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The science in the middle: Middle level theory in international development

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List of abbreviations

CA	Collective Action (group)
CEDIL	Centre of Excellence in Development Impact and Learning
COCOBOD	Ghana Cocoa Marketing Board
CSP	Country Strategy Paper
DFID	Department for International Development
ELA	Empowerment and Livelihood for Adolescents (a BRAC programme)
FCDO	Foreign, Commonwealth and Development Office
MLT	Middle Level Theory
pTOC	Causal-Process-Tracing Theory of Change
TOC	Theory of Change
UFEP	User Fee Exemption Policies
WCA	Women's Collective Action (group)

Abstract

This paper discusses how Middle Level Theory is becoming an important tool in the evaluation of international development programmes by connecting abstract theory to project level theory. The paper discusses three defining features of how mid-level theorising generates transferable knowledge across disciplines and settings; it consolidates empirical regularities in human behaviour, it explains the diversity of outcomes observed across contexts, and it is explicit about causal principles observed in different settings. These attributes are illustrated using examples from interventions in international development that show the potential of the method in improving the design of international development programmes.

1. Introduction

Middle level theory (MLT) has long been used across disciplines as a tool to identify and test the principles that cause action, and the underlying assumptions required for these principles to work as expected. There is still limited work on how MLT can be applied to research in impact evaluations in international development. The Centre of Excellence in Development Impact and Learning (CEDIL) has defined a programme of work in this area to fill the gap, and commissioned research to open innovative thinking on the use, applications, and transdisciplinary synergies that MLT offers (White, 2020a).

This paper makes three contributions to the literature on middle level theory. First, it asks the question of *why* different disciplines have used the MLT approach, focusing on the appeal of the construct to identify regularities in the behaviour of individuals and organisations. Second, it clarifies *where* is the middle by distinguishing theory of change from mid-level theory and suggesting how mid-level theory could be seen as a specific, 'higher' level type of theory of change. Third, it explains *how* MLT connects grand theory to project theory using three interventions drawn from the international development field. These three features define a new analytical framework on how to use middle level theory in evaluation research: identify the *perimeter* of the middle, understand the assumptions required to trigger causality principles, and define the boundaries between abstract and project level theory, to transfer knowledge.

The paper proceeds in four sections. Section one looks at the use of middle level theory across disciplines: sociology, healthcare, development science and economic policy. Section 2 reviews key difference between theory of change and middle theory, emphasising the idea of the middle as a place to test what assumptions will ensure theory is grounded to project level. Section three describes the value added of MLT through the empirical analysis of three interventions. Section four concludes drawing lessons from CEDIL's programme of work in this area.

2. **Why: finding regularities across disciplines through middle level theory**

The idea of theorising at middle level is not new. One of the immediate appeals of the construct is the identification of regularities in findings and behaviour so that new knowledge is accumulated to better calibrate interventions across disciplines. Sociologists have often used the word *theory* to identify a given type of social process as the main aspect of social life, referring to this as broad theory. In his seminal work in this area, Merton (1967) claimed that it is one of these theories, 'the middle level (range) theory, that consolidates empirical regularities'. Merton also suggested that sociology should build 'families' of MLTs that cut across different 'spheres of social behaviour'. While MLT performs a different explanatory task depending on the context in which it applies, all MLTs occupy a semi-independent space in the 'middle ground' where they share the common objective of identifying 'empirical uniformities' (Leeuw and Vaessen, 2010).

One way to see how the middle captures regularities is to separate it from what lies above and below, between grand theory and piecemeal empiricism. Above the middle reside all conceptual systems that are so abstract as to cover all forms of behaviour and are therefore incapable of explaining the observed heterogeneity of any of them. Examples of this could include the frequently observed pattern that price discounts incentivise purchases, or that cash handouts relax budget constraints of poor families. In contrast, below the middle is context-specific evidence: price discounts may cause the intended effect only for those that are economically 'price elastic' (for example, among less wealthy, young people), but not for all. Cash handouts will affect differently individuals escaping from poverty traps depending on their position on the poverty distribution, who receives them in the household, and how they are used. MLT harvests seemingly different forms of social behaviour, abstracting from an event (e.g., a specific project, intervention, policy) to understand the event as an instance, one case of a more general class of happenings (regularities). Realists such as Pawson (2000) have later suggested that Merton completed only half of the job, leaving unspecified the 'missing link' of how MLTs build the steps required to generate explanations that will eventually be absorbed into middle-range theories. Finding regularities is not theorising in the middle according to Realists; this happens when an explanation is provided for why these regularities happen, identifying a set of assumptions on familiar behaviour to make predictions that can then be tested at the project level.

