Summer 2017 Newsletter

INFORMS Behavioral Operations Management Section

If you have any information for the next issue of this semiannual newsletter,
If you get a paper accepted, include a note to me as part of the victory celebration,
forward an announcement to Bopschultz@gmail.com.
(Note the change in email address.)

This newsletter cannot continue without your input.

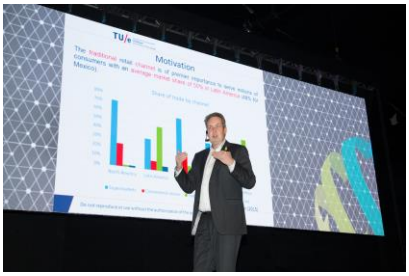
Old copies of the newsletter can be found at the INFORMS Section Website
https://www.informs.org/Community/BOM

General topics include:
A. People, B. Places (Meetings, special issues, etc.), C. Things (Research) and D. On the Market

A. People:

Brent Moritz received tenure at Penn State and **Ryan Buell** was promoted to Associate Professor at Harvard Business School. Good job. (Note: the editor is and old codger and posts photos as received. ;))

Congratulations to **Karen Zheng**, MIT, and **Steven Leider**, Michigan, who joined Brent and Ryan on the promotion list.



Jan Fransoo will move from Eindhoven University of Technology in the Netherlands to the recently established Kühne Logistics University (www.the-klu-.org) in Germany as per 1 January 2018. At KLU, apart from continuing his research and teaching as Professor of Operations Management & Logistics, he will take up the position of Dean of Research. He will keep a courtesy faculty appointment at Eindhoven.

Lisa Yeo has acquired a pool! The pool is accompanied by a house, and a new position at UC Merced in sunny California. If you saw her drive by on her way to California this summer, I hope you waved.

Michael Becker-Peth will be looking at a new cathedral after moving from Cologne to Rotterdam School of Management on 1 September.

The University of Maryland, in a brilliant move, has promoted **Wedad Elmaghraby** to full professor.

Manuel Sosa will be taking his sabbatical at IESE, in Barcelona this year.

B. Places

1. 12th Annual Behavioral Operations Conference, July 12-14, 2017, MIT Sloan School of Management. The conference featured a tutorial by Kyle Hyndman from the University of Texas at Dallas and a keynote speech by John Sterman from MIT. The conference had a historically high attendance of 107 participants, sending a strong signal that our community is growing well.

John Sterman presented the keynote talk on the Capability Trap. For those of you who are interested in the basis for his presentation you they are: Lyneis, J. and J. Sterman (2016). How to Save a Leaky Ship: Capability Traps and the Failure of Win-Win Investments in Sustainability and Social Responsibility. Academy of Management Discoveries 2: 7-32. and Sterman, J. and G. Dogan (2015). "I'm not hoarding, I'm just stocking up before the hoarders get here" Behavioral causes of phantom ordering in supply chains. Journal of Operations Management 39-40: 6-22. http://jsterman.scripts.mit.edu/Online_Publications.html#NotHoarding

2. 13th Annual Behavioral Operations Conference will be hosted by the Naveen Jindal School of Management at the University of Texas at Dallas from June 29 through July 1, 2018. Date were chosen to facilitate attendance at the MSOM conference immediately following. For more information, contact Elena Katok emk120030@utdallas.edu.

3. 14th Annual Behavioral Operations Conference will be hosted by the Technische Univerisiet Eindhove (Eindhoven University of Technology) in the Netherlands, July 8 – 10, 2019. Save the dates! For more information contact Dr. Basten, R.J.I.Basten@tue.nl.

4. The **2017 INFORMS annual meeting** will take place in Houston Texas (if dry by then), October 22-25. The INFORMS Section of Behavioral Operations Management is sponsoring a track. We encourage you all to attend! Jordan Tong and Bob Batt (U. of Wisconsin-Madison) are the cluster chairs. We will have 15 sessions: 1 "opportunities and new directions" session, 1 award session, and 13 regular sessions. Michael Becker-Peth will chair the BOM working paper award session. Serguei Netessine, Amy Ward, and Ioana Popsecu are scheduled for the "opportunities and new directions" session (chaired by Bob and Jordan). The 13 regular session chairs are: Javad Nasiry & Xiaoyang Long, Tingliang Huang & Hang Ren, Ryan Buell, Hummy Song, Steve Leider & Evgeny Kagan, Mirko Kremer, Karen Donohue, Dennis Zhang, Enno Siemsen, Elena Katok, Ruth Beer, Ken Schultz, and Brent Moritz. Please contact Jordan or Bob if you have questions. Look forward to seeing you in Houston!

