medium, instead of the earlier exclusive interest in message characteristics. The affordances of

*Media Effects Research in the Age of Artificial Intelligence, Automation, and Algorithms*

the technologies will make it increasingly possible for each audience member to have a distinct, unique experience, and therefore there are unique effects arising from that experience. Focus will be more on the temporal dynamics of individual user experience rather than on blanket effects of messages on large masses of people, as was the case in the old days of mass communication research with its focus on a large, anonymous homogeneous group. I see media-effects research becoming much more individual-centered.

Media effects research will be less about the effects of specific messages and more about how affordances of the medium will shape individual reception and reaction to those messages that come through the medium. Thanks to big-data research these days and computational advancements, our empirical work will be much more precise. Granular level data are becoming available in large numbers, and with greater velocity. The implication is that research can be more specific. In order to make sense of all this, I think we will see a greater proliferation of homegrown theories about our digital media experience. We will come up with original theoretical formulations about specific gratifications and media effects rather than simply importing broad theories from social psychology.

In the last fifty years of media-effects research, most of the theories are about message characteristics, almost to the exclusion of medium features. I think we are going to see more theories that are about medium itself and the affordances of the technology of that medium. As we know, psychologists have long studied the effects of messages, but ignored medium attributes. For psychologists, it has always been “let us record this message about human action, then put that in front of kids or the study participants, and then see the reaction.” But they never stop to consider the fact that it is mediated, that it is coming through video would make a difference compared to it being face to face or in real life. We have pretty much imported this focus on the action in the message. We have mostly talked about aggression in media, violence in media or health communication or advertisements, and focus so much on the content, which anyway psychologists have been studying. So, there is nothing that is distinct about our work compared to psychologists. What makes us distinct as a field, I feel, is that we are here to problematize this notion of

*Communication and Society, 61 (2022)*

mediation. When mediation happens, how do these things change? That is kind of focus I think we will see going forth. I feel like we need more and more of that, and that is what distinguishes us from psychologists and other social scientists.

**YS: Looking back on your academic journey, how would you position yourself among different disciplines, say social science, communication, information science, and psychology? Your works are notable for the application of an interdisciplinary approach to the study of the affordances of technologies. What are the challenges that you have experienced in interdisciplinary research?**

SS: I am the outsider who comes in and disrupts in a way. Within each discipline, there is a core that is very conservative and orthodox. While I respect it, I also keep a distance from the core. In our field, it has always been a challenge to publish research on the effects of technology. When you look at any books in communication science or media effects, the chapter on technology is always toward the end, as though the editors want to pay lip service to the role of the medium. I have found myself always having to make a case for technology and trying to bring that into the mainstream.

It has been a challenge to shake up the status quo. However, the challenge is important to address because there is great value in interdisciplinary research. My own work has benefited by leveraging all the different perspectives from various disciplines. The most important thing however is to do such interdisciplinary work with rigor and persistence.

**RQ: Part of your research focuses on the social and psychological effects of a variety of digital media. Recently, your work touched upon AI-human interaction. What have scholars discovered by examining the concept of interactivity as it applies to AI? How does it differ from the dynamics of interactivity for other forms of digital media? Also, privacy is the buzzword in the AI era. According to your recent findings, how to handle privacy among AI-human interaction?**

SS: I have a recent publication out in the *JCMC (Journal of Computer-Mediated Communication)* called HAI-TIME model (Human-AI interaction) (Sundar, 2020). It is marrying AI research with

*Media Effects Research in the Age of Artificial Intelligence, Automation, and Algorithms*

interactivity research. I came up with three different types of interactivities—Source, Message, and Medium Interactivity (Sundar, 2020). In the world of static websites, message interactivity is the biggest challenge. The designers had to program all possible questions from the users and create Q&A loops that provide an appearance of a conversation that gives a sense of dialogue. If the questions from the users are not anticipated, the website would not be able to handle it. But now, chatbots and smart speakers are able to have more intelligent interpersonal communications. These AI tools can approximate fellow human beings as natural language processing technologies improve. We will see more and more AI products that can interact with users almost as seamlessly as other human beings.

But, for all its advantages, AI technology raises serious concerns of privacy, which has given rise to concepts like the personalization-privacy paradox (Liao & Sundar, 2021). On the one hand, we want our systems personalized to our individual tastes, but on the other hand, we do not want to compromise our privacy. My lab’s approach is to resolve this paradox by providing more agency to users. We bring communication, human-computer interaction (HCI), and psychology together to find solutions for challenges in human-AI interactions, on the best way to handle these infractions and provide more agency to users. For example, we studied the effects of reactive personalization, which is the idea that the system asks your permission before it gives you something personalized (Zhang & Sundar, 2019). It won’t personalize things for you in a covert manner. It will not creep you out. More importantly, it gives the user control over the interaction.

**YS: Another line of research in your recent works looks into fake news and online sources. Could you share with us your observations? What is your approach?**

**SS:** People are getting more and more news from their friends rather than from professional sources. There has been an undervaluation of professional journalistic sources and overvaluation of your friends as sources. Our research has also found that a story appearing in a customized venue is trusted more. The phenomenon is called “self as source” (Sundar, 2008b). You are defending your domain. We also have found strong modality effects on believability of news. We got a grant from WhatsApp and went to India to do a project on the spread

*Communication and Society, 61 (2022)*

of fake videos on WhatsApp. We found that fake news was believed more when it was presented in video modality compared to audio form or text only (Sundar, Molina, & Cho, 2021).