We now review three examples from healthcare, philosophy of science and economic policy to illustrate the transdisciplinary nature of MLT for the identification of regularities and the formulation of hypotheses on the mechanisms of behavioural change. Like Pawson, we argue that all MLTs must have the level of abstraction needed to explain the diversity of outcomes produced by an intervention in different contexts. Healthcare interventions often focus on developing a MLT to explain how material

practices (the things that people do when they implement complex healthcare interventions) become routinely embedded in their social contexts as the result of people working, individually and collectively, to enact them. Robert et al. (2017) discuss user fees in sub-Saharan Africa as one of the major barriers to healthcare access. User fee exemption policies (UFEPs) are considered a rapid solution to improve access, so the authors focus on systematically examining free public healthcare seeking behaviour to develop a MLT for this complex phenomenon. The study identifies two types of behavioural regularities: first, local and individual factors that either constrain or strengthen users' capability to access healthcare spaces, and second how users' choice of free public healthcare is shaped by the trust they hold in providers and their awareness of the risks associated with their medical conditions. Based on these two sets of regularities, the authors develop a MLT where UFEP beneficiaries would choose to seek free public healthcare when they either trust the providers, the health facility, and more broadly the health system (with the causal factor here being *trust*), or they perceive and are aware of the risks associated with their medical condition (with the causal factor here being *risk awareness*); and they perceive the choice to seek free healthcare as acceptable (the causal factor here being *acceptability*). These causal factors are called the 'mechanisms' by which the intervention operates by Realists.

In the area of philosophy of science MLT is used to investigate how scientific and local knowledge can help build better interventions, focus on better policies, and make better predictions about outcomes. In one of her 2018 lectures, Cartwright (2018) says there are good practical reasons why mid-level theorising is widespread in the social, economic and health sciences: MLT helps the evidence-based-policy movement explain 'what works, for whom, where'. This is done by supporting causal predictions, exploring how they work, and understanding some of the problems in their use to enable improvements in knowledge. Cartwright's assertion carries a fundamental message about MLT: context is critical – the *where* part of 'what works, for whom, where' really matters, and the reason is that context differs from place to place. Different contexts with different underlying structures enable different causal factors- or mechanisms in the Realist sense- to be present and to operate, thereby permitting different causal pathways and consequently different causal regularities. Cartwright refers to these underlying structures as 'structural mechanisms'. When the cause is a policy intervention and the effect is its targeted outcome, a long chain of intervening steps lies in the middle. These steps are what we lay out in a theory of change. Which steps are actually possible in a given context -which of the Realist mechanisms can be expected to be there and to operate- depends on the underlying structure in that context. While there is no established methodology for studying these underlying structural mechanisms to determine what causal pathways they systematically generate, middle-level theorising helps to identify easily recognisable signs (which Cartwright refers to as 'markers') to pick out contexts that have the right structure to support causal pathways of interest. In the UFEPs healthcare intervention described above, the choice to seek free public healthcare is found at the intersection where three fairly wide-spread causal factors are all present and triggered: trust, risk awareness, and acceptability. These

three mechanisms have sufficient explanatory power to deepen the understanding of free healthcare seeking in various contexts because they have been empirically observed and sufficiently tested to be theorised in the middle. Any theory that can help identify those contexts which make it likely they will all three appear and operate together is then a great boon.

One last illustration of MLT's power to find empirical regularities comes from social science. White (2018) refers to mid-level theory as an approach to generalize and transfer evidence by testing mechanisms in the Realist sense. He exemplifies the use of MLT to understand change in the behavioural component observed in several development interventions. One of these is the general theory of the transtheoretical model of behaviour change applied to the introduction of a hand washing intervention in a low- and middle-income country context. Acquiring hand washing is a new habit that results from six interconnected steps that can all feature in mid-level theorising:

- Exposure to information on benefits of handwashing with soap will lead people to consider changing behaviour. Similarly, community engagement to identify sanitation-related problems and solutions can change social norms regarding handwashing (both these steps fall into the pre-contemplation phase).
- Providing information on when and how to carry out handwashing with soap will improve knowledge on to wash hands correctly: using soap, washing frequently and duration (contemplation and knowledge acquisition phases)
- Financial and non-financial incentives will support adoption of proper handwashing practice (action phase)
- Following correct handwashing practice for sufficient duration will eventually turn the practice into a habit (maintenance phase)

Interestingly, a recent post from the Covid-19 Hygiene Hub (White, 2021) argues that changing handwashing behaviour during the health pandemic will require context-specific determinants to be triggered, though some key points will be relevant to all settings (e.g., changing the environment, information campaigns). Although the piece does not refer explicitly to MLT thinking, the association is clear and would benefit from an explicit framing of the ideas. The logic underlying the use of MLT described above is the same: understanding the processes by which practices become routinely embedded in everyday life, and recognising what contexts make those processes probable.

Theorising in the middle enables us to understand and evaluate practices across settings and subsequently test and refine the knowledge accumulated for designing better interventions elsewhere through project level theories of change. Theories of change will then make explicit assumptions on what influences choices. What is then the distinctive role of middle level theory relative to a well-developed theory of change?

3. *Where is the middle? From high level theory to project level theory*

A theory of change (ToC) is a tool to design programmes that can also carry cumulative learning from similar programmes. A theory of change usually features a diagrammatic representation of how an initiative works through the logical flow between activities implemented during the intervention and the overall goals of project implementers. A good ToC should act as a compass to guide programme developers how to navigate the day-to-day realities of programming while offering evaluators with a plausible model of how the intervention works to inform a theory-based evaluation.

Much of the discussion around ToC revolves around the issues of how best these are constructed, and Davies (2018) offers an insightful discussion on how a good ToC should balance simplicity with enough detail to make it is relatable to the complexity of the real world.

One of the features of good ToCs is their being populated with assumptions that make explicit beliefs about what triggers (Cartwright 2018) influence behavioural choices of individuals and organisations. However, Brown (2020) rightly argues that assumptions do not influence choices, and simply assuming an activity will cause a result is incorrect at best when not void of any predictive power.