5. **The 2017 International Workshop on Behavioral Operations Management** will be jointly organized by Tsinghua University and Northeastern University and take place in Northeastern University in Shenyang on December 16-17, 2017. Northeastern University (NEU), initially established in 1923, Marshal Peter H. L. Chang was its president in the 1920s and served as the university's honorary president from 1993 to 2001. Northeastern University has become a comprehensive and research-oriented university featuring the coordinated development of such multi-disciplines as science, engineering, medicine and health, bio-science, architecture, law, philosophy, education, management, art, etc., with engineering as its focus.

6. **The 2016 International Workshop on Behavioral Operations Management** jointly organized by Tsinghua University and Southeast University was held in Nanjing, China on December 17-18, 2016. There were more than 410 conference participants. Gad Allon (University of Pennsylvania), Ernan Haruvy (University of Texas at Dallas), Sanjay Jain (University of Texas at Dallas), and Aks Zaheer(University of Minnesota) gave keynote speeches. Tony Haitao Cui, Shu-Cherng Fang, Haiyan Wang, Lindu Zhao, and Xiaobo Zhao served as co-chairs for the workshop

7. **INFORMS BOM Section Best Working Paper Competition 2017:** The goal of this Competition is to highlight the best working papers in the area of Behavioral Operations. We received 30 submissions and the winner will be awarded at the INFORMS Annual Meeting in Houston. The three finalist will present their paper in a special award session (currently scheduled on October 24, 2017, 10:30 AM – TB48). We invite everyone to see the finalist and the announcement of the winner in that session. First prize will receive a plaque and a check for $500 while second prize and honorable mention with receive plaques.

Thanks to this year's Award Committee: Michael Becker-Peth, Stephen Leider and Karen Donohue.

8. **CfP, Omega**: Human Judgment in supply chain forecasting and multitier operations.

Human judgment is an integral part of supply chain forecasting and operations planning. Despite early evidence suggesting that statistical models outperform human judgment in terms of accuracy (e.g., Carbone et al. 1983, Hogarth and Makridakis 1981), more recent research emphasizes that this dominance of statistical forecasts does not always hold true (Can Eksoz et al. 2014; Fildes et al. 2009; Kremer et al. 2011; Lawrence et al. 2006). In this environment where we know that

"judgement" and "forecasting operations planning" are fundamentally inseparable, it is important to understand how best expert judgement can be evaluated and incorporated into the support systems. This special issue calls for novel contributions that address the above issues within a supply chain context. The last date for submission is 30th September 2017.

9. CfP, International Journal of Physical Distribution & Logistics Management on The Human Factor in Logistics and Supply Chain Management.

Logistics and supply chain management have become more challenging in the past decades with ever more demanding customers, increasing complexity of network flows, and requirements to adopt new disruptive technologies. However, supply chains are (and will) still be managed be humans. Successful management of supply chains is heavily influenced by an organization's ability to hire the "right" talent with the "best" competencies and the "appropriate" understanding of the complexities of the end-to-end supply chain. On top of that, ensuring that those talents manage the supply chains in the best interest of all stakeholders is another critical challenge. Surprisingly, scientific research on the human factor in logistics and supply chain management has been relatively scarce. Therefore it is the objective of this special issue to shed light on the topic both from a human resource as well as from a behavioral perspective.

C. Things (Send a picture to accompany your paper and make it stand out more. Your work deserves the extra attention!)

1. Schultz, K. L., L. W. Robinson, L. J. Thomas, J. Schultz and J. O. McClain, (2017). **The use of framing in inventory decisions**. Production and Operations Management, forthcoming.