The traditional way is to teach people to spot fake news through literacy campaigns. In India, there was street campaigning with megaphones saying do not believe everything you saw on WhatsApp. However, people are overwhelmed with online information, and they cannot be vigilant all the time. So, we need to find technological solutions to tackle the problem of fake news.

One of our projects is to develop an algorithm that could detect fake news. While there are many fact-checkers all over the world checking hundreds of stories every day, a major problem is that fake news has already spread like wildfire before it is manually fact-checked, which is also very resource-intensive, in addition to being time-consuming. Therefore, we need more proactive AI-based tools that can stop fake news in its tracks and stop it from going viral (Molina et al., 2021).

**YS: More and more research in communication is being conducted using computational approaches. Some people have criticized this line of research for preferring to ask questions that are somewhat basic, not that deep or theoretically motivated. What do you think of the computational approaches and their status in our field?**

SS: It is new across the social sciences, not just in our field. There have been developments in computational aspects that have been much more profound than we had even the ability to anticipate. Now, we are able to get more data about more specific things than our theories even envisioned. So, as a result, we have a big hammer in our hand but we only see small nails. Sometimes, we use the hammer to hit those small nails, expending a lot of effort to get at a minor point.

When you think about it in terms of development of field and evolution of scholarship, our methods have not just caught up to our theories but surpassed them. We are now able to see more than we know what we are looking for. We can only describe what we are seeing and we still cannot make sense of all the things that are going on in that petri dish because there are so many unknown organisms or unknown factors that are playing a role, but have not been accounted

*Media Effects Research in the Age of Artificial Intelligence, Automation, and Algorithms*

for by current theories. That is why we need more homegrown theories that can catch up to the reality that we are able to capture with these advanced methods and help us make sense of what we are seeing with new powerful computational approaches.

We now have data access to a lot more phenomena in the world, so it is not surprising that computational data sciences are mostly descriptive at this stage. Why and how these phenomena occur can be explained by more home-grown theories, but first we need to document all the new things we are able to see with these new computationally intensive methods. While some scholars have sought to pursue description of media use and content generally, others have adopted the strategy of studying each media user over time and still others have focused on screen changes on our mobile devices. All of us are, in general, trying to bring more structure to deal with this world of new data that is inundating us. Simply thinking of all these data as a means to test theories that some psychologist came up with thirty years ago is doing a disservice to the richness of currently available data.

Our theories are quite general whereas these data are very specific. So, in a way, I would not blame the computational sciences for being atheoretical. I would blame the existing theories for not being sufficiently nuanced or detailed for us to be able to entertain this level of granularity in data. So, I foresee that in the next few years and decades, there will be a meeting of the two—the granularity of available data will inspire theorists to theorize about certain phenomena at that level. Data will then fit the theory better.

Right now, we have granular data and general theory, and the fit is not great. A simple example is the research tradition of uses and gratifications, which has historically had very broad labels, such as information, escapism, and surveillance, that is true for pretty much all our online media activities. I find these broad gratifications deeply unsatisfying when applied to modern digital media because they do not explain why many adolescents use Snapchat, or why people switch from Facebook to Instagram, or why some people prefer textual platforms like Twitter while others prefer more visual platforms like Pinterest. For me, those kinds of questions can be answered only if we take into account some of the newer gratifications that emerge

*Communication and Society, 61 (2022)*

from the newer aspects of these technologies, relating to modality, interactivity and so on. That is what motivated me to come up with a whole new suite of gratifications related to such specific affordances of modern media technologies, which we call Uses & Grats 2.0 (Sundar & Limperos, 2010). Several data scientists are using the U&G 2.0 framework to study uses and gratifications of current-day media at a granular level. So, in sum, I feel the urgent need for more sophisticated theorizing in order to effectively leverage the power of emerging computational sciences.

**YS: How do you balance your time? How do you deal with several challenges that come up at the same time?**

SS: I usually get to work at 8 a.m. By the time I sign off for the day, it is midnight. This happens at least on a couple of days a week. Those are my 16-hour days. And they are not for meeting any deadlines. Those hours are to get small increments of work done so that they can all add up to something—a study, grant proposal, or paper. I am a big believer in chunking work and making steady progress toward a goal. Having a bit of public accountability in the form of a weekly lab-group meeting is a good way to ensure that you are organized. I always joke that lab-group is to research what the mafia is to crime—both are organized!

I also believe that in order to keep us productive in academic work, we must have a rich non-academic life. I have a lot of passions outside of work, including cooking, hiking, and traveling. I run a single-malt whisky club in my city. I am a Jazz DJ for a local radio station. I go into the studio once a week and broadcast my show from 9 a.m. to 11 a.m. every Wednesday. Whenever I travel to a city, one of the first things that I do is to find a jazz club.

**YS: What advice would you give to students and young scholars about their careers?**

SS: For students, the most important thing is intellectual curiosity. Finding what you are passionate or curious about rather than doing something that seems fashionable. I would also suggest that you focus rigorously on your interests and conduct theoretically driven research.

Right now, we are in an exciting time, especially as our media platforms and media reception patterns are changing dramatically. At the same time, the unprecedented access to data and powerful

*Media Effects Research in the Age of Artificial Intelligence, Automation, and Algorithms*

computing ability to analyze the data are revolutionizing the scientific process. I would urge future students to seize this opportunity and generate new insights into the effects of emerging media and their roles in our lives and society.

## Selected Works by S. Shyam Sundar

Please refer to the end of the Chinese version of the dialogue for S. Shyam Sundar's selected works.