This void has been identified earlier in economic policy work by Booth and White (1999) who talked about the 'missing middle'. Scrutinising a set of FCDO's (Foreign, Commonwealth & Development Office, formerly DFID) country strategy papers (CSPs), the authors argued that these documents - which all featured poverty reduction objectives and a clearly planned spending schedule on how to reach the goal over a five-year period - were all characterised as having a 'missing middle' by not being explicit about the causes of poverty and how the proposed policy was to remove or ameliorate these. The absence of an explanation of how the proposed programmes would achieve the intended poverty reduction outcomes was considered a serious shortcoming. Although there was no reference to middle level theory, the missing-middle strategy referred to by the authors echoed the issue about the missing middle in theories of change: what are the causal principles underlying any specific stage (e.g., output to outcome) in the ToCs? Diagrammatic representations of ToCs are typically made up of boxes with text descriptions of events and arrows connecting them. The connection is that a cause, or Realist mechanism, like trust, is matched by a principle

like 'people tend to follow advice of people/institutions they trust' and calling the factor 'trust' is meant to signal that it is that principle that is expected to hold.

Figure 1. from identifying the issues to actions in programme design: missing middle

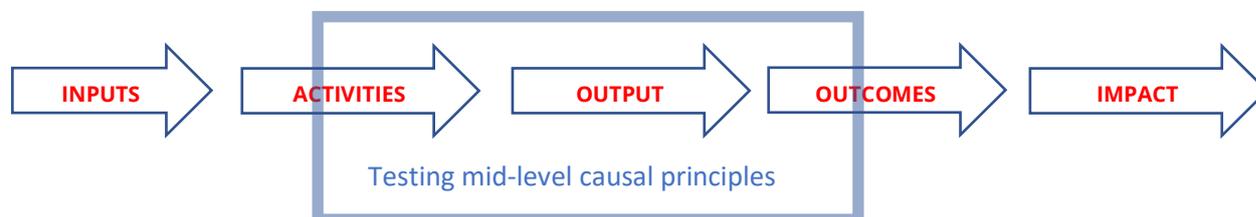


Figure 1 is a stylised representation of a ToC and illustrates a typical process from inputs to impact through, activities, outputs and outcomes as intended as seen in ToC. Assumptions about the predictive power of theory will not automatically cause the progressive flow depicted above. MLTs help explore the more hidden aspects of the life of theories of change. An MLT can be thought of as the process of extrapolating from a ToC the missing information between different stages to identify and test the assumptions (or causal principles) and the conditions under which they hold. The blue box illustrates one possible junction in a ToC where MLT operates.

How does one move from the causal connections (the arrows of a ToC) to an MLT? The question is not trivial because it affects the plausibility and testability of theories of change (Davies, 2018). Cartwright et al. (2020a) offer a specific type of MLT, a 'causal-process-tracing theory of change' (pToC), that they recommend for programme prediction, planning and evaluation. A pToC describes in ten steps the information required for a programme to arrive at the intended outcomes by unpacking the causal principles/Realist mechanisms meant to be at work at each step. Cartwright and co-authors use the term thickening to describe how a good MLT that is designed to hold more widely gets fitted to local circumstances by using local knowledge to make it operationally relevant through the operation of context specific enablers and derailers.

In a recent workshop on the use of MLTs in international development interventions, Vogel (2020) raised important concerns around the practicalities of how commissioners and funders of evaluation research can be made aware of the value added of investing in MLT, which we summarise below.

Useful MLTs in disguise: MLTs and/or causal principles are not always well-articulated or in 'usable' framings both in academic literature and evaluation studies. One must do detective work to discover or uncover casual principles (even in evaluation work not all documentation suggests a deep search to uncover the causal principles at play). It is

possible to be explicit about causal principles if enough research is done to thicken up the middle level theory with context specific details. The ten steps process of a pToC is one tool for theorising in the middle to link theoretical assumptions with local knowledge.

MLT applications across CEDIL studies focus on building or using an MLT within their own fields. Sometimes there is value in looking to other fields or disciplines that may use analogous interventions to discover other 'causal principles' that might be relevant or offer explanations. Other CEDIL work (Vigneri et al. 2018) for example suggests that although different disciplines use theory for different purpose, looking at how theories in different disciplines explain the causal mechanisms observed can help with better predictions on behavioural change and therefore better evaluation design. MLT carries great multidisciplinary potential.

Portable MLTs: mid-level theorising intends to generate transferable knowledge across disciplines and settings, but this knowledge is often hard to find. There are general causal principles in a range of fields, e.g., behavioural theory, adult education, diffusion of innovations theory, organisational theory etc. that recurrently come up in development interventions. An MLT framework that gathers empirical regularities across disciplines should aim to be explicit about how the same causal principles may apply.

The key implication from the three MLT attributes -finding empirical regularities in human behaviour, explaining the diversity of outcomes observed across contexts, and being explicit about causal principles observed in different settings- is perhaps the need to focus on how to connect these middling ingredients, and the potential of being able to move back and forth between high-level policy ambitions and project theories to ensure more interaction between of program architects, program practitioners and program participants through this powerful framework.