Abstract: It is well established that human newsvendors tend to order insufficient inventory in high-margin situations, possibly due to implicit risk aversion. In this paper, we investigate the use of framing to change newsvendors' risk preference in order to induce them to make better ordering decisions. Through an exploratory experiment and five different treatments of the newsvendor problem, we found risk reversal only in the treatments with one question. In the other four treatments and the exploratory experiment we asked multiple questions and found no evidence of risk reversal. Thus, we conclude that risk reversal cannot reliably be used without pretesting and demonstrate that behavioral theories need to be tested in context. Finally, we reaffirm research showing that relying on averages can mask the heterogeneity of human decision-making.

2. Lessons from Seru Production on Manufacturing Competitively in a High Cost Environment, with Yong Yin, Kathryn E. Stecke, Morgan Swink, and Ikou Kaku. Journal of Operations Management, forthcoming, 2017.

Abstract. High capital and labor costs, coupled with high rates of technological and competitive change, present challenges for manufacturers in developed countries, often spurring them to offshore production to low cost sources. However, the electronics industry provides an exception to this trend, where dynamic, high cost conditions have given rise to a new production system – seru – a cellular assembly approach. Seru evolved as an alternative to lean systems approaches, manifesting important differentiated system design choices that appear to offer promise for manufacturing in dynamic, high-cost markets. This paper reports the results of in-depth, longitudinal case studies of two electronics

giants who have implemented seru. The case studies describe seru's fundamental extensions to, and departures from, lean production, agile production, and group technology-based cellular manufacturing. We explain how Sony and Canon have applied seru to improve productivity, quality, and flexibility in ways that have enabled them to remain competitive. In addition, our findings elaborate the theory of swift, even flow, with implications for future research of trade-offs related to production efficiency, responsiveness, and competitiveness in high-cost, technologically dynamic markets.

3. Csermely, T. & Rabas, A. (2016): **How to reveal people's preferences: Comparing time consistency and predictive power of multiple price risk elicitation methods**, Journal of Risk and Uncertainty, 53(2), 107-136

Abstract: The question of how to measure and classify people's risk preferences is of substantial importance in the field of economics. Inspired by the multitude of ways used to elicit risk preferences, we conduct a holistic investigation of the most prevalent method, the multiple price list (MPL) and its derivations. In our experiment, we find that revealed preferences differ under various versions of MPLs as well as yield unstable results within a 30-minute time frame. We determine the most stable elicitation method with the highest forecast accuracy by using multiple measures of within-method consistency and by using behavior in two economically relevant games as benchmarks. A derivation of the well-known method by Holt and Laury (American Economic Review 92(5):1644–1655, 2002), where the highest payoff is varied instead of probabilities, emerges as the best MPL method in both dimensions. As we pinpoint each MPL characteristic's effect on the revealed preference and its consistency, our results have implications for preference elicitation procedures in general.

4. J. Prince Vijai, G.S.R. Somayaji, R.J.R. Swamy, Padmanabha Aital, (2017) **Relevance of F.W. Taylor's principles to modern shop-floor practices: A benchmarking work study**, Benchmarking: An International Journal, Vol. 24 Iss: 2, pp.445 – 466.

Abstract: The purpose of this paper is to use an inter-disciplinary approach to examine the relevance of F.W. Taylor's principles to modern shop-floor practices in the context of a manufacturing organization. Standard time study guidelines laid out by the ILO were adopted and random observations made between two operators independently performing an identical operation in the shop-floor premises of a particular factory. The study findings suggest that measuring the operator's performance in terms of time consumption and resource utilization is necessary but not sufficient to evaluate and improve his/her productivity because operators evaluate their performance in terms of the total number of jobs completed during the duration of the shift.

5. U K. Mukherjee and K K. Sinha, 2017. **Product Recall Decisions in Medical Device Supply Chains: A Big Data Analytic Approach to Evaluating Judgment Bias**, Production and Operations Management, forthcoming.