4. How MLT connects grand theory to project theory: three applications

We now discuss three interventions in international development to show how MLTs achieves three objectives discussed above: identifying regularities, improving programme design, and accumulating and transferring knowledge on causal principles across settings. The discussion below largely draws from research by Cartwright et al. (2020) and White (2020b) which features in the programme of work of CEDIL. The discussion below spells out the defining features of a MLT that are likely to be useful to distinguish grand theory, middle level theory and project theory and the value of being explicit about the 'middle'. The approach begins with Cartwright's et al. (2020a) six testable assumptions, and then adapts White's (2020b) visual representation of how MLT sits between high-level theory and project-level theory. This representation usefully emphasises the middle as the place where information flows iteratively from a project finding to a general principle, or from a mid-level principle to a project level feature, generating at each iteration an enriching of theory with context-specific information. The practice of developing this theory iteratively - and in consultation with project-level stakeholders - is what helps building evidence on the causal mechanisms of specific interventions and assess their transferability across interventions that feature the same principles. We begin with a brief description of each intervention.

Ghana: Government programmes subsidising fertilisers to cocoa farmers.

The Ghana cocoa marketing board (COCOBOD) has rolled out over time several public initiatives to distribute fertilisers at a discount price to increase adoption rates and boost yields. One of this was the Hi-tech programme rolled out in 2002/2003. To finance this and other industry costs, COCOBOD retains producers' revenues by retaining a higher share of export revenues that would otherwise be used to pay higher prices to growers. In 2009/10, only 40% of the area under cocoa cultivation was treated with fertiliser, therefore the fertiliser subsidy offered to all farmers has de facto operated as a tax for the many who do not use any fertiliser. Programme evaluation findings suggest that eliminating the fertiliser subsidies would raise the income of non-users by 8%. While the Hi-tech programme has served the purpose of encouraging fertilizer use even among the most credit constrained growers, it has not been cost-effective. The subsidy operated as a free supply programme with many inefficiencies (timing and logistics of deliveries to name a few) and discouraged the development of private supplies that would have best fit the land productivity needs of those willing to buy at a shared cost (for more details see Kolavalli and Vigneri, 2017).

Mali: women's collective action programmes to economically empower women in the shea sector.

The Researching Women's Collective Action (WCA) project was launched in 2009 by Oxfam GB. The research aimed at gathering evidence on how collective action can improve women smallholders' incomes, strengthen their assets, and increase their empowerment. An impact evaluation was conducted in one sub-sector per country: honey in Ethiopia, vegetables in Tanzania and shea butter in Mali (see Baden, 2011 for more details on the projects). In all three sectors the project was found to be successful in aggregating products for greater market reach, to improve women's negotiation skills and favour economies of scale, for example in transport. A key element of success in the Mali project were pre-existing forms of women's community involvement (i.e., self-help groups), taking advantage of a female dominated sector (shea), and identifying higher market opportunities within the sector. Moreover, the sustained engagement with men in the community was essential to overcome their resistance to their wives' engagement in groups. WCA members gained greater autonomy over the use of agricultural incomes and were consulted more in the community. On the other hand, restrictions on time, finances, and access to land and credit prevented the poorest, marginalised women from participating successfully in CA groups (for more details see Baden, 2013).

Sierra Leone: social signalling for child immunisation

Childhood immunisation is one of the most cost-effective ways of reducing child mortality. A child under the age of one needs to receive five routine vaccinations. Complete and timely vaccination protects infants from potentially life-threatening diseases and ensures social benefits by increasing overall immunisation rates to herd immunity levels. In 2018, only 58 percent of children in Sierra Leone completed the first-year series of vaccinations, a pattern that is common across many low-income countries. The Ministry of Health and Sanitation together with researchers from Innovation for Policy Action introduced a social signal in the form of highly visible bracelets differently coloured which children would receive at each vaccination appointment. This system would help parents show they had taken their children to clinics for immunisation and if and when the immunisation cycle was completed. An evaluation study conducted on the experiment featured three important findings. First, that parents used the colour coded bracelets to learn about others' actions. Second, the impact of bracelets varied significantly with the social desirability of the action; wearing bracelets had a weaker effect when linked to a vaccine with low perceived benefits and a large positive effect when linked to a vaccine with high perceived benefits. Third, completing the vaccination course increased substantially in the population exposed to the experiment at a very low cost (just under \$1 per child) proving to be very cost effective (for more details see Karing, 2018).

Table 1 below illustrates how MLTs promote making reliable predictions in a new setting by building a thick local causal model in each context. The first assumption captures the

empirical regularities derived from overall theory: individuals respond to price discounts by increasing the demand for the subsidised good, organising women in some form of collective group enhances empowerment and gender justice, and visible social signals help reinforce how individuals' behaviour is perceived.

Assumptions 3, 4, and 5 are what Cartwright refers to as 'tendency' principles: common behavioural principles describing what the causal factor tends to and not necessarily what will happen following an action. For instance, although fertiliser subsidies tend to increase applications and therefore raise land productivity, unless complementary actions are practiced (e.g., weeding) the intended impact on yields might be reduced. Similarly, women's marketing groups are more effective in achieving higher returns from sales in groups where members have already consolidated strong social networks and trust. This, however, might be to the exclusion of 'new' members who might have been marginalised from those social networks (younger, inexperienced in the sector). In the social signalling example, unless the social desirability of all vaccines required to complete children's immunization is adequately reinforced, the social signal will become weaker and ineffective for vaccinations which are considered less important. To note that in each example, it is the interaction of enablers (E) and derailers (D) that determine what action is realised in the face of what the intended causal mechanism tends to. The framework also allows for safeguards as means to mitigate what can go wrong and derail the intended causal process. For instance, in the Sierra Leone study, social signals need to be informative but also linked to actions that are sufficiently valued by communities (completion of all vaccinations) to guarantee their intended impact.

Table 1. Examples of how MLTs could be developed.

Assumptions	<i>Fertiliser subsidies cocoa - Ghana</i>	<i>Women collective action (WCA) shea butter- Mali</i>	<i>Social signalling immunisation - Sierra Leone</i>
1. Overall theory	Discounting cost of inputs increase likelihood of higher demand and use.	Supporting women participation in CA groups increases gender justice.	Social influence changes behaviour among individuals who care about others' perceptions of them.
2. Middle level theory	Subsidising the cost of fertiliser increases its use and land productivity	Agricultural WCAs increase women processing and sales skills & economic empowerment	Social signalling (SS) encourages adoption of beneficial health choices
3. Enabler (things which need to be in place) Derailers (things which may undermine the causal chain)	<p>E1 Giving farmers fertilisers at a subsidized price, incentivises use of the chemical and this will increase land productivity (yields). D1 Applying fertilizer alone may be insufficient where land is very depleted.</p> <p>E2 Providing supplies and subsidies for fertilizer in all cocoa growing areas ensures coverage and timely applications. D2 Several inefficiencies may occur if the service is provided by the state (e.g., timing of supplies and corruption in selling practices).</p> <p>E3 Subsidy programme has important demonstration effects especially among low users that are credit constrained.</p>	<p>E1 Establishing marketing groups in a women-specific sector enables women to become visible economic actors. D1 As WCA access higher value chains men might crowd in to compete for resources & markets.</p> <p>E2 Women's increased contribution to household incomes through WCAs can convince men of value of collective activities. D2 Misconceptions in families & communities about women economic role may prevent women access to marketing groups.</p> <p>E3 Marketing groups are more successful when they build on existing social networks within communities.</p>	<p>E1 Motivating families to go to clinics, SS allows health care workers to stay at central clinics and see more patients. D1 Physical distance to clinics may hinder travelling for immunization.</p> <p>E2 Information on meaning of coloured bracelets is clearly conveyed and valued widely in community. D2 Parents of new-borns vaccinate children but do not complete immunizations because they value differently some vaccination.</p> <p>E3 Increase the social desirability of the action for higher impact of the signal. D3 A vaccine with low perceived benefits weakens the signal.</p>

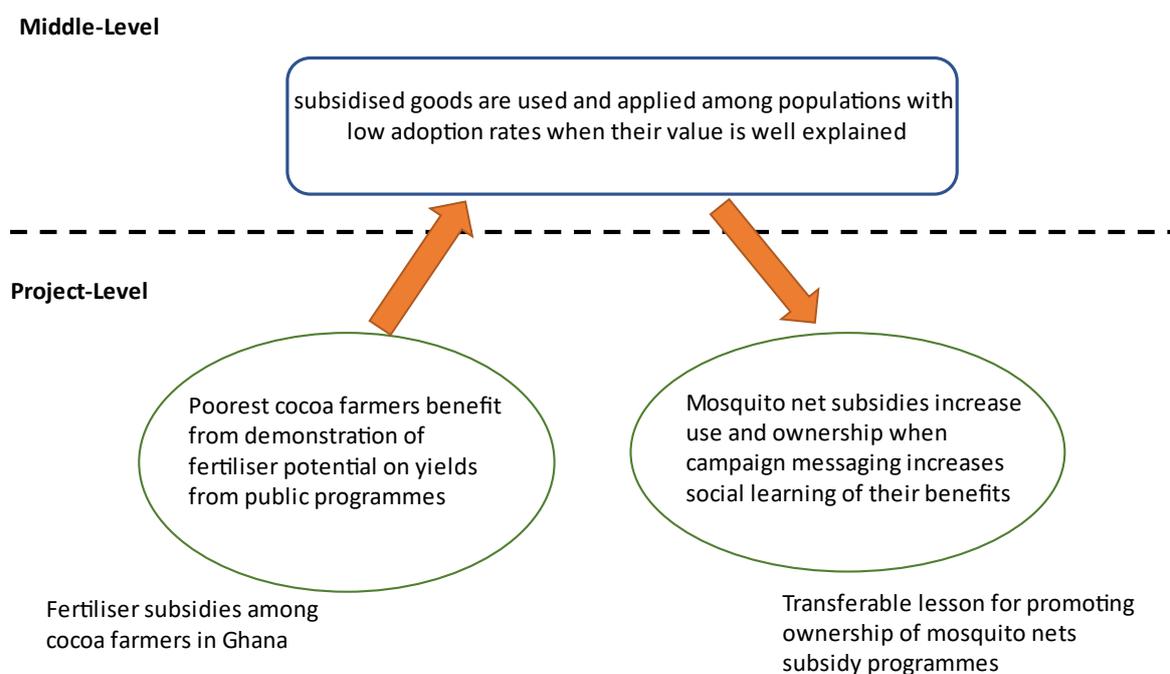
<p>D3 Farmers not using fertiliser may be indirectly paying for the service by receiving lower producer prices.</p>	<p>D3 Specific membership conditions can prevent young, poor, time constrained women from joining groups.</p>	
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Table 1 continued