Abstract: This study investigates judgment bias (under-reaction or over-reaction) in product recall decisions by firms when they respond to adverse event reports generated by users of their products. We develop an integrative theoretical framework for identifying the sources of judgment bias in product recall decisions. We analyze user-generated reports (big and unstructured data) on adverse events related to medical devices, using a combination of econometric and predictive analytic methods. We find that (i) noisy signals in user feedback, that is, high noise-to-signal ratio, are associated with underreaction likelihood; and (ii) user feedback related to adverse events characterized by high severity is associated with high over-reaction likelihood. We also identify conditions related to the situated context of managers that are associated with under-reaction or over-reaction likelihood. The findings of this study are consequential for firms and government regulatory agencies, in that they shed light on the

sources of judgment bias in recall decisions, thereby ensuring that such decisions are made correctly and in a timely manner. Our findings also contribute toward improving the post-launch market surveillance of products (e.g., medical devices) by making it more evidence-based and predictive.

6. Stangl T, Thonemann UW, 2017. **Equivalent Inventory Metrics: A Behavioral Perspective.** Manufacturing & Service Operations Management (forthcoming) https://doi.org/10.1287/msom.2017.0620.

Abstract: We analyze how performance metrics that contain equivalent information affect actual decisions. We consider two such performance metrics from supply chain management, days of supply and inventory turn rate, where one is the inverse of the other. We argue that individuals' assessment of performance is also affected by the metric as opposed to solely based on the inventory value that actually matters. We perform three laboratory studies and analyze how decisions are affected by the metric used to indicate inventory performance. The first study considers alternative inventory optimizations, out of which one must be selected. The second study analyzes a decision maker who must decide on the effort to invest in optimizing inventory of a specific product. The third study corresponds to the economic order quantity model. Our behavioral models suggest that decisions are affected by the metric that is used to indicate performance, and we find support for the predictions in laboratory experiments with human subjects: Under the inventory turn rate metric, individuals overvalue inventory reductions. Compared to decisions under the days of supply metric, they choose worse inventory optimization options, invest more effort optimizing inventory of specific products, and choose higher ordering cost.

7. Ball, G., E. Siemsen, R. Shah. **Do Plant Inspections Predict Future Quality? The Role of Investigator Experience**. Forthcoming at Manufacturing & Service Operations Management.

Abstract: "Plant inspections enable firms to manage their quality risk in global supply chains. However, surprisingly little research examines the relationship between such inspections and future product quality. In this paper, we study how well plant inspection outcomes predict the hazard of a future recall and analyze how investigator experience affects this predictive relationship. Using secondary data spanning a seven-year period in the medical device industry and a recurrent-event Cox Proportional Hazard model, our analysis shows that inspection outcomes reliably predict future product recalls. However, inspection outcomes become an unreliable predictor of recalls with an increase in site-specific investigator experience. Through post-hoc analysis, we also observe that the hazard of a recall at a plant increases with site-specific experience, independent of the inspection outcome. Compared to the first visit by an investigator, the recall hazard increases by 21% the second time the investigator visits a specific plant, and by 57% on the third visit. We propose investigator rotation and investigator sequencing as two policies to help mitigate this increased recall risk."

8. Dhanokar, S., E. Siemsen, K. Linderman. P**romoting Change from the Outside: Directing Managerial Attention in the Implementation of Environmental Improvements**. Forthcoming at Management Science.

Abstract: Regulatory agencies, auditing firms, and supply chain partners externally promote change in firms. To this end, they commonly employ two different and somewhat contradictory intervention approaches. One approach uses punitive tactics to coerce firms to change, while the other approach uses supportive tactics to encourage change. Using the context of government agencies promoting environmental improvements in firms, we examine whether such punitive (e.g., regulatory inspections with possible sanctions) and supportive (e.g., environmental assistance, improvement recommendations) tactics can be administered in a complementary manner. Using a unique and novel longitudinal data set collected from two state-level environmental agencies in Minnesota, we analyze

over 1,000 supportive environmental improvement (EI) projects in combination with intermittent (but currently uncoordinated) punitive tactics. One key finding from our research is that the timing, severity, and relatedness of punitive tactics is critical for directing managerial attention and thus improving the efficacy of supportive tactics (i.e., EI implementation). Contingent on their timing, inspections can increase EI implementation rates by up to 60% but can also reduce implementation rates by up to 50% compared with EIs in facilities that do not experience inspections. Classifying regulatory inspections as (1) either clean or adverse and (2) either related or unrelated allows us to further explain the influence of such punitive tactics on EI implementation. Finally, we provide evidence for a positive effect of successful EI implementation on long-term environmental compliance."

9. Sosa, M., M. Gargiulo, C. Rowles. 2015. **Can informal communication networks disrupt coordination in new product development projects?** Organization Science 26(4): 1059–1078.

Abstract: This paper investigates how the structure of the informal communication network that results from efforts to coordinate task interdependence between design teams in complex product development projects moderates the effect of task interdependence on interteam communication. Drawing on theoretical mechanisms from the social network and knowledge transfer literature, as well as on recent empirical advances in exponential random graphs models of social networks, we examine how the presence of a common third party in the communication network affects the likelihood of technical communication between interdependent teams designing the components of a large commercial aircraft engine. Although task interdependence has a strong and significant effect on the likelihood of communication between teams, this effect is moderated by the presence of common third parties. The nature of this moderation depends on the position of the common third party within the triadic communication structure. When the common third party seats in the middle of a communication chain between the potential source and the potential recipient of technical communication, its presence increases the likelihood of communication between these two teams. However, when the communication between the source and recipient can trigger cyclic exchanges between the three teams, the presence of the third party reduces the likelihood of communication between the two interdependent teams, increasing the risk of coordination disruptions. We discuss the implications of our findings on the literature of intraorganizational networks in new product development.

10. 2. Gargiulo, M. and M. Sosa. 2016. **Common third parties and coordination disruptions in new product development organizations.** Journal of Product Innovation Management 33(2): 132-140. (Special issue on social networks in new product development)

Abstract: This conceptual article builds on existing research on network analysis to examine the possibility that the self- organizing tendencies of communication networks may endogenously affect the likelihood of informal communication between interdependent teams in new product development organizations. Although informal communication between teams emerges out of those teams' effort to coordinate their task interdependencies, the presence of common third parties in the communication network may shape the behavior of teams in ways that makes this communication network depart from the underlying network of technical interdependencies between the teams. In some cases, the presence of a common third party may reinforce the predisposition of interdependent teams to exchange information. In others, it may drive teams to enter exchanges without an apparent technical need to do so. Finally, and more importantly, the presence of a common third party may induce interdependent teams to neglect exchanging information on their technical interdependencies. This possibility is more likely when coordination between two interdependent teams and a common third party can result in cyclic exchanges that can trigger design oscillations affecting the work of the common third party. While these oscillations may be undesirable, efforts to prevent them can result in coordination disruptions

that are also undesirable, because they can affect the performance or durability of the affected components and subsystems.

11. W. Elmaghraby, A. and A. Pilehvar, (2017). **Starting Prices in Liquidation Auctions for IT Equipment: Evidence from field experiments**. Production and Operations Management, forthcoming.

Abstract: It is widely accepted that the information technology (IT) industry has high clockspeed. This very phenomenon has led to IT OEMs finding themselves selling new generation models only to be left holding returned merchandise from older generations. Similarly, customers who migrate to newer generations of products experience uncertainty about how to dispose of older but functional IT equipment. Online liquidation markets have emerged to address these needs by finding ways to resell this equipment. On these liquidation markets, sellers of out-of-date or lightly used durable items like computers and tablets can transact with buyers interested in these products at discounted prices, without needing to alter the state/quality of the product. There is limited understanding of how these markets function and how they may be designed to increase their effectiveness. We report on a unique opportunity for a field experiment that was conducted through the co-operation of a large liquidation company (wholesale liquidator) for IT equipment in the United States. With the specific intention of understanding the design of these liquidation auctions, the research site allowed us to conduct a field experiment on their auction platform for different categories of iPad tablets. By manipulating auction starting prices, we are able to provide insight into the effect of starting prices on the final auction prices of the returned IT products, and find evidence of cross-product dependencies. To the extent that efficient and viable liquidation markets have ecological and market value, our work provides insights into how sellers may, through the adjustment of starting prices, increase their final prices from online auctions.