Assumptions	<i>Fertiliser subsidies cocoa - Ghana</i>	<i>Women collective action (WCA) shea butter- Mali</i>	<i>Social signalling immunisation - Sierra Leone</i>
4. Safeguards (actions to reinforce enablers and mitigate derailers)	<p>SG1 Ensure farmers receiving subsidies have access to other complementary inputs.</p> <p>SG2 Delegate to private sector distribution channel of fertiliser.</p> <p>SG3 reduce size of state involvement in subsidies so that non-users do not pay the facto for state subsidies by receiving lower prices.</p>	<p>SG1 Exploit international demand for higher quality products to support WCA development.</p> <p>SG2 Engage with men and community leaders to consolidate WCA support.</p> <p>SG3 Develop strong group leadership to minimise risk of benefits being appropriated by marginalised group members.</p>	<p>SG1 Ensure clinic days are synchronised with other important events for dwellers (e.g., market days).</p> <p>SG2 Ensure appropriate communication on meaning of different colours is given to caregivers.</p> <p>SG3 Signal needs to be informative about others' actions and linked to actions that are sufficiently valued by communities.</p>
5. Range of application (which settings does the theory apply to)	<p>Settings in which low fertiliser use calls for demonstration of benefits, land is not depleted beyond point where fertiliser alone cannot increase yields and public-private partnership is possible to reduce industry costs and private sector can meet input needs effectively.</p>	<p>Settings with high-value products and women-friendly sub-sectors and technologies; where it is possible to safeguard women's continued engagement in the sector and where it is possible to ensure buy-in from men.</p>	<p>Settings where individuals have strong shared values for specific health outcomes, health practices are low or imperfect, social influence among peers is strong and accessibility of central clinics can be facilitated.</p>

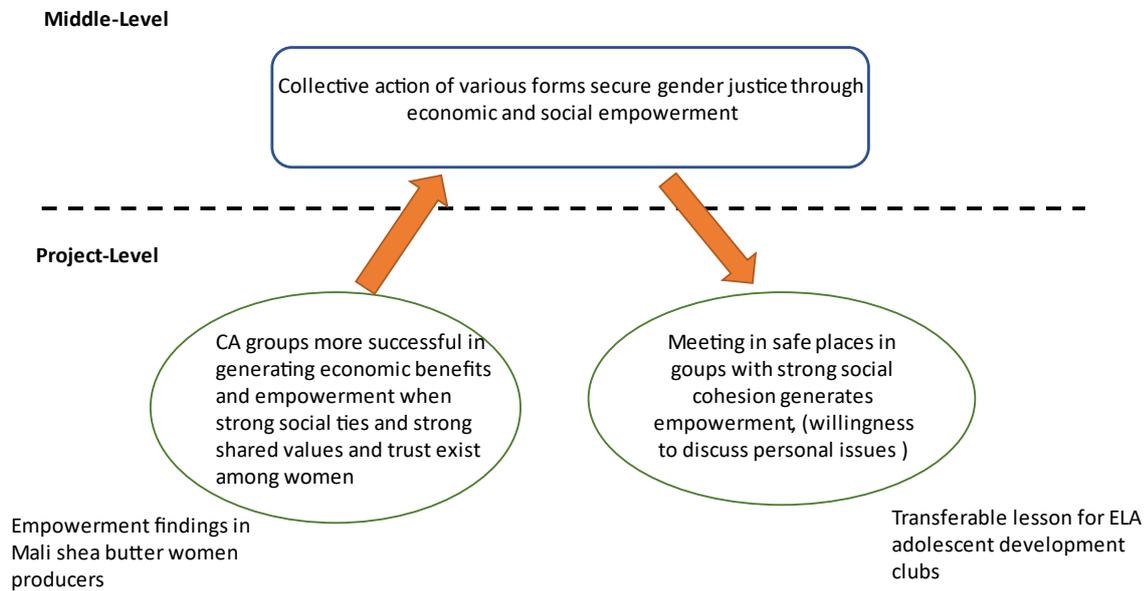
Assumptions 6 show how knowledge of causal principles acquired in one setting can be transferred elsewhere. The transportability of causal mechanisms is illustrated in figures 2 to 4 which describe for each case what actions triggered a tendency principle in one setting, which are then elaborated in the middle to refine the understanding of familiar regularities and transferred forward into new settings to improve programme design. In the Ghana cocoa fertiliser subsidy case, it is the demonstration effect of the Hi-Tech subsidy programme for example, that triggers the use of fertilisers even among cash-constrained smallholders. Any activity (media campaigns, demonstration agronomic practices) that triggers an understanding of the benefits of adopting a good is more likely to trigger the desired change in behaviour. This would apply, for example, in the case of acquisition of subsidised bed nets in malaria affected areas.

Figure 2. Transferability of causal principles in price subsidies



In Mali's WCA shea sector, there is evidence that social cohesion, shared values and trust within group members are pre-conditions for collective actions to be impactful. This is a transferable tendency principle which is transferable to other typologies of collectives, for example 'adolescent development clubs' established under the ELA project to create a gender-sensitive safe place for the acquisition of life changing assets (life skills training, and vocational skills training).