12. Tereyağoğlu N, Fader P S, Veeraraghavan S (2017) **Multiattribute loss aversion and reference dependence: Evidence from the performing arts industry**, Management Science, ePub ahead of print February 17, https://doi.org/10.1287/mnsc.2016.2605

Abstract We study the prevalence of multiattribute loss aversion and reference effects in a revenue management setting based on data of individual-level purchases over a series of concert performances. The reference dependence that drives consumer choice is not only based on the price but also on observed sales (as a fraction of the seating capacity) during their past visits. We find that consumers suffer from loss aversion on both prices and seats sold: consumers incur significant utility loss when prices are above their references or when the actual seat sales are lower than their references. We suggest pricing policies that can address consumer decisions driven by such reference dependence and loss aversion.

13. Andrew M. Davis and Kyle Hyndman, **An Experimental Investigation of Managing Quality Through Monetary and Relational Incentives**, Forthcoming in Management Science.

Abstract: We investigate the efficacy of monetary and relational incentives for managing the quality of a product in a two-tier supply chain. In our setting, a retailer offers a supplier contract terms for a product, where the product can be low or high quality. The supplier can choose to exert high effort, which is costly but guarantees high quality, or low effort, which does not assure high quality with certainty. We compare how monetary incentives, such as a bonus that is paid to the supplier when high quality is received by the retailer, and relational incentives, such as the two parties engaging in a long-term relationship where there is the threat of punishment, affect overall quality and supply chain efficiency. Two of our primary results suggest that (1) relational incentives improve both quality and supply chain efficiency, regardless of whether a monetary incentive is present, and (2) when relational

incentives are present, the impact of adding monetary incentives is non-monotonic: less efficient monetary incentives appear to crowd out the benefits of relational incentives leading even to a reduction in supply chain efficiency, whereas more efficient monetary incentives actually complement relational incentives and lead to significant increases in both quality and supply chain efficiency. We then proceed by demonstrating that a behavioral model of fairness can organize the data quite well.

14. Andrew M. Davis and Stephen Leider, **Contracts and Capacity Investment in Supply Chains**, Forthcoming in Manufacturing & Service Operations Management.

Abstract: Suppliers are often reluctant to invest in capacity if they believe that they will be unable to recover their investment costs in subsequent transactions with buyers. In theory, a number of different contracts can solve this issue and induce first-best investment levels by the supplier. In this study, we investigate the performance of these contracts in a two-tier supply chain. We develop an experimental design where retailers and suppliers bargain over contract terms, and have the ability to make multiple back-and-forth offers, while also providing feedback on the offers they receive. One key result from our study is that an option contract and a service-level agreement are best at increasing first-best investment levels and overall supply chain profits. However, these same contracts also generate the largest inequity in expected profits between the two parties. We find that both of these results are driven by the bargaining tendencies of retailers and suppliers, which we refer to as "superficial fairness." In particular, retailers and suppliers place more emphasis on negotiating the wholesale price, while partially overlooking any secondary parameter, such that final wholesale prices end up roughly halfway between the retailer's selling price and the supplier's production cost. We show that this bargaining behavior contributes to higher investment levels observed in the option contract and service-level agreement, along with the inequitable payoffs.

15. Hartley, J., Eboch, K., & Gilberg, J. (2017). **Using a Corporate Partnership to Enhance Learning in a Sourcing Negotiation Role-Play**. Decision Science Journal of Innovative Education, 15 (2), 124-137

Abstract: Although role-plays can be effective teaching tools for buyer-supplier negotiation, learning can be somewhat limited because typically novices are negotiating with each other (Feinstein, Mann, & Corsun, 2002). We describe how we collaborated with a corporate partner, CACI International, to develop and implement a repeatable sourcing and negotiation role-play that helps to address this limitation. The role play, used in a dual listed undergraduate/MBA strategic sourcing course, covers the sourcing process from strategy development, solicitation, bidding, negotiation, and supplier selection for security services. The unique aspect of the role play is that CACI supply managers assume the role of suppliers through-out the activity including during phone negotiations with student teams. Content analysis of student reflections and a student survey show that the highest degree of perceived learning from the role-play was in the negotiation. Ways to modify the role-play approach when you do not have strong corporate partnerships are discussed.

16. K. Ramachandran, N. Tereyagoglu, Y. Xia, 2017. **Multi-Dimensional Decision Making in Operations: An Experimental Investigation of Joint Pricing and Quantity Decisions**. Management Science, Forthcoming.

Abstract: Firms in several industries like medicine, apparel and publishing must jointly determine the price and production quantity of their products well in advance of the selling season. Normative prescriptions to solve this problem have generally ignored behavioral aspects of decision-making, while behavioral research has paid limited attention to interdependent, multi-dimensional decisions. We experimentally examine subjects' performance when they jointly determine price and quantities. We find that subjects systematically deviate from the theoretically optimal price and quantity levels. Contrary to expectation, decomposing the price and quantity decisions does not improve subjects'

decisions. In a series of follow-up experiments, we isolate the effects of (a) interdependence between decisions, and (b) demand uncertainty. We show that decisions improve by making subjects more aware of interdependence and by reducing the uncertainty. However, reducing complexity through partial automation of the interdependent dimensions does not improve the decisions made by subjects. We also find that subjects anchor on cost for price decisions, and on mean demand potential for quantity decisions, thereby explaining the consistent under-pricing and over-ordering behavior across experiments.

17. M. Udenio, E. Vatamidou, J. Fransoo and N. Dellaert, 2017. **Behavioral causes of the bullwhip effect: An analysis using linear control theory**. IISE Transaction, 49 (10).

Abstract: It has long been recognized that the bullwhip effect in real life depends on a behavioral component. However, non-experimental research typically considers only structural causes in its analysis. In this article, we study the impact of behavioral biases on the performance of inventory/production systems modeled through an APVIOBPCS (Automatic Pipeline, Variable Inventory, Order-Based Production Control System) design using linear control theory. To explicitly model managerial behavior, we allow independent adjustments to inventory and pipeline feedback loops. We consider the biases of smoothing/over-reaction to inventory and pipeline mismatches and the under-/over-estimation of the pipeline. To quantify the performance of the system, we first develop a new procedure to determine the exact stability region of the system and we derive an asymptotic stability region that is independent of the lead time. Afterwards, we analyze the effect of different demand signals on order and inventory variations. Our findings suggest that normative policy recommendations must take demand structure explicitly into account. Finally, through extensive numerical experiments, we find that the performance of the system depends on the combination of the behavioral biases and the structure of the demand stream.

18. M. Ibanez, J. Clark, R. Huckman and B. Staats, 2017. **Discretionary task ordering: Queue management in radiological services**. Management Science, forthcoming.

Abstract: Work scheduling research typically prescribes task sequences implemented by managers. Yet employees often have discretion to deviate from their prescribed sequence. Using data from 2.4 million radiological diagnoses, we find that doctors prioritize similar tasks (batching) and those tasks they expect to complete faster (shortest expected processing time). Moreover, they exercise more discretion as they accumulate experience. Exploiting random assignment of tasks to doctors' queues, instrumental variable models reveal that these deviations erode productivity. This productivity decline lessens as doctors learn from experience. Prioritizing the shortest tasks is particularly detrimental to productivity. Actively grouping similar tasks also reduces productivity, in stark contrast to productivity gains from exogenous grouping, indicating deviation costs outweigh benefits from repetition. By analyzing task completion times, our work highlights the tradeoffs between the time required to exercise discretion and the potential gains from doing so, which has implications for how discretion over scheduling should be delegated.

19. A behavioural analysis of the newsvendor game: Anchoring and adjustment with and without demand information, D D'Urso, C Di Mauro, F Chiacchio, L Compagno - Computers & Industrial …, 2017

Abstract: Production systems are the combined result of technologies, organization, and individual behaviour. The impact of the human factor on the efficacy and efficiency of production systems is difficult to predict, since it often escapes the predictions of orthodox models of rationality. Recent behavioural studies in Operations Management highlight that the Human's behaviour deviates from the optimal solution, even in simplified operating conditions such as those represented by the famous Newsvendor problem. Building on the results of controlled human experiments, this study proposes a

decision-making model that accounts for the heuristics of anchoring and adjustment. Two experimental conditions, differing in the provision of demand information to decision makers, are used to generate data. The model estimated shows that anchoring and adjustment behaviour differs in the two conditions.