Figure 3. Transferability of causal principles in CA for women's empowerment



The social signalling intervention was quoted in a recent report of the French *Le Monde* (Romaniuc and Stuan, 2020) as an effective behavioural strategy for those who wish to visibly signal their adherence to the best scientific advice on vaccination against the pandemic for a common good (population immunisation). The adaptation of the coloured bracelets signal from Sierra Leone is proposed as a testable tendency principle to exert peer pressure on the French sceptical of the C-19 vaccination.

Figure 4. Transferability of causal principles in social signalling

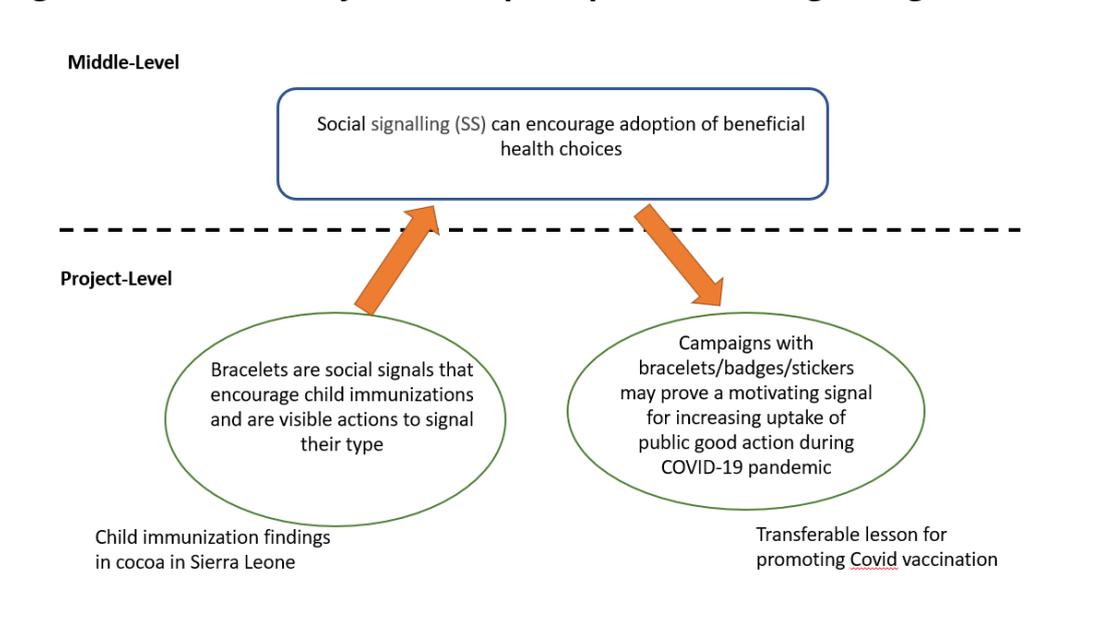
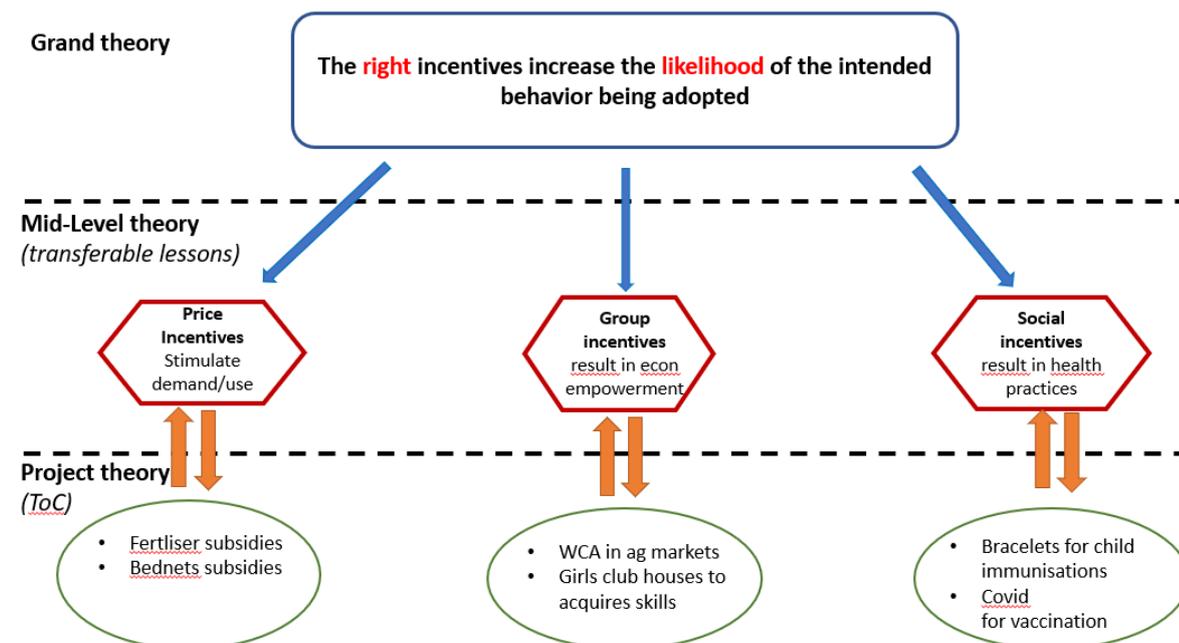


Figure 5 summarises the essence of MLTs with reference to all three studies discussed in the paper. Starting from the abstract theory of a familiar tendency principle (individuals are *likely* to change behaviour if given the *right* incentives) the middle level is the place where the empirical regularities are categorised in three types of incentives (price reductions, collective actions, and social signals). From the middle subsequently starts the iteration process described in table 1 where the causal processes observed in one setting are used to thicken the theory of change of a different setting.