20. Timm Schorsch, Carl Marcus Wallenburg, Andreas Wieland, (2017) **The human factor in SCM: Introducing a meta-theory of behavioral supply chain management**, International Journal of Physical Distribution & Logistics Management, Vol. 47 Issue: 4, pp.238-262,

The purpose of this paper is to advance supply chain management by describing the current state of behavioral supply chain management (BSCM) research and paving the way for future contributions by developing a meta-theory for this important field.

21. Berry Jaeker, Jillian and Tucker, Anita L., **The Value of Process Friction: An Empirical Investigation of Justification to Reduce Medical Costs** (July 20, 2017).

Abstract: Identifying operational levers that reduce over-provision of services by credence-good workers can reduce costs to customers. We examine one potential lever: "justification"—an otherwise non-value added process step that introduces process friction by forcing workers to explain the rationale for requesting an optional service. We study the provision of medical tests by emergency department (ED) physicians. We exploit the presence—and absence—of a justification step in the ultrasound (US) ordering process at two EDs in the same health system employing the same physicians. We find that patients with abdominal pain are less than half as likely to receive an US when there is a justification step compared to when there is not. The difference is driven by reduced use in USs for patients who have fewer clinical indications for an US. Additionally, we find there is a spillover effect where non-US diagnostic tests—which are unaffected by the US justification step—are also ordered less frequently. These results are explained by two mechanisms: 1.) justification reduces the available time for workers to order any type of service; and 2.) justification forces workers to reflect on the customer's need for the service. Further analyses find no change in clinical quality metrics as a result of the decreased testing. Thus, our results suggest that justification can serve as an effective lever for reducing medical tests without negatively impacting quality.

22. J. Abbey and M. Meloy, 2017. **Attention by design: Using attention checks to detect inattentive respondents and improve data quality**. Journal of Operations Management, forthcoming.

Abstract: This paper examines attention checks and manipulation validations to detect inattentive respondents in primary empirical data collection. These prima facie attention checks range from the simple such as reverse scaling first proposed a century ago to more recent and involved methods such as evaluating response patterns and timed responses via online data capture tools. The attention check validations also range from easily implemented mechanisms such as automatic detection through directed queries to highly intensive investigation of responses by the researcher. The latter has the potential to introduce inadvertent researcher bias as the researcher's judgment may impact the interpretation of the data. The empirical findings of the present work reveal that construct and scale validations show consistently significant improvement in the fit statistics—a finding of great use for researchers working predominantly with scales and constructs for their empirical models. However, based on the rudimentary experimental models employed in the analysis, attention checks generally do not show a consistent, systematic improvement in the significance of test statistics for experimental manipulations. This latter result indicates that, by their very nature, attention checks may trigger an inherent trade-off between loss of sample subjects—lowered power and increased Type II error—and

the potential of capitalizing on chance alone—the possibility that the previously significant results were in fact the result of Type I error. The analysis also shows that the attrition rates due to attention checks—upwards of 70% in some observed samples—are far larger than typically assumed. Such loss rates raise the specter that studies not validating attention may inadvertently increase their Type I error rate. The manuscript provides general guidelines for various attention checks, discusses the psychological nuances of the methods, and highlights the delicate balance among incentive alignment, monetary compensation, and the subsequently triggered mood of respondents.

D. On the Market

1. Percy Mistry, Cognitive-econometric basis for structural modeling of adaptive behavioral responses to policy changes. website: http://sites.uci.edu/percymistry/

2. Karen Eboch, A Longitudinal Study of the Catalysts for Socially Sustainable Athletic Footwear Supply Chains. Contact at eboch@bgsu.edu.

And finally, as a reward for getting this far, a picture Winston.

It was either that or fill up the space with a picture of the chalkboards at MIT. Did you know MIT recently installed chalkboards? Smart people those MIT folks - but the dog is cuter.