Figure 5. From grand theory to project theory: thickening with MLTs



The MLT becomes pivotal to connect and update both the understanding of empirical regularities (the abstract theories) and to transfer knowledge of causal mechanisms into better designs of theories of change for similar projects. A word of caution on the description above is warranted: the ‘transferability’ of explanations around ‘what works and where’ requires that each time MLT should use existing evidence to inform the design of a new programme by investigating the causal contingencies in place in the new context. As White (2020a) explains, the application of MLT from one intervention to another requires practical information to support and sustain the process of behavioural change at every step of the way. In the social signalling example illustrated above, the middle level principle of social incentives embedded in the community is transferable to an intervention to promote vaccination against Covid. However, the MLT should also identify the local barriers to a successful vaccination campaign that will ensure positive incentives and reliable information are given for people to act.

Programme designers might consider the value of an MLT *manager* role to facilitate the difficult conversation across different research and technical expertise required in each evaluation team for defining the ‘correct’ middle level theory. Resources and time on the ground are rarely available to articulate and document the long sequences of intermediate cause–effect relationships to achieve the targeted goal of the programme. The discussion above suggests that mapping out all mid-level causal principles to support each cause–effect pair is increasingly important for interventions in complex development settings to have an impact while providing a learning blueprint.

5. Discussion: MLT approaches in CEDIL work

Are middle level theorists a *colourless, centrist party* (Vaessen and Leeuw, 2010)? There is no exact formula of middle level theory, no *how-to* guide to build mid-level theories and this is what makes the approach sound and versatile to different users. In CEDIL's agenda-setting paper, Masset and White (2019) lay out three questions that CEDIL's approach to MLT intends to address; 1) what is the fundamental problem of generalising and transferring evidence from evaluations; 2) What are mid-level theories? 3) How can mid-level theories inform impact evaluations? MLT offers an additional method to complement existing ones (meta-regression analyses and systematic reviews) through theorising and conceptualising how projects work.

There are many methods by which MLT may be produced: high level theorising, theorising from practice, induction, or from a combination of these strategies. In its agenda setting process, CEDIL identified gaps in methods to use findings from evaluations to inform policy decisions. MLT was identified as one approach to develop theories describing how the causal principles governing specific interventions could be transported from one place to another and developed frameworks (White and Cartwright) to improve programme design. CEDIL has commissioned research under this programme of work that shows the many approaches of building a MLT (White, 2020a) which confirm the Swiss-knife versatility of the approach. This paper focused on three features of the science of the middle: 1. finding regularities to build new, grand theories, 2. improving theories of change for better programme design, and 3. transferring knowledge across settings. Some interesting reflections on the use and value of MLT emerged from a multidisciplinary workshop organised by CEDIL and can be summarised as follows.

The importance of understanding the flexibility of MLT: there is no hierarchy, good or wrong MLT, just different applications for different needs. MLT can be thought of as a theory which holds across multiple environments and is applied within a particular programme environment.

The importance of creating a shared language. As one of the goals of MLT is to connect intervention developers/evaluators and theorists (both within organizations and in the broader field), more attention is needed on the precision of language choices. For example, what White (2009) calls *inter alia* assumptions are referred to as tendency principles by Cartwright and as mechanisms by Realists and by Elster (2007). Similarly, the term MLT is sometimes used to mean the pToC (the long causal process from inputs to impact), and other times, the causal theories that are developed *within* the pToC (the six assumptions of a pToC). Discussion about 'process' – using the phrase process-theory-of-change (pToC) may be problematic, because many people just build theories of change as a set of activities (representation of a process). These ambiguities cause a lack of conceptual precision which is to be avoided when developing MLT as a stand-alone concept. Is there scope for a 'mid-level prog manager' in evaluation research that can act as mid-level information broker between theorists, programme developers, and field level implementers.

Start by defining communities of practice. Finally, MLT does not exist in a social vacuum; it is the shared understanding that holds communities of practice together. Good evaluation identifies the community of practice it is speaking to quickly and sharpens the aspects of its shared theory that is contestable ('tension points' or 'hot spots') but also empirically testable. MLT is the legacy of useful ideas we share and pass on within a community of practice. Good evaluation can then be viewed as an accepted process of deliberation over core generalizations within that community.

In conclusion, the paper discusses three defining attributes of middle level theory that researchers should validate to benefit from the full potential of this framework in evaluation research. First, understanding the evidence from prior research of what has worked elsewhere. Second, identifying the conditions sufficient for observing the evidence to recur, to ensure they will hold in new contexts. This second attribute may be referred to as the 'perimeter' of MLTs. Thirdly, theorising in the middle needs to account for all incentives (enablers and barriers) relevant for the activation of causal principles at the project level that will ensure successful implementation and sustainable outcomes. At every iteration, MLTs should test the applicability of those causal principles to the new study's unique conditions to provide evidence of their generalisability across the conditions that differ from the original study. The paper also uses three examples of international development interventions to illustrate how the MLT approach work in practice linking across programs in Ghana, Mali, and Sierra Leone.